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XARIFIIDAE (COPEPODA) PARASITIC IN INDO-PACIFIC SCLERACTINIAN CORALS

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ABSTRACT

Based upon material collected in Madagascar, Enewetak Atoll, New Caledonia, and the Moluccas, seventeen new species of *Xarifia* and one new species of a new xarifiid genus (*Lipochrus*) are described from various species of *Acropora, Montipora, Alveopora, Cyphastrea,* and *Echinopora.* Several previously known species of *Xarifia* are redescribed in part and new hosts and geographical records are listed. A key to the three genera of the Xarifiidae is provided, as well as tabular differentiation of the 39 species of *Xarifia.* The external morphology of *Xarifia* is discussed.

INTRODUCTION

Xarifiid copepods were first described as inhabitants of polyps of hard corals in the Maldive Islands and the Red Sea, when Humes (1960) published the descriptions of two species of the new genus *Xarifia.* Since then eighteen species of *Xarifia* Humes, 1960, and two species of *Orstomella* Humes and Ho, 1968, have been described, mostly from Madagascar (Humes, 1962; Humes and Ho, 1967, 1968). Two species of *Xarifia* have recently been described from Japan (Misaki, 1978). Two additional species of *Xarifia* from India were briefly mentioned by Sebastian (1972) in an unpublished thesis.

Among the twenty-two described species of *Xarifia* several are known from corals in the family Acroporidae, six from various species of *Acropora* and one from a species of *Montipora.* Both of Sebastian's unpublished species of *Xarifia* came from *Montipora.* Thus far *Xarifia* has not been reported from *Alveopora, Cyphastrea,* or *Echinopora.* A detailed list of copepods and their hosts may be found at the conclusion of this work.

Based upon additional material primarily from the western Pacific, we now describe seventeen new species of *Xarifia* and one new species of a new xarifiid genus, from *Acropora, Montipora, Alveopora, Cyphastrea,* and *Echinopora.* In this work the following xarifiid copepods are treated:

MATERIALS AND METHODS

In order to recover xarifiids from fragments or whole colonies of Scleractinia the corals were treated in the following manner. Immediately upon collection in the field each colony was isolated in a plastic bag. Later in the laboratory the coral and sea water were placed in a pail to which sufficient 95% ethyl alcohol was added to make approximately a 5% solution. The coral remained in this solution at ambient temperature for several hours or overnight. Then the coral was thoroughly rinsed by shaking well, and the wash water was poured through a fine net (120 holes per 2.5 cm, each hole approximately 100 μm square). The copepods were then picked from the sediment retained in the net. The dilute alcohol together with the accumulated products of decomposition apparently stimulates the copepods to leave the polyps, at which time they fall to the bottom of the container, since they are unable to swim. Rapid washing of freshly collected corals usually yielded very few xarifiids.

In the laboratory the xarifiids were studied in lactic acid using the wooden slide technique described by Humes and Gooding (1964). All figures were drawn with the aid of a camera lucida. The letter after the explanation of each figure refers to the scale at which it was drawn. All specimens were measured in lactic acid.

ACKNOWLEDGEMENTS

The xarifiids were collected at various times and with differing support over a fifteen-year period. The opportunities making it possible for the first author to collect in the Indo-Pacific, and for which grateful acknowledgement is here made, were:

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(1967) — in Madagascar, supported by a grant (GB-5838) from the National Science Foundation;
(1969) — at Enewetak Atoll, supported by the Enewetak Marine Biological Laboratory;
(1971) — in New Caledonia, supported by a grant (GB-8381X) from the National Science Foundation;
(1975) — in the Moluccas, during the *Alpha Helix* East Asian Bioluminescence Expedition, which was supported by the National Science Foundation under grants OFS 74 01830 and OFS 74 02888 to the Scripps Institution of Oceanography and grant MBS 74 23242 to the University of California, Santa Barbara.

We also thank Mrs. Katharine Twombly who inked the pencil drawings.

SYSTEMATIC DESCRIPTIONS

Xarifia echinoporae n. sp.

Figs. 1a-g, 2a-i, 3a-e

Type material. — 8 ♀♀, 5 ♂♂, and 1 copepodid from *Echinopora horrida* Dana, in 1 m, east of Isle To N'du, near Noumea, New Caledonia, 22°13′15″S, 166°24′26″E, 12 July 1971. Holotype ♀, allotype, and 6 paratypes (4 ♀♀, 2 ♂♂) deposited in the National Museum of Natural

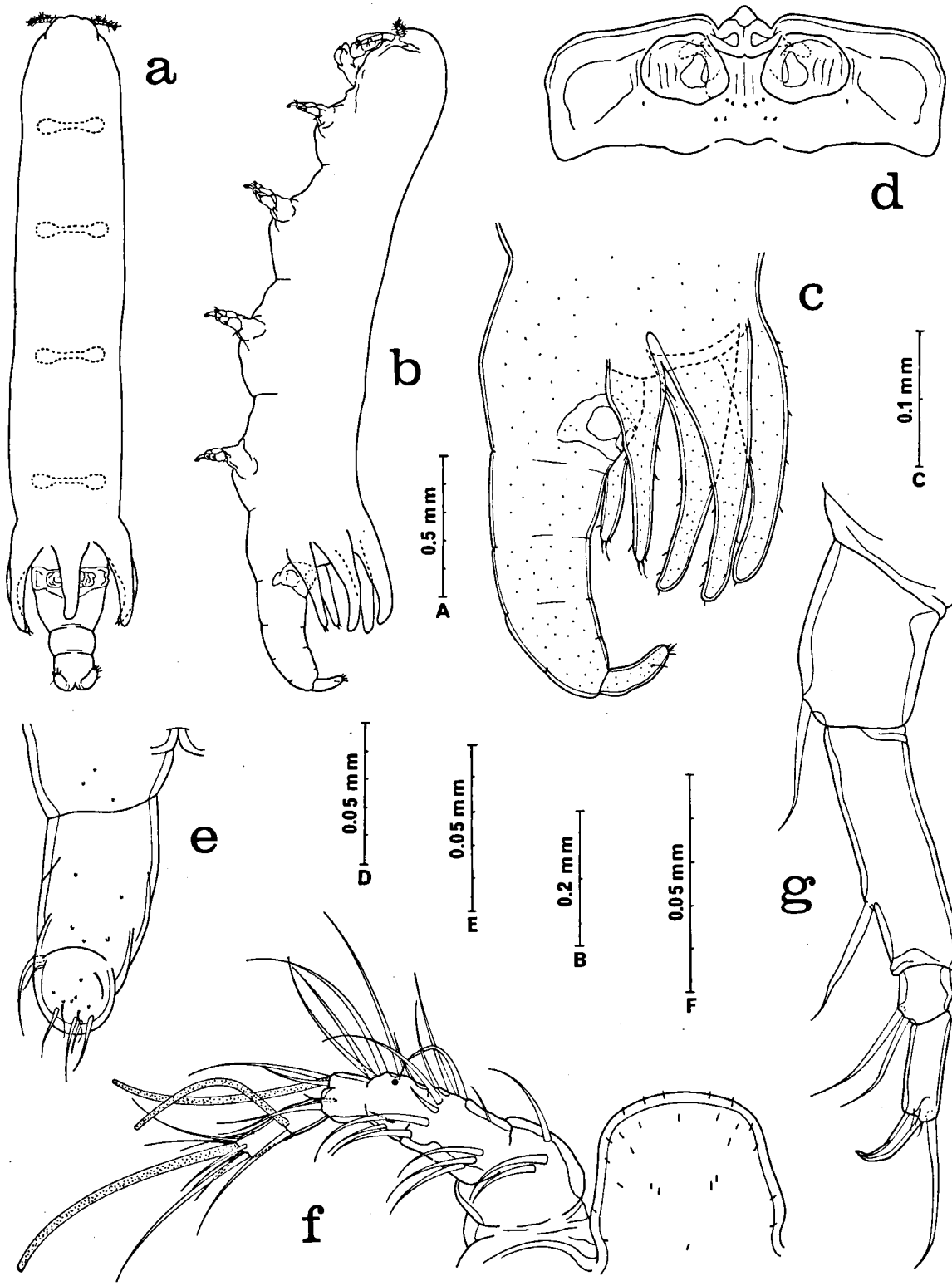

Fig. 1. *Xarifia echinoporae* n. sp., female. a, dorsal (scale A); b, lateral (A); c, urosome, lateral (B); d, genital area, dorsal (C); e, caudal ramus, dorsal (D); f, rostrum and first antenna, with dot indicating position of aesthete added in male, anterodorsal (E); g, second antenna, dorsal (F).

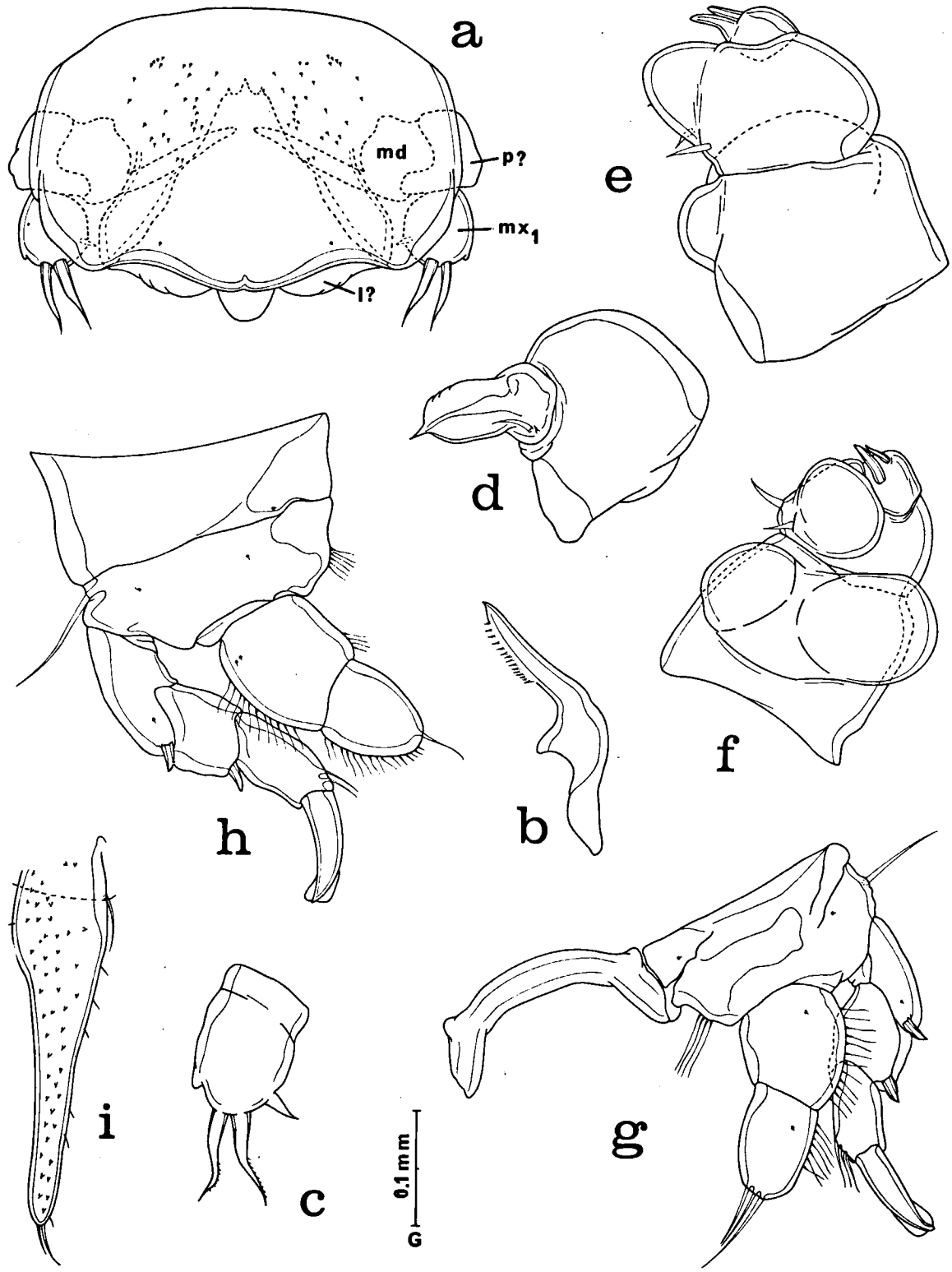

Fig. 2. *Xarifia echinoporae* n. sp., female. a, labrum, labium (l ?), mandible (md), paragnath (p ?), and first maxilla (mx_1), anteroventral (scale E); b, mandible, ventral (F); c, first maxilla, anteroventral (F); d, second maxilla, antero-inner (F); e, maxilliped, postero-outer (E); f, maxilliped, inner (E); g, leg 1 and intercoxal plate, anterior (D); h, leg 3, anterior (D); i, leg 5, lateral (G).

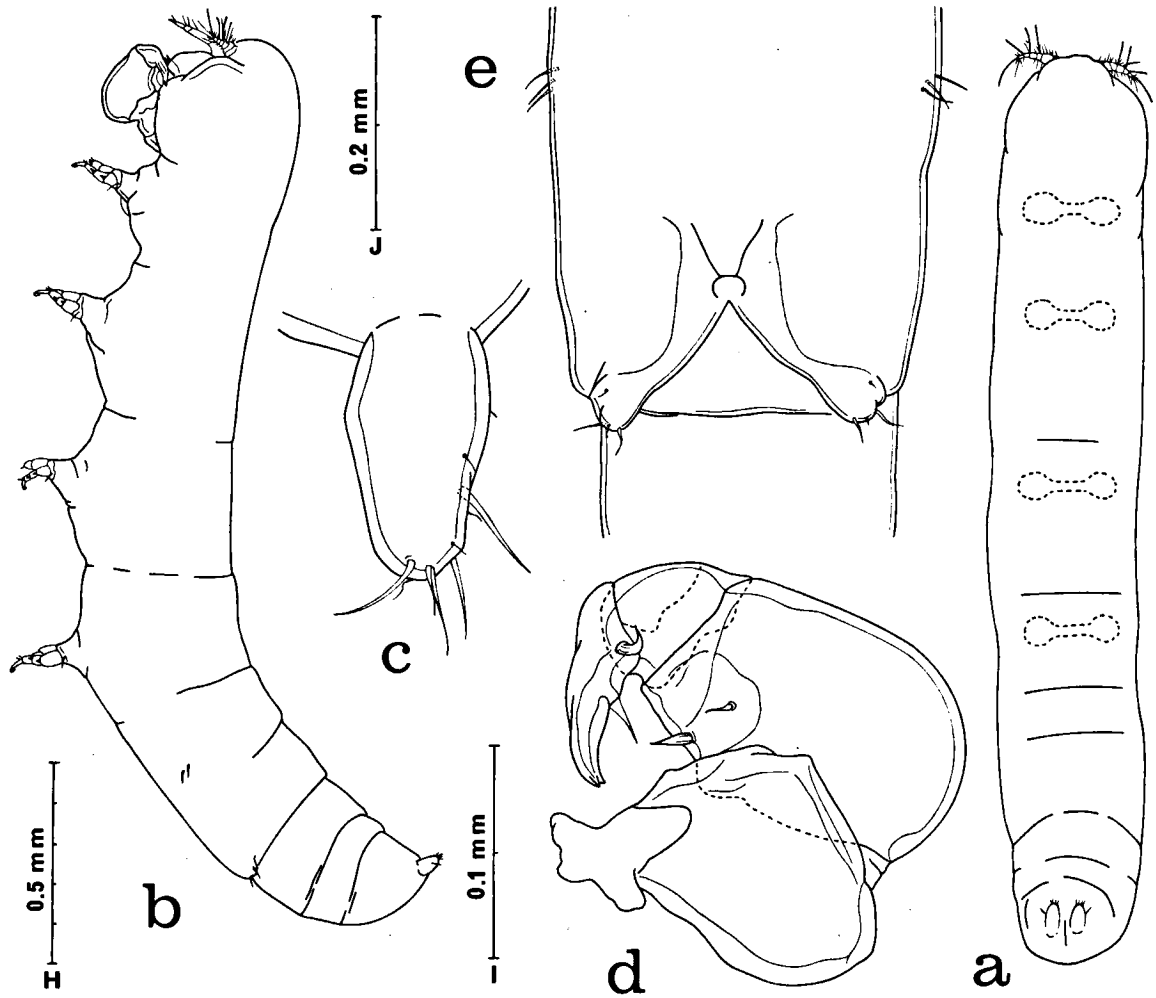

Fig. 3. *Xarifia echinoporae* n. sp., male. a, dorsal (scale H); b, lateral (H); c, caudal ramus, ventral (E); d, maxilliped, inner (I); e, leg 5 and leg 6, ventral and slightly lateral (J).

History, Smithsonian Institution, Washington, D.C.; the remaining paratypes (dissected) in the collection of the first author.

Other specimens. — 1 ♂ and 4 copepodids from *Echinopora lamellosa* (Esper), in 2 m, Karang Mie, eastern central Halmahera, Moluccas, 00°20'07", 128°25'00"E, 19 May 1975.

Female. — Body (Fig. 1a, b) moderately stout, about 6 times longer than wide. Length (not including setae on caudal rami) 2.26 mm (1.86-2.39 mm) and greatest width 0.38 mm (0.37-0.40 mm), based on 7 specimens. External segmentation not defined. Region dorsal to fifth pair of legs bearing 3 long posteriorly directed processes (Fig. 1c). Genital and postgenital segments together a little less than one-fifth of body length. Genital areas (Fig. 1d) located dorsally (Fig. 1a). Caudal ramus (Fig. 1e) approximately 76 × 43 μm, ratio 1.77:1, with 5 major setae (4 terminal and 1 lateral) and 4 setules. Egg sac not seen. Body surface with minute setules.

Rostrum (Fig. 1f) subquadrate in outline. First antenna (Fig. 1f) 103 μm and 6-segmented (though separation of first 3 segments not distinct). Lengths of segments (measured along anterior sides): 35, 29, 21, 13, 14, and 14 μm, respectively. Armature: 3, 11, 7, 4 + 1 aesthete, 2 + 1 aesthete, and 7 + 1 aesthete. All setae smooth. Second antenna (Fig. 1g) 4-segmented,

146 μm long including claw. Armature: 1, 1, 2, and I + 1 + 3 setules. Claw on last segment 17 μm and long seta 37 μm. All setae smooth.

Labrum (Fig. 2a) with slightly trilobate posteroventral margin, minutely indented medially. Mandible (Fig. 2b) about 65 μm long, with blade having approximately 15 slender teeth along inner side. Paragnath perhaps represented by a lobe (labelled "p?" in Fig. 2a). First maxilla (Fig. 2c) a small lobe with 3 setae (2 long setae unilaterally finely barbed) and small protuberance. Second maxilla (Fig. 2d) 2-segmented, second segment bearing 2 very unequal inner setae and distal lamellate expansion with apical spikelike extension. Maxilliped (Fig. 2e, f) 3-segmented. First segment with lobate expansion. Second segment bearing 2 small inner setae and lobate expansion. Third segment with 2 smooth spiniform setae.

Legs 1-4 (Fig. 2g, h) with 3-segmented exopods and 2-segmented endopods. Spine and setal formula as follows (Roman numerals indicating spines, Arabic numerals representing setae):

P_{1+2}	coxa	o-o	basis	1-o	exp	I-o;	I-o;	I, 3
					enp	o-o;	3	
P_{3+4}	coxa	o-o	basis	1-o	exp	I-o;	I-o;	I, 2
					enp	o-o;	1	

All 4 legs with basis having inner hairs and outer seta. Endopods of all legs with outer hairs and those of legs 3 and 4 with first segment having few inner hairs.

Leg 5 (Fig. 2i) approximately 299 μm long, tapered, bearing 2 terminal setae 19 μm and 31 μm, and surficial setules.

Color in living specimens in transmitted light opaque gray, intestine dull reddish brown, eye red.

Male. — Body (Fig. 3a, b) resembling that of female. Length 2.34 mm (2.03-2.56 mm) and greatest width 0.39 mm (0.37-0.40 mm), based on 5 specimens. External segmentation weakly indicated. Caudal ramus (Fig. 3c) 62 × 35 μm, with 4 terminal setae, 1 lateral seta, and several setules.

Rostrum as in female. First antenna like that of female but one aesthete added on third segment (at point indicated by dot in Fig. 1f). Second antenna, labrum, mandible, first maxilla, and second maxilla resembling those of female. Maxilliped (Fig. 3d) 4-segmented. First segment unarmed. Fourth segment forming terminal claw 100 μm long bearing 2 setae (1 proximal, 1 on midinner margin) and having minutely bifurcate tip.

Legs 1-4 as in female.

Leg 5 (Fig. 3e) lacking free segment and represented only by 3 small setae.

Leg 6 (Fig. 3e) represented by posteroventral flap on genital segment bearing 2 small setae and 2 minute setules.

Spermatophore not seen.

Color as in female.

Etymology. — The specific name *echinoporae* is formed from the generic name of the host coral.

Remarks. — Four congeners having 2-segmented endopods in legs 1-4 with terminal armature 3, 3, 1, 1 as in the new species may be distinguished from *Xarifia echinoporae* as follows: in *Xarifia decorata* Humes and Ho, 1968, the outer element on the second exopod segment of legs 2-4 is a seta rather than a spine; in *Xarifia villosa* the spine on the second exopod segment of leg 1 is much smaller than the spines on the other segments, and the body surface has many tufts of branched setules; in *Xarifia fastigiata* the single terminal seta on the endopod of legs 3 and 4 is stout and the rostrum is pointed; in the female of *Xarifia radians* the second segment of the second maxilla has a broad distal part with rounded tip, partly set off from the proximal part, and the second segment of the maxilliped bears a small depression with five radiating setules.

Xarifia villosa n. sp.

Figs. 4a-h, 5a-l, 6a-h

Type material. — 3 ♀♀, 4 ♂♂ from *Cyphastrea chalcidicum* (Forskål), in 1 m, west of Isle Mando, near Noumea, New Caledonia, 22°18′59″E, 166°09′30″E, 1 July 1971. Holotype ♀, allotype, and 2 paratypes (1 ♀, 1 ♂) deposited in the

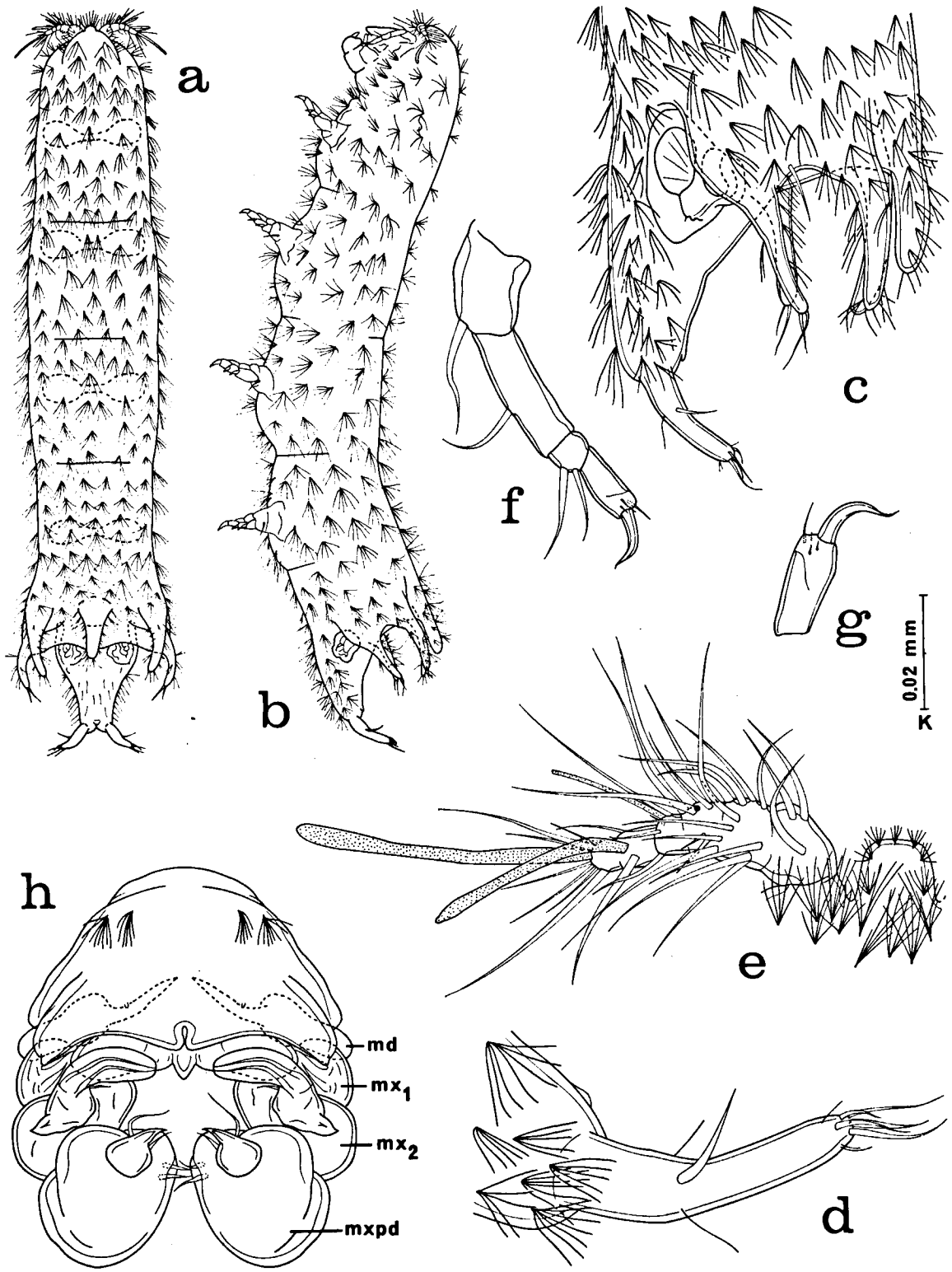

Fig. 4. *Xarifia villosa* n. sp., female. a, dorsal (scale B); b, lateral (B); c, urosome, lateral (I); d, caudal ramus, outer (lateral) (F); e, rostrum and first antenna, with dot indicating position of aesthete in male, anterodorsal (F); f, second antenna, dorsal (F); g, fourth segment of second antenna, dorsal (K); h, labrum, with mandibles (md), first maxillae (mx_1), second maxillae (ms_2), and maxillipeds (mxpd), ventral (F).

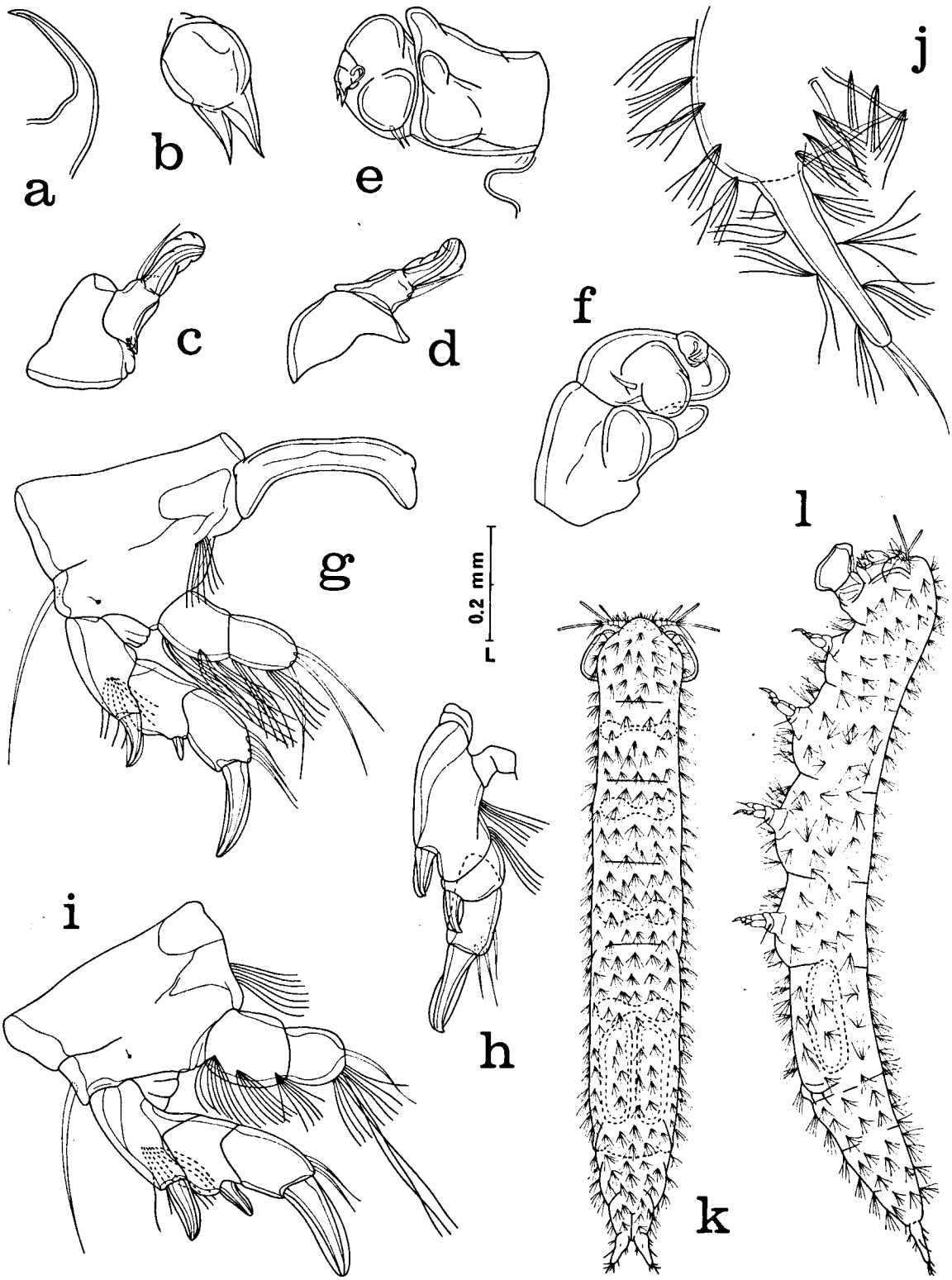

Fig. 5. *Xarifia villosa* n. sp. Female. a, mandible, ventral (scale K); b, first maxilla, posterodorsal (K); c, second maxilla, anteroventral (F); d, second maxilla, posterodorsal (F); e, maxilliped, anterior (F); f, maxilliped, antero-inner (F); g, leg 1 and intercoxal plate, anterior (F); h, exopod of leg 2, posterior (F); i, leg 3, anterior (F); j, leg 5, outer (D). Male. k, dorsal (L); l, lateral (L).

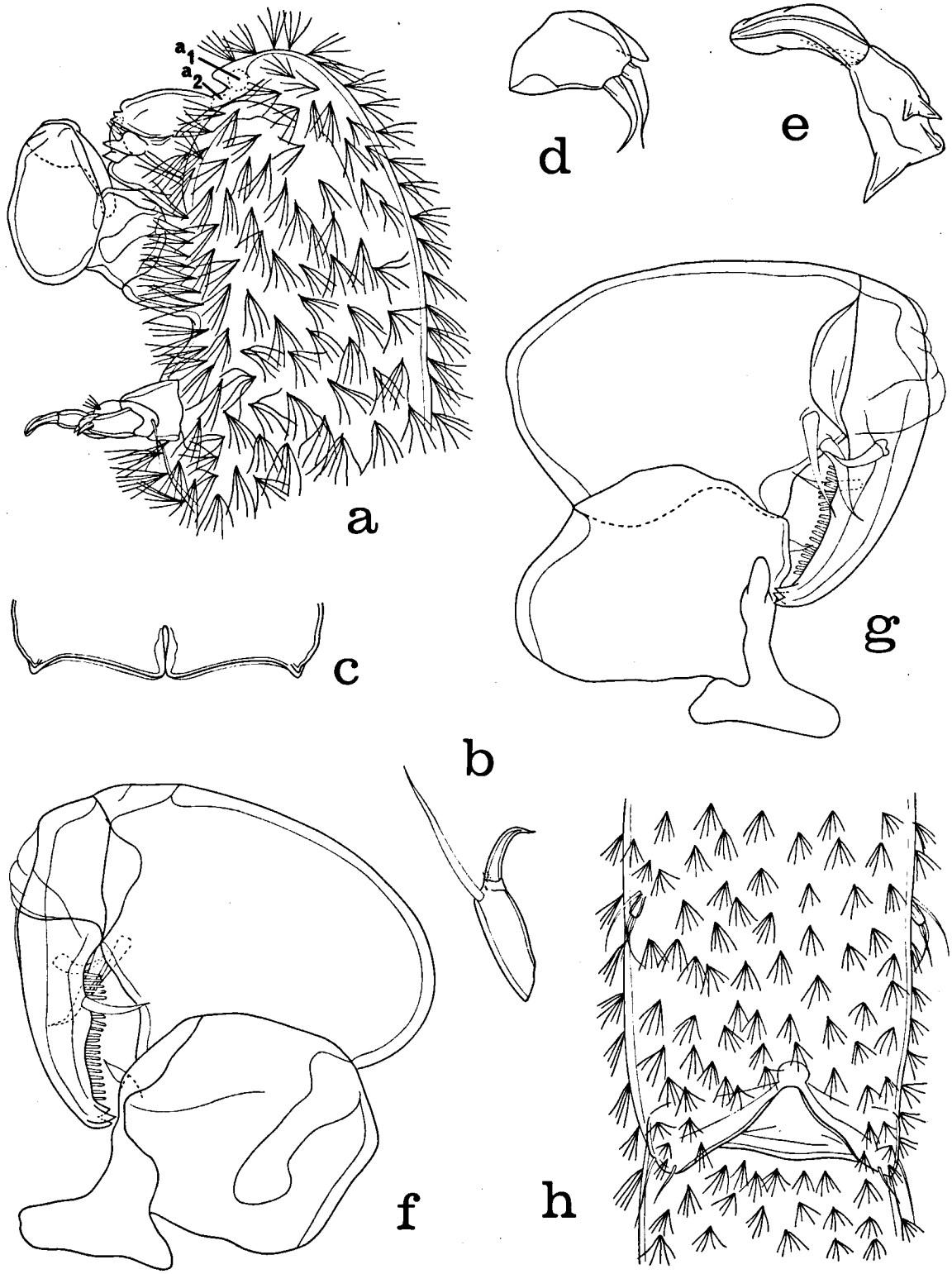

Fig. 6. *Xarifia villosa* n. sp., male. a, cephalothorax, lateral (a_1 = position of first antenna, a_2 = position of second antenna) (scale I); b, fourth segment of second antenna, ventral (K); c, posterior edge of labrum, ventral (F); d, first maxilla, inner (K); e, second segment of second maxilla, posteroventral (K); f, maxilliped, outer (F); g, maxilliped, inner (F); h, leg 5 and 6, ventral (I).

National Museum of Natural History, Smithsonian Institution, Washington, D.C.; the remaining paratypes (dissected) in the collection of the first author.

Female. — Body (Fig. 4a, b) moderately stout, about 5.6 times longer than wide, and covered with tufts of delicate branched setules. Length (including caudal rami) 1.09 mm (1.09-1.12 mm) and greatest width 0.17 mm (0.16-0.17 mm), based on 3 specimens. External segmentation weakly defined. Region dorsal to fifth pair of legs bearing 3 posteriorly directed processes (Fig. 4c), middle process shorter than other 2 processes. Genital and postgenital segments together little more than one-fifth of body length. Genital areas situated dorsally. Caudal ramus (Fig. 4d) 68 × 16 μm, with 5 terminal setae, 1 outer lateral seta, and several long hairlike setules. Egg sac not seen.

Rostrum (Fig. 4e) with truncate tip. First antenna (Fig. 4e) 58 μm long and 6-segmented, with first 3 segments indistinctly separated. Lengths of segments (measured along anterior sides): 19, 11, 10, 6, 10, and 7 μm, respectively. Armature as in *Xarifia echinoporae*. All setae smooth. Second antenna (Fig. 4f) 4-segmented, 83 μm long including clawlike spine. Armature as in *X. echinoporae*. Clawlike spine on last segment (Fig. 4g) 16 μm and adjacent seta 6 μm. All setae smooth.

Labrum (Fig. 4h) with trilobate posteroventral margin having prominent medial indentation. Mandible (Fig. 5a) about 30 μm long with smooth blade. Paragnath not seen. First maxilla (Fig. 5b) with 2 setae. Second maxilla (Fig. 5c, d) with second segment bearing minute proximal outer spinelike processes, 2 unequal inner setae, and terminal lamellate expansion with smooth rounded tip. Maxilliped (Fig. 5e, f) 3-segmented. First segment with 3 lobate expansions. Second segment with 2 small setae and lobate expansion. Third segment with 2 small setae and terminating in sharply pointed process.

Legs 1-4 (Fig. 5g-i) with 3-segmented exopods and 2-segmented endopods. Spine and setal formula as follows (Roman numerals indicating spines and Arabic numerals representing setae):

P_{1+2}	coxa	0-0	basis	1-0	exp	I-0;	I-0;	I, 3
					enp	0-0;	3	
P_{3+4}	coxa	0-0	basis	1-0	exp	I-0;	I-0;	I, 2
					enp	0-0;	1	

All 4 legs with basis having inner hairs and outer seta. Exopod of leg 1 with outer spine on second segment much smaller than spine on first segment. Exopod of leg 2 with spines on first 2 segments nearly equal (Fig. 5h). Exopods of legs 3 and 4 with spine on second segment shorter than that on first segment. Tufts of setules on rami as shown in figures.

Leg 5 (Fig. 5j) 78 μm long, tapered, with 2 unequal terminal setae 17 μm and 40 μm, and bearing tufts of setules.

Color in living specimens in transmitted light opaque gray, eye red.

Male. — Body (Fig. 5k, l) more slender than that of female, about 7.2 times longer than wide. Length 1.23 mm (1.20-1.26 mm) and greatest width 0.17 mm (0.16-0.18 mm), based on 4 specimens. External segmentation weak. Caudal ramus like that in female.

Rostrum as in Fig. 6a. First antenna as in female but aesthete added on third segment as in male of *X. echinoporae*. Second antenna resembling that of female but last segment (Fig. 6b) with clawlike spine 12 μm and adjacent seta 25 μm.

Labrum with posteroventral margin as in Fig. 6c. Mandible like that of female. First maxilla (Fig. 6d) with digitiform projection in addition to 2 setae. Second segment of second maxilla as in Fig. 6e. Maxilliped (Fig. 6f, g) 4-segmented. First segment with inner setiform prominence. Second segment swollen with 2 setae. Third segment unarmed. Fourth segment forming terminal claw 62 μm long, with row of obtuse spines along concave margin, 2 proximal setae, and trifid tip.

Legs 1-4 as in female.

Leg 5 (Fig. 6h) with minute free segment bearing 2 terminal setae and having adjacent dorsal seta.

Leg 6 (Fig. 6h) represented by posteroventral flap on genital segment bearing 2 setae.

Spermatophore not seen.

Color as in female.

Etymology. — The specific name *villosa*, Latin meaning hairy, alludes to the many tufts of setules on the body surface.

Remarks. — The many tufts of setules over the body surface are characteristic of the new species. Such ornamentation is unknown in other species of *Xarifia*. The condition of the outer spines on the first and second segments of the exopod in legs 1 and 2 may also be used to distinguish *Xarifia villosa* from its congeners that have 2-segmented endopods in legs 1-4 armed terminally with 3, 3, 1, 1. The spiniform processes on the second maxilla of the male are diagnostic features of this species.

Xarifia pectinea n. sp.

Figs. 7a-g, 8a-i, 9a-i, 10a, b

Type material. — 17 ♀♀, 18 ♂♂ from *Acropora intermedia* (Brook), in 2 m, Karang Mie, eastern central Halmahera, 00°20'07"N, 128°25'00"E, 19 May 1975. Holotype ♀, allotype, and 26 paratypes (12 ♀♀, 14 ♂♂) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.; the remaining paratypes (dissected) in the collection of the first author.

Other specimens. — From *Acropora rambleri* (Bassett-Smith): 1 ♂, in 15 m, Poelau Parang, eastern Ceram, 3°17'00"S, 130°44'48"N, 23 May 1975. From *Acropora hyacinthus* (Dana): 24 ♀♀, 18 ♂♂, in 0.5 m, western side of Ricaudy Reef, near Noumea, New Caledonia, 22°20'05"S, 166°24'05"E, 19 June 1971; 43 ♀♀, 47 ♂♂, and 1 immature specimen, from same colony, 25 June 1971; 23 ♀♀, 10 ♂♂, in 10 m, Poelau Parang, eastern Ceram, 23 May 1975; 1 ♀, 1 ♂, in 1.5-2 m, Rocher à la Voile, Noumea, New Caledonia, 22°18'24"S, 166°25'50"E, 19 June 1971. From *Acropora humilis* (Dana): 6 ♀♀, 2 ♂♂ in 1.5 m, Rocher à la Voile, Noumea, 19 June 1971. From *Acropora patula* (Brook): 22 ♀♀, 34 ♂♂, in 1.5 m, Ricaudy Reef, near Noumea, 22°19'00"S, 166°26'44"E, 15 June 1971. From *Acropora gravida* (Dana): 10 ♀♀, 1 immature ♂, and 7 ♂♂, in 3 m, west of Isle Mando, near Noumea, 22°18'59"S, 166°09'30"E, 26 June 1971. From *Acropora affinis* (Brook): 1 ♀, 1 ♂, in 2 m, west of Isle Mando, near Noumea, 5 July 1971. From *Montipora ramosa* Bernard: 1 ♂, in 2 m, north of Isle Maître, near Noumea, 22°19'30"S, 166°24'35"E, 13 July 1971.

Female. — Body (Fig. 7a, b) moderately stout, about 4.6 times longer than wide. Length 1.64 mm (1.53-1.63 mm) and greatest width 0.30 mm (0.27-0.33 mm), based on 10 specimens. External segmentation weakly defined. Region dorsal to fifth pair of legs bearing 3 long processes (Fig. 7c, 10a), middle process a little shorter and stouter than 2 lateral processes. Genital and postgenital segments together about one-fourth of body length. Genital areas situated dorsally (Fig. 7a). Caudal ramus (Fig. 7d-f) approximately 103 × 70 μm, with 5 major setae (4 terminal and 1 lateral) and several single or compound setules. Egg sac not seen. Body surface with many very small setules.

Rostrum (Fig. 7g) rounded. First antenna (Fig. 7g) short, 47 μm, and 5-segmented. Lengths of segments (measured along anterior sides): 21, 9, 8, 5, and 4 μm, respectively. Armature: 3, 10, 8 + 1 aesthete, 2 + 1 aesthete, and 7 + 1 aesthete. All setae naked. Second antenna (Fig. 8a) 60 μm long including claw and 4-segmented, though third and fourth segments incompletely separated. Armature: 1, 1, 2, and I + 1 + 3 setules. Claw 7 μm and long seta 35 μm. All setae smooth.

Labrum (Fig. 8b) with posteroventral margin only slightly indented medially. Mandible (Fig. 8c) with blade having distally 2 tines preceded by comblike row of spinules. Paragnath not seen. First maxilla (Fig. 8d) with 3 smooth setae and slight protuberance. Second maxilla (Fig. 8e, f) 2-segmented, second segment bearing 2 small setae. Maxilliped (Fig. 8g, h, 10b) 3-segmented. Second segment with 2 unequal smooth setae. Third segment with inner knob and terminal seta with distal two-thirds weakly sclerotized. (In specimens from *Acropora hyacinthus* with long slender seta instead of knob.) Location of appendages of cephalosome as shown in Fig. 8i.

Legs 1-4 (Fig. 9a-c) with 3-segmented exopods and 1-segmented endopods, though

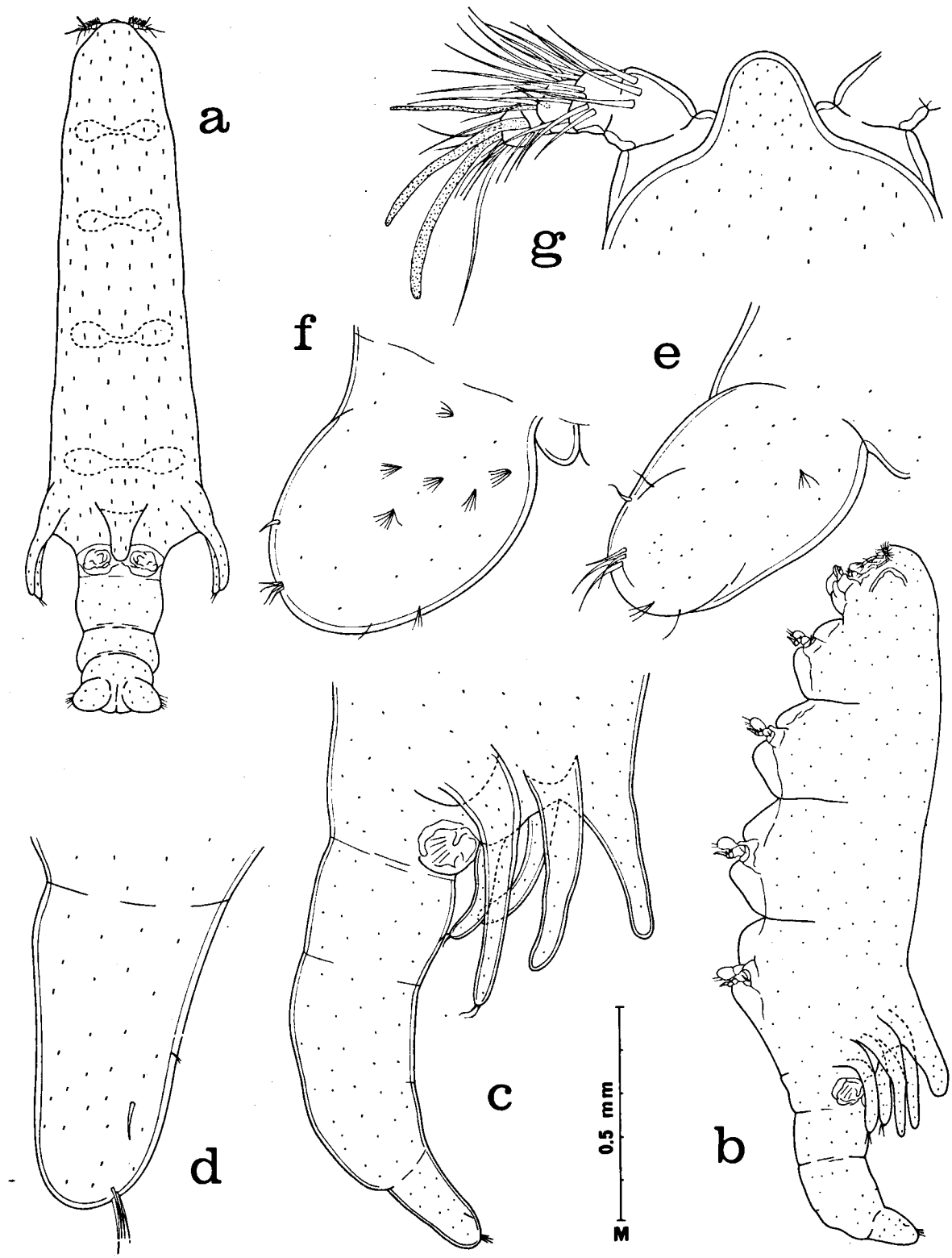

Fig. 7. *Xarifia pectinea* n. sp., female. a, dorsal (scale M); b, lateral (M); c, urosome, lateral (J); d, caudal ramus, lateral (D); e, caudal ramus, dorsal (D); f, caudal ramus, dorsal (D); g, rostrum and first antenna, anterodorsal (F).

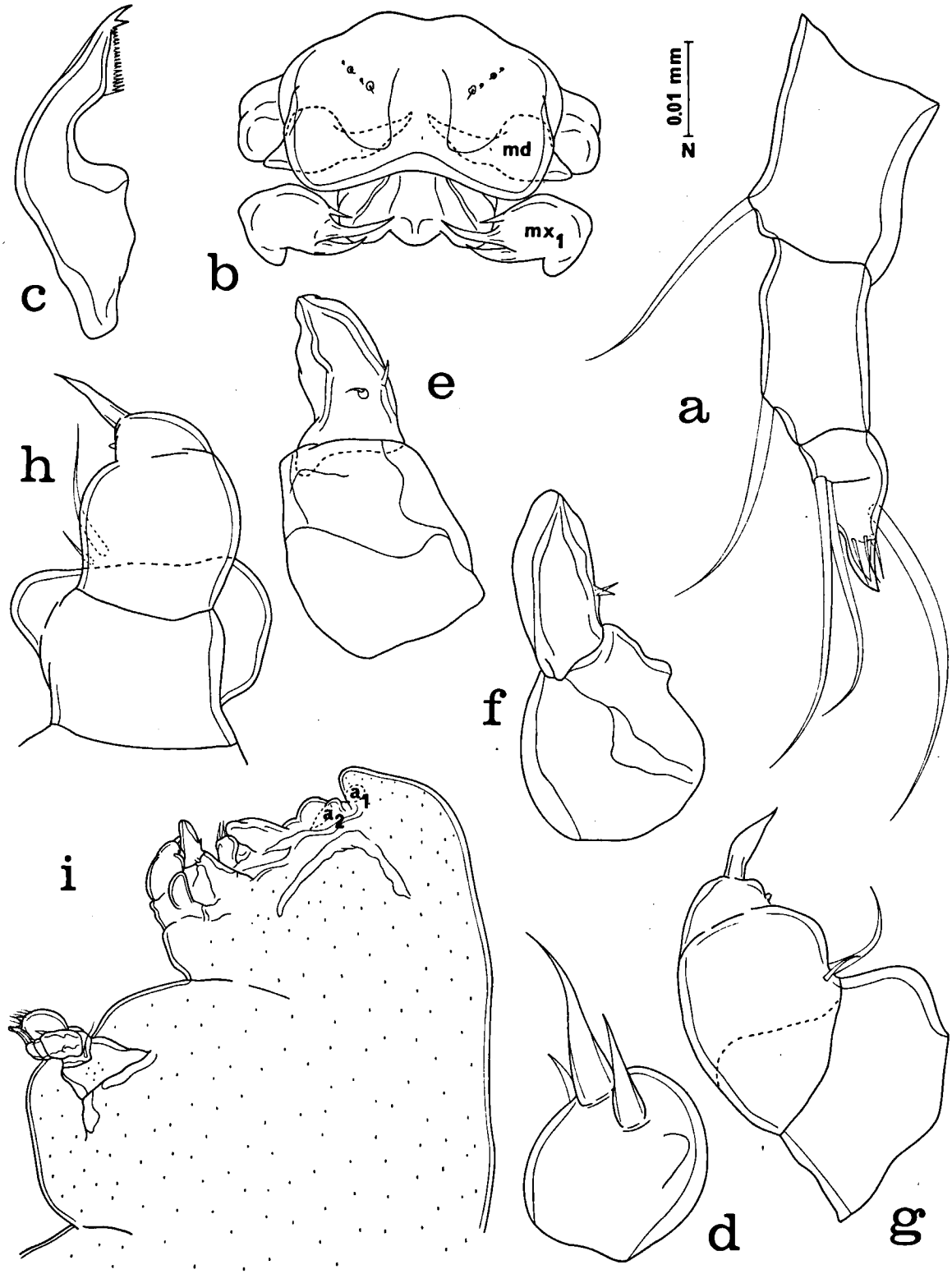

Fig. 8. *Xarifia pectinea* n. sp., female. a, second antenna, dorsal (scale N); b, labrum, mandible (md), and first maxilla (mx_1), ventral (F); c, mandible, ventral (N); d, first maxilla, posteroventral (N); e, second maxilla, anteroventral (K); f, second maxilla, postero-outer (K); g, maxilliped, inner (K); h, maxilliped, outer (K); i, cephalothorax (a_1 = position of first antenna, a_2 = position of second antenna), lateral (C).

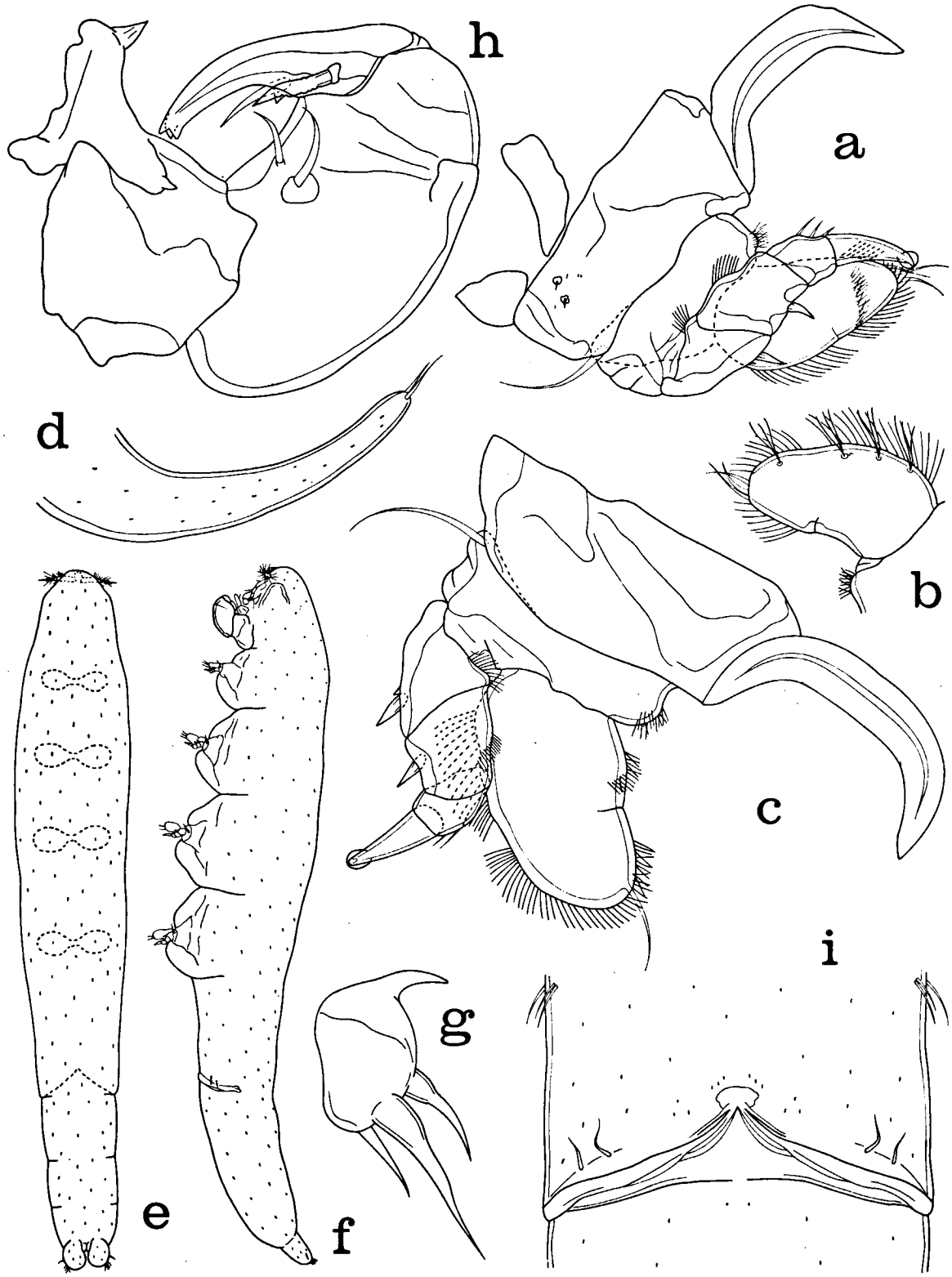

Fig. 9. *Xarifia pectinea* n. sp. Female. a, leg 1 and intercoxal plate, posterior (scale F); b, endopod of leg 1, anterior (F); c, leg 3 and intercoxal plate, posterior (F); d, leg 5, lateral (I). Male. e, dorsal (M); f, lateral (M); g, first maxilla, ventro-outer (N); h, maxilliped, inner (F); i, leg 5 and leg 6, ventral (I).

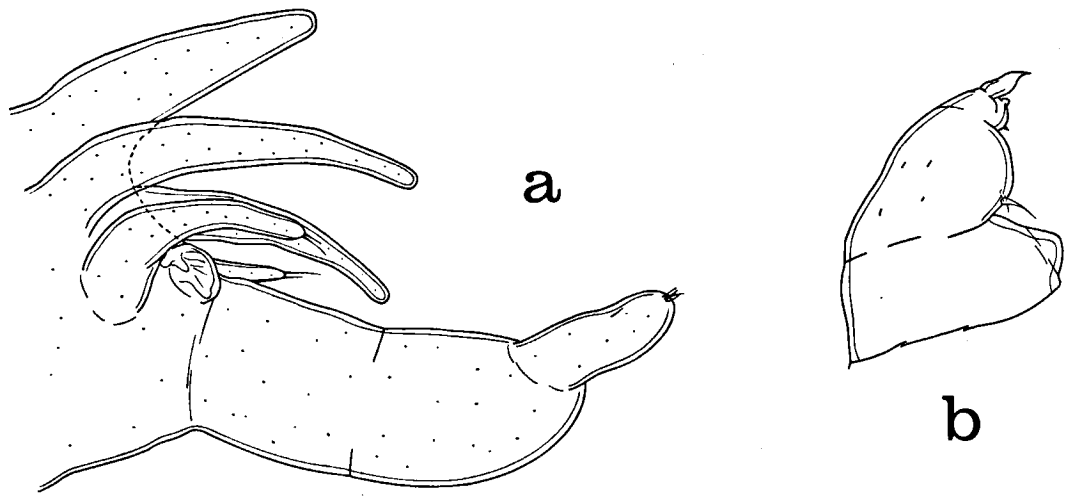

Fig. 10. *Xarifia pectinea* n. sp. (from *Acropora patula*), female. a, urosome, lateral (scale J); b, maxilliped, inner (F).

slight indication of separation into 2 endopodal segments (as in *Xarifia lissa* Humes and Ho, 1968). Spine and setal formula as follows (Roman numerals indicating spines, Arabic numerals representing setae):

P_{1+2}	coxa	0-0	basis	1-0	exp	I-0;	I-0;	I, 3
					enp	3		
P_{3+4}	coxa	0-0	basis	1-0	exp	I-0;	I-0;	I, 2
					enp	1		

Exopod spines on first 2 segments only weakly sclerotized, appearing more like setae than spines. First exopod segment of legs 1-4 with minute spinelike process at base of spine. Rami ornamented with hairlike setules as in figures, with endopods of all 4 legs having compound setules along outer anterior surface as in Fig. 9b.

Leg 5 (Fig. 9d) about 200 μm long, slender, bearing 2 terminal setae 24 μm and 30 μm.

Color in living specimens in transmitted light opaque gray to slightly brown, intestine dark brown, eye red, egg sacs dark gray.

Male. — Body (Fig. 9e, f) more slender than in female, about 6 times longer than wide. Length 1.52 mm (1.39-1.66 mm) and greatest width 0.24 mm (0.21-0.26 mm), based on 10 specimens. Caudal ramus resembling that of female.

Rostrum, first antenna, second antenna, labrum, and mandible as in female. First maxilla (Fig. 9g) in majority of specimens with sclerotized process in addition to 3 setae (in some, sclerotized process minute or absent). Second maxilla as in female. Maxilliped (Fig. 9h) 4-segmented. First segment with proximal inner spine. Second segment with 2 smooth setae. Third segment unarmed. Claw (fourth segment) 62 μm long, with trifid tip, and bearing proximally 2 setae and on concave margin 1 small tooth.

Legs 1-4 as in female.

Leg 5 (Fig. 9i) represented by 3 small setae.

Leg 6 (Fig. 9i) a posteroventral flap on genital segment bearing 2 small setae.

Spermatophore not seen.

Color as in female.

Etymology — The specific name *pectinea*, from Latin *pecten*, a comb, and the suffix *-eus*, made of or having, alludes to the comblike row of spinules on the mandible.

Remarks — Six congeners having 1-segmented endopods in legs 1-4 with armature 3, 3, 1, 1 as in the new species may be distinguished from *Xarifia pectinea* as follows: in the female of *Xarifia maldivensis* Humes, 1960, there are three long processes and two knobs dorsal

to the fifth legs, the second antenna is 3-segmented, and leg 5 has a small free segment 16 × 6 μm; in *Xarifia lissa* Humes and Ho, 1968, there are no processes (only a small dorsomedial lobe) above the fifth legs in the female; in *Xarifia obesa* Humes and Ho, 1968, there are only two processes above the fifth legs in the female; in *Xarifia tumorisa* Misaki, 1978, the first and second postgenital segments in the female have lateral lobelike expansions; in *Xarifia breviramea*, new species described below, the second antenna is 3-segmented, and the caudal ramus in the female is very short, 18 × 11 μm; and in *Xarifia exuta*, new species described below, there are no processes (only a small dorsomedial lobe) above the fifth legs, and the first and second segments of the second antenna are unarmed.

Xarifia breviramea n. sp.

Figs. 11a-m, 12a-h

Type material. — 13 ♀♀, 12 ♂♂ from *Acropora intermedia* (Brook), in 2 m, Karang Mie, eastern central Halmahera, Moluccas, 00°20'07"N, 128°25'00"E, 19 May 1975. Holotype ♀, allotype, and 15 paratypes (7 ♀♀, 8 ♂♂) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.; the remaining paratypes (dissected) in the collection of the first author.

Other specimens. — From *Acropora rambleri* (Bassett-Smith): 3 ♀♀, in 15 m, Poelau Parang, eastern Ceram, 3°17'00"S, 130°44'48"E, 23 May 1975; 4 ♀♀, 4 ♂♂, same locality and date. From *Acropora hyacinthus* (Dana): 15 ♀♀, 1 immature ♀, and 6 ♂♂, in 1.5-2 m, Rocher à la Voile, Noumea, New Caledonia, 22°18'24"S, 166°25'50"E, 19 June 1971. From *Acropora corymbosa* (Lamarck): 11 ♀♀, 12 ♂♂, in 1 m, Rocher à la Voile, Noumea, 15 June 1971. From *Acropora danai* (Milne Edwards and Haime): 13 ♀♀, 7 ♂♂, in 1.5 m, Ricaudy Reef, near Noumea, 22°19'00"S, 166°26'44"E, 15 June 1971. From *Acropora valida* (Dana): 20 ♀♀, 5 ♂♂, in 1.5 m, Ricaudy Reef, near Noumea, 15 June 1971. From *Acropora gravida* (Dana): 9 ♀♀, 9 ♂♂, in 3 m, west of Isle Mando, near Noumea, 22°18'59"S, 166°09'30"E, 26 June 1971. From *Acropora florida* (Dana): 60 ♀♀, 3 immature ♀♀, 103 ♂♂, in 2 m, Rigili Island, Enewetak Atoll, 3 July 1969; 2 ♀♀, 5 ♂♂, in 4 m, south end of Parry Island, Enewetak Atoll, 5 July 1969. From *Acropora affinis* (Brook): 2 ♀♀, 3 ♂♂, in 2 m, west of Isle Mando, near Noumea, 5 July 1971. From *Acropora exigua* (Dana): 1 ♂, in 2 m, eastern end of Isle Ndié, Baie Dumbea, near Noumea, 22°13'15"S, 166°24'26"E, 6 July 1971. From *Acropora squamosa* (Brook): 20 ♀♀, 30 ♂♂, in 20 cm, eastern end of Isle Maître, near Noumea, 22°20'35"S, 166°25'45"E, 31 July 1971.

Female. — Body (Fig. 11a, b) about 6 times longer than wide. Length 1.74 mm (1.69-1.79 mm) and greatest width 0.25 mm (0.23-0.26 mm), based on 10 specimens. External segmentation weakly defined. Region dorsal to fifth pair of legs bearing 3 long processes (Fig. 11a), middle process nearly as long as lateral processes. Genital and postgenital segments together about 28 per cent of body length. Genital areas located dorsally. Caudal ramus (Fig. 11c) short, approximately 18 × 11 μm, and incompletely demarcated from anal segment. Each caudal ramus with 5 terminal setae and 1 lateral proximal outer seta. Egg sac (Fig. 11d) with uniseriate arrangement of eggs, greatest egg diameter about 167 μm. Body surface with minute setules.

Rostrum rounded and projecting slightly in lateral view. First antenna (Fig. 11e) short, 49 μm, and probably 4-segmented though segmentation obscure. Armature: 3, 18, 3 + 1 aesthete, and 6 + 2 aesthetes. All setae naked. Second antenna (Fig. 11f) 55 μm long including claw and 3-segmented, usual third and fourth segments being fused. Armature: 1, 1, and 2 + I + 1 + 2 small setules. Claw 5 μm and long terminal seta 46 μm. All setae smooth.

Labrum (Fig. 11g) with posteroventral margin trilobed, middle lobe indented. Mandible (Fig. 11h, i) 34 μm long with smooth slender blade having recurved tip. Paragnath not seen. First maxilla (Fig. 11j) with 3 smooth setae, 1 seta very short. Second maxilla (Fig. 11k) 2-segmented, second segment elongate with

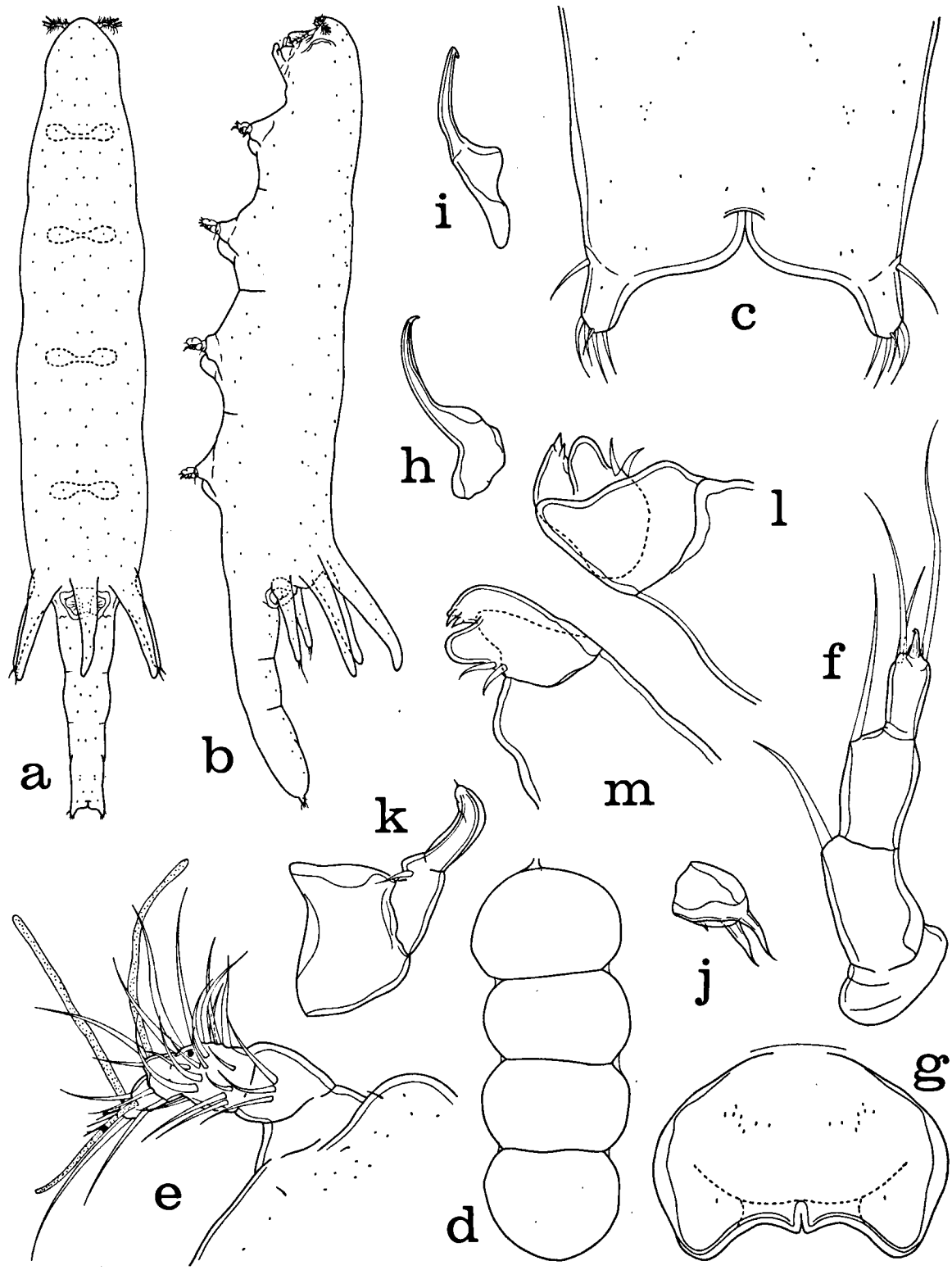

Fig. 11. *Xarifia breviramea* n. sp., female. a, dorsal (scale M); b, lateral (M); c, caudal ramus, dorsal (F); d, egg sac, lateral (J); e, rostrum and first antenna, with dot indicating position of aesthete added in male, anterodorsal (F); f, second antenna, ventral (K); g, labrum, ventral (F); h, mandible, ventral (K); i, mandible, outer (K); j, first maxilla, dorso-outer (F); k, second maxilla, anterior (K); l, maxilliped, outer (F); m, maxilliped, inner (F).

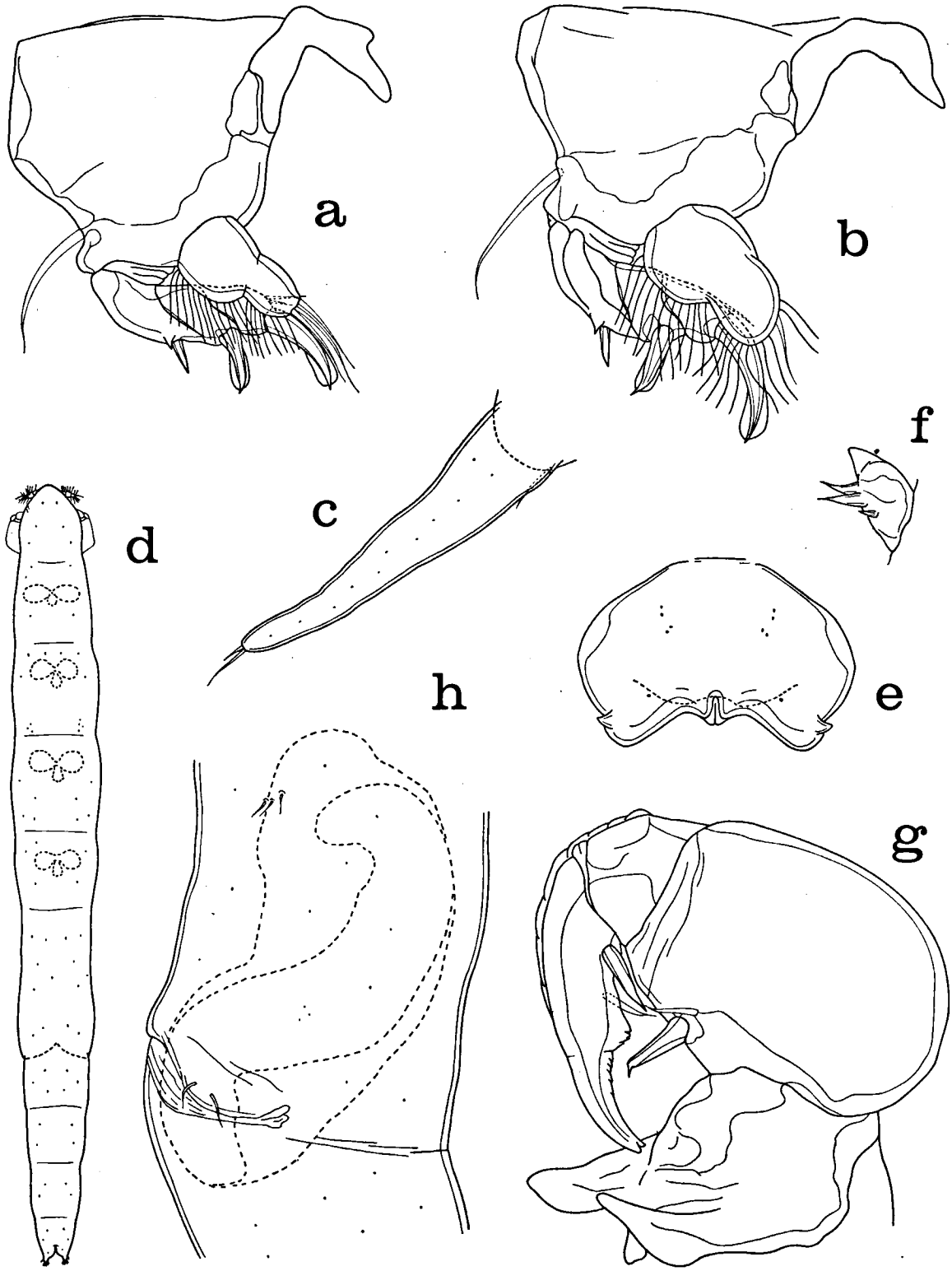

Fig. 12. *Xarifia breviramea* n. sp. Female. a, leg 1 and intercoxal plate, anterior (scale F); b, leg 3 and intercoxal plate, anterior (F); c, leg 5, lateral (I). Male. d, dorsal (M); e, labrum, ventral (F); f, first maxilla, ventral (F); g, maxilliped, inner (F); h, leg 5 and leg 6, lateral (I).

2 very unequal setae proximally and in some specimens with minute hyaline process (setule ?). Maxilliped (Fig. 11l, m) 3-segmented. Second segment nearly equal smooth setae and inner lobe. Third segment with 2 small subterminal setae and 1 rounded protrusion.

Legs 1-4 (Fig. 12a, b) with 3-segmented exopods and 1-segmented endopods (endopods showing slight indication of 2 segments). Spine and setal formula as follows (Roman numerals indicating spines, Arabic numerals representing setae):

P_{1+2}	coxa	o-o	basis	1-o	exp enp	I-o; 3	I-o;	I, 2
P_{3+4}	coxa	o-o	basis	1-o	exp enp	I-o; 1	I-o;	I, 1

Endopods ornamented with long hairlike setules along outer margin. Exopods with first segment having smooth outer spine, second segment with lamellate outer spine, and third segment with lamellate terminal spine. First exopod segment of legs 1-4 with minute spinelike process at base of spine.

Leg 5 (Fig. 12c) 194 μm long, tapered, bearing 2 terminal smooth setae 14 μm and 29 μm.

Color in living specimens in transmitted light opaque gray to slightly brown, intestine dark brown, eye red, egg sacs dark gray.

Male. — Body (Fig. 12d) slender, about 9 times longer than wide. Length 1.74 mm (1.63-1.93 mm) and greatest width 0.19 mm (0.18-0.20 mm), based on 8 specimens. Caudal ramus similar to that of female.

Rostrum as in female. First antenna like that of female but 1 aesthete added (at point indicated by dot in Fig. 11e). Second antenna resembling that of female.

Labrum (Fig. 12e) similar to that of female but having 2 small toothlike processes laterally. Mandible as in female. First maxilla (Fig. 12f) having 3 setae and conical process. Second maxilla like that of female. Maxilliped (Fig. 12g) 4-segmented. First segment unarmed. Second segment with 2 very unequal smooth setae, larger seta with small bent tip. Third segment unarmed. Claw (fourth segment) 70 μm long, with bifid tip and bearing proximally 2 setae. Concave edge of claw with irregular serrations.

Legs 1-4 as in female.

Leg. 5 (Fig. 12h) represented by 3 small setae.

Leg 6 (Fig. 12h) a posteroventral flap on genital segment bearing 2 small setae.

Spermatophore not seen.

Color as in female.

Etymology. — The specific name *breviramea*, from Latin *brevis*, short, and *rameus*, of a ramus, alludes to the short caudal ramus in this species.

Remarks. — Two congeners having, as in the new species, 1-segmented endopods in legs 1-4 with armature 3, 3, 1, 1 and 3-segmented second antennae may be distinguished from *Xarifia breviramea* as follows: in *Xarifia maldivensis* Humes, 1960, the female has three long processes and two knobs above the fifth legs, and the free segment of leg 5 is small, 16 × 6 μm; in *Xarifia obesa* Humes and Ho, 1968, the female has only two processes above the fifth legs, a median process being absent.

Xarifia trituberata n. sp.

Figs. 13a-m, 14a-f

Type material. — 9 ♀♀, 10 ♂♂ from *Acropora intermedia* (Brook), in 2 m, eastern central Halmahera, Moluccas, 00°20'07"N, 128°25'00"E, 19 May 1975. Holotype ♀, allotype, and 10 paratypes (4 ♀♀, 6 ♂♂) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.; the remaining paratypes (dissected) in the collection of the first author.

Other specimens. — From *Acropora rambleri* (Bassett-Smith): 1 ♀, in 15 m, Poelau Parang, eastern Ceram, 3°17'00"S, 130°44'48"E, 23 May 1975. From *Acropora hyacinthus* (Dana): 7 ♀♀, 15 ♂♂, in 1.5-2 m, Rocher à la Voile, Noumea, New Caledonia, 22°18'24"S, 166°25'50"E, 19 June 1971; 23 ♀♀, 22 ♂♂, in 0.5 m, western side of Ricaudy Reef, near Noumea, 22°20'05"S, 166°24'05"E, 19 June 1971; 27 ♀♀, 113 ♂♂, and 14 immature specimens, from same colony, 25 June 1971; 3 ♀♀, 3 ♂♂, in 10 m, Poelau Parang, eastern Ceram, 3°17'00"S, 130°44'48"E, 23 May 1975. From *Acropora corymbosa* (La-

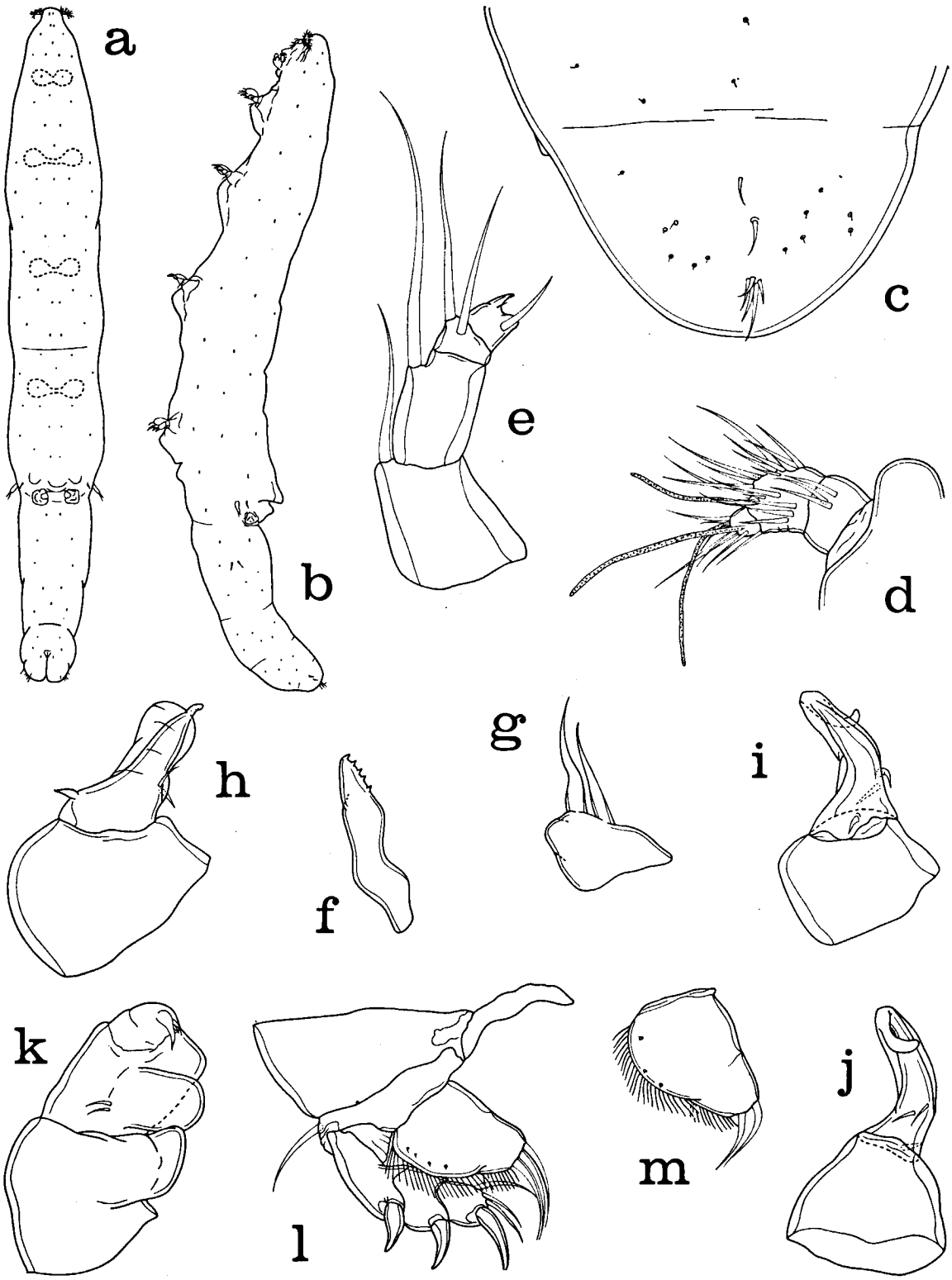

Fig. 13. *Xarifia trituberata* n. sp., female. a, dorsal (scale M); b, lateral (M); c, caudal ramus, lateral (F); d, rostrum and first antenna, dorsal (F); e, second antenna, ventral (N); f, mandible, ventral (N): g, first maxilla, anteroventral (N); h, second maxilla, antero-outer (N); i, second maxilla, outer (N); j, second maxilla, inner (N); k, maxilliped, inner (N); l, leg 1 and intercoxal plate, anterior (F); m, endopod of leg 2, anterior (F).

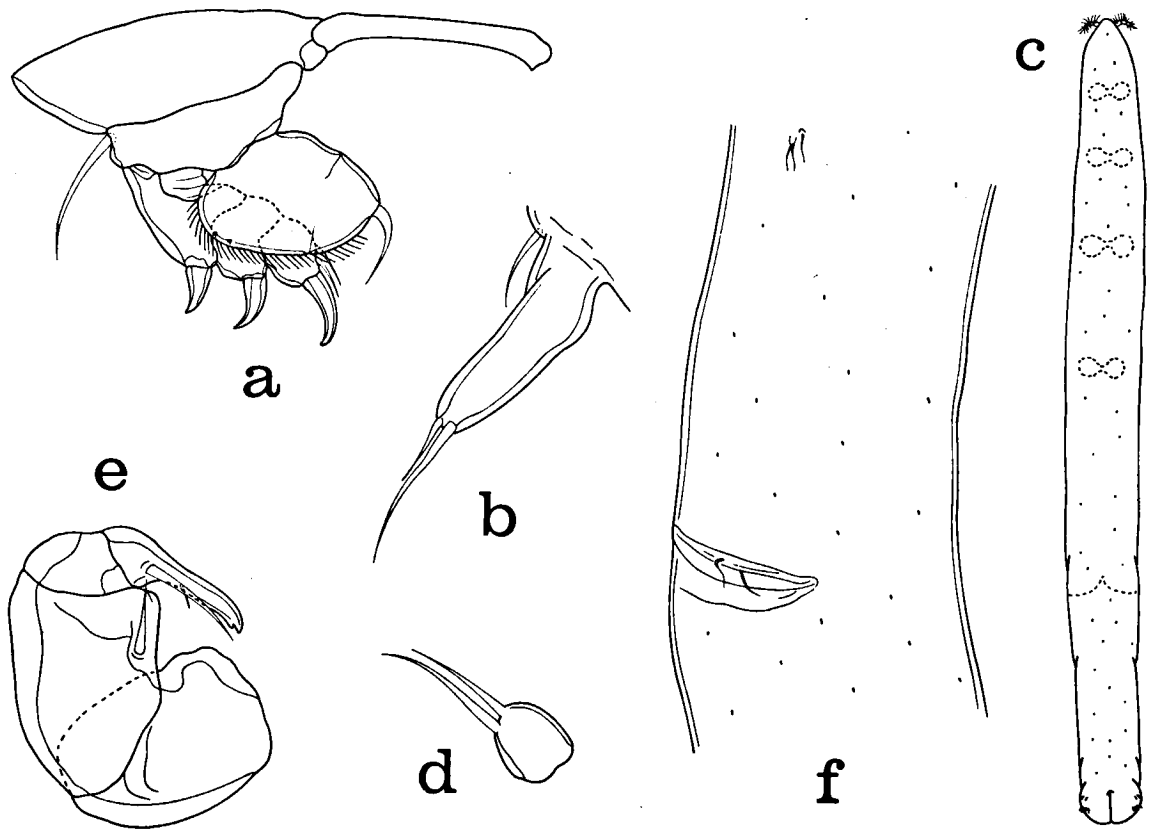

Fig. 14. *Xarifia trituberata* n. sp. Female. a, leg 3 and intercoxal plate, anterior (scale F); b, leg 5, ventrolateral (F). Male. c, dorsal (M); d, first maxilla, anterior (N); e, maxilliped, medial (N); f, leg 5 and leg 6, lateral (I).

marck): 1 ♂, in 1 m, Rocher à la Voile, Noumea, 15 June 1971. From *Acropora danai* (Milne Edwards and Haime): 3 ♀♀, 2 ♂♂, in 1.5 m, Ricaudy Reef, near Noumea 22°19'00"S, 166°26'44"E, 15 June 1971. From *Acropora humilis* (Dana): 4 ♀♀, in 1.5 m, Rocher à la Voile, Noumea, 19 June 1971. From *Acropora patula* (Brook): 1 ♂, in 1.5 m, Ricaudy Reef, near Noumea, 15 June 1971. From *Acropora gravida* (Dana): 3 ♀♀, 20 ♂♂, in 3 m, west of Isle Mando, near Noumea, 22°18'59"S, 166°09'30"E, 26 June 1971. From *Acropora affinis* (Brook): 3 ♂♂, in 2 m, west of Isle Mando, near Noumea, 5 July 1971.

Female. — Body (Fig. 13a, b) moderately slender, about 7 times longer than wide. Length 1.50 mm (1.49-1.53 mm) and greatest width 0.23 mm (0.23-0.24 mm), based on 3 specimens. External segmentation very weak. Region dorsal to fifth pair of legs with 3 small subequal knobs or processes. Genital and postgenital segments together about 28 per cent of body length. Genital areas situated dorsally. Caudal ramus (Fig. 13c) short, rounded, fused with anal segment, and bearing 5 subterminal setae and 2 lateral setae, all smooth. Egg sac not seen.

Rostrum rounded. First antenna (Fig. 13d) short, 39 μm, and perhaps 3-segmented but segmentation indistinct. Formula: 3, 17 + 1 aesthete + 1 knoblike process, and 6 + 2 aesthetes. All setae naked. Second antenna (Fig. 13e) 31 μm long including claw and 4-segmented. Armature: 1, 1, 2, and I + 1 + 1 small setule. Claw 2.5 μm and subterminal seta 7 μm. All setae smooth.

Labrum similar to that of *Xarifia breviramea*. Mandible (Fig. 13f) 18 μm long and unilaterally dentate near tip. Paragnath not seen. First maxilla (Fig. 13g) with 2 smooth setae. Second maxilla (Fig. 13h-j) 2-segmented. Second segment with 3 proximal setae and terminal digitiform process. Maxilliped (Fig. 13k) 3-segmented. First segment with inner lobe. Second segment with inner lobe and 2 small setae. Third segment with 3 terminal setae.

Legs 1-4 (Figs. 13l, m, 14a) with 3-segmented exopods and 1-segmented endopods. Spine and setal formula as follows (Roman numerals indicating spines, Arabic numerals representing setae):

P_1	coxa	o-o	basis	1-o	exp	I-o;	I-o;	I, 3
					enp	3		
P_2	coxa	o-o	basis	1-o	exp	I-o;	I-o;	I, 3
					enp	2		
P_{3+4}	coxa	o-o	basis	1-o	exp	I-o;	I-o;	I, 2
					enp	1		

Exopods with smooth outer spines. First exopod segments of legs 1 and 2 with minute spinelike process at base of spine. Endopods with hairlike setules along outer margin.

Leg 5 (Fig. 14b) 42 μm long, its 2 terminal smooth setae 13 μm and 31 μm.

Color in living specimens in transmitted light opaque gray or brown, intestine brown, eye red.

Male. — Body (Fig. 14c) slender, about 10.4 times longer than wide. Length 1.59 mm (1.43-1.66 mm) and greatest width 0.14 mm (0.14-0.15 mm), based on 7 specimens. External segmentation mostly absent. Caudal ramus similar to that of female.

Rostrum, first antenna, second antenna, labrum, and mandible as in female. Paragnath not seen. First maxilla (Fig. 14d) with 2 setae. Second maxilla similar to that of female. Maxilliped (Fig. 14e) 4-segmented. First segment unarmed. Second segment with only 1 seta visible. Third segment unarmed. Claw (fourth segment) 16 μm with bifid tip and bearing 2 very unequal setae.

Legs 1-4 as in female.

Leg 5 (Fig. 14f) represented by 3 small setae, 2 of them arising from extremely small lobe.

Leg 6 (Fig. 14f) a posteroventral flap on genital segment bearing 2 small setae.

Spermatophore not seen.

Color as in female.

Etymology. — The specific name *trituberata*, from Latin *tri-*, three, and *tuberatus*, with knobs, refers to the three small knobs on the region dorsal to the fifth legs.

Remarks. — *Xarifia trituberata* may be separated from all other species in the genus by the three small subequal knobs or processes on the region dorsal to the fifth pair of legs. Only *Xarifia gerlachi* Humes, 1962, approaches this condition, but in this species the median process is distinctly shorter than the two lateral processes. The endopod of leg 1 bears 3 setae in the new species, but only 2 setae in *X. gerlachi*.

Xarifia ablusa n. sp.

Figs. 15a-k, 16a-n

Type material. — 17 ♀♀, 6 ♂♂ from *Acropora rambleri* (Bassett-Smith), in 15 m, Poelau Parang, eastern Ceram, 3°17′00″S, 130°44′48″E, 23 May 1975. Holotype ♀, allotype, and 15 paratypes (12 ♀♀, 3 ♂♂) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.; the remaining paratypes (dissected) in the collection of the first author.

Other specimens. — From *Acropora rambleri* (Bassett-Smith): 3 ♀♀, 2 ♂♂, from type locality, same date. From *Acropora corymbosa* (Lamarck): 4 ♀♀, 5 ♂♂, in 1 m, Rocher à la Voile, Noumea, New Caledonia, 22°18′24″S, 166°25′50″E, 15 June 1971. From *Acropora rosaria* (Dana): 20 ♀♀, 5 ♂♂, in 2 m, west of Isle Mando, near Noumea, 22°18′59″S, 166°09′30″E, 1 July 1971. From *Acropora exilis* (Brook): 3 ♀♀, in 2 m, west of Isle Mando, near Noumea, 15 July 1971.

Female. — Body (Fig. 15a, b) moderately slender, about 6.5 times longer than wide. Length 1.00 mm (0.93-1.06 mm) and greatest width 0.16 mm (0.14-0.17 mm), based on 10 specimens. External segmentation weak. Region dorsal to fifth pair of legs with 3 long

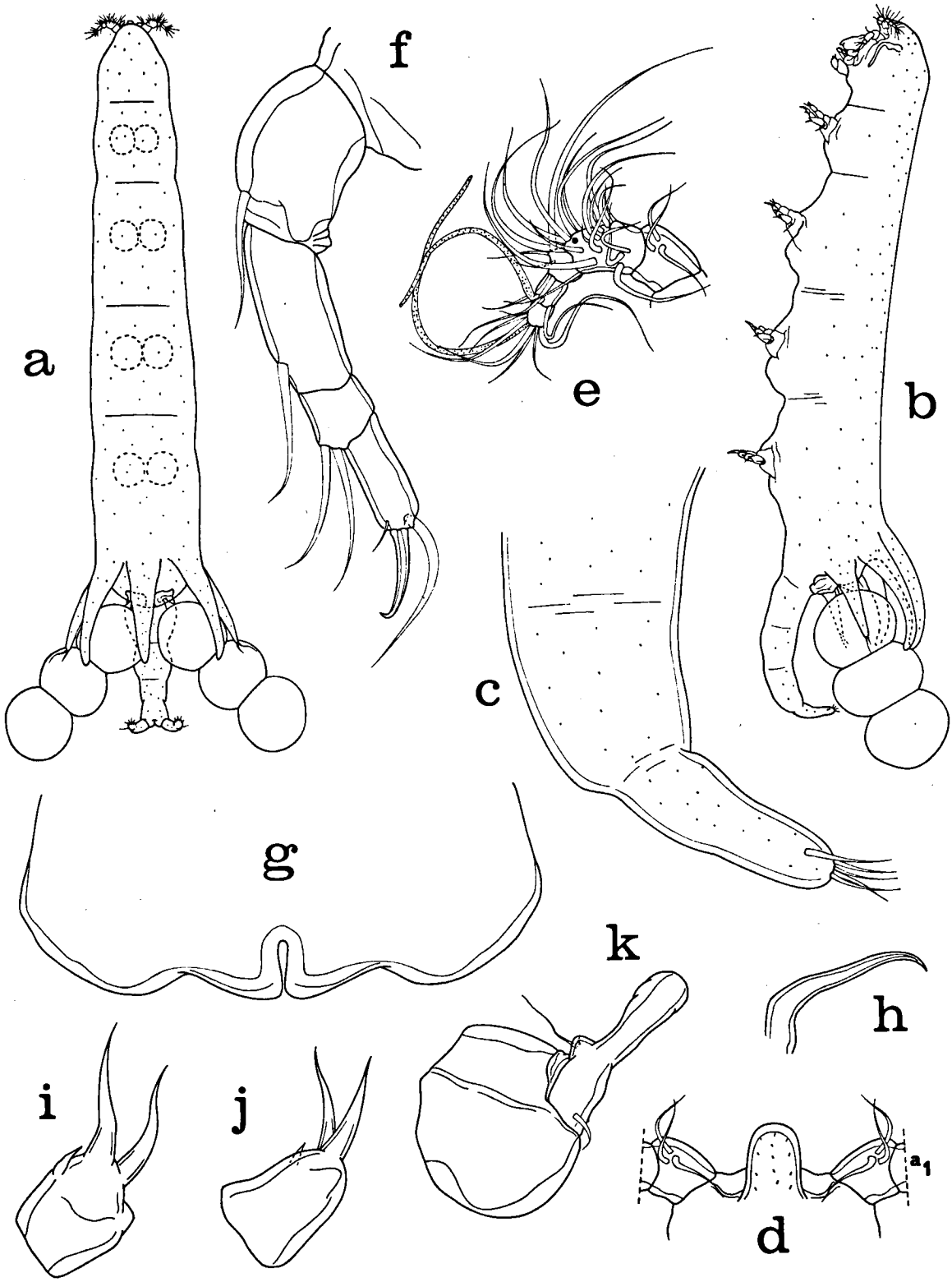

Fig. 15. *Xarifia ablusa* n. sp., female. a, dorsal (scale B); b, lateral (B); c, caudal ramus, lateral (F); d, rostrum (a_1 = position of first antenna), dorsal (F); e, first antenna, with dot indicating position of aesthete added in male, anterodorsal (F); f, second antenna, dorsal (N); g, labrum, ventral (N); h, mandible, ventral (N); i, first maxilla, ventro-outer (N); j, first maxilla, dorsal (N); k, second maxilla, antero-outer (N).

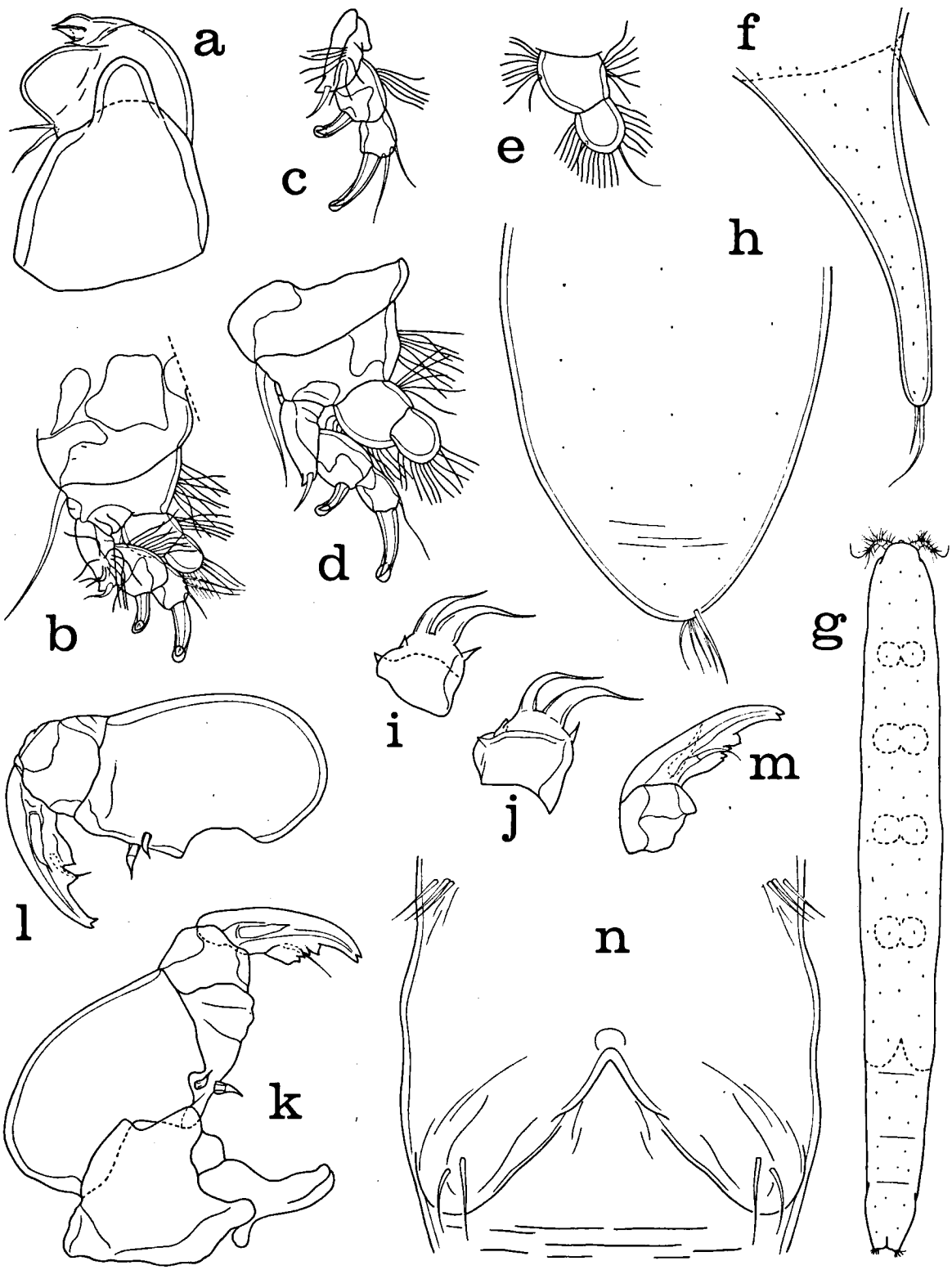

Fig. 16. *Xarifia ablusa* n. sp. Female. a, maxilliped, outer (scale N); b, leg 1, posterior (F); c, exopod of leg 2, posterior (F); d, leg 3, posterior (F); e, endopod of leg 4, anterior (F); f, leg 5, lateral (E). Male. g, dorsal (B); h, caudal ramus, lateral (F); i, first maxilla, inner (N); j, first maxilla, outer (N); k, maxilliped, inner (F); l, distal portion of maxilliped, inner (F); m, third segment and claw of maxilliped, outer (F); n, leg 5 and leg 6, ventral (E).

equal processes. Genital and postgenital segments together about 20 per cent of body length. Genital areas located dorsally. Caudal ramus (Fig. 15c) elongate, 35 × 16 μm, bearing 1 subterminal and 4 terminal smooth setae. Egg sac (Fig. 15b) 276 × 138 μm, with 3 eggs 115-138 μm in diameter.

Rostrum (Fig. 15d) slender and rounded. First antenna (Fig. 15e) short, 38 μm, and 5-segmented. Lengths of segments (measured along their posterior sides): 8.5, 11, 3.5, 6, and 6 μm, respectively. Formula: 3, 18,5 (longest of these setae possibly an aesthete), 2 + 1 aesthete, and 7 + 1 aesthete. All setae naked. Second antenna (Fig. 15f) 35 μm, not including claw, and 4-segmented. Armature: 1, 1, 2, and I + 1 + 1 setule. Claw 11 μm and long seta 18 μm. Setae smooth.

Labrum (Fig. 15g) deeply incised medially. Mandible (Fig. 15h) slender, falcate, and smooth. Paragnath not seen. First maxilla (Fig. 15i, j) with 2 smooth setae, 1 small spiniform process, and 1 conical process. Second maxilla (Fig. 15k) 2-segmented. Second segment proximally with 1 seta and 2 setules; distal segment prolonged as digitiform process. Maxilliped (Fig. 16a) 3-segmented. First segment with distal lobe. Second segment with inner lobe and 2 small setae. Third segment with 3 terminal setae.

Legs 1-4 (Fig. 16b-e) with 3-segmented exopods and 1-segmented endopods. Spine and setal formula as follows (Roman numerals indicating spines, Arabic numerals representing setae):

P_1	coxa	o-o	basis	1-o	exp	1-o;	I-o;	I, 3
					enp	o-o;	3	
P_2	coxa	o-o	basis	1-o	exp	1-o;	I-o;	I, 2
					enp	o-o;	3	
P_3	coxa	o-o	basis	1-o	exp	1-o;	I-o;	I,1
					enp	o-o;	o	
P_4	coxa	o-o	basis	1-o	exp	1-o;	I-o;	I, 1
					enp	o-o;	1	

Exopods with first segment having outer seta rather than spine and possessing minute spinelike process at base of seta.

Leg 5 (Fig. 16f) elongate, 116 μm, tapered, bearing 2 terminal smooth setae 13 μm and 25 μm. Dorsal seta 29 μm.

Color in living specimens in transmitted light opaque gray, eye red, egg sacs gray.

Male. — Body (Fig. 16g) slender, about 8.5 times longer than wide. Length 0.98 mm (0.93-1.03 mm) and greatest width 0.12 mm (0.11-0.13 mm), based on 8 specimens. External segmentation mostly not evident. Caudal ramus (Fig. 16h) fused with anal segment and bearing 5 smooth setae (1 seta slightly subterminal).

Rostrum as in female. First antenna like that of female, but 1 aesthete added on second segment (at point indicated by dot in Fig. 15e). Second antenna, labrum, and mandible as in female. Paragnath not seen. First maxilla (Fig. 16i, j) with 2 or 3 small spiniform processes in addition to 2 terminal setae. Maxilliped (Fig. 16k, l) 4-segmented. First segment unarmed. Second segment with 2 small setae. Small third segment unarmed. Claw (fourth segment) (Fig. 16m) 38-43 μm long, with bifid tip, with variably toothed concave margin, and having 2 proximal setae.

Legs 1-4 as in female.

Leg 5 (Fig. 16n) represented by 3 small setae.

Leg 6 (Fig. 16n) a posteroventral flap on genital segment bearing 2 small setae.

Spermatophore not seen.

Color as in female.

Etymology. — The specific name *ablusa*, from Latin *abludo*, meaning to differ in appearance, alludes to the extreme sexual dimorphism in the caudal ramus of this species.

Remarks. — *Xarifia ablusa* may be distinguished from all congeners by the presence of a seta instead of a spine on the first exopod segment in legs 1-4. The formula 3, 3, 0, 1 for the terminal segments of the endopods in legs 1-4 is unique in the genus. Extreme sexual dimorphism in the caudal ramus, similar to that seen in the new species, occurs in three species, *Xarifia anomala* Humes and Ho, 1968, and *Xarifia heteromeles* and *Xarifia extensa*, both new species described below, all of which can be distinguished from *Xarifia ablusa* by the two characters just mentioned.

Xarifia exuta n. sp.

Figs. 17a-k, 18a-g

Type material. — 11 ♀♀, 4 preadult ♀♀, and 27 ♂♂ from *Acropora palifera* (Lamarck), in 10 m, Poelau Gomumu, south of Obi, Moluccas, 1°50'00"S, 127°30'54"E, 30 May 1975. Holotype ♀, allotype, and 28 paratypes (5 ♀♀, 23 ♂♂) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.; the remaining paratypes in the collection of the first author.

Other specimens. — 4 ♀♀, 3 preadult ♀♀, 7 ♂♂ from *Acropora palifera*, in 3 m, Poelau Gomumu, south of Obi, 30 May 1975.

Female. — Body (Fig. 17a, b) slender, about 7.4 times longer than wide. Length 2.28 mm (2.13-2.49 mm) and greatest width 0.28 mm (0.23-0.31 mm), based on 10 specimens. External segmentation visible indistinctly only in postgenital area. Region dorsal to fifth pair of legs with small dorsomedial lobe (Fig. 17c). Genital and postgenital segments together about 25 per cent of body length. Genital areas located dorsally. Caudal ramus (Fig. 17d) fused with anal segment and bearing 5 setae. Egg sac not seen.

Rostrum (Fig. 17e) rounded and a little protuberant. First antenna (Fig. 17e) very short, 22 μm long, and probably 4-segmented with armature 3, 15, 4, and 6, but segmentation and armature difficult to determine. All setae smooth. Second antenna (Fig. 17f) 43 μm long and probably 4-segmented but third and fourth segments not completely separated. Armature: 0, 0, 2, and 1 minute clawlike tip + 1 + 1 setule. Long subterminal seta 17 μm. Setae smooth.

Labrum (Fig. 17g) with truncate posteroventral margin and having small lobe overlapping shallow median indentation ventrally. Mandible (Fig. 17h) a slender unilaterally dentate blade with minutely bifurcate tip. Paragnath not seen. First maxilla (Fig. 17i) with 3 smooth setae. Second maxilla (Fig. 17j) 2-segmented. Second segment with 2 unequal setae and proximal sclerotized dentiform process; terminal digitiform process with attenuate tip. Maxilliped (Fig. 17k) 3-segmented. First segment with slight inner lobe. Second segment with inner lobe and 2 setae. Third segment with 2 setae and having spiniform tip.

Legs 1-4 (Fig. 18a, b) with 3-segmented exopods (though segmentation indistinct) and 1-segmented endopods. Spine and setal formula as follows (Roman numerals indicating spines, Arabic numerals representing setae):

P_{1+2}	coxa 0-0	basis 1-0	exp	I-0;	I-0;	I, 3
			enp	3		
P_{3+4}	coxa 0-0	basis 1-0	exp	I-0;	I-0;	I, 1
			enp	1		

Exopods with spines having lamellate tips. First exopod segment of legs 1 and 2 with minute spinelike process at base of spine. Endopods with hairlike setules along outer margin.

Leg 5 (Fig. 18c) with oval free segment 47 × 31 μm, bearing single terminal seta 13 μm.

Color in living specimens in transmitted light opaque gray, eye red.

Male. — Body (Fig. 18d, e) more slender than in female, about 13.3 times longer than wide. Length 1.37 mm (1.30-1.46 mm) and greatest width 0.11 mm (0.10-0.12 mm), based on 10 specimens. External segmentation absent. Caudal ramus similar to that of female.

Rostrum, first antenna, second antenna, labrum, and mandible as in female. Paragnath not seen. First maxilla and second maxilla as in female. Maxilliped (Fig. 18f) 4-segmented. First segment unarmed. Second segment with 2 setae. Third segment unarmed. Claw (fourth segment) 32 μm long with bifid tip and bearing proximally 2 unequal setae.

Legs 1-4 like those of female.

Leg 5 (Fig. 18g) represented by 3 small setae.

Leg 6 (Fig. 18g) a posteroventral flap on genital segment bearing 2 small setae.

Spermatophore not seen.

Color as in female.

Etymology. — The specific name *exuta*, Latin meaning divested or stripped, alludes to the absence of processes or knobs on the region dorsal to the fifth legs in the female, the absence of a seta on the first two segments of the

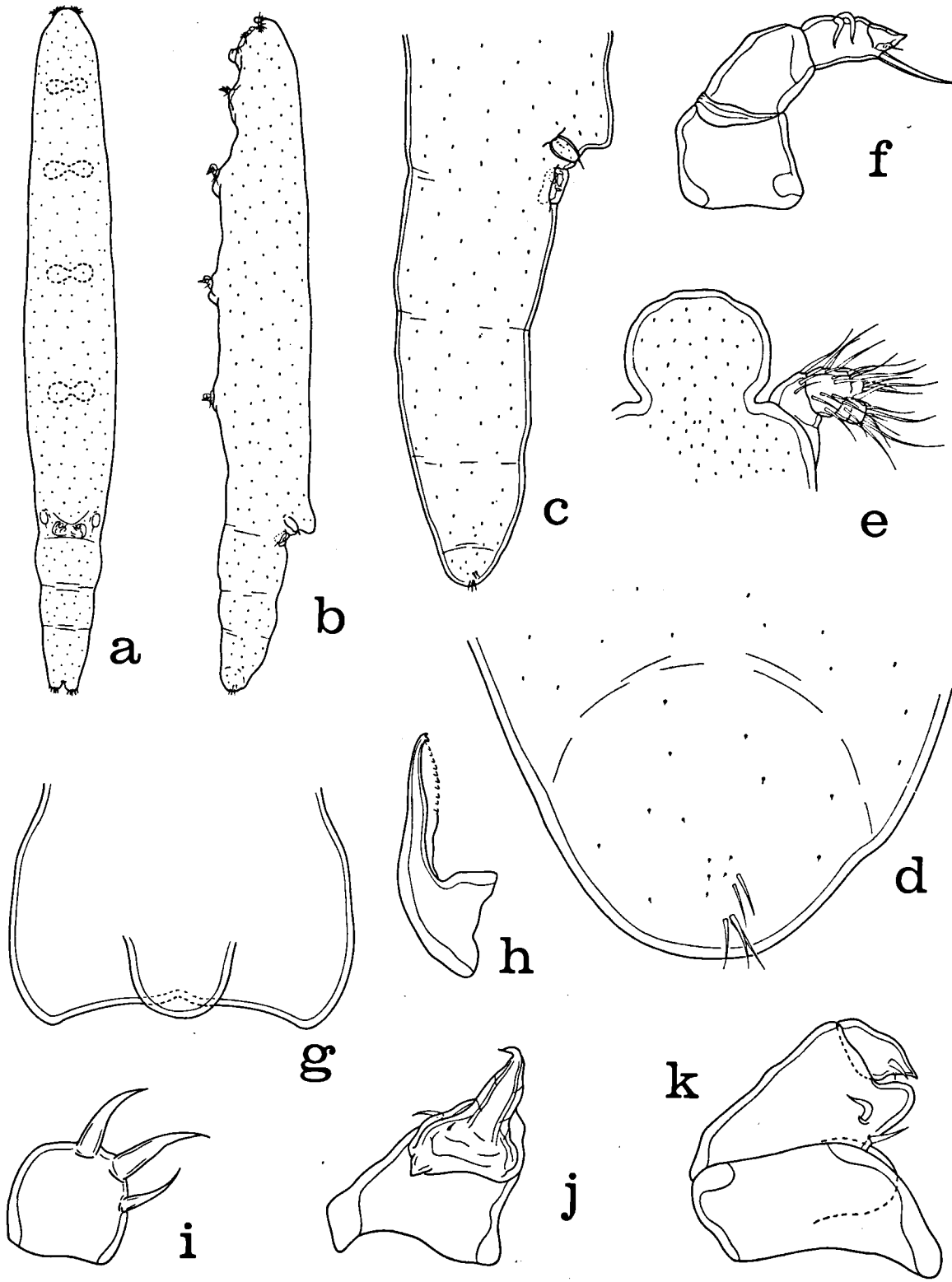

Fig. 17. *Xarifia exuta* n. sp., female. a, dorsal (scale A); b, lateral (A); c, urosome, lateral (E); d, caudal ramus, lateral (F); e, rostrum and first antenna, dorsal (F); f, second antenna, anteroventral (K); g, labrum, ventral (K); h, mandible, ventral (N); i, first maxilla, anteroventral (N); j, second maxilla, inner (N); k, maxilliped, inner (K).

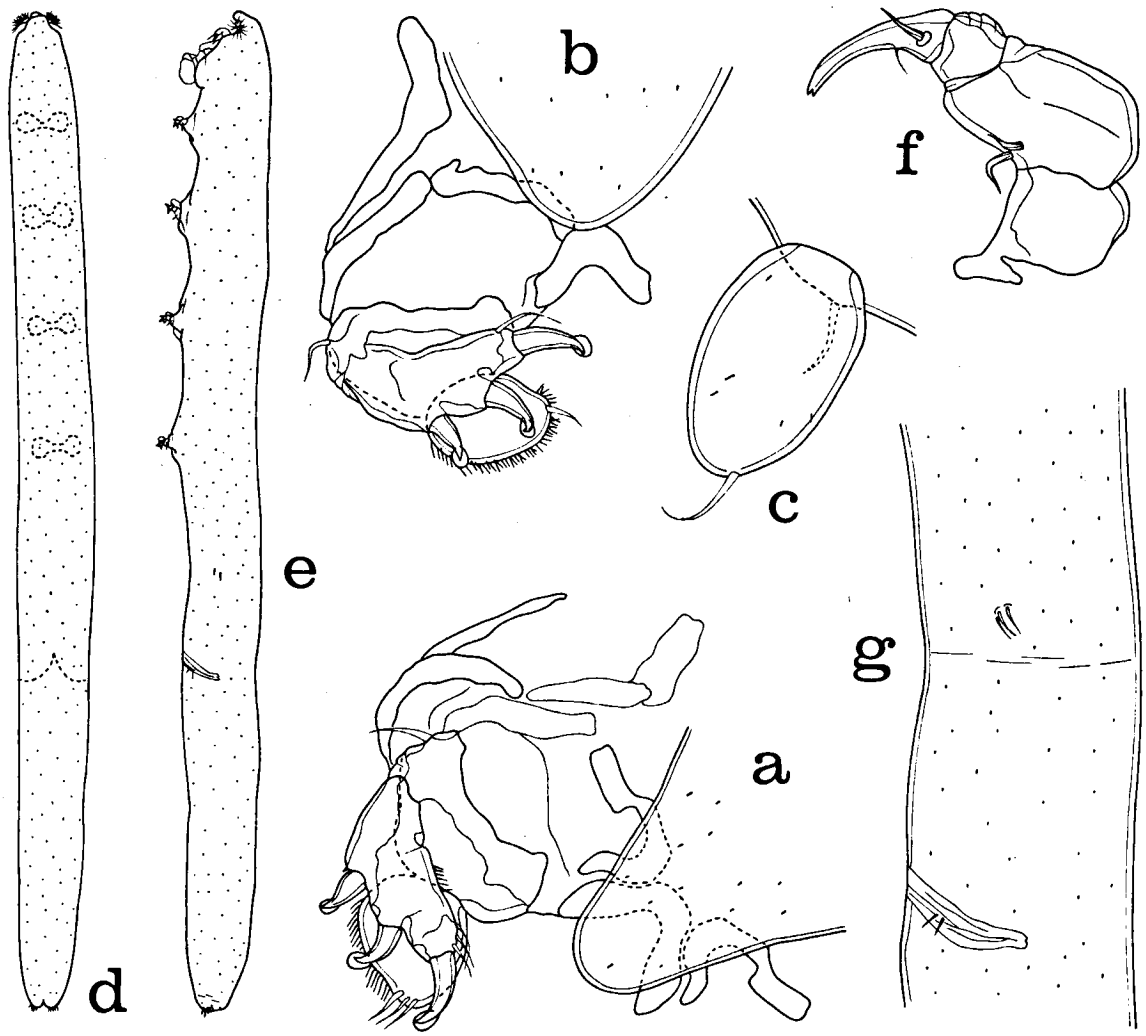

Fig. 18. *Xarifia exuta* n. sp. Female a. leg 1 and intercoxal plate, posterior (scale F); b, leg 3 and intercoxal plate, posterior (F); c, leg 5, lateral (F). Male. d, dorsal (L); e, lateral (L); f, maxilliped, inner (F); g, leg 5 and leg 6, lateral (I).

second antenna, and the presence of only one terminal seta on the fifth leg of the female.

Remarks. — Six congeners lack processes or knobs dorsal to the fifth legs, as in the new species. These species may be distinguished from *Xarifia exuta* as follows: in *Xarifia reducta* Humes, 1962, *Xarifia serrata* Humes, 1962, *Xarafia lissa* Humes and Ho, 1968, *Xarifia temnura* Humes and Ho, 1968, and *Xarifia extensa*, new species described below, the second exopod segment of leg 2 lacks an outer spine or at most has only a minute remnant of such a spine; in *Xarifia anopla*, new species described below, the caudal ramus is fused with the anal segment and lacks setae.

Xarifia mucronata n. sp.

Figs. 19a-l, 20a-m

Type material. — 4 ♀♀, 3 ♂♂ from *Acropora palifera* (Lamarck), in 10 m, Poelau Gomumu, south of Obi, Moluccas, 1°50′00″S, 127°30′54″E, 30 May 1975. Holotype ♀, allotype, and 2 paratypes (1 ♀, 1 ♂) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.; the remaining

paratypes (dissected) in the collection of the first author.

Other specimens. — 2 ♀♀, 2 ♂♂ from *Acropora palifera* forma *alpha* (Brook), in 2-3 m, west of Isle Mando, near Noumea, New Caledonia, 22°18′59″S, 166°09′30″E, 5 July 1971.

Female. — Body (Fig. 19a, b) elongate and slender, about 11.5 times longer than wide. Length 2.08 mm (1.66-2.36 mm) and greatest width 0.18 mm (0.14-0.20 mm), based on 6 specimens. External segmentation obscure and only vaguely indicated in urosome. Region dorsal to fifth pair of legs bearing 3 long processes, middle process distinctly longer than 2 lateral processes (Fig. 19c). Genital and postgenital segments together about one-fourth of body length. Genital areas located dorsally. Caudal ramus (Fig. 19d) elongate, about 140 × 32 μm, with 5 terminal setae and 1 lateral seta. Egg sac not seen. Body surface with extremely minute setules (sensilla ?).

Rostrum (Fig. 19e) rounded. First antenna (Fig. 19e) very short, 24 μm, and probably 4-segmented (though segmentation difficult to determine). Armature: 3, 16, 3 + 1 aesthete, and 4 + 2 aesthetes. All setae smooth. Second antenna (Fig. 19f) 33 μm long, not including terminal seta, and 3-segmented (with third segment apparently result of fusion of 2 segments). Armature: 1, 1, and 2 + 2. Long terminal seta 14 μm and not clawlike, adjacent seta 7 μm. All setae smooth.

Labrum (Fig. 19g) with posteroventral margin bearing 2 slender digitiform processes near medial indentation. Mandible (Fig. 19h, i) with blade slightly swollen and bearing 2 or 3 terminal tines and 3 subterminal spines. Paragnath a small hairy lobe. First maxilla (Fig. 19j) with 2 smooth setae and a minute knob. Second maxilla (Fig. 19k) 2-segmented, second segment bearing 2 small hyaline setae. Maxilliped (Fig. 19l) 2-segmented (second and third segments seen in congeners here fused). First segment unarmed. Second segment with 2 proximal inner setae and having near tip 2 minute setae and 1 spine.

Legs 1-4 (Fig. 20a-c) with 3-segmented exopods and 1- or 2-segmented endopods as in following spine and setal formula (Roman numerals indicating spines, Arabic numerals representing setae):

P_1	coxa	o-o	basis	1-o	exp	I-o;	I-o;	I, 2
					enp	3		
P_2	coxa	o-o	basis	1-o	exp	I-o;	I-o;	I, 2
					enp	o-o;	3	
P_{3+4}	coxa	o-o	basis	1-o	exp	I-o;	I-o;	I, 1
					enp	1		

Endopod of leg 1 one-segmented but endopod of leg 2 clearly 2-segmented. Endopods of legs 3 and 4 apparently 1-segmented but with very slight indication of second segment.

Leg 5 (Fig. 20d-f) approximately 68-86 μm long, varying slightly in shape depending on specimen observed, and bearing 2 terminal setae about 13 μm.

Color in living specimens in transmitted light opaque gray, eye red.

Male. — Body (Fig. 20g) long and slender, about 11 times longer than wide. Length 1.74 mm (1.59-1.86 mm) and greatest width 0.16 mm (0.15-0.16 mm), based on 5 specimens. Caudal ramus (Fig. 20h) shorter than in female, 35 × 19 μm.

Rostrum as in female. First antenna like that of female but 1 aesthete added (at position indicated by dot in Fig. 19e). Second antenna, labrum, mandible, paragnath, first maxilla, and second maxilla similar of those of female. Maxilliped (Fig. 20i) 4-segmented. First segment with inner seta. Second segment with 2 setae. Small third segment unarmed. Claw (fourth segment) short, 29 μm long, with trifid tip and subterminal small tooth, and bearing 2 very unequal proximal setae, 1 seta slender, other seta large and stout with mucronate tip.

Exopods of legs 1-4 as in female; endopods of these legs (Fig. 20j-l) with formula as follows (Arabic numerals representing setae);

P_{1+2}	o-o;	3
P_3	1	
P_4	o-o;	1

Endopods 2-segmented except for 1-segmented endopod in leg 3.

Leg 5 (Fig. 20 m) represented by 3 small setae.

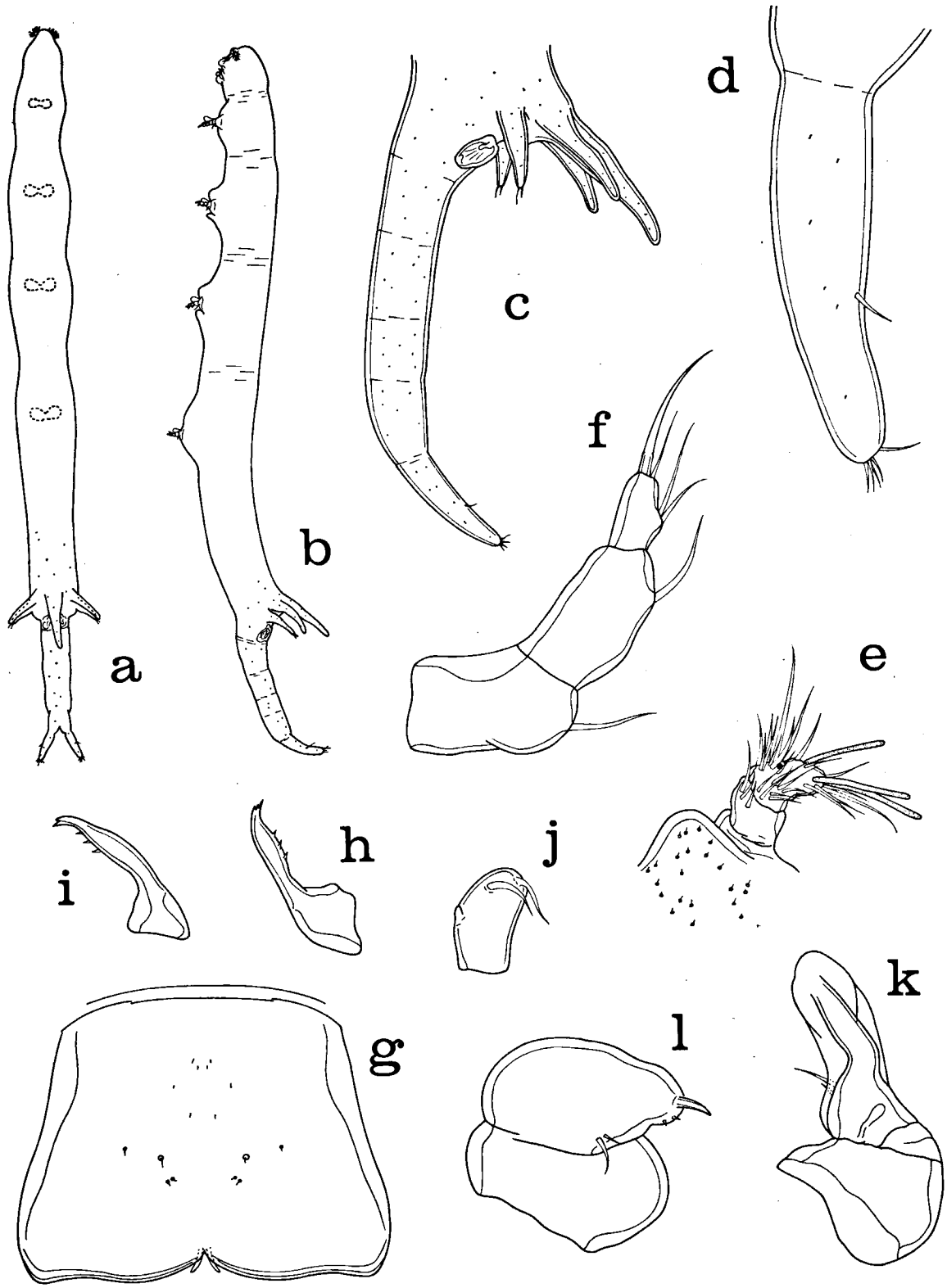

Fig. 19. *Xarifia mucronata* n. sp., female. a, dorsal (scale H); b, lateral (H); c, urosome, lateral (L); d, caudal ramus, lateral (D); e, rostrum and first antenna, with dot indicating position of aesthete added in male, antero-dorsal (F); f, second antenna, dorsal (N); g, labrum, ventral (N); h, mandible, ventral (N); i, mandible, dorsal (N); j, first maxilla, postero-inner (N); k, second maxilla, postero-inner (N); l, maxilliped, inner (N).

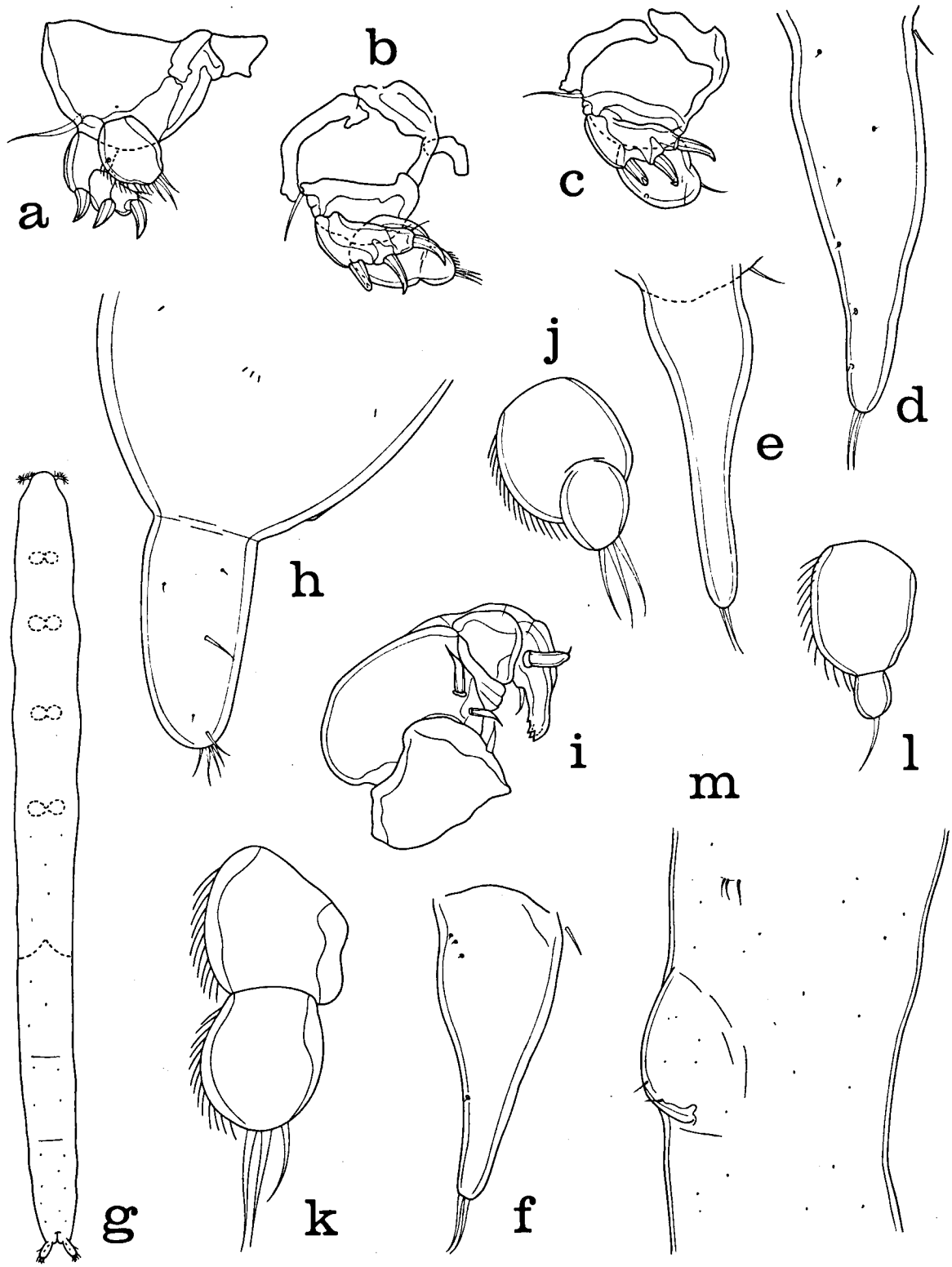

Fig. 20. *Xarifia mucronata* n. sp. Female. a, leg 1 and intercoxal plate, anterior (scale F); b, leg 2 and intercoxal plate, posterior (F); c, leg 3, posterior (F); d, leg 5, lateral (F); e, leg 5, lateral (F); f, leg 5, lateral (F). Male. g, dorsal (M); h, caudal ramus, lateral (F); i, maxilliped, inner (F); j, endopod of leg 1, posterior (N); k, endopod of leg 2, posterior (N); l, endopod of leg 4, posterior (N); m, leg 5 and leg 6, lateral (I).

Leg 6 (Fig. 20 m) consisting of posteroventral flap on genital segment bearing 2 small setae.

Spermatophore not seen.

Color resembling that of female.

Etymology. — The specific name *mucronata*, Latin meaning terminating in a point, refers to the mucronate seta on the claw of the maxilliped in the male.

Remarks. — *Xarifia mucronata* may be distinguished from its congeners by the segmentation of the endopods of legs 1-4, being 1, 2, 1, 1 in the female and 2, 2, 1, 2 in the male. The mucronate seta on the claw of the maxilliped of the male is a feature unique to the new species.

Xarifia guttulifera n. sp.

Figs. 21a-j, 22a-l

Type material. — 2 ♀♀, 28 ♂♂ from *Acropora palifera* (Lamarck) forma *alpha* (Brook), in 3 m, west of Isle Mando, near Noumea, New Caledonia, 22°18'59"S, 166°09'30"E, 26 June 1971. Holotype ♀, allotype, and 24 paratypes (1 ♀, 23 ♂♂) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.; the remaining paratypes (dissected) in the collection of the first author.

Other specimens. — 2 ♀♀, 9 ♂♂ from *Acropora palifera* forma *alpha*, in 2 m, west of Isle Mando, near Noumea, 5 July 1971.

Female. — Body (Fig. 21a, b) slender, 9.2 times longer than wide. Length 2.44 mm (2.42-2.46 mm) and greatest width 0.20 mm (0.20-0.21 mm), based on 4 specimens. External segmentation not visible. Region dorsal to fifth pair of legs bearing 3 short drop-shaped processes (Fig. 21c), middle process a little longer than 2 lateral processes. Genital and postgenital segments together about 38 per cent of body length. Genital areas situated dorsally (Fig. 21a). Caudal ramus (Fig. 21d) fused with anal segment and bearing 5 setae (4 terminal and 1 lateral). Egg sac not seen. Body surface with extremely small setules.

Rostrum (Fig. 21e) rounded. First antenna (Fig. 21f) short, only 22 μm along greatest length, and 4-segmented. Armature: 2, 11, 3 + 1 aesthete, and 4 + 1 aesthete. All setae naked. Second antenna (Fig. 21g) 38 μm long and 4-segmented. Armature: 0, 0, 2, and I + 1 + 3. Claw very short and broad. Long seta 17 μm. All setae naked.

Labrum (Fig. 21h) with median lobe overhanging truncate posteroventral margin. Mandible (Fig. 21i) with slender blade having terminally 2 small tines and subterminally bearing row of minute spinules. Paragnath not seen. First maxilla (Fig. 21j) with 3 smooth setae. Second maxilla (Fig. 22a) 2-segmented, second segment with 2 proximal setae and 1 terminal seta. Maxilliped (Fig. 22b) 3-segmented, second and third segments with 2 setae.

Legs 1-4 (Fig. 22c-e) with 3-segmented exopods and 1-segmented endopods. Spine and setal formula as follows (Roman numerals indicating spines, Arabic numerals representing setae):

P_1	coxa	0-0	basis	1-0	exp	I-0;	I-0;	I, 3
					enp	3		
P_2	coxa	0-0	basis	1-0	exp	I-0;	I-0;	I, 2
					enp	3		
P_{3+4}	coxa	0-0	basis	1-0	exp	I-0;	I-0;	I, 1
					enp	0		

First segment of exopod of legs 1-4 with minute spinelike process at base of spine. Leg 5 variable in form, and having single terminal seta. In Fig. 22f segment 42 × 17 μm, terminal seta 13 μm; in Fig. 22g segment 41 × 20 μm, terminal seta 22 μm. Dorsal seta 17 μm long.

Color in living specimens in transmitted light opaque gray, eye red.

Male. — Body (Fig. 22h, i) more slender than in female, about 13 times longer than wide. Length 1.51 mm (1.43-1.59 mm) and greatest width 0.11 mm (0.11-0.12 mm), based on 10 specimens. Caudal ramus like that of female.

Rostrum, first antenna, second antenna, labrum, mandible, and first maxilla as in female. Second maxilla (Fig. 22j) with second segment more attenuate than in female, having 2 spinelike processes in addition to 2 setae, and tip filiform terminally rather than setiform as in female. Maxilliped (Fig. 11k) 4-segmented. First segment unarmed. Second segment with

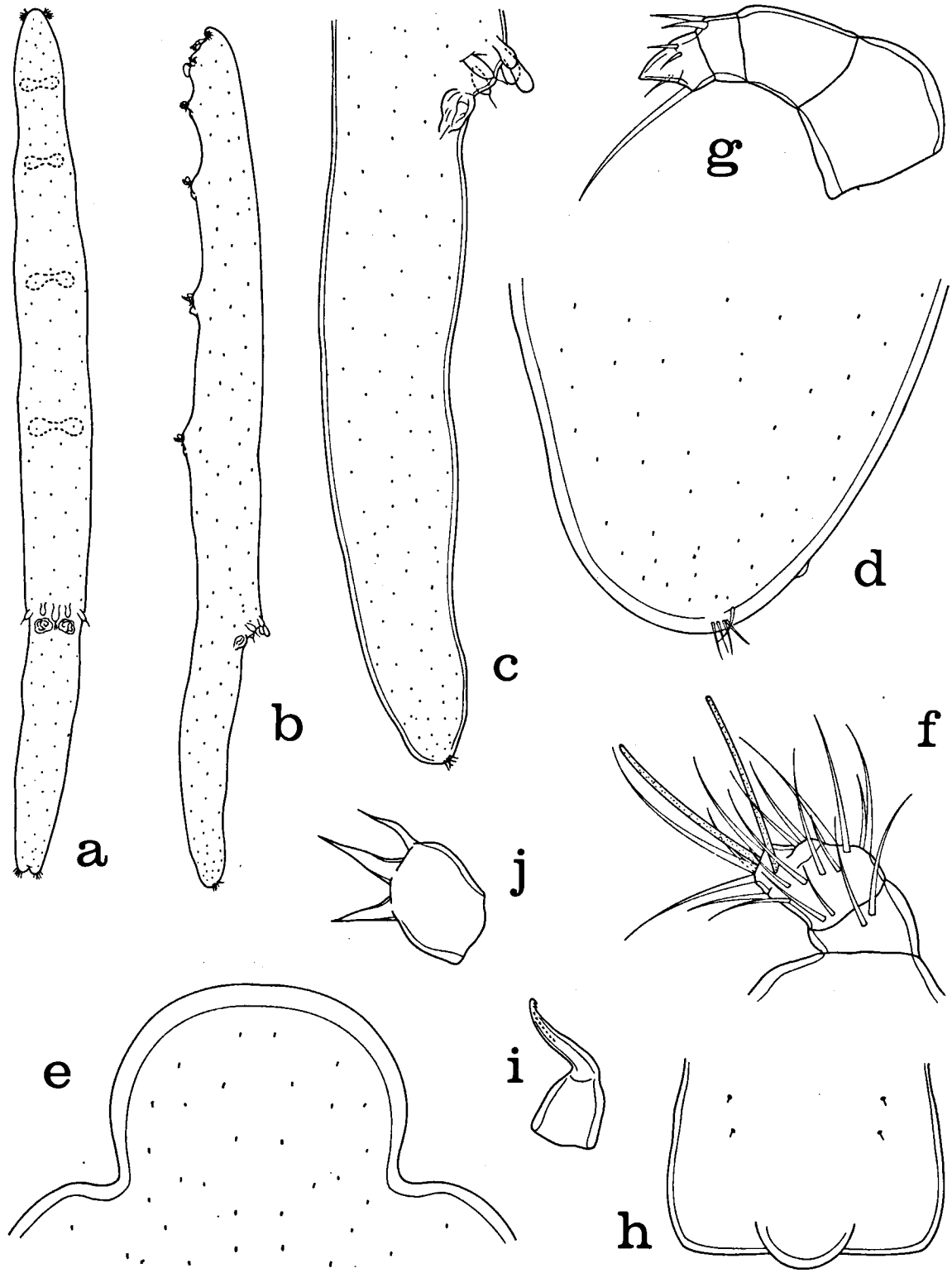

Fig. 21. *Xarifia guttulifera* n. sp., female. a, dorsal (scale H); b, lateral (H); c, urosome, lateral (J); d, caudal ramus, lateral (F); e, rostrum, dorsal (N); f, first antenna, anterodorsal (N); g, second antenna, dorsal (N); h, labrum, ventral (K); i, mandible, inner (N); j, first maxilla, posterodorsal (N).

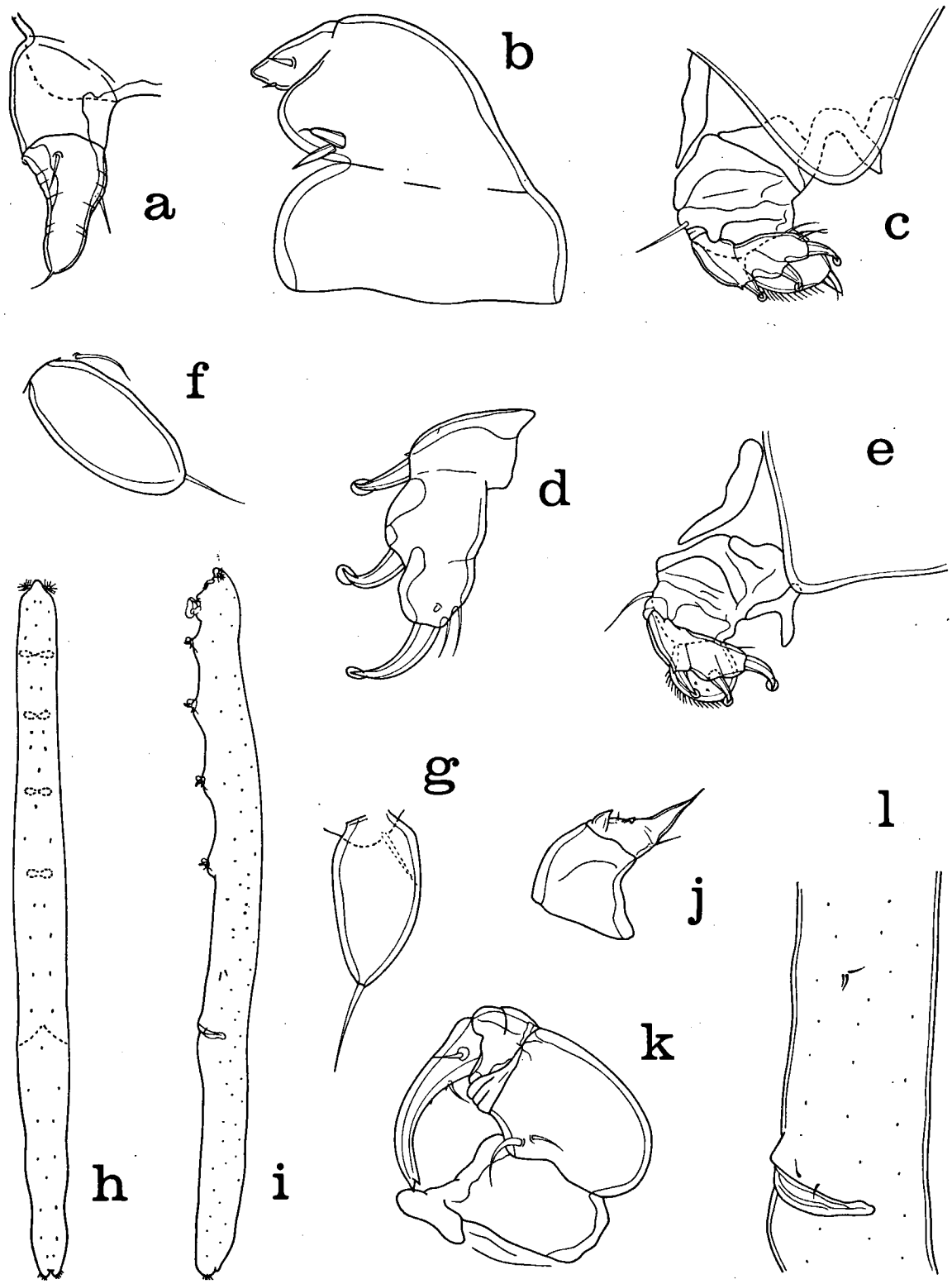

Fig. 22. *Xarifia guttulifera* n. sp. Female. a, second maxilla, outer (scale N); b, maxilliped, inner (N); c, leg 1 and intercoxal plate, posterior (F):, d, exopod of leg 2, posterior (N); e, leg 3 and intercoxal plate, posterior (F); f, leg 5, lateral (F); g, leg 5, lateral (F). Male. h, dorsal (M); i, lateral (M); j, second maxilla, postero-inner (N); k, maxilliped, inner (K): l, leg 5 and leg 6, lateral (C).

2 setae. Third segment unarmed. Claw (fourth segment) 32 μm long, with bifid tip, and bearing 2 proximal setae and 2 minute denticles on concave margin.

Legs 1-4 as in female.

Leg 5 (Fig. 22l) represented by 3 small setae.

Leg 6 (Fig. 22l) a posteroventral flap on genital segment bearing 2 small setae.

Spermatophore not seen.

Color as in female.

Etymology. — The specific name *guttulifera*, from Latin *guttula*, a little drop, and *fero*, to bear, alludes to the drop-shaped processes above the fifth legs in the female.

Remarks. — Only five congeners have, as in the new species, 1-segmented endopods in legs 1-4, a 4-segmented (or indistinctly 4-segmented) second antenna, and the female caudal ramus fused with the anal segment. These species may be separated from *Xarifia guttulifera* as follows: in *Xarifia gerlachi* Humes, 1962, the body of the female is stout and the endopods of legs 1-4 are armed with 2, 2, 1, 1; in *Xarifia trituberata*, new species described above, the endopods are armed with 3, 2, 1, 1; and in *Xarifia exuta*, new species described above, the endopods are armed with 3, 3, 1, 1; in *Xarifia anopla*, new species described below, and *Xarifia temnura* Humes and Ho, 1968, there are no processes dorsal to the fifth legs in the female.

Only one other species, *Xarifia exuta*, new species described above, lacks setae on the first and second segments of the second antenna. This species lacks processes or knobs dorsal to the fifth legs and thus may be readily distinguished from *Xarifia guttulifera*.

Xarifia rosariae n. sp.

Figs. 23a-o, 24a-h

Type material. — 29 ♀♀, 11 ♂♂ from 1 colony of *Acropora rosaria* (Dana), in 2 m, west of Isle Mando, near Noumea, New Caledonia, 22°18′59″S, 166°09′30″E, 1 July 1971. Holotype ♀, allotype, and 29 paratypes (22 ♀♀, 7 ♂♂) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.; the remaining paratypes (dissected) in the collection of the first author.

Female. — Body (Fig. 23a, b) slender, about 13 times longer than wide. Length (including caudal rami) 1.67 mm (1.53-1.76 mm) and greatest width 0.13 mm (0.12-0.14 mm), based on 10 specimens. External segmentation not defined. Region dorsal to fifth pair of legs bearing 3 posteriorly directed processes, lateral processes more than half length of median process (Fig. 23c). Genital and postgenital segments together about one-third of body length. Genital areas situated dorsally. Caudal ramus (Fig. 23d, e) relatively short, 43 × 23 μm, ratio 1.87:1, with 4 terminal setae and 1 lateral seta. Egg sac not seen. Body surface with very small setules.

Rostrum (Fig. 23f) bluntly rounded. First antenna (Fig. 23f) very short, 25 μm in length, probably 3-segmented (though separation of second and third segments weak). Lengths of segments (measured along posterior nonsetiferous margins): 8.5, 9.6, and 7.2 μm, respectively. Armature: 3, 19 + 1 aesthete, and 5 + 2 aesthetes. All setae smooth. Second antenna (Fig. 23g) 3-segmented, 33 μm long without terminal clawlike spine. Armature: 1, 1, and 2 + I + 1. Clawlike spine 11 μm, and long adjacent seta 22 μm. All setae smooth.

Labrum (Fig. 23h) with posteroventral margin having 2 distantly spaced lateral lobes; no medial indentation. Mandible (Fig. 23i) slender, falcate, with bifid tip. Paragnath not seen. First maxilla (Fig. 23j, k) with 2 smooth setae and very small spiniform projection. Second maxilla (Fig. 23l, m) 2-segmented, second segment with 2 minute setae, constricted in midregion and flaring broadly at distal end. Maxilliped (Fig. 23n) 3-segmented. First segment unarmed. Second segment with 2 unequal setae and several setules. Third segment with stout terminal seta and slender subterminal seta.

Legs 1-4 (Figs. 23o, 24a) with 3-segmented exopods and 1-segmented endopods having following spine and setal formula (Roman numerals indicating spines, Arabic numerals representing setae):

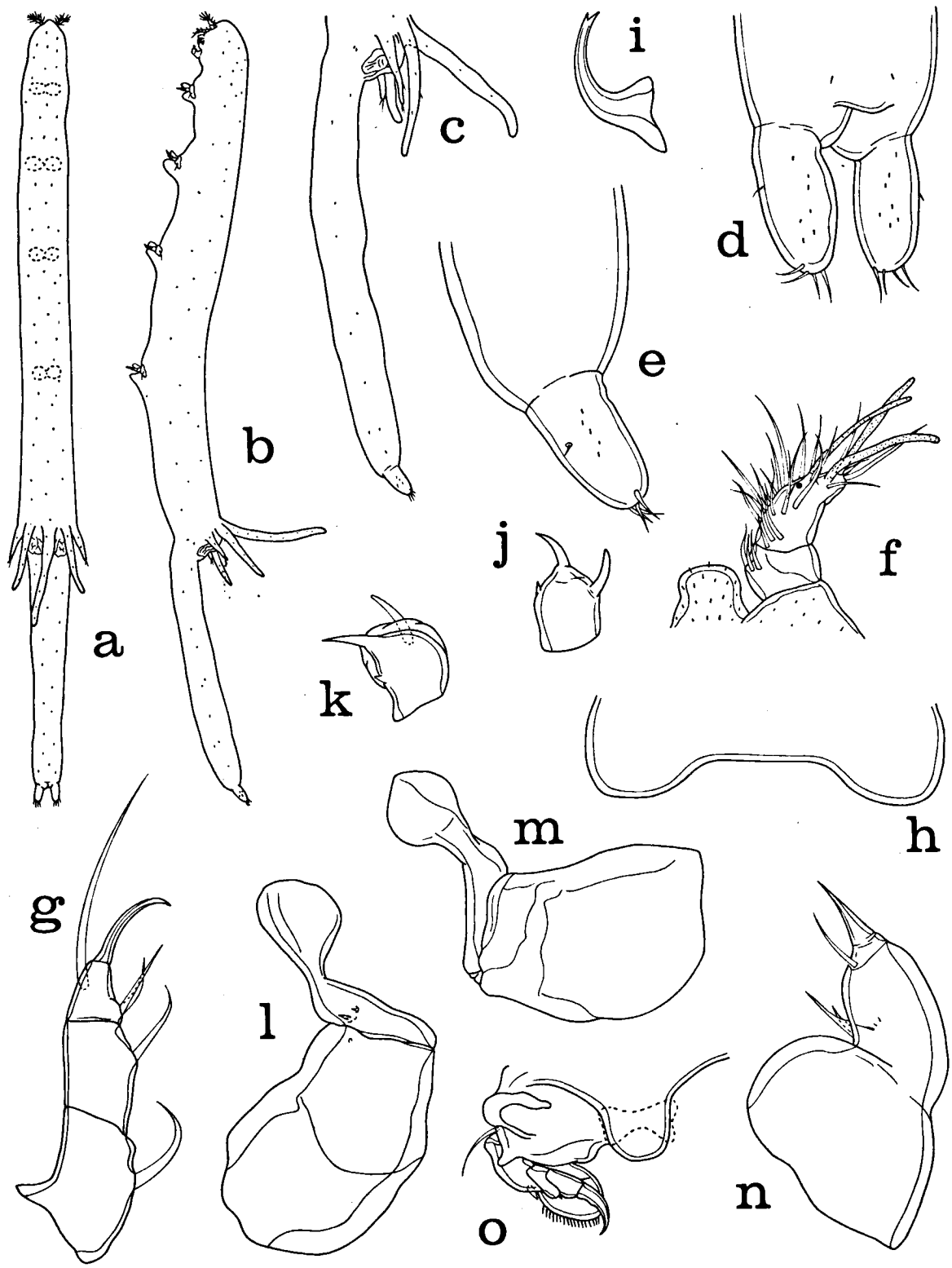

Fig. 23. *Xarifia rosariae* n. sp., female. a, dorsal (scale M); b, lateral (M); c, urosome, lateral (B); d, caudal rami, dorsal (E); e, caudal ramus, lateral (E); f, rostrum and first antenna, with dot indicating position of aesthete added in male, dorsal (F); g, second antenna, dorsal (N); h, labrum, ventral (N); i, mandible, ventral (N); j, first maxilla, outer (N); k, first maxilla, inner (N); l, second maxilla, outer (N); m, second maxilla, inner (N); n, maxilliped, outer (N); o, leg 1 and intercoxal plate, posterior (F).

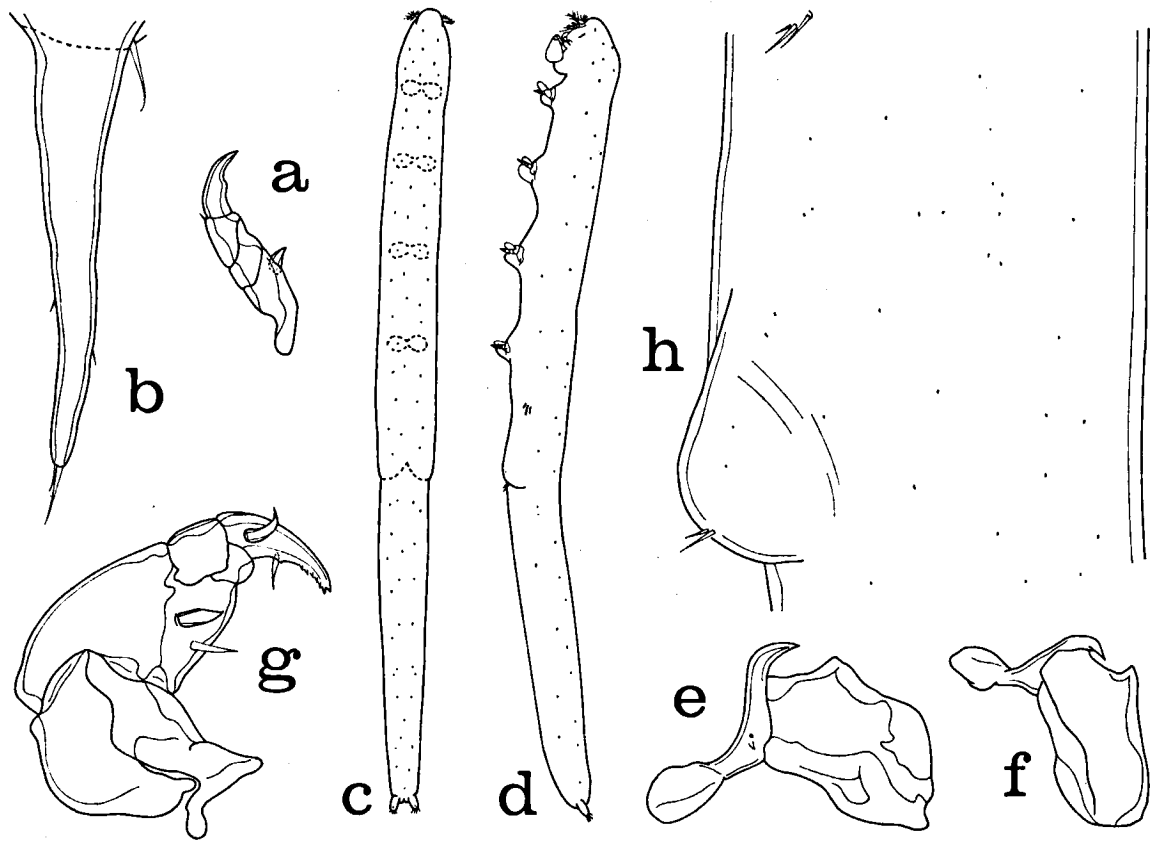

Fig. 24. *Xarifia rosariae* n. sp. Female. a, exopod of leg 2, posterior (scale F); b, leg 5, lateral (E). Male. c, dorsal (M); d, lateral (M); e, second maxilla, outer (K); f, second maxilla, inner (K); g, maxilliped, inner (F); h, leg 5 and leg 6, lateral (E).

P_1	coxa 0-0	basis 1-0	exp 1-0; enp 0	1-0;	1-0;	I, 1
P_{2-4}	coxa 0-0	basis 1-0	exp 1-0; enp 0	0-0;	1-0;	I, 1

Outer spine on second segment of exopod of leg 1 very small; this spine absent in legs 2-4.

Leg 5 (Fig. 24b) 105 μm long, bearing 2 unequal terminal setae 5 μm and 13 μm. Dorsal seta 13 μm.

Color in living specimens in transmitted light reddish, eye red.

Male. — Body (Fig. 24c, d) slender, nearly 14 times longer than wide. Length 1.44 mm (1.36-1.53 mm) and greatest width 0.12 mm (0.10-0.14 mm), based on 10 specimens. Caudal ramus resembling that of female.

Rostrum like that of female. First antenna similar to that of female but 1 aesthete added (at location shown by dot in Fig. 23f). Second antenna, labrum, mandible, and first maxilla as in female. Second maxilla (Fig. 24e, f) resembling that of female but proximal outer corner of second segment with spiniform process. Maxilliped (Fig. 24g) 4-segmented. First segment unarmed. Second segment with 2 setae. Small third segment unarmed. Claw (fourth segment) short, 28 μm, with bifid tip and subterminal row of denticles, and bearing 2 proximal setae.

Legs 1-4 as in female.

Leg 5 (Fig. 24h) represented by 3 small setae.

Leg 6 (Fig. 24h) consisting of posteroventral flap on genital segment bearing 2 small setae.

Spermatophore not seen.

Color less reddish than in female.

Etymology. — The specific name *rosariae* is

the genitive form of the specific name of the coral host.

Remarks. — *Xarifia rosariae* resembles *Xarifia infrequens* in certain respects such as the first and second antennae and the segmentation of legs 1-4, but differs in several important features. In the female (1) the two lateral processes on the region dorsal to the fifth legs are distinctly longer in relation to the median process than in *X. infrequens*, (2) the caudal ramus has a length to width ratio of 1.87:1, compared to 4.2-5:1, (3) the second segment of the second maxilla has a constricted mid-region and greatly expanded tip, these features being much more pronounced than in *X. infrequens*, (4) the terminal seta on the maxilliped is much stouter than the subterminal seta, rather than both setae being similar, and (5) leg 5 is 105 μm long, compared to 47-65 μm.

Xarifia fastigiata n. sp.

Figs. 25a-l, 26a-k

Type material. — 5 ♀♀, 1 immature ♀, 14 ♂♂ from 1 colony of *Acropora rosaria* (Dana), in 2 m, west of Isle Mando, near Noumea, New Caledonia, 22°18'59"S, 166°09'30"E, 1 July 1971. Holotype ♀, allotype, and 13 paratypes (2 ♀♀, 10 ♂♂, 1 immature ♀) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.; the remaining paratypes (dissected) in the collection of the first author.

Other specimens. — 1 ♀, 1 ♂ from *Acropora exilis* (Brook), in 2 m, west of Isle Mando, near Noumea, New Caledonia, 15 July 1971.

Female. —. Body (Fig. 25a, b) not unusually slender, about 6.5 times longer than wide. Length (including caudal rami) 1.49 mm (1.46-1.53 mm) and greatest width 0.22 mm (0.21-0.22 mm), based on 5 specimens. External segmentation absent in prosome and only weakly defined in urosome. Region dorsal to fifth pair of legs bearing 3 posteriorly directed processes of nearly equal length (Fig. 25c). Genital and postgenital segments together about 28 per cent of body length. Genital areas located dorsally. Caudal ramus (Fig. 25d) moderately elongate, 78 × 30 μm, bearing 4 terminal setae, 1 subterminal seta, and 1 lateral seta, and ornamented with minute surficial spinules. Egg sac (Figs. 25e) 363 × 165 μm, containing row of 3 eggs with average size 159 × 128 μm. Body surface with minute spinules.

Rostrum (Fig. 25f) pointed. First antenna (Fig. 25f) 47 μm long and 4-segmented. Lengths of segments (measured along posterior edges): 14, 20, 5, and 6 μm, respectively. Armature: 3, 20 + 1 aesthete, 2 + 1 aesthete, and 7 + 1 aesthete. All setae smooth. Second antenna (Fig. 25g) probably 4-segmented, although separation of third and fourth segments weak. Length 54 μm. Armature: 1, 1, 2 and 2 + I + 1. Clawlike spine 7 μm. Adjacent long seta 23 μm. Fourth segment with minute terminal rounded bilobed knob near base of claw. All setae smooth.

Labrum (Fig. 25h) with posteroventral margin having 2 distantly spaced lateral lobes and showing minute medial indentation. Mandible (Fig. 25i) falcate, with bifid tip and subterminal serrate lamella. Paragnath not seen. First maxilla (Fig. 25j) with 3 setae. Second maxilla (Fig. 25k) 2-segmented, second segment with 2 very small proximal setae and 1 subterminal seta. Maxilliped (Fig. 25l) 3-segmented. First segment unarmed. Second segment with 2 setae and several small setules. Third segment with 2 spiniform setae and 1 slender seta.

Legs 1-4 (Fig. 26a-c) with 3-segmented exopods and 2-segmented endopods having following spine and setal formula (Roman numerals indicating spines, Arabic numerals representing setae):

P_1	coxa	o-o	basis	1-o	exp	I-o;	I-o;	I, 3
					enp	o-o;	3	
P_2	coxa	o-o	basis	1-o	exp	I-o;	I-o;	I, 2
					enp	o-o;	3	
P_{3+4}	coxa	o-o	basis	1-o	exp	I-o;	I-o;	I, 2
					enp	o-o;	1	

Spines on first and second exopod segments slightly setiform. First segment of exopods of legs 1-4 with minute spinelike process at

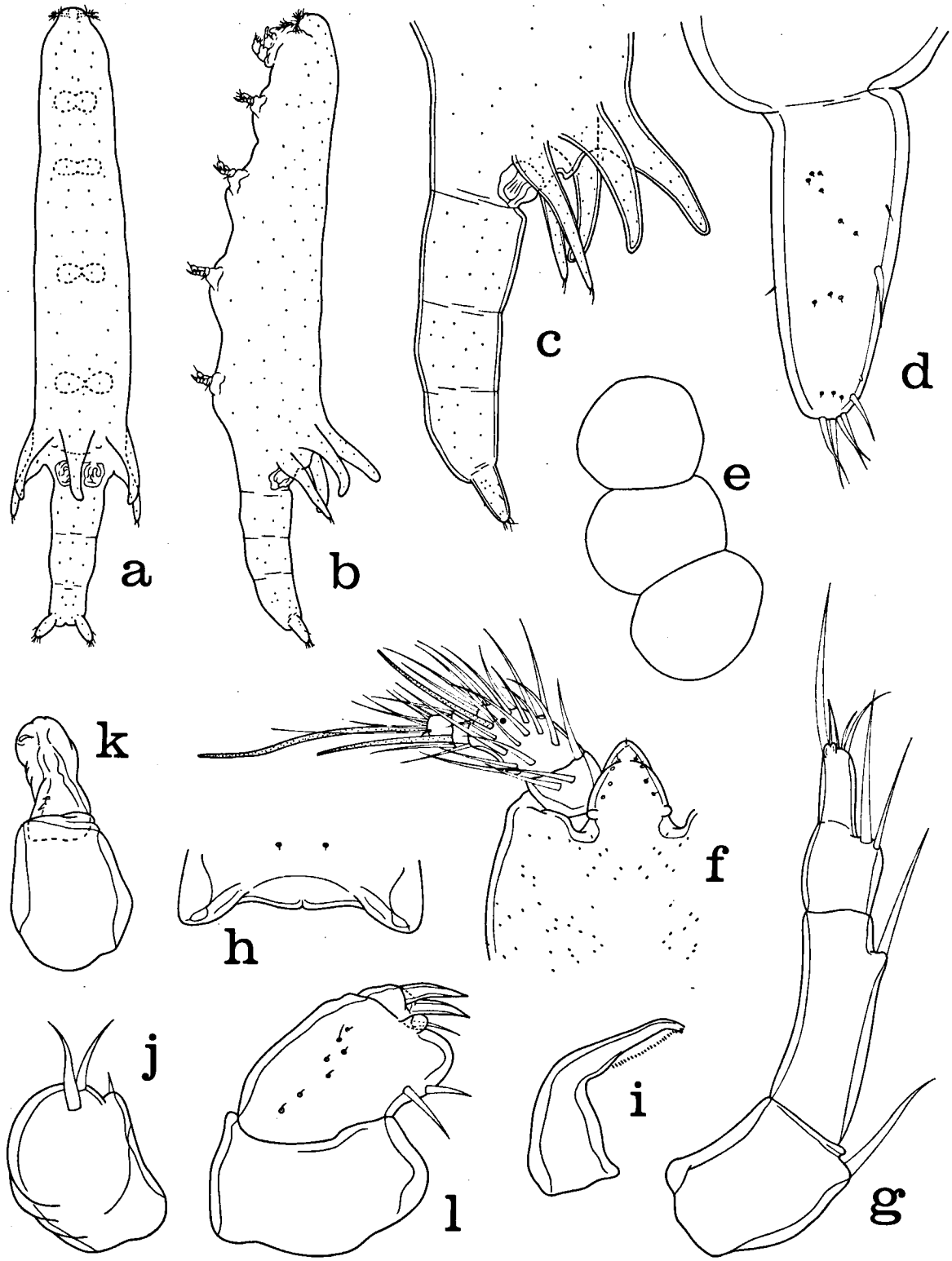

Fig. 25. *Xarifia fastigiata* n. sp., female. a, dorsal (scale M); b, lateral (M); c, urosome, lateral (F); d, caudal ramus, lateral (F); e, egg sac, lateral (J): f, rostrum and first antenna, with dot indicating position of aesthete added in male, dorsal (F); g, second antenna, dorsal (N); h, labrum, posteroventral (F); i, mandible, ventral (N); j, first maxilla, posteroventral (N); k, second maxilla, inner (F); l, maxilliped, inner (K).

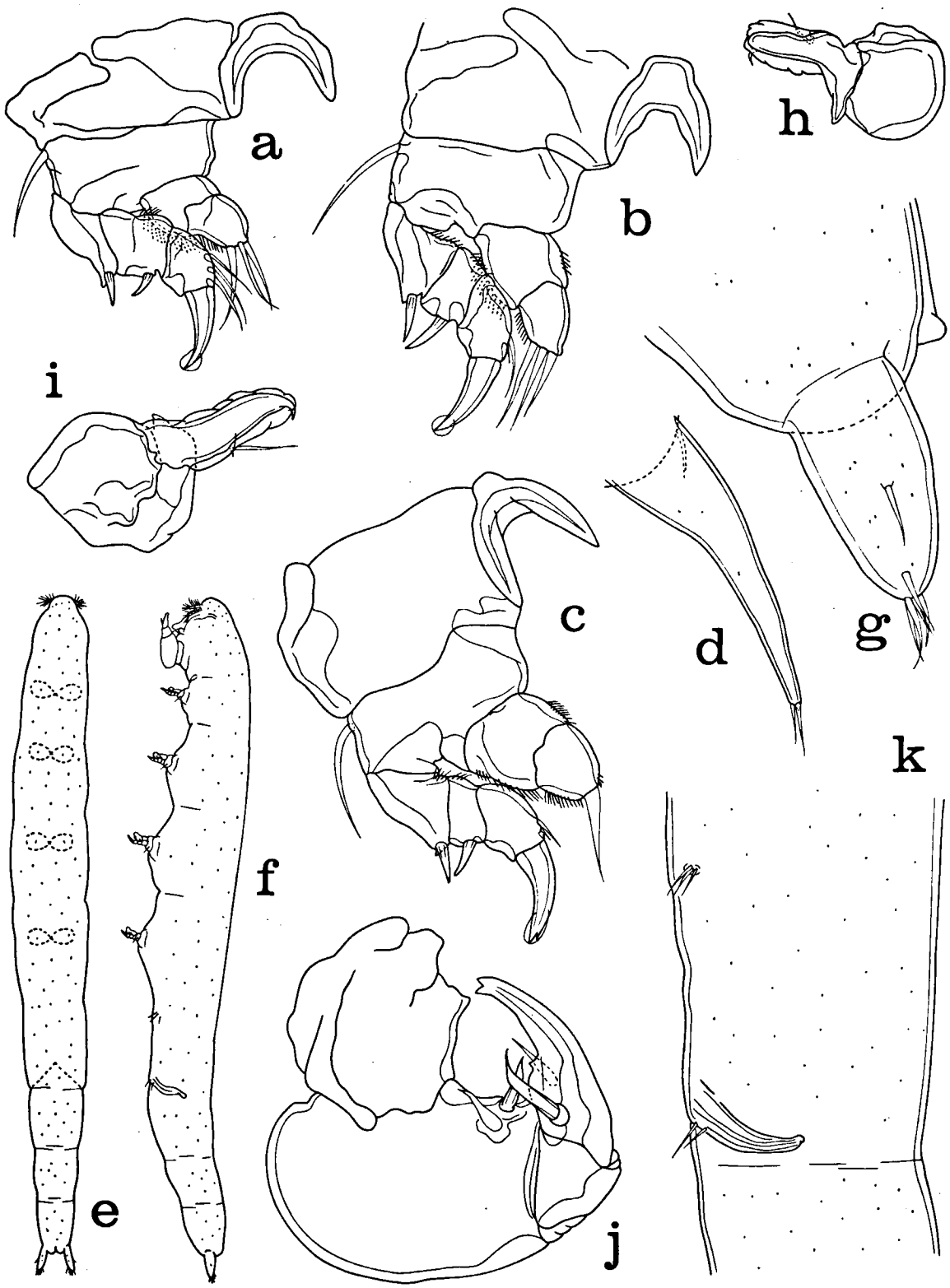

Fig. 26. *Xarifia fastigiata* n. sp. Female. a, leg 1 and intercoxal plate, posterior (scale F); b, leg 2 and intercoxal plate, posterior (F); c, leg 3 and intercoxal plate, posterior (F); d, leg 5, lateral (I). Male. e, dorsal (M); f, lateral (M); g, caudal ramus, lateral (F); h, second maxilla, ventral (F); i, second maxilla, postero-outer (K); j, maxilliped, inner (F); k, leg 5 and leg 6, lateral (I).

base of spine. Single stout seta on second segment of endopod in legs 3 and 4.

Leg 5 (Fig. 26d) 184 μm long, with 2 terminal setae 20 μm and 25 μm. Dorsal seta 23 μm.

Color in living specimens in transmitted light reddish, eye red.

Male. — Body (Fig. 26e, f) about 8.6 times longer than wide. Length 1.49 mm (1.43-1.56 mm) and greatest width 0.17 mm (0.15-0.18 mm), based on 10 specimens. Caudal ramus (Fig. 26g) 58 × 24 μm.

Rostrum pointed as in female. First antenna resembling that of female but 1 aesthete added (at site shown by dot in Fig. 25f). Second antenna, labrum, mandible, and first maxilla as in female. Second maxilla (Fig. 26h, i) similar to that of female, but 1 of 2 setae on second segment much longer than other and segment having proximal spiniform process. Maxilliped (Fig. 26j) 4-segmented. First segment unarmed. Second segment with 2 setae. Small third segment unarmed. Claw (fourth segment) 54 μm long, with bifid tip; bearing 2 proximal setae, and concave margin having small tooth.

Legs 1-4 as in female.

Leg 5 (Fig. 26k) represented by 3 small setae.

Leg 6 (Fig. 26k) consisting of posteroventral flap on genital segment bearing 2 small setae.

Spermatophore not seen.

Color less reddish than in female.

Etymology. — The specific name *fastigiata*, Latin meaning narrowing to a point or cone-shaped, alludes to the shape of the rostrum in this species.

Remarks. — Four congeners have 2-segmented endopods in legs 1-4 with terminal armature 3, 3, 1, 1, as in the new species. These species may be distinguished from *Xarifia fastigiata* as follows: in *Xarifia decorata* Humes and Ho, 1968, the outer element on the second exopod segment of legs 2-4 is a seta rather than a spine; in *Xarifia villosa*, new species described above, the rostrum is rounded and the body surface has many tufts of branched setules; in *Xarifia radians*, new species described below, the second segment of the second maxilla in the female has a broad distal part with rounded tip, partly set off from the proximal part, and the second segment of the maxilliped bears a small depresion with five radiating setules; and in *Xarifia echinoporae*, new species described above, the rostrum is rounded and the second segment of the second maxilla has an acuminate apex.

Xarifia mediolobata n. sp.

Figs. 27a-g, 28a-i, 29a-e

Type material. — 7 ♀♀, 2 ♂♂ from *Alveopora mortenseni* Crossland, in 3 m, Karang Mie, eastern central Halmahera, Moluccas, 00°20'07"N, 128°25'00"E, 19 May 1975. Holotype ♀, allotype, and 4 paratypic ♀♀ deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.; the remaining paratypes (dissected) in the collection of the first author.

Female. — Body (Fig. 27a, b) moderately stout, about 5.13 times longer than wide. Length (not including setae on caudal rami) 2.64 mm (2.49-2.89 mm) and greatest width 0.55 mm (0.53-0.56 mm), based on 7 specimens. External segmentation weak. Region dorsal to fifth pair of legs bearing prominent stout median posteriorly directed lobe (Fig. 27c); no lateral processes on this area. Genital and postgenital segments together about one-fourth of body length. Genital areas located dorsally but somewhat laterally (Fig. 17c). Caudal ramus (Fig. 27d) relatively short, 68 × 43 μm, with 5 terminal setae and 1 lateral seta. Egg sac (Fig. 27e) elongate, 1.03 × 0.35 mm, containing numerous eggs with diameter 138 μm (119-151 μm). Body surface with many sensilla, some of them bifurcate (Fig. 27a, b).

Rostrum a rounded lobe. First antenna (Fig. 27f) 105 μm long and 6-segmented. Lengths of segments (measured along posterior nonsetiferous side): 25, 40, 8, 12, 9, and 8 μm, respectively. Armature: 4, 11, 7, 5, 2 + 1 aesthete, and 7 + 1 aesthete. All setae smooth. Second antenna (Fig. 27g) 4-segmented, 218 μm long including claw. Armature: 1, 1, 2, and I + 1 + 4 setules. Claw 26 μm and long seta 14 μm long. All setae smooth.

Labrum (Fig. 28a) with posteroventral mar-

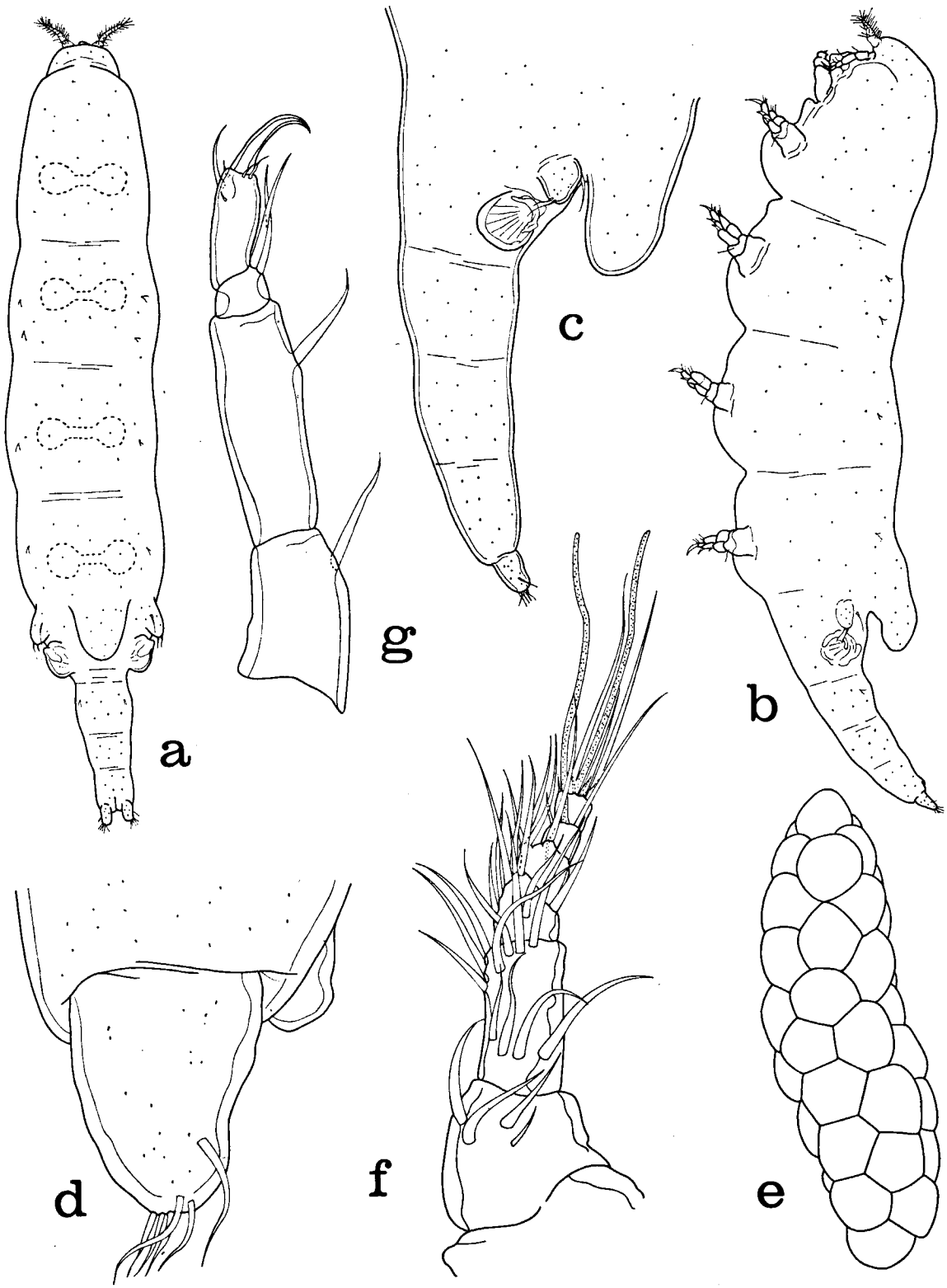

Fig. 27. *Xarifia mediolobata* n. sp., female. a, dorsal (scale A); b, lateral (A); c, urosome, lateral (L); d, caudal ramus, lateral (E); e, egg sac, lateral (M); f, first antenna, dorsal (E); g, second antenna, dorsal (E).

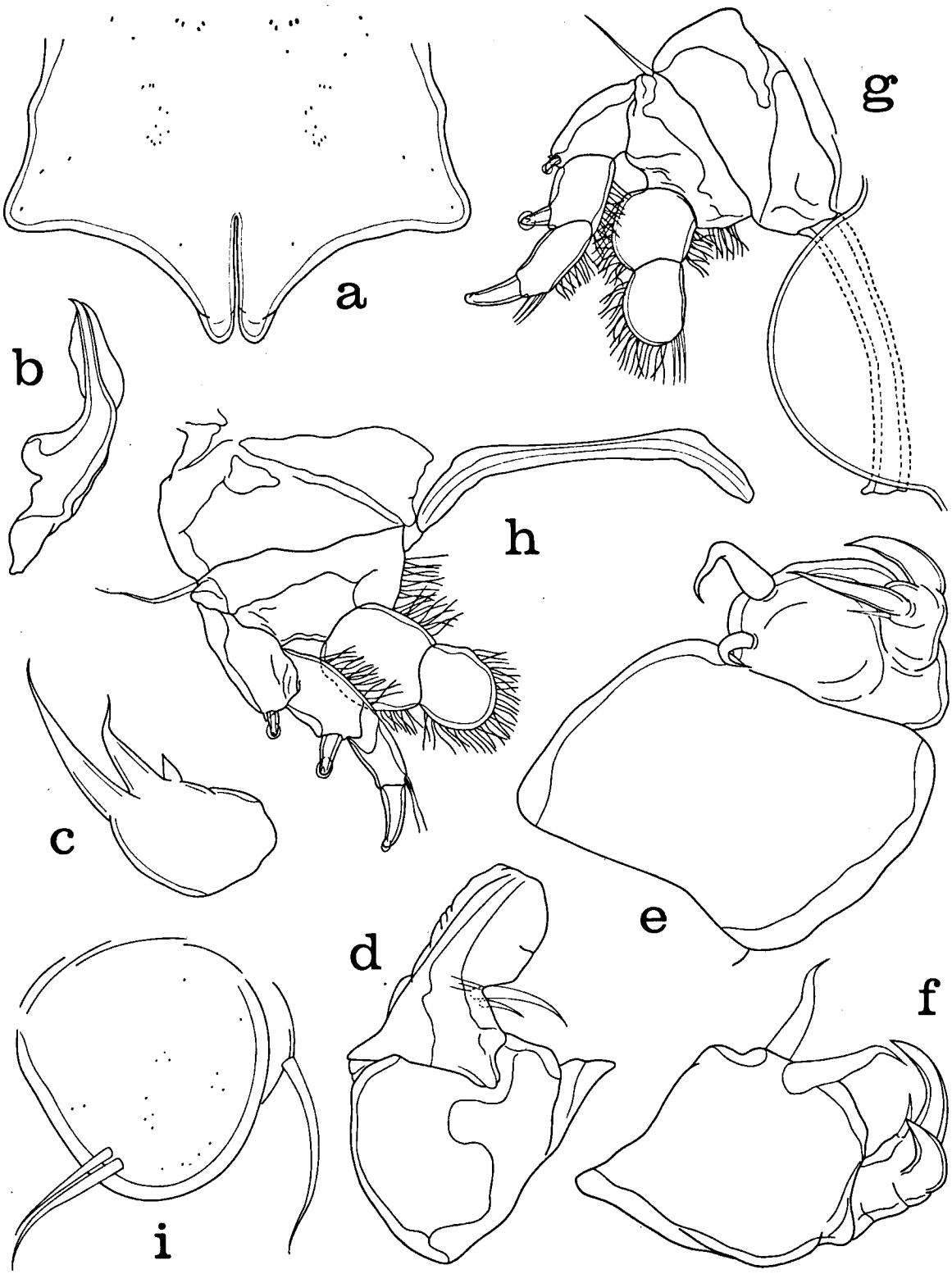

Fig. 28. *Xarifia mediolobata* n. sp., female. a, labrum, ventral (scale E); b, mandible, ventral (F); c, first maxilla, anteroventral (F); d, second maxilla, postero-outer (F); e, maxilliped, antero-inner (F); f, distal portion of maxilliped, anterior (F); g, leg 1 and intercoxal plate, posterior (I); h, leg 3 and intercoxal plate, posterior (I); i, leg 5, lateral (E).

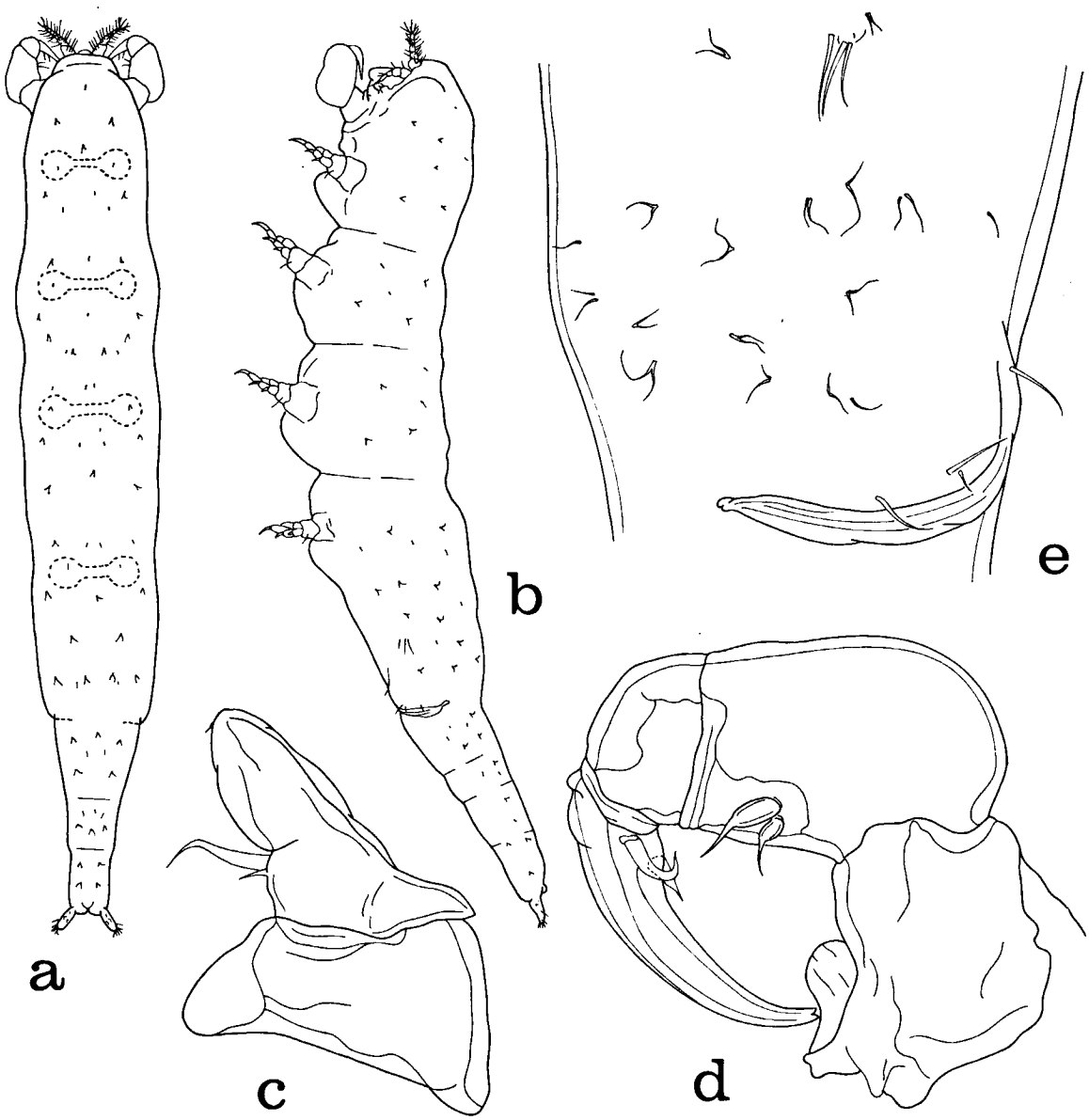

Fig. 29. *Xarifia mediolobata* n. sp., male. a, dorsal (scale A); b, lateral (A); c, second maxilla, postero-outer (F); d, maxilliped, inner (I); e, leg 5 and leg 6, lateral (C).

gin having 2 slender lobes separated by deep medial indentation. Mandible (Fig. 28b) 57 μm long, bilamellate distally. Paragnath not seen. First maxilla (Fig. 18c) with 3 setae. Second maxilla (Fig. 28d) 2-segmented, second segment bearing 2 unequal inner setae and expanded in broad lamella distally. Maxilliped (Fig. 28e, f) 3-segmented. First segment unarmed. Second segment with 2 inner setae. Third segment with 2 spiniform setae and 1 small slender seta.

Legs 1-4 (Fig. 28g, h) with 3-segmented exopods and 2-segmented endopods. Spine and setal formula as follows (Roman numerals indicating spines, Arabic numerals representing setae):

P_{1+2}	coxa	o-o	basis	1-o	exp	I-o;	I-o;	I, 3
					enp	o-o;	3	
P_{3+4}	coxa	o-o	basis	1-o	exp	I-o;	I-o;	I, 2
					enp	o-o;	o	

All 4 legs with basis having inner hairs and outer seta. Exopods of legs 1 and 2 with inner hairs on second and third segments; third segment of exopods of legs 3 and 4 without hairs. First exopod segments of legs 1-4 with minute spinelike process at base of spine. Endopods with first segment having outer and inner hairs; second segment with hairs around most of margin.

Leg 5 (Fig. 28i) oval, approximately 81 μm long, with 2 terminal setae and adjacent dorsal seta on body. Dorsal seta 78 μm long.

Color of living specimens in transmitted light opaque gray, gut slightly orange red, eye red, egg sac reddish gray.

Male. — Body (Fig. 29a, b), about 6.16 times longer than wide, resembling that of female. Length 2.59 mm and greatest width 0.43 mm, based on 2 specimens. Caudal ramus similar to that of female.

Rostrum, first antenna, second antenna, labrum, mandible, and first maxilla like those of female. Second maxilla (Fig. 29c) showing sexual dimorphism in having strong dentiform proximally directed process on outer proximal corner of second segment. Maxilliped (Fig. 29d) 4-segmented. First and third segments unarmed. Second segment with 2 inner setae swollen in proximal half. Claw 167 μm long with 2 proximal setae and having bifid tip.

Legs 1-4 as in female.

Leg 5 (Fig. 29e) lacking free segment and represented only by 3 slender setae.

Leg 6 (Fig. 29e) a posteroventral flap on genital segment bearing 3 setae + 1 setule.

Spermatophore not seen.

Color as in female.

Etymology. — The specific name *mediolobata*, from Latin *medius*, middle, and *lobus*, a lobe, refers to the prominent median lobe dorsal to the fifth pair of legs in the female.

Remarks. — *Xarifia mediolobata* is the only species in the genus with the female having a single median process dorsal to the fifth pair of legs. All other species show 2 or 3 processes or none. The oval fifth leg of the female is also diagnostic of this species.

Xarifia radians n. sp.

Figs. 30a-g, 31a-j, 32a-g

Type material. — 2 ♀♀, 1 ♂ from 1 colony of *Alveopora mortenseni* Crossland, in 3 m, Karang Mie, eastern central Halmahera, Moluccas, 00°20'07"N, 128°25'00"E, 19 May 1975. Holotype ♀ and allotype (dissected) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.; one paratypic ♀ (dissected) in the collection of the first author.

Female. — Body (Fig. 30a) moderately stout, about 5.6 times longer than wide. Length 2.34 mm (2.29-2.39 mm) and greatest width 0.42 mm (0.40-0.43 mm), based on 2 specimens. External segmentation scarcely visible. Region dorsal to fifth pair of legs with 3 long nearly equal processes (Fig. 32b). Genital areas located more laterally than dorsally. Caudal ramus (Fig. 32c) elongate, 259 × 70 μm, bearing 1 subterminal, 1 lateral, and 4 terminal setae. Egg sac (Fig. 32d) elongate, containing about 18 eggs with diameters approximately 140 μm. Body surface with numerous very small sensilla or setules.

Rostrum (Fig. 30e) bluntly rounded. First antenna (Fig. 30e) 108 μm long and 6-segmented. Armature: 3, 11, 7, 5, 2 + 1 aesthete, and 7 + 1 aesthete. Lengths of segments (measured along posterior nonsetiferous margins): 22, 32, 16, 14, 16, and 11 μm, respectively. Setae unusually long and smooth. Second antenna (Fig. 30f) 219 μm long including claw, and 4-segmented. Armature: 1, 1, 2, and I + 1 + 4 setules. Claw 32 μm and long seta 17 μm. Seta on first segment with 2 small lateral spinules.

Labrum (Fig. 30g) with posteroventral margin broadly truncate and insected medially. Mandible (Fig. 31a) resembling that of *Xarifia mediolobata*. Paragnath (Fig. 31b) a small hairy lobe. First maxilla (Fig. 31c) with 2 large barbed terminal setae and 1 small subterminal smooth seta. Second maxilla (Fig. 31d) 2-seg-

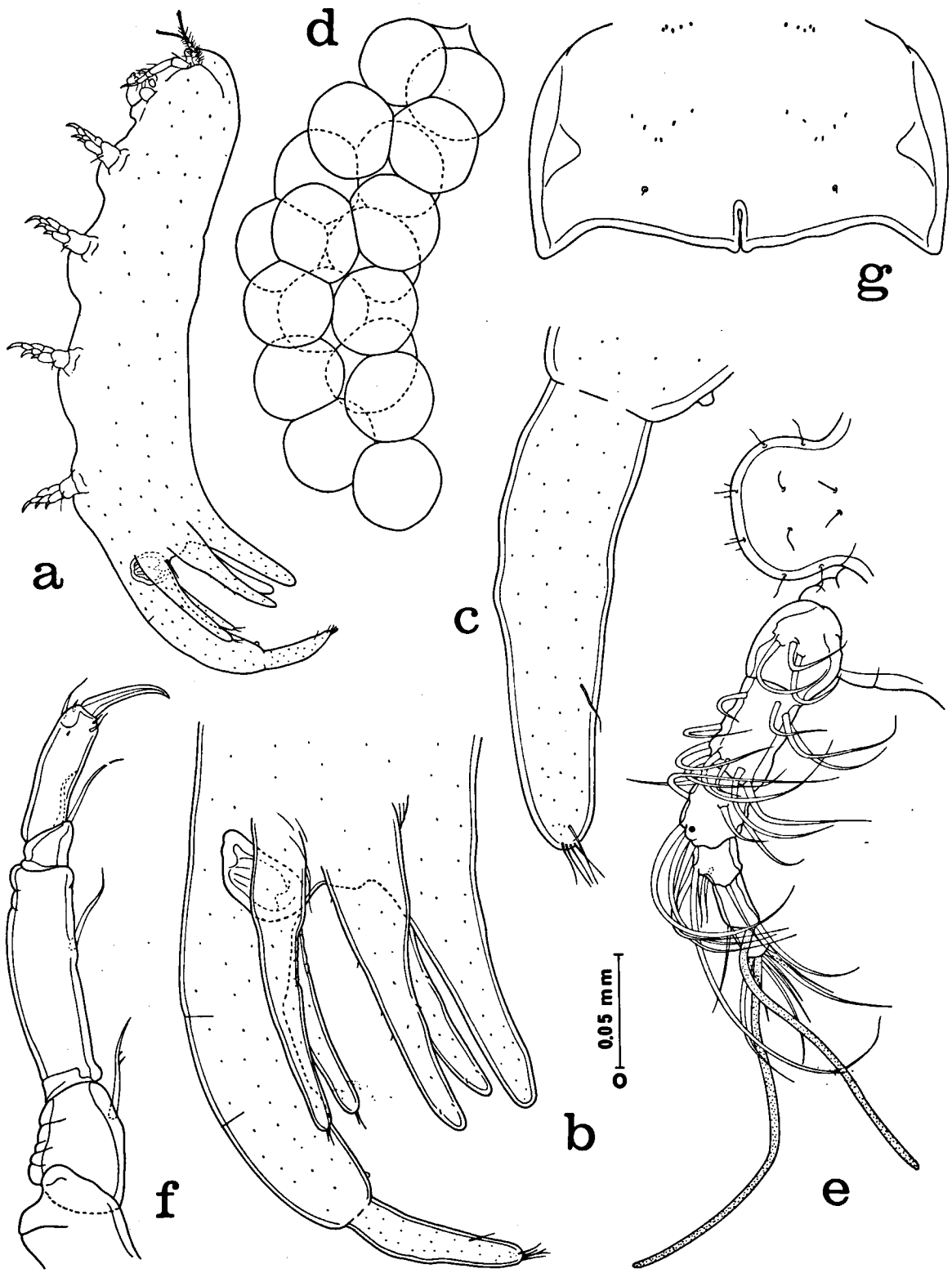

Fig. 30. *Xarifia radians* n. sp., female. a, lateral (scale A); b, urosome, lateral (B); c, caudal ramus, lateral (I); d, egg sac, lateral (B); e, rostrum and first antenna, with dot indicating position of aesthete added in male, dorsal (D); f, second antenna, dorsal (O); g, labrum, ventral (D).

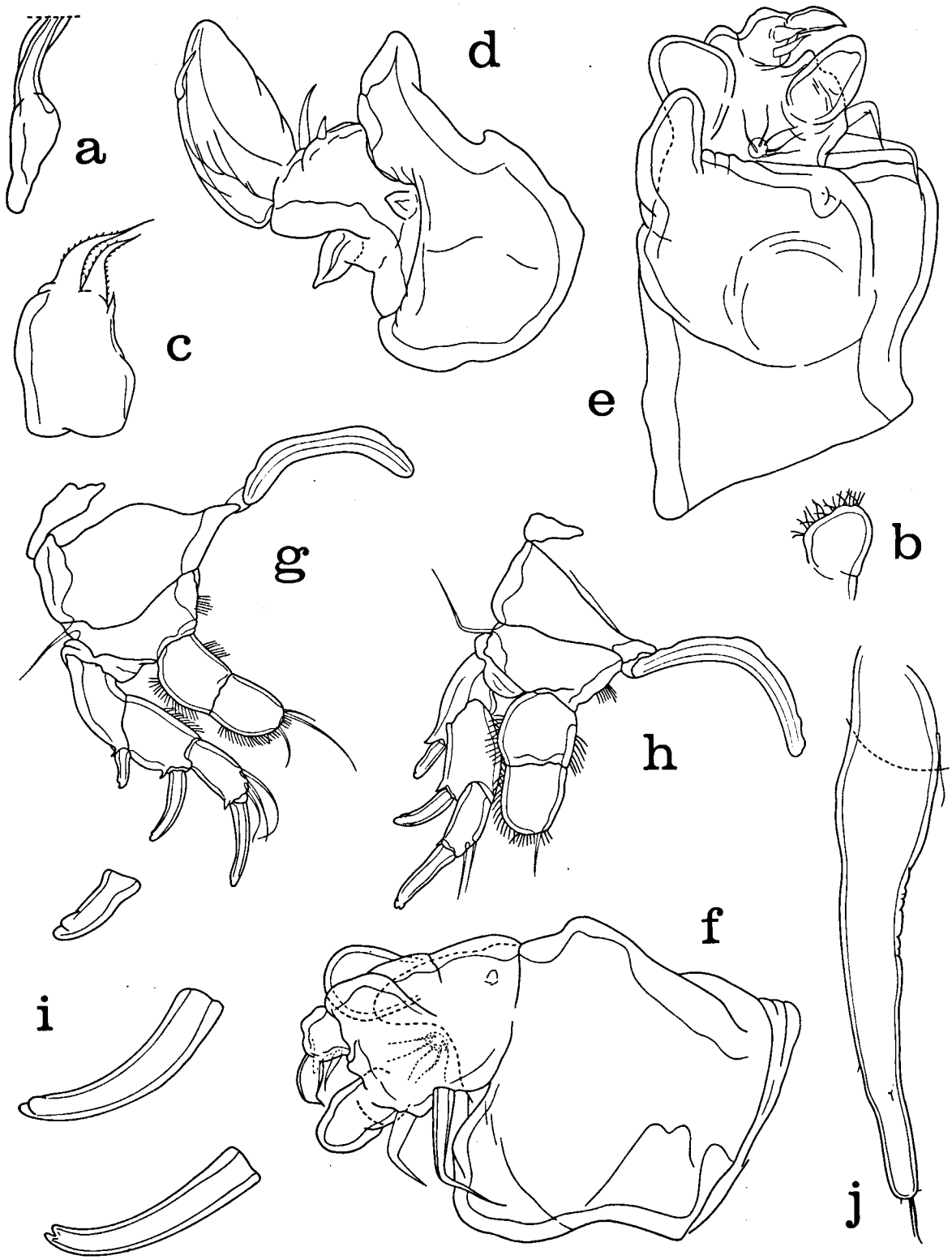

Fig. 31. *Xarifia radians* n. sp., female. a, mandible, broken tip, ventral (scale E); b, paragnath, outer (E); c, first maxilla, anteroventral (E); d, second maxilla, antero-inner (F); e, maxilliped, inner (F); f, maxilliped, postero-outer (F); g, leg 1 and intercoxal plate, anterior (I); h, leg 3 and intercoxal plate, anterior (I); i, spines of exopod of leg 2, posterior (F); j, leg 5, lateral (G).

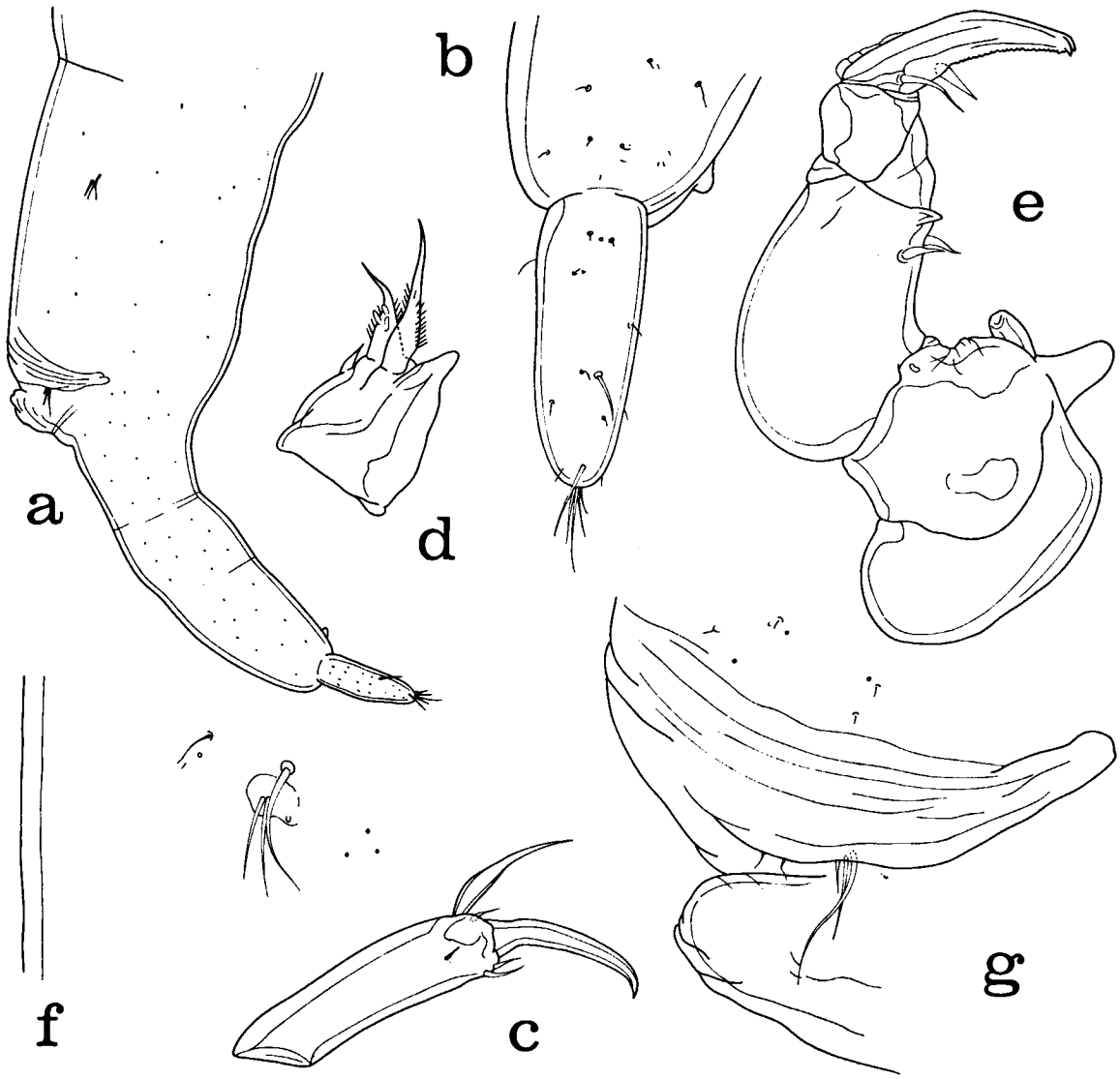

Fig. 32. *Xarifia radians* n. sp., male. a, urosome, lateral (scale L); b, caudal ramus, lateral (I); c, distal portion of second antenna, dorsal (F); d, first maxilla, ventro-outer (E); e, maxilliped, inner (G); f, leg 5, lateral (D); g, leg 6, lateral (D).

mented. First segment unarmed. Second segment with 2 inner setae and 2 spiniform processes; distal part of this segment broad, partly set off from proximal part and armed with 1 seta. Maxilliped (Fig. 31e, f) 3-segmented. First segment with outer lobe. Second segment with 2 inner setae, 2 lobes, and small depression having 5 slender radiating setules. Third segment with terminal stout spiniform seta and 2 subterminal more slender setae.

Legs 1-4 (Fig. 31g, h) with 3-segmented exopods and 2-segmented endopods. Spine and setal formula as follows (Roman numerals indicating spines, Arabic numerals representing setae):

P_{1+2}	coxa	o-o	basis	1-o	exp	I-o;	I-o;	I, 3
					enp	o-o;	3	
P_{3+4}	coxa	o-o	basis	1-o	exp	I-o;	I-o;	I, 2
					enp	o-o;	1	

All 4 legs with basis having inner hairs and outer seta. Exopods with inner hairs on second segment only, and small spiniform processes at base of all exopod spines. Endopods with first segment having both inner and outer hairs, second segment with outer hairs only. Three spines on exopods with bluntly bifurcate tips (Fig. 31i).

Leg 5 (Fig. 31j) elongate, 460 μm long, with 2 small terminal setae and adjacent dorsal seta on body. Dorsal seta 70 μm long.

Color of living specimens in transmitted light opaque gray, eye red, egg sac reddish gray.

Male. — Body form similar to that of female. Length of allotype 2.49 mm and greatest width 0.44 mm. Postgenital segments abruptly more slender than anterior segments (Fig. 32a). Caudal ramus (Fig. 32b) shorter than in female, 140 × 54 μm, ratio 2.59:1.

Rostrum as in female. First antenna like that of female, but 1 long aesthete added on third segment (at position indicated by dot in Fig. 30e). Second antenna resembling that of female but long seta near claw proximally swollen (Fig. 32c). Labrum, mandible, and paragnath as in female. First maxilla (Fig. 32d) with 3 minute fingerlike processes on shorter of terminal setae; prominent blunt terminal projection in addition to 3 setae. Second maxilla like that of female. Maxilliped (Fig. 32e) relatively slender, 4-segmented. First and third segments unarmed (2 processes shown in figure probably not part of first segment). Second segment with 2 inner setae and dentiform process. Claw 178 μm long with 2 proximal setae and bifid tip; concave margin of claw bluntly serrate.

Legs 1-4 as in female.

Leg 5 (Fig. 32f) without free segment and represented only by 3 slender setae.

Leg 6 (Fig. 32g) a posteroventral flap on genital segment bearing 3 small setae. Ventral region immediately posterior to flap protruding in lateral view (Fig. 32a).

Spermatophore not seen.

Color as in female.

Etymology. — The specific name *radians*, Latin meaning radiating, alludes to the depression with radiating setules on the second segment of the maxilliped in the female.

Remarks. — The female of *Xarifia radians* may be distinguished from all other species in the genus by the group of radiating setules on the maxilliped. The form of the second maxilla is also diagnostic of the new species. The length of the body of the female (more than 2.0 mm), coupled with the three nearly equally long processes dorsal to the fifth pair of legs in the female, separates the new species readily from all congeners except *Xarifia echinoporae*. The latter, however, has a shorter caudal ramus in the female (ratio 1.77:1) and the concave margin of the claw of the maxilliped in the male is smooth.

Xarifia heteromeles n. sp.

Figs. 33a-l, 34a-l

Type material. — 6 ♀♀, 42 ♂♂ from *Montipora* sp. cf. *M. undata* Bernard, in 10 m, Poelau Parang, eastern Ceram, 3°17′00″S, 130°44′48″E, 23 May 1975. Holotype ♀, allotype, and 41 paratypes (3 ♀♀, 38 ♂♂) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.; the remaining paratypes (dissected) in the collection of the first author.

Female. — Body (Fig. 33a, b) moderately stout, about 7.6 times longer than wide. Length 0.96 mm (0.94-0.98 mm) and greatest width 0.11 mm (0.10-0.19 mm), based on 5 specimens. Region dorsal to fifth pair of legs bearing 3 nearly equal posteriorly directed processes (Fig. 33c). Genital and postgenital segments together about 18 per cent of body length. Genital areas located dorsally. Caudal ramus (Fig. 33d) elongate, 49 × 14 μm, with 4 major setae (3 terminal and 1 lateral) and minute setules. Egg sac (Fig. 33e) containing 1 egg 146 × 76 μm. Body surface with many minute setules.

Rostrum rounded as in other species. First antenna (Fig. 33f) 4-segmented and short, only 29 μm long. Second and third segments incompletely separated. Lengths of segments (measured along posterior nonsetiferous mar-

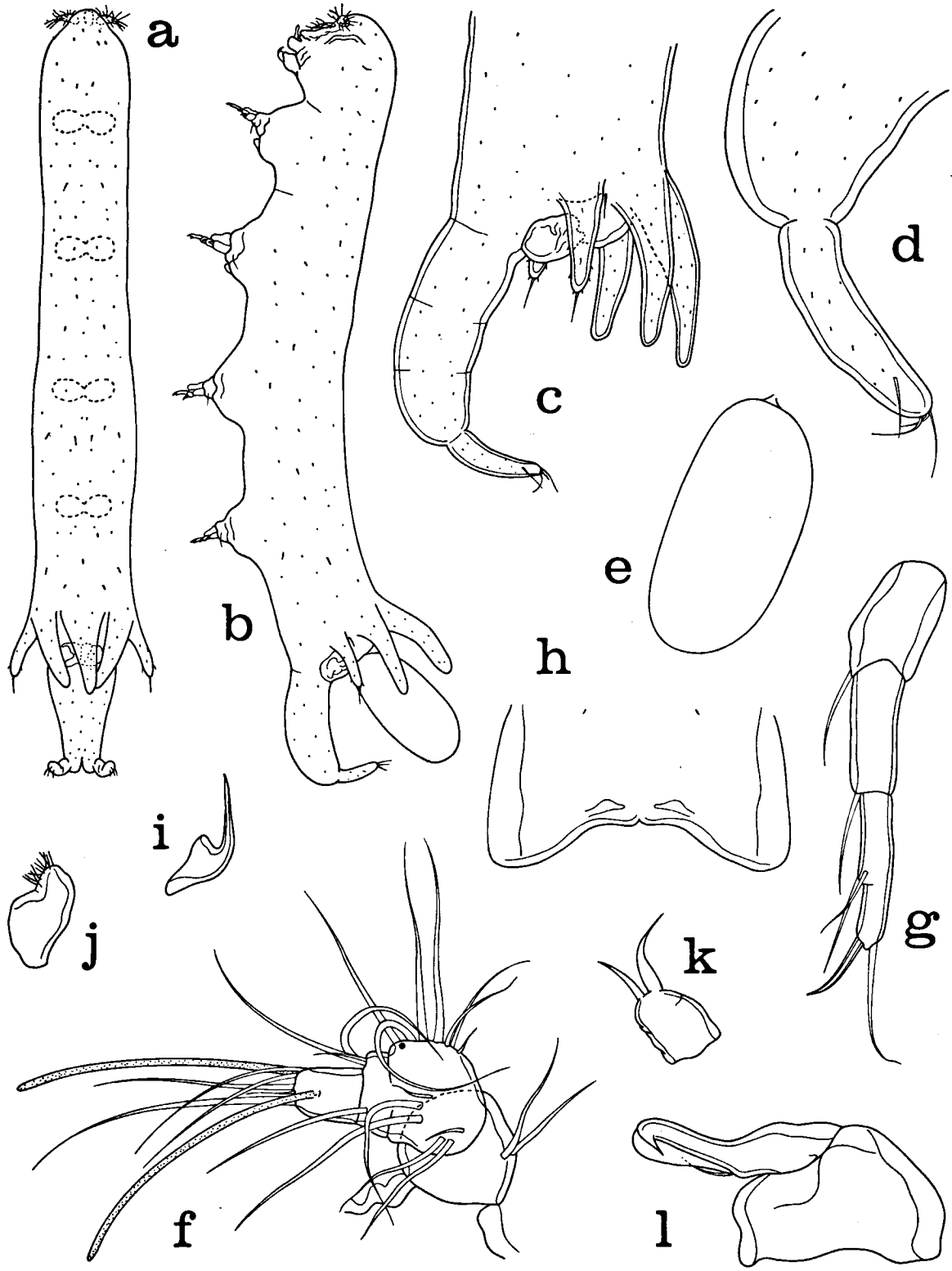

Fig. 33. *Xarifia heteromeles* n. sp., female. a, dorsal (scale J); b, lateral (J); c, urosome, lateral (I); d, caudal ramus, lateral (F); e, egg, lateral (I); f, first antenna, dorsal (N); g, second antenna, ventral (N); h, labrum, ventral (N); i, mandible, ventral (N); j, paragnath, ventral (N); k, first maxilla, ventral (N); l, second maxilla, antero-outer (N).

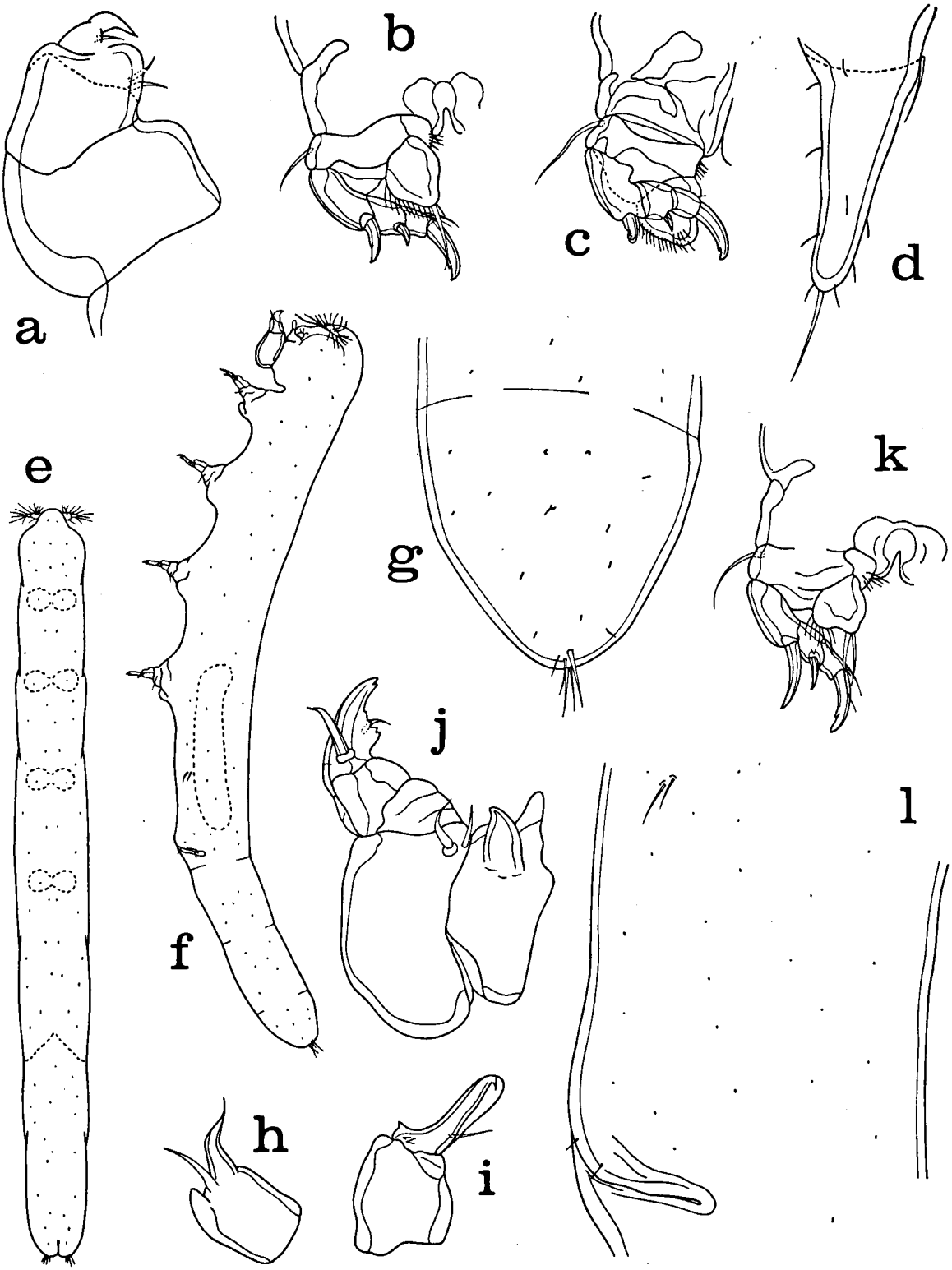

Fig. 34. *Xarifia heteromeles* n. sp. Female. a, maxilliped, outer (scale N); b, leg 1 and intercoxal plate, anterior (F); c, leg 3, anterior (F); d, leg 5, lateral (F). Male. e, dorsal (B); f, lateral (B); g, caudal ramus, lateral (E); h, first maxilla, ventral (N); i, second maxilla, outer (K); j, maxilliped, inner (F); k, leg 1 and intercoxal plate, anterior (F); l, leg 5 and leg 6, lateral (E).

gins): 4.8, 6, 4.8, and 7.2 μm, respectively. Armature: 2, 13, 4, and 5 + 2 aesthetes. All setae smooth. Second antenna (Fig. 33g) 3-segmented, 42 μm long. Armature: 1, 1, and 2 + I + 1. Claw on third segment 6 μm and adjacent seta 14.5 μm. All setae smooth.

Labrum (Fig. 33h) with concave posteroventral margin minutely insected medially. Mandible (Fig. 33i) very small, slender, and smooth, 13 μm long. Paragnath (Fig. 33j) a minute hairy lobe. First maxilla (Fig. 33k) with 2 setae. Second maxilla (Fig. 33l) 2-segmented, second segment with inner seta and having inner distal lamella. Maxilliped (Fig. 34a) 3-segmented. Second segment with 2 inner setae. Third segment with 1 seta and having terminal spiniform process.

Legs 1-4 (Fig. 34b, c) with 3-segmented exopods and 1-segmented endopods. Spine and setal formula as follows (Roman numerals indicating spines, Arabic numerals representing setae):

P_{1+2}	coxa	o-o	basis	1-o	exp	I-o;	I-o;	I, 2
					enp	1		
P_{3+4}	coxa	o-o	basis	1-o	exp	I-o;	I-o;	I, 1
					enp	o		

All 4 legs with basis having inner hairs and outer seta. In leg 1 three spines of exopod 10, 4.5, and 13.5 μm, first and third spines with small denticle on concave margin. Endopods with outer hairs.

Leg 5 (Fig. 34d) elongate, tapered, 68 μm long, ornamented with several setules. Only 1 terminal seta 24 μm. Adjacent dorsal seta on body approximately 12 μm.

Color of living specimens in transmitted light pale opaque gray, eye red, egg sacs gray.

Male. — Body (Fig. 34e, f) slender, about 10 times longer than wide. Length 0.96 mm (0.90-1.00 mm) and greatest width 0.11 mm (0.10-0.11 mm), based on 10 specimens. Caudal ramus (Fig. 34g) short, fused with anal segment, bearing 4 setae as in female.

Rostrum as in female. First antenna like that of female but 1 aesthete added on second segment (at point indicated by dot in Fig. 33f). Second antenna, labrum, mandible, and paragnath like those of female. First maxilla (Fig. 34h) with small process near 2 terminal setae. Second maxilla (Fig. 34i) with proximal outer spiniform processes on second segment. Maxilliped (Fig. 34j) 4-segmented. First segment with prominent inner process having slightly hooked tip. Second segment with 2 inner setae. Third segment unarmed. Fourth segment forming short terminal claw 24 μm long, with serrate expansion on concave margin, 2 proximal setae, and bifid tip.

Leg 1 (Fig. 34k) segmented as in female, but showing sexual dimorphism. Three spines on exopod 13, 7.5, and 13.5 μm long, their comparative relations differing from female. Endopod with broad truncate tip bearing 2 setae. Formula for leg 1:

coxa	o-o	basis	1-o	exp	I-o;	I-o;	I, 2
				enp	2		

Legs 2-4 as in female.

Leg 5 (Fig. 34l) represented by 2 small setae.

Leg 6 (Fig. 34l) a posteroventral flap on genital segment bearing 2 very small setae.

Extruded spermatophore not seen.

Color as in female.

Etymology. — The specific name *heteromeles*, from Greek *heteros*, different, and *melos*, limb, alludes to the sexually dimorphic leg 1.

Remarks. — Five congeners have the combination of 3-segmented second antennae and 1-segmented endopods in legs 1-4. These species show features in the female by which they may be separated from *Xarifia heteromeles* as follows: in *Xarifia maldivensis* Humes, 1960, leg 5 is short, 16 × 6 μm; in *Xarifia obesa* Humes and Ho, 1968, only the two lateral processes dorsal to the fifth legs are present, the median process being absent; in *Xarifia breviramea*, new species described above, the caudal ramus is short, 18 × 11 μm; in *Xarifia rosariae*, new species described above, the endopods of legs 1-4 are unarmed and the medianthan process dorsal to the fifth legs is longer the two lateral processes; in *Xarifia anopla*, new species described below, the region dorsal to the fifth legs lacks processes or knobs.

Only one other species in the genus shows sexual dimorphism in leg 1, namely, *Xarifia mucronata*, new species described above, where the male has a 2-segmented endopod instead of a single segment as in the female. The new species exhibits sexual dimorphism also in the caudal ramus, first maxilla, second maxilla, maxilliped, and leg 5.

Xarifia syntoma n. sp.

Figs. 35a-l, 36a-m

Type material. — 12 ♀♀, 5 ♂♂ from *Montipora* sp. cf. *M. undata* Bernard, in 10 m, Poelau Parang, eastern Ceram, Moluccas, 3°17′00″S, 130°44′48″E, 23 May 1975. Holotype ♀, allotype, and 11 paratypes (8 ♀♀, 3 ♂♂) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.; the remaining paratypes (dissected) in the collection of the first author.

Female. — Body (Fig. 35a, b) fairly slender, about 6.6 times longer than wide. Length 0.76 mm (0.71-0.81 mm) and greatest width 0.11 mm (0.10-0.12 mm), based on 10 specimens. External segmentation not defined. Region dorsal to fifth pair of legs bearing 3 moderately long, posteriorly directed processes (Fig. 35c), middle process slightly longer than lateral processes. Genital and postgenital segments together about 15 per cent of body length. Genital areas located dorsally (Fig. 35a). Caudal ramus (Fig. 35d) elongate, 40 × 17 μm, with 4 major setae (3 terminal and 1 lateral) and several setules. Egg sac not seen. Body surface with numerous moderately long setules.

Rostrum (Fig. 35e) narrow and rounded at tip. First antenna (Fig. 35e) 34 μm long, 4-segmented (though second and third segments indistinctly separated). Lengths of segments (measured along posterior sides): 7, 11, 2.5, and 8.5 μm, respectively. Formula: 3, 17, 5, and 9 + 2 aesthetes (2 + 1 aesthete and 7 + 1 aesthete). All setae smooth. Second antenna (Fig. 35f) 4-segmented, slender, 112 μm long not including terminal setae. Armature: 1, 1, 2, and 2 + 1 minute setule. Two terminal setae, neither clawlike, 19 μm and 15.5 μm. All setae smooth.

Labrum (Fig. 35g) with posteroventral edge broadly concave medially, 2 lateral truncate lobes, and pair of medial dentiform processes. Mandible (Fig. 35h) with 2 narrow lamellae. Paragnath not seen. First maxilla (Fig. 35i) with 2 setae, minute setule, and rounded process. Second maxilla (Fig. 35j) 2-segmented, elongate second segment bearing 2 proximal setae and 1 distal seta. Maxilliped (Fig. 35k) apparently 2-segmented. First segment with lobe; second segment with 2 setae, and terminating in acuminate tip and minute rounded process.

Legs 1-4 (Figs. 35l, 36a, c) with 3-segmented exopods and 1-segmented endopods. Spine and setal formula as follows (Roman numerals indicating spines, Arabic numerals representing setae):

P_1	coxa	o-o	basis	1-o	exp	I-o;	I-o;	I, 3
					enp	1		
P_2	coxa	o-o	basis	1-o	exp	I-o;	I-o;	I, 3
					enp	2		
P_{3+4}	coxa	o-o	basis	1-o	exp	I-o;	I-o;	I, 2
					enp	o		

Spines on exopods with denticle on outer margin and in some specimens additional denticles on posterior surfaces. First exopod segment of legs 1-4 and second exopod segment of legs 2-4 with minute spinelike process at base of spines. Endopod of leg 2 shaped as in Fig. 36b, but 1 specimen with outer bulge as in Fig. 36a.

Leg 5 (Fig. 36d) without free segment and represented by 2 long setae 31 μm and 32 μm, and minute setule. One female showing aberrant condition of 3 setae, 7, 6, and 32 μm long (Fig. 36e).

Color in living specimens in transmitted light opaque gray, eye red, egg sacs gray.

Male. — Body (Fig. 34f, g) slender, about 10 times longer than wide. Length 0.91 mm (0.85-1.00 mm) and greatest width 0.10 mm (0.10-0.11 mm), based on 5 specimens. External segmentation more clearly indicated than in

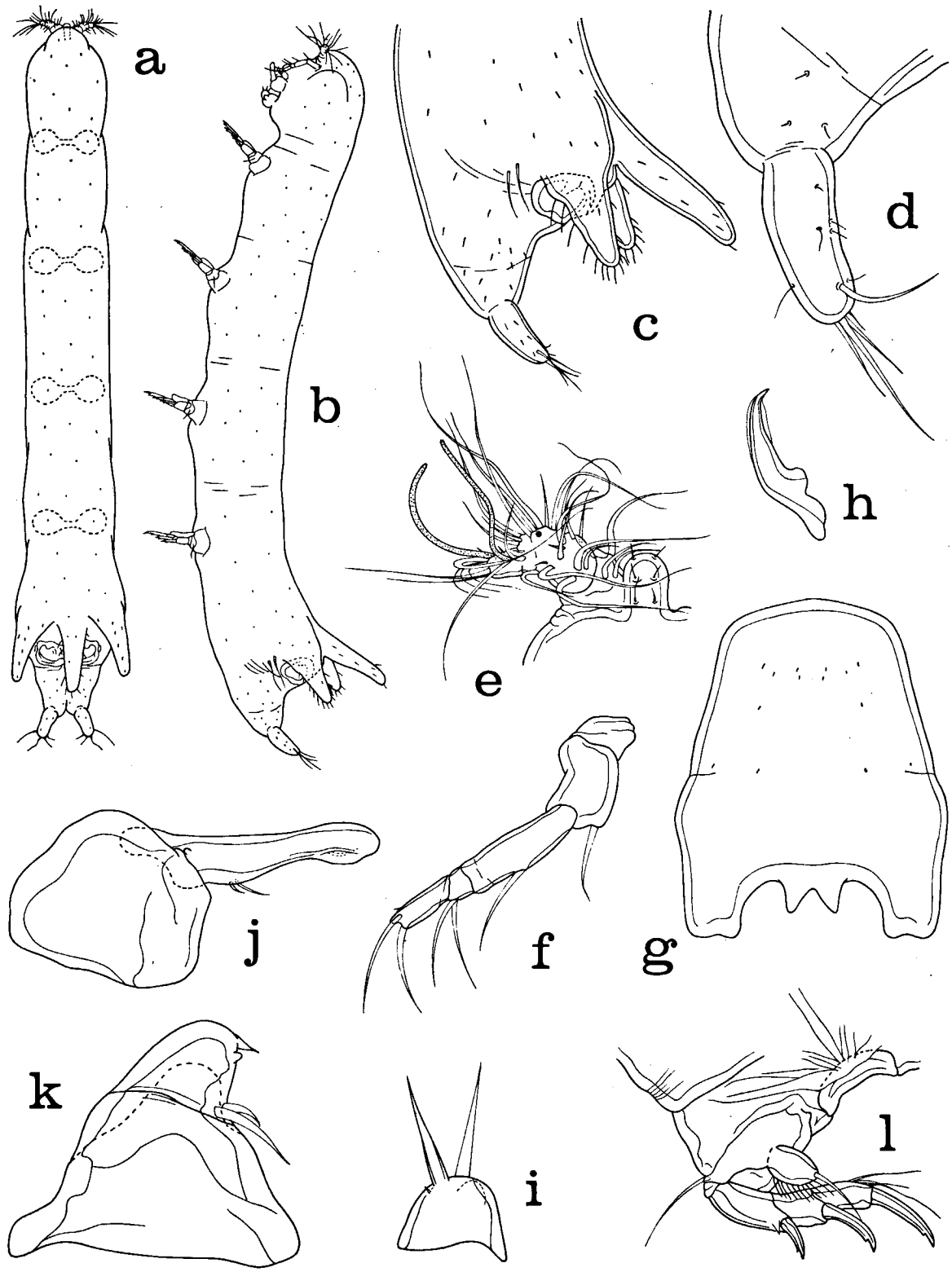

Fig. 35. *Xarifia syntoma* n. sp., female. a, dorsal (scale J); b, lateral (J); c, urosome, lateral (I); d, caudal ramus, lateral (F); e, rostrum and first antenna, with dot indicating position of aesthete added in male, dorsal (F); f, second antenna, ventral (K); g, labrum, ventral (N); h, mandible, ventral (N); i, first maxilla, antero-inner (N); j, second maxilla, postero-outer (N); k, maxilliped, anterior (N); l, leg 1 and intercoxal plate, anterior (F).

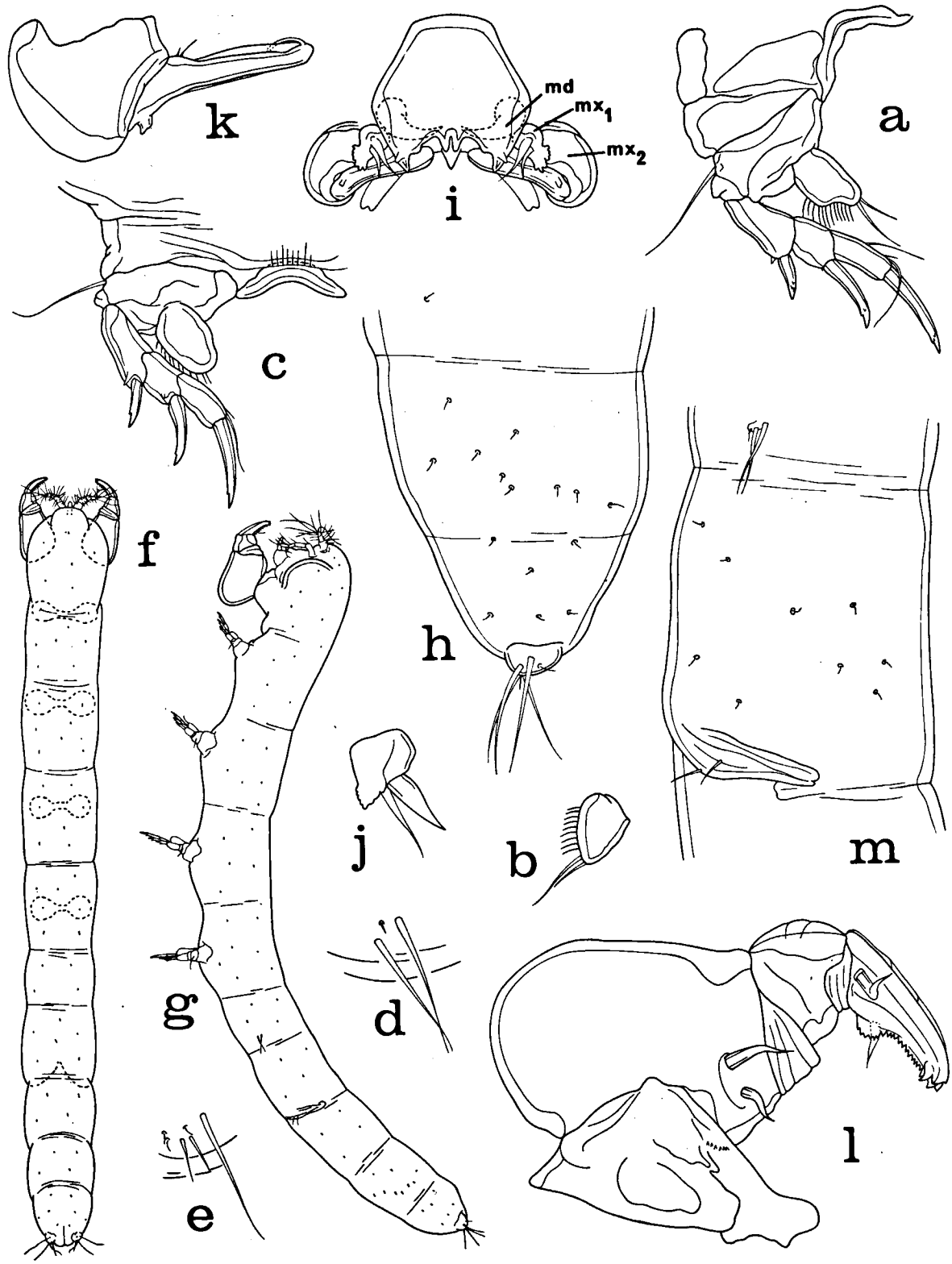

Fig. 36. *Xarifia syntoma* n. sp., Female. a, leg 2 and intercoxal plate, posterior (scale F); b, endopod of leg 2, posterior (F); c, leg 3 and intercoxal plate, anterior (F); d, leg 5, lateral (F); e, leg 5, aberrant specimen, lateral (F). Male. f, dorsal (J); g, lateral (J); h, posterior part of urosome and caudal ramus, lateral (F); i, labrum, with mandibles (md), first maxillae (mx_1), and second maxillae (mx_2) in position, ventral (F); j, first maxilla, postero-outer (N); k, second maxilla, antero-inner (N); l, maxilliped, inner (F); m, leg 5 and leg 6, lateral (E).

female. Caudal ramus (Fig. 36h) minute, 8.5 × 13 μm, bearing 4 setae as in female.

Rostrum as in female. First antenna like that of female but 1 aesthete added on second segment and 1 seta on third segment transformed to an aesthete. Formula: 3, 17 + 1 aesthete, 4 + 1 aesthete, and 9 + 2 aesthetes. Second antenna like that of female.

Labrum (Fig. 36i) showing sexual dimorphism in having pointed (rather than truncate) lateral lobes bearing 2 spiniform processes. Mandible and paragnath as in female. First maxilla (Fig. 36j) with 2 unequal setae and process with crenulate margin. Second maxilla (Fig. 36k) similar to that of female but having small proximal outer process on second segment. Maxilliped (Fig. 36l) 4-segmented. First segment with short row of minute spinules. Second segment with 2 inner setae. Third segment unarmed. Claw short, 42 μm long, with 2 setae (1 proximal and 1 on midinner margin), having serrate lamella on concave margin, and having tip divided into 5 small points.

Legs 1-4 as in female.

Leg 5 (Fig. 36m) like that of female.

Leg 6 (Fig. 36m) represented by posteroventral flap on genital segment bearing 2 small setae.

Spermatophore not seen.

Color as in female.

Etymology. — The specific name *syntoma*, Greek *syntomos*, abridged or shortened, refers to the short urosome and the absence of the free segment of leg 5 in this species.

Remarks. — Only two congeners lack entirely a free segment in leg 5 of the female. These two species may be distinguished from *Xarifia syntoma* as follows: in *Xarifia fimbriata* Humes, 1960, only two (lateral) processes are present dorsal to the fifth legs, an outer spine is lacking on the second segment of the exopod of legs 1-4, and the urosome is relatively long; in *Xarifia extensa*, new species described below, there are no processes or knobs on the region dorsal to the fifth legs, and the length of the body of the female is greater, 2.48 mm (2.26-2.72 mm), than in the new species.

Xarifia anopla n. sp.

Figs. 37a-p, 38a-f

Type material. — 3 ♀♀, 1 ♂ from *Montipora* sp. cf. *M. undata* Bernard, in 10 m, Poelau Parang, eastern Ceram, Moluccas, 3°17′00″S, 130°44′48″E, 23 May 1975. Holotype ♀ and allotype (dissected) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.; 2 paratypic ♀♀ (dissected) in the collection of the first author.

Other specimens. — 12 ♀♀ (deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.) from *Montipora* sp., in 3 m, Ambatoloaka, Nosy Bé, Madagascar, 23 June 1967.

Female. — Body (Fig. 37a, b) slender, 8.8 times longer than wide. Length 0.98 mm (0.85-1.08 mm) and greatest width 0.12 mm (0.09-0.14 mm), based on 10 specimens. External segmentation obscure. Region dorsal to fifth pair of legs without processes. Genital areas (Fig. 37c) located dorsolaterally. Caudal ramus (Fig. 37d) fused with anal segment, lacking setae but ornamented with several very small setules. Egg sac not seen. Body surface with many minute setules.

Rostrum (Fig. 37e) rounded. First antenna (Fig. 37e) short, 30 μm long, and probably 6-segmented, but second and third segments and fifth and sixth segments incompletely separated. Lengths of segments (measured along posterior sides): 6, 4.8, 2.4, 2.4, 2.4, and 2.4 μm, respectively. Armature: 3, 17 (11 + 6), 3 + 1 aesthete, 3 + 2 aesthetes (1 + 1 aesthete and 2 + 1 aesthete). All setae naked. Second antenna (Fig. 37f) 42 μm long and probably 3-segmented but last segment with suggestion of subdivision. Armature: 1, 1, and 2 + 1 + 1. Terminal claw 6 μm and adjacent seta 7 μm. All setae smooth.

Labrum (Fig. 37g) with posteroventral margin having 2 broad lateral lobes and 2 small medial lobes. Mandible (Fig. 37h) smooth, with narrow hyaline membrane along 1 side and recurved tip. Paragnath (Fig. 37i) very small and bearing few spinules. First maxilla (Fig. 37j) with 2 setae and minute denticle. Second

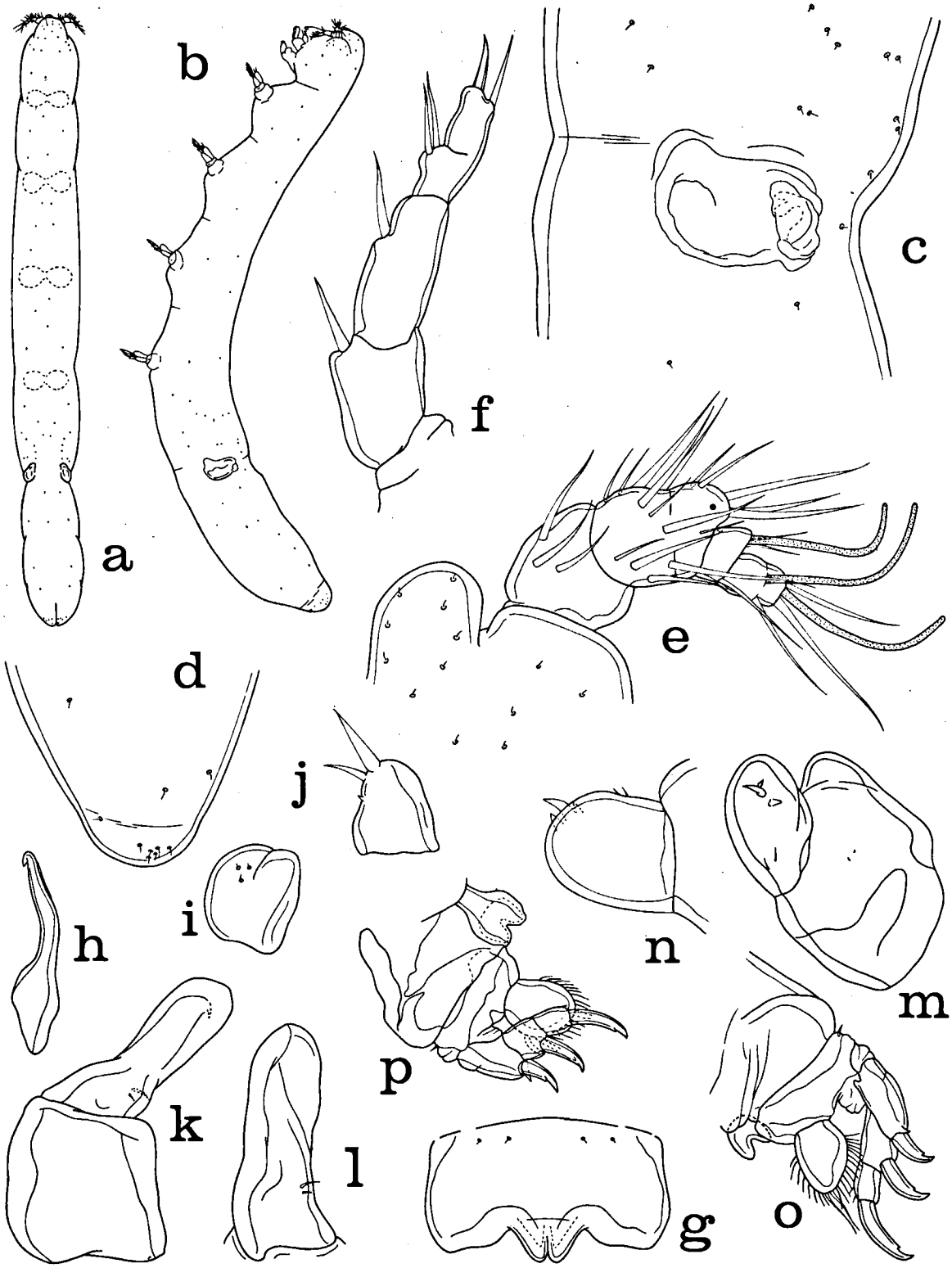

Fig. 37. *Xarifia anopla* n. sp., female. a, dorsal (scale B); b, lateral, (B); c, genital area, lateral (E); d, caudal ramus, lateral (E); e, rostrum and first antenna, with dot indicating position of aesthete added in male, antero-dorsal (N); f, second antenna, ventral (N); g, labrum, ventral (K); h, mandible, outer (N); i, paragnath, outer (N); j, first maxilla, ventral (N); k, second maxilla, outer (N); l, second segment of second maxilla, inner (N); m, maxilliped, antero-inner (N); n, second segment of maxilliped, outer (N); o, leg 1 and intercoxal plate, anterior (F); p, leg 3 and intercoxal plate, posterior (F).

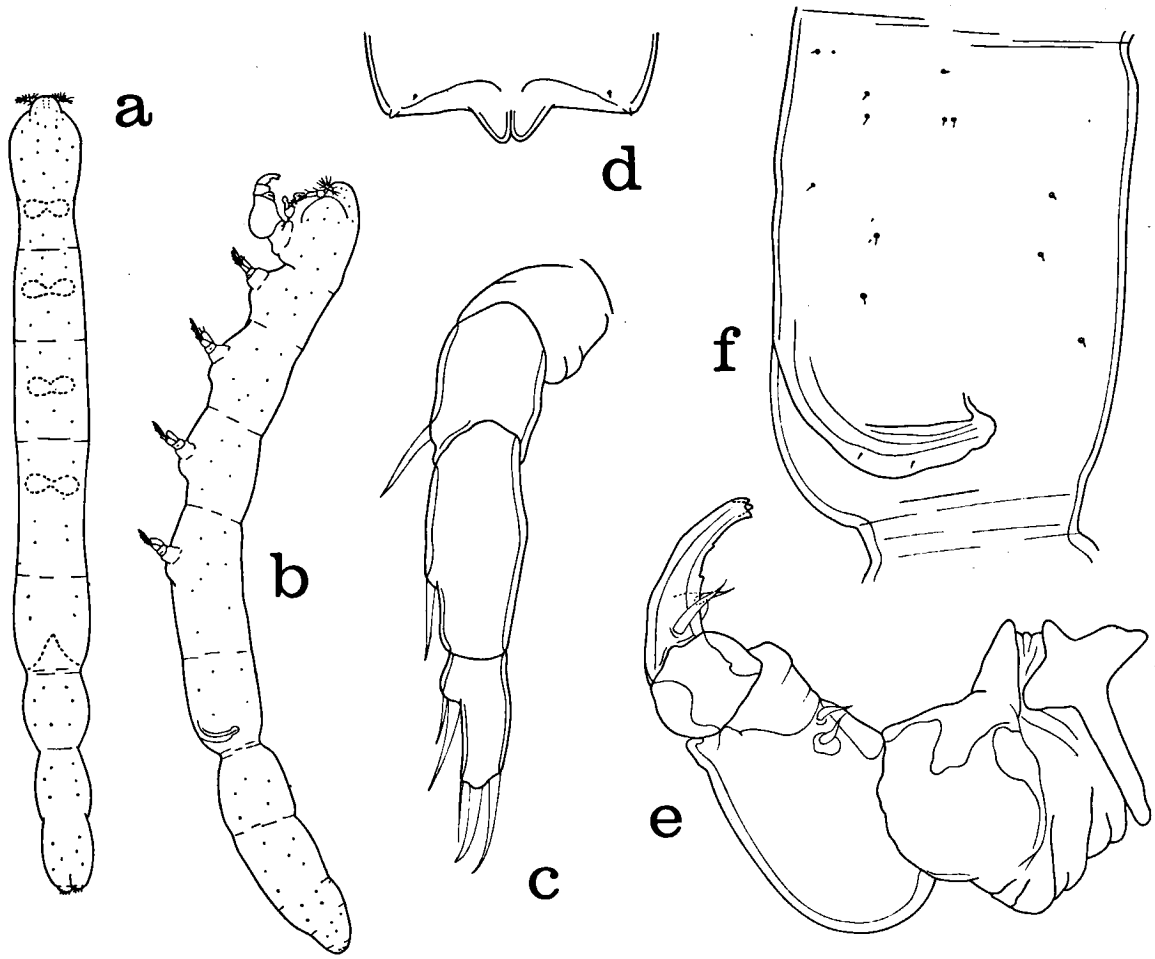

Fig. 38. *Xarifia anopla* n. sp., male. a, dorsal (scale B); b, lateral (B); c, second antenna, dorsal (N); d, labrum, ventral (K); e, maxilliped, inner (F); f, genital area and leg 6, lateral (E).

maxilla (Fig. 37k, l) 2-segmented, second segment with 2 small setae and broadly rounded tip. Maxilliped (Fig. 37m) 2-segmented. First segment with inner lobe. Second segment with 2 proximal setules and 3 terminal processes (setae ?), middle process larger than other 2 (Fig. 37n).

Legs 1-4 (Fig. 37o, p) with 3-segmented exopods and 1-segmented endopods. Spine and setal formula as follows (Roman numerals indicating spines, Arabic numerals representing setae):

P_{1+2}	coxa	o-o	basis	1-o	exp	I-o;	I-o;	I, 2
					enp	2		
P_{3+4}	coxa	o-o	basis	1-o	exp	I-o;	I-o;	I, 1
					enp	o		

Outer seta on basis of legs very small. Spines on exopods with prominent tooth on outer margin. First exopod segment of legs 1-4 with minute spinelike process at base of spine.

Leg 5 absent.

Color in living specimens in transmitted light reddish brown, eye red.

Male. — Body (Fig. 38a, b) slender, about 10.5 times longer than wide. Length of allotype 0.93 mm and greatest width 0.09 mm. Caudal ramus as in female.

Rostrum like that of female. First antenna similar to that of female but 1 aesthete added on third segment (at point indicated by dot in Fig. 37e). Second antenna (Fig. 38c) resembling that of female but 1 seta added terminally.

Labrum (Fig. 38d) with minute tooth on both outer lobes. Mandible, paragnath, first maxilla, and second maxilla as in female. Maxilliped (Fig. 38e) 4-segmented. First segment unarmed. Second segment with 2 setae. Third segment unarmed. Claw (fourth segment) short, 37 μm, with trifid tip and 2 proximal setae. Concave side of claw with few serrations and small lobe.

Legs 1-4 as in female.

Leg 5 absent.

Leg 6 (Fig. 38f) consisting of posteroventral flap on genital segment bearing 2 minute setae.

Spermatophore not seen.

Color as in female.

Etymology. — The specific name *anopla*, Greek *anoplos*, unarmed, alludes to the absence of leg 5, to the lack of setae on the caudal ramus, and to the absence of processes dorsal to the fifth legs in the female.

Remarks. — *Xarifia anopla* differs from all other species in the genus in the absence of leg 5, showing neither a free segment nor traces of setae. The lack of setae on the caudal ramus is also characteristic of the new species.

In an unpublished thesis Sebastian (1972) briefly mentioned a species of *Xarifia* based on a single female from washings of *Montipora foliosa* in 1.5 m off Mandapam, Palk Bay, southeastern coast of India. We believe this to be *Xarifia anopla*.

Xarifia extensa n. sp.

Figs. 39a-m, 40a-l

Type material. — 8 ♀♀, 8 ♂♂ from *Montipora* sp., in 3 m, Ambatoloaka, Nosy Bé, Madagascar, 23 June 1967. Holotype ♀, allotype, and 8 paratypes (4 ♀♀, 4 ♂♂) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.; the remaining paratypes (dissected) in the collection of the first author.

Female. — Body (Fig. 39a, b) very elongate, 15 times longer than wide. Length 2.48 mm (2.26-2.72 mm) and greatest width 0.18 (0.17-0.20 mm), based on 7 specimens. External segmentation not visible. Region dorsal to fifth legs without processes but extended in broad lobe overhanging genital areas in dorsal view (Fig. 39c). Genital and postgenital segments together comprising about 10 per cent of body length. Caudal ramus (Fig. 39d) approximately 70 × 32 μm, weakly articulated with body segment, bearing 1 subterminal and 3 terminal smooth setae, and several small surficial spinules. Body surface with many very small spinules. Egg sac (Fig. 39e) elongate, 667 × 113 μm, with 5 serially arranged eggs, each egg about 134 μm (124-146 μm) × 113 μm.

Rostrum (Fig. 39f) rounded with slightly wrinkled margin. First antenna (Fig. 39f) short, 29 μm, and 4-segmented. Lengths of segments (measured along posterior edges): 4.8, 3.6, 2.4, and 4.8 μm, respectively. Formula for armature: 3, 16, 3 + 1 aesthete, and 5 + 2 aesthetes. All setae smooth. Second antenna (Fig. 39g) 4-segmented, 55 μm long. Armature: 1, 1, 2, and 2 + I + 1 setule. Small clawlike terminal spine 3.6 μm, adjacent long seta 19 μm (Fig. 39h). All setae smooth. Few minute spinules on outer sides of second and third segments.

Labrum (Fig. 39i) with posteroventral margin slightly trilobed with few small conical knobs. Mandible (Fig. 39j) with narrow lamellae and few very small inner distal denticles. Paragnath a small lobe. First maxilla (Fig. 39k) with 3 setae and small nodiform process. Second maxilla (Fig. 39l) 2-segmented. First segment unarmed. Second segment with small outer proximal seta, 2 setae on midregion, and tapered to somewhat sigmoid clawlike tip. Maxilliped (Fig. 39m) probably 3-segmented, but boundaries of segments obscure. First segment unarmed. Second segment with 2 inner setae and pronounced inner lobe. Small third segment with stout spine and slender seta.

Legs 1-4 (Fig. 40a-d) with exopod of leg 1 distinctly 3-segmented, exopods of legs 2-4 probably 3-segmented but middle segment not clearly defined. Endopods of all 4 legs 1-segmented. Spine and setal formula as follows (Roman numerals indicating spines, Arabic numerals representing setae):

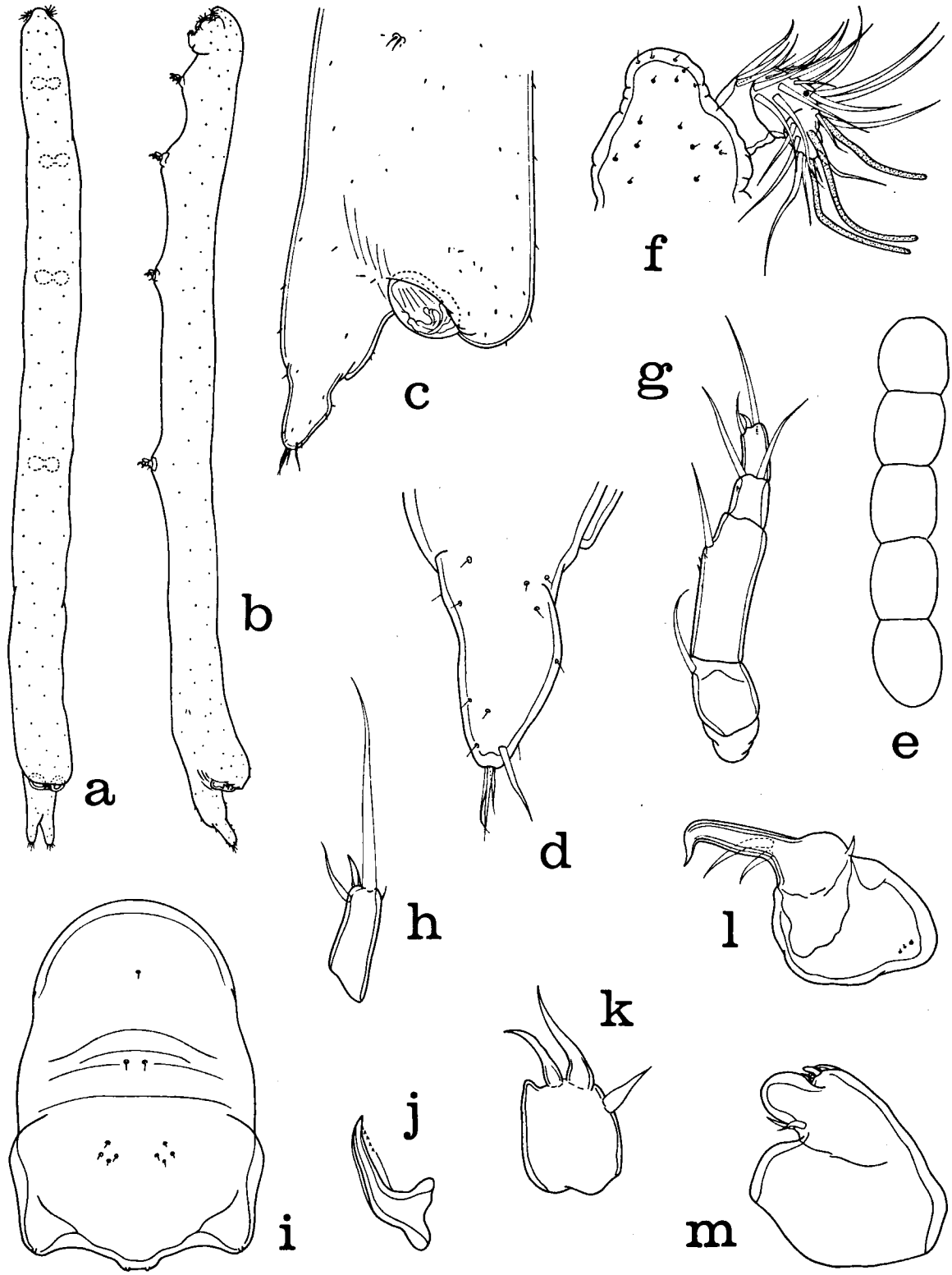

Fig. 39. *Xarifia extensa* n. sp., female. a, dorsal (scale H); b, lateral (H); c, urosome, lateral (G); d, caudal ramus, lateral (D); e, egg sac, lateral (L); f, rostrum and first antenna, anterodorsal (F); g, second antenna, ventro-inner (K); h, distalmost segment of second antenna, dorsal (N); i, labrum, ventral (K); j, mandible, ventral (N); k, first maxilla, postero-outer (N); l, second maxilla, anteroventral (N); m, maxilliped, inner (F).

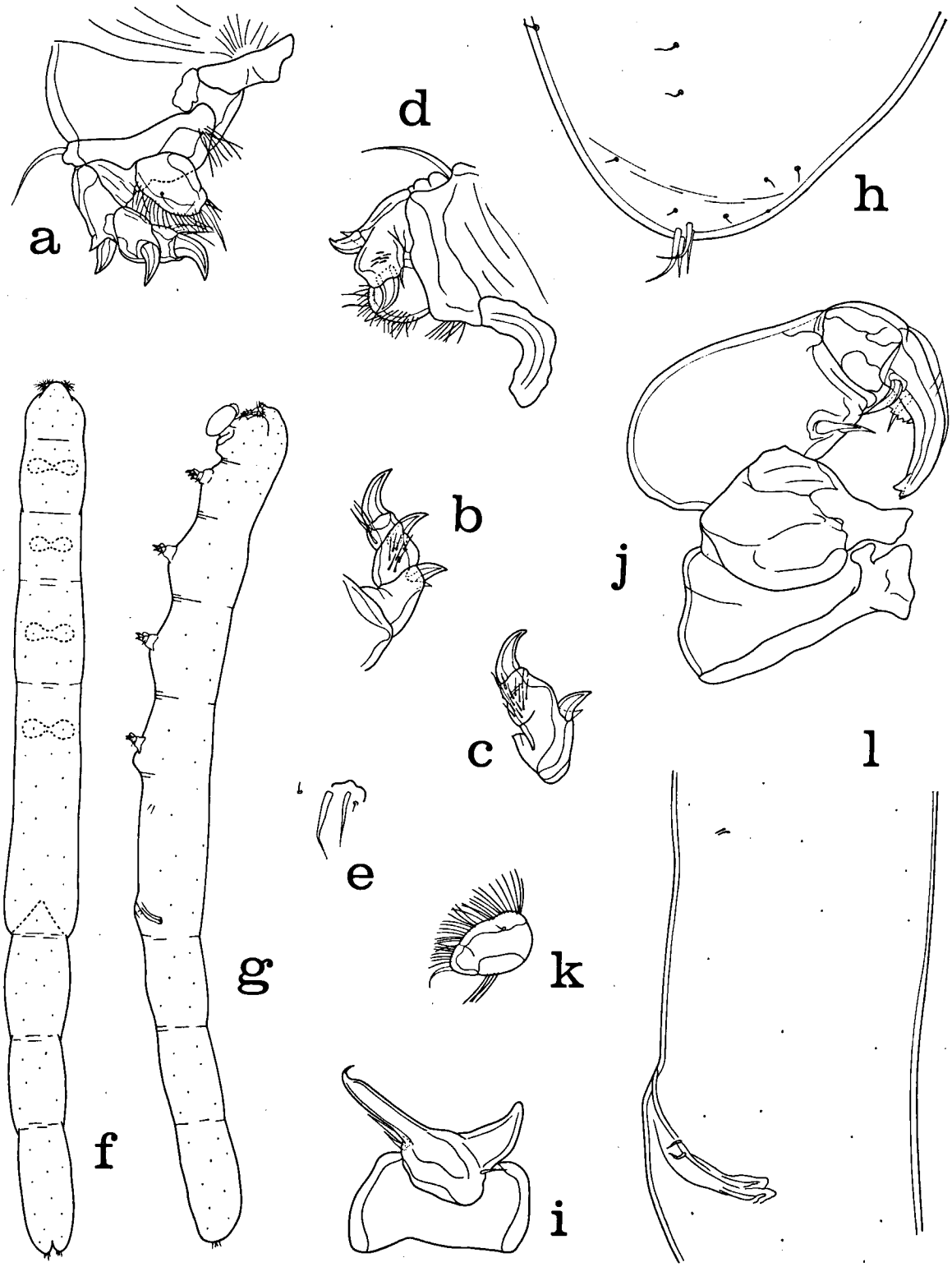

Fig. 40. *Xarifia extensa* n. sp. Female. a, leg 1 and intercoxal plate, anterior (scale F); b, exopod of leg 1, posterior (F); c, exopod of leg 2, posterior (F); d, leg 3 and intercoxal plate, posterior (F); e, leg 5, lateral (F). Male. f, dorsal (M); g, lateral (M); h, caudal ramus, lateral (F); i, second maxilla, anteroventral (N); j, maxilliped, inner (E); k, endopod of leg 1, anterior (F); l, leg 5 and leg 6, lateral (I).

P_1	coxa	o-o	basis	1-o	exp enp	I-o; 1	I-o; I, 3
P_2	coxa	o-o	basis	1-o	exp enp	I-o; 1	[o-o]; I, 2
P_{3+4}	coxa	o-o	basis	1-o	exp enp	I-o; o	[o-o]; I, 1

Basis in all 4 legs with inner hairlike setules. First exopod segment of legs 1-4 with spinelike process at base of spines. Second segment of exopod in all 4 legs with slender spinules on posterior surface. Endopods with numerous long marginal setules.

Leg 5 (Fig. 40e) lacking free segment and represented only by 2 setae.

Color in living specimens in transmitted light slightly reddish brown, eye red.

Male. — Body (Fig. 40f, g) very elongate, 12 times longer than wide. Length 1.92 mm (1.86-1.99 mm) and greatest width 0.16 mm (0.16-0.17 mm), based on 7 specimens. Genital and postgenital segments comprising about 54 per cent of body length. Caudal ramus (Fig. 40h) very small, fused with anal segment, and bearing 4 setae.

Rostrum as in female. First antenna like that of female but 1 aesthete added (at location indicated by dot in Fig. 39f). Second antenna, labrum, mandible, paragnath, and first maxilla as in female. Second maxilla (Fig. 40i) sexually dimorphic in having large dentiform proximal outer process on second segment. Maxilliped (Fig. 40j) 4-segmented. First segment unarmed. Second segment with 2 inner setae. Small third segment unarmed. Claw (fourth segment) 50 μm long, bearing 2 proximal setae, with concave margin having serrate expansion, and with trifid tip.

Legs 1-4 resembling those of female. Endopod of leg 1 slightly different in shape from that of female (as in Fig. 40k).

Leg 5 (Fig. 40l) like that of female.

Leg 6 (Fig. 40l) a posteroventral flap on genital segment bearing 2 small setae.

Spermatophore not seen.

Color like that of female.

Etymology. — The specific name *extensa*, Latin meaning stretched out, alludes to the long body in this species.

Remarks. — *Xarifia extensa* is close to *Xarifia temnura* Humes and Ho, 1968, in many ways, such as the short urosome, the absence of processes dorsal to the fifth legs in the female, the segmentation of legs 1-4, the labrum, etc. Yet the new species differs from *X. temnura* in several respects. Salient differences are shown in Table 1.

Table 1. Salient differences between *Xarifia extensa* n. sp. and *Xarifia temnura* Humes and Ho, 1968.

	Xarifia extensa	*Xarifia temnura*
Female		
Ratio of length to width	15:1	10:1
Body length	2.5 mm	1.5 mm
Caudal ramus	70 μm long, weakly articulated	28 μm long, fused
Second antenna, fourth segment	2, I, 1	I, 1
Maxilliped, second segment	with pronounced inner lobe	without such lobe
Leg 5	without free segment	with small free segment
Male		
Genital and postgenital segments	54% of body length	about one-third of body length

Xarifia sabiuraensis Misaki, 1978

Figs. 41a-m, 42a-l, 43a-j, 44a-j, 45a-d

Specimens studied. — From *Acropora intermedia* (Brook): 2 ♀♀, 2 ♂♂, in 2 m, Karang Mie, eastern central Halmahera, Moluccas, 00°20'07"N, 128°25'00"E, 19 May 1975. From *Acropora rambleri* (Bassett-Smith): 1 ♀, 1 ♂, in 15 m, Poelau Parang, eastern Ceram, Moluccas, 3°17'00"S, 130°44'48"E, 23 May 1975. From *Acropora gravida* (Dana): 16 ♀♀, 16 ♂♂, in 3 m, west of Isle Mando, near Noumea, New Caledonia, 22°18'59"S, 166°09'30"E, 26 June 1971. From *Acropora convexa* (Dana): 11 ♀♀, 37 ♂♂, in 1 m, Rocher à la Voile, Noumea, New Caledonia 22°18'24"S, 166°25'50"E, 28 June 1971. From *Acropora hyacinthus* (Dana): 5 ♀♀, 1 ♂, in 10 m, Poelau Parang, eastern Ceram, Moluccas, 23 May 1975; 1 ♀, in 1.5-2 m, Rocher à la Voile, New Caledonia, 19 June 1971; 33 ♀♀, 66 ♂♂, in 0.5 m, western end of Ricaudy Reef, near Noumea, New Caledonia, 22°19'05"S, 166°26'28"E, 25 June 1971; 11 ♀♀, 28 ♂♂,

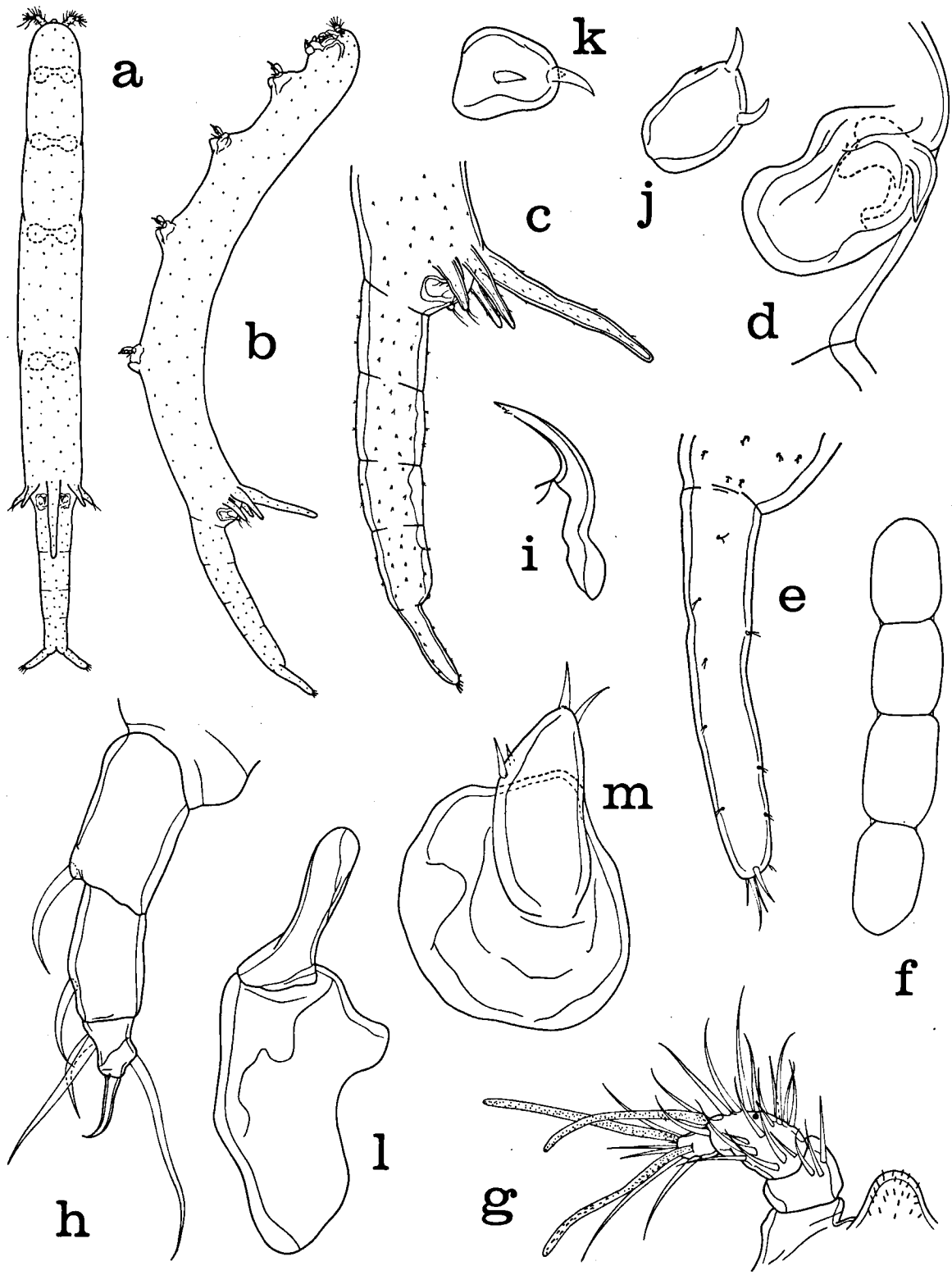

Fig. 41. *Xarifia sabiuraensis* Misaki, 1978, female. a, dorsal (scale M); b, lateral (M); c, urosome, lateral (J); d, genital area, lateral (F); e, caudal ramus, lateral (E); f, egg sac, lateral (B); g, rostrum and first antenna, with dot indicating position of aesthete in male, anterodorsal (F); h, second antenna, dorsal (N); i, mandible, ventral (N); j, first maxilla, outer (N); k, first maxilla, antero-inner (N); l, second maxilla, antero-inner (N); m, maxilliped, ventral (N).

same locality, 19 June 1971. From *Acropora patula* (Brook): 1 ♂, in 1.5 m, Ricaudy Reef, near Noumea, New Caledonia, 22°19'00"S, 166°26'44"E, 19 June 1971. From *Acropora florida* (Dana): 1 ♀, 1 ♂, in 2 m, Rigili Island, Enewetak Atoll, 3 July 1969; 1 ♀, in 4 m, southern end of Parry Island, Enewetak Atoll, 5 July 1969. From *Acropora affinis* (Brook): 5 ♀♀, 5 ♂♂, in 2 m, west of Isle Mando, near Noumea, New Caledonia, 22°18'59"S, 166°09'30"E, 5 July 1971. From *Acropora danai* (Milne Edwards and Haime): 7 ♀♀, 3 ♂♂, in 1.5 m, Ricaudy Reef, near Noumea, New Caledonia, 22°19'00"S, 166°26'44"E, 15 June 1971.

The following brief redescription supplements Misaki's original description of *Xarifia sabiuraensis*.

Female. — Body (Fig. 41a, b) slender, about 10 times longer than wide. Length (including caudal rami) 1.59 mm (1.56-1.66 mm) and greatest width 0.15 mm (0.14-0.15 mm), based on 3 specimens from *Acropora intermedia* in lactic acid. External segmentation visible in urosome of some specimens. Relative lengths of 3 processes dorsal to fifth legs and of caudal rami variable (Figs. 41c, 43a-j, 44a-j and Table 2). Genital area (Fig. 41d) with recurved spine. Caudal ramus (Fig. 41e) 95 × 19 μm. Body surface with minute double hairs. Egg sac (Fig. 41f) 610 × 108 μm, with 4 linearly arranged eggs, each about 141 × 108 μm.

Rostrum (Fig. 41g) rounded. First antenna (Fig. 41g) 3-segmented, 40 μm long, with armature: 3, 19 + 1 aesthete, and 6 + 2 aesthetes. Second antenna (Fig. 41h) 44 μm long including claw, 4-segmented but segments 3 and 4 indistinctly separated. Armature: 1, 1, 2, and 1 + I + 1 small setule. Terminal claw 7 μm and adjacent long seta 24 μm.

Mandible (Fig. 41i) with minute subterminal teeth. First maxilla (Fig. 41j, k) with 2 setae and minute spine. Second maxilla (Fig. 41l) with unarmed second segment. Maxilliped (Fig. 41m) 2-segmented, with second and third segments fused. Relationships of head appendages shown in Fig. 42a.

Legs 1-4 (Fig. 42b, d) with 3-segmented exopods and 1-segmented endopods. Spine and setal formula as follows (Roman numerals indicating spines, Arabic numerals representing setae):

P_1	coxa	o-o	basis	1-o	exp enp	I-o; o	I-o;	I, 1
P_{2-4}	coxa	o-o	basis	1-o	exp enp	I-o; o	o-o;	I, 1

Bulbous protrusion between right and left leg 1 (Fig. 42b). Spine on third segment of exopod of leg 1 shaped as in Fig. 42c. Second segment of exopod of legs 2-4 with extremely minute outer spine (?), not included in formula given above.

Leg 5 (Fig. 42e) 65 × 24 μm, its 2 terminal setae 25 μm and 11 μm. Adjacent dorsal seta 28 μm.

Color of living specimens in transmitted light opaque gray, eye red, egg sac with red and green spots.

Male. — Body (Fig. 42f) slender, about 10 times longer than wide. Length of 1 specimen in lactic acid 1.44 mm and greatest width 0.11 mm. Caudal ramus (Fig. 42g) short, 24 × 12 μm.

Rostrum as in female. First antenna like that of female but 1 aesthete added (at location indicated by dot in Fig. 41g). Second antenna as in female. Mandible (Fig. 42h) similar to that of female. First maxilla (Fig. 42i) with lateral spine much larger than in female. Second maxilla (Fig. 42j) with sclerotized sickle-shaped process on first segment. Second segment with 2 minute proximal setae and 1 very small subterminal process. Maxilliped (Fig. 42k) 4-segmented. First segment with small tooth. Second segment with 2 setae. Small third segment unarmed. Claw (fourth segment) variable in length, average 29 μm (23-39 μm), based on 4 specimens from *Acropora hyacinthus*, 1 from *Acropora gravida*, and 1 from *Acropora patula*. Claw with 2 proximal setae, trifid tip, and distinct tooth and row of denticles near middle of concave margin.

Legs 1-4 as in female.

Leg 5 (Fig. 42l) represented by 3 small setae.

Leg 6 (Fig. 42l) represented by 2 small setae on genital flap.

Spermatophore elongate, 234 × 49 μm.

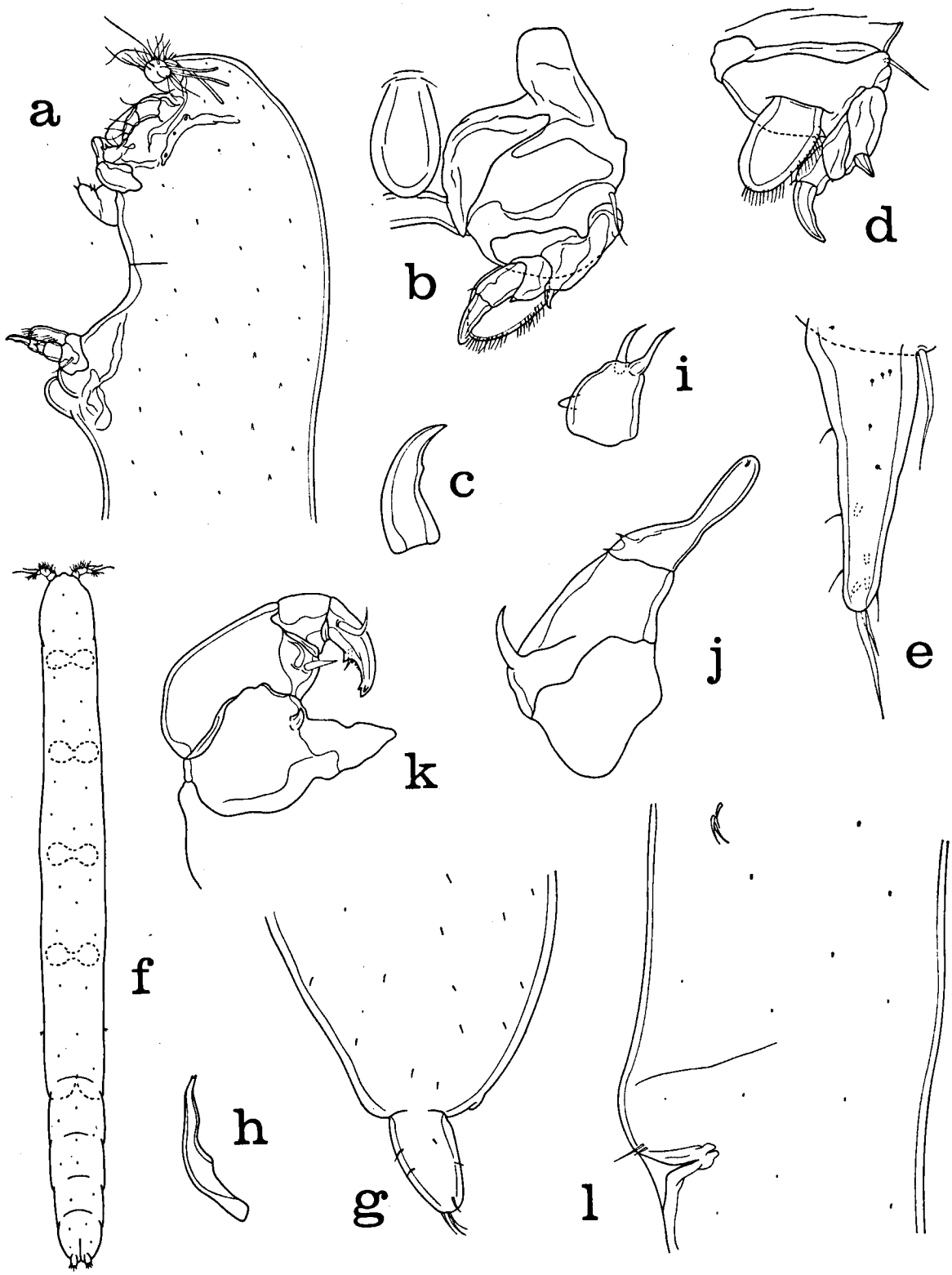

Fig. 42. *Xarifia sabiuraensis* Misaki, 1978. Female. a, cephalosome and first pedigerous segment, lateral (scale I); b, leg 1, intercoxal plate, and median bulbous protrusion, posterior (F); c, spine of third segment of exopod of leg 1, posterior (N); d, leg 2, anterior (F); e, leg 5, lateral (F). Male. f, dorsal (B); g, caudal ramus, lateral (F); h, mandible, ventral (N); i, first maxilla, anteroventral (N); j, second maxilla, posteroventral (N); k, maxilliped, inner (F); l, leg 5 and leg 6, lateral (E).

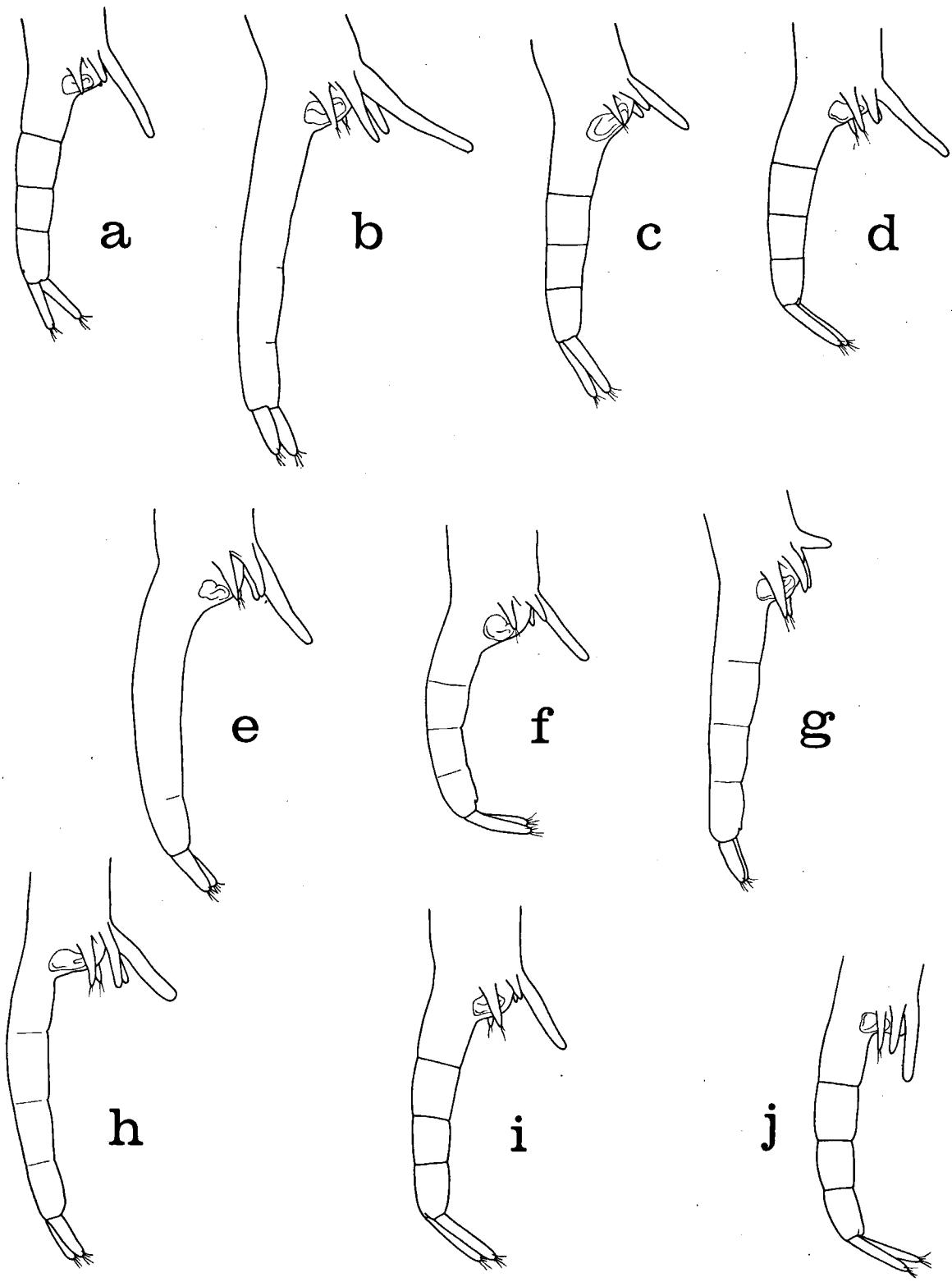

Fig. 43. *Xarifia sabiuraensis* Misaki, 1978. a-j, variation in urosomes of 10 females from *Acropora hyacinthus*, lateral.

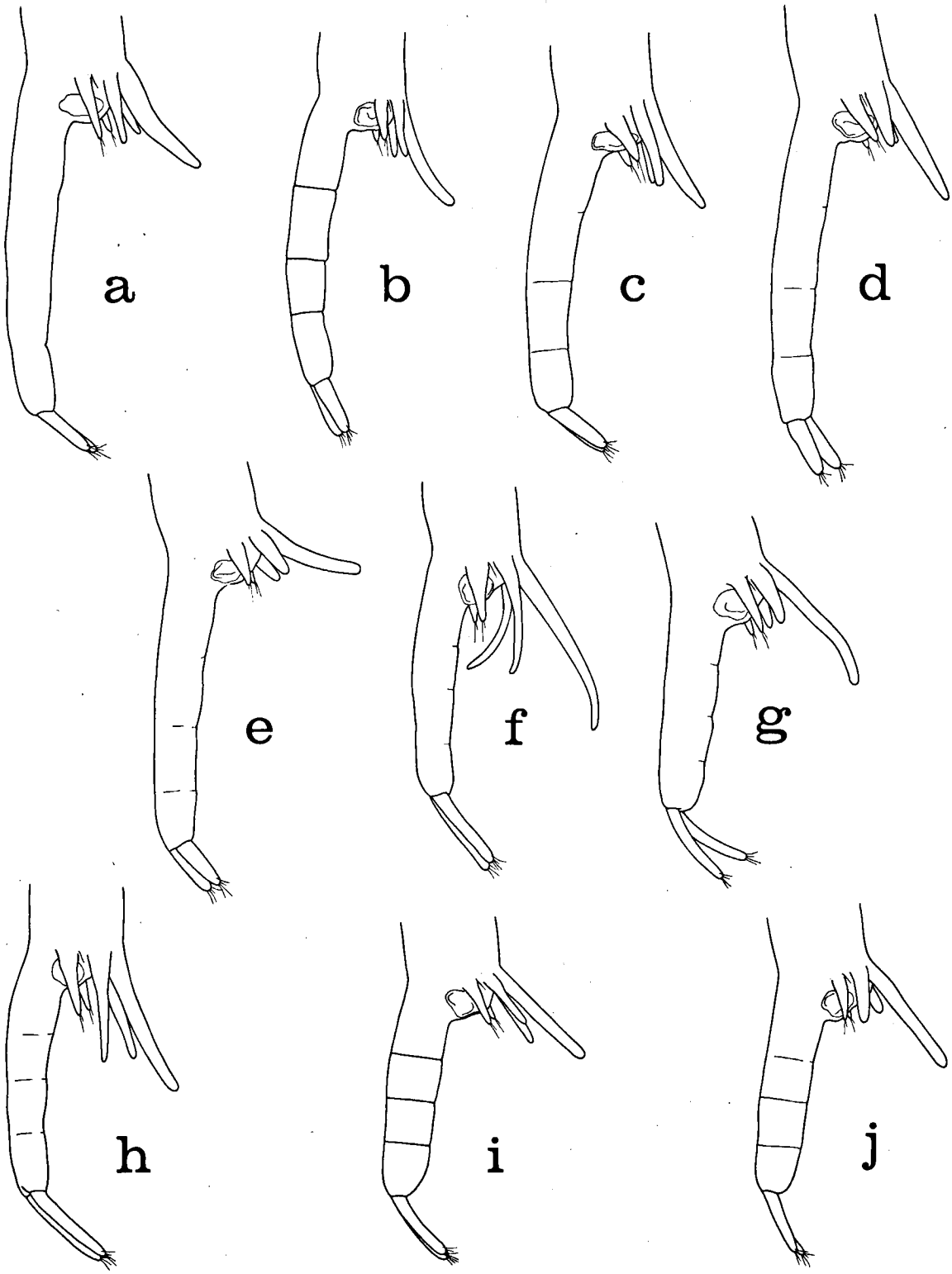

Fig. 44. *Xarifia sabiuraensis* Misaki, 1978. a-e, variation in urosomes of 5 females from *Acropora convexa*, lateral; f-j, variation in urosomes of 5 females from *Acropora gravida*, lateral.

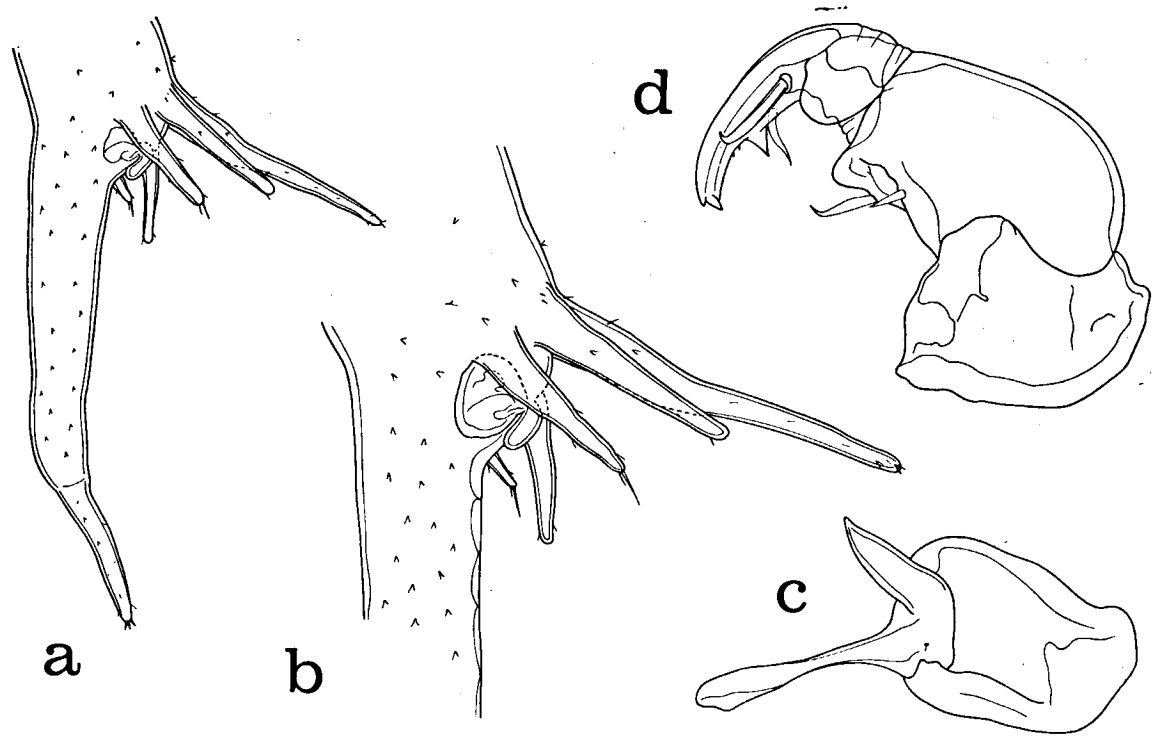

Fig. 45. *Xarifia sabiuraensis* Misaki, 1978, female from *Acropora affinis*. a, urosome, lateral (scale J); b, genital area, lateral (C). Male. c, second maxilla, posteroventral (N); d, maxilliped, inner (F).

Color as in female.

Remarks. — The type specimens of *Xarifia sabiuraensis* were collected from *Acropora pectinata* (Brook) at Sabiura, Japan (Misaki, 1978). The present study reveals nine new hosts, *Acropora intermedia, Acropora rambleri, Acropora gravida, Acropora hyacinthus, Acropora florida, Acropora danai, Acropora affinis, Acropora patula,* and *Acropora convexa.* The range of this copepod is extended from Japan to Enewetak Atoll, the Moluccas, and New Caledonia.

The females of *Xarifia sabiuraensis* show considerable variation in the relative lengths of the three processes dorsal to the fifth legs and of the caudal ramus. In ten females from *Acropora hyacinthus* (Fig. 43a-j and Table 2) variation in the three processes was sufficient that single specimens might be mistakenly considered as separate species (compare, for example, Fig. 43b, c, g). These ten females also showed variation in the caudal ramus (compare Fig. 43b, j). In five females from *Acropora convexa* (Fig. 44a-e and Table 2)

Table 2. Variation in processes dorsal to fifth legs, leg 5, and caudal ramus observed in *Xarifia sabiuraensis* Misaki, 1978, from three species of *Acropora*. (Measurements in μm).

	Figure	Length middle process	Length lateral process	Length leg 5	Caudal ramus
From	43a	130	42	49	86 × 17
Acropora	43b	196	108	65	75 × 21
hyacinthus	43c	110	53	50	96 × 17.5
	43d	138	52	68	99 × 18
	43e	148	65	65	72 × 34
	43f	109	42	47	95 × 17
	43g	42	62	73	75 × 21
	43h	143	78	70	70 × 21
	43i	117	36	68	101 × 18
	43j	104	71	66	104 × 18
		124	61	62	87 × 20
		(42-196)	(36-108)	(47-73)	(70-104 × 17-34)
From	44a	173	102	91	96 × 24
Acropora	44b	169	83	62	81 × 23
convexa	44c	160	117	73	87 × 23
	44d	179	82	75	83 × 26
	44e	146	75	65	78 × 23
		165	92	73	85 × 24
		(146-179)	(82-117)	(62-91)	((78-96 × 23-26
From	44f	263	165	81	133 × 21
Acropora	44g	208	83	88	127 × 17
gravida	44h	211	164	96	143 × 18
	44i	172	91, 105	71	125 × 18
	44j	180	73	55	107 × 16
		207	117	78	127 × 18
		(172-263)	(73-165)	(55-96)	(107-143 × 16-21)

and in five females from *Acropora gravida* the three processes varied (Fig. 44f-j and Table 2) significantly (compare, for example, Fig. 44f, j).

The specimens of *Xarifia sabiuraensis* from *Acropora affinis* differ in a few points from those collected from other hosts. The caudal ramus of the female is slightly longer (Fig. 45a). The process on the genital area of the female is a large rounded protrusion (Fig. 45b) rather than the usual spinelike structure (Fig. 41d). In the second maxilla of the male (Fig. 45c) the sclerotized process is larger. In the maxilliped of the male (Fig. 45d) the dentiform process on the concave margin of the claw is larger and the first segment lacks a tooth.

Xarifia tumorisa Misaki, 1978

Figs. 46a-l, 47a-h

Specimens studied. — From *Acropora hyacinthus* (Dana): 3 ♀♀, 2 ♂♂ from fragments of 1 colony, in 0.5 m, western side of Ricaudy Reef, near Noumea, New Caledonia, 22°20′05″S, 166° 24′05″E, 19 June 1971; 14 ♀♀, 9 ♂♂, 1 immature specimen, from same colony, 25 June 1971; 2 ♀♀, 1 ♂, from 1 colony, in 1.5-2 m, Rocher à la Voile, Noumea, 22°18′24″S, 166°25′50″E, 19 June 1971. From *Acropora corymbosa* (Lamarck): 2 ♂♂ from 1 colony, in 1 m, Rocher à la Voile, Noumea, 15 June 1971. From *Acropora gravida* (Dana): 9 ♀♀, 7 ♂♂, from 1 colony, in 3 m, west of Isle Mando, near Noumea, 22°18′59″S, 166°09′30″E, 26 June 1971. From *Acropora intermedia* (Brook): 2 ♀♀, from 1 colony, in 2 m, Karang Mie, eastern central Halmahera, Moluccas, 00°20′07″N, 128°25′00″E, 19 May 1975. From *Acropora affinis* (Brook): 2 ♀♀, 2 ♂♂, in 2 m, west of Isle Mando, near Noumea, 5 July 1971. From *Acropora exilis* (Brook): 1 ♂, in 2 m, west of Isle Mando, near Noumea, 15 July 1971.

The following partial redescription, based on specimens from *Acropora hyacinthus* in New Caledonia, is intended to supplement Misaki's original description.

Female. — Body (Fig. 46a, b) about 5.25 times longer than wide. Length (including caudal rami) 1.33 mm (1.23-1.39 mm) and greatest width 0.24 mm (0.23-0.25 mm), based on 10 specimens. External segmentation evident only in urosome. Three long processes dorsal to fifth legs nearly equal in length (Fig. 46c). First two postgenital segments with distinct posterolateral lobelike expansions (Fig. 46a). Caudal ramus (Fig. 46d) 80 × 29 μm, with 5 terminal setae and 1 lateral seta. Egg sac (Fig. 46e) with 2 eggs, both approximately 151 × 167 μm.

First antenna (Fig. 46f) 30 μm long, with armature 3, 18, 4 + 1 aesthete, and 9 + 2 aesthetes [2 + 1 aesthete, 7 + 1 aesthete]. Second antenna (Fig. 46g) 61 μm long including clawlike spine. Armature: 1, 1, 2, and 1 + I + 1 setule. Fourth segment with long seta 29 μm and clawlike spine 10 μm.

Labrum (Fig. 46h) with shallowly indented posteroventral edge having 2 broad lateral lobes and medial incision. Mandible (Fig. 46i) with unequally bifid tip and few minute subterminal spinules. First maxilla (Fig. 46j) with 2 large terminal setae and 1 minute subterminal seta. Second maxilla as in Fig. 46k. Maxilliped (Fig. 46l) 3-segmented. First segment with slight inner lobe. Second segment with prominent inner lobe and 2 inner setae. Third segment with 2 large terminal setae and adjacent small seta.

Legs 1-4 (Fig. 47a, b) with following spine and setal formula (Roman numerals indicating spines, Arabic numerals representing setae):

P_{1+2}	coxa	o-o	basis	1-o	exp	I-o; I-o;	I, 3
					enp	3	
P_{3+4}	coxa	o-o	basis	1-o	exp	I-o; I-o;	I, 2
					enp	1	

First exopod segment of legs 1-4 with spinelike process at base of spine.

Leg 5 (Fig. 47c) 146 μm long, its 2 terminal setae 19 μm and 25 μm, and ornamented with several marginal double hairs.

Color in living specimens in transmitted light opaque light gray, intestine orange, eye red.

Male. — Body (Fig. 47d) with length (including caudal rami) 1.28 mm (1.16-1.39 mm) and greatest width 0.17 mm (0.16-0.17 mm), based

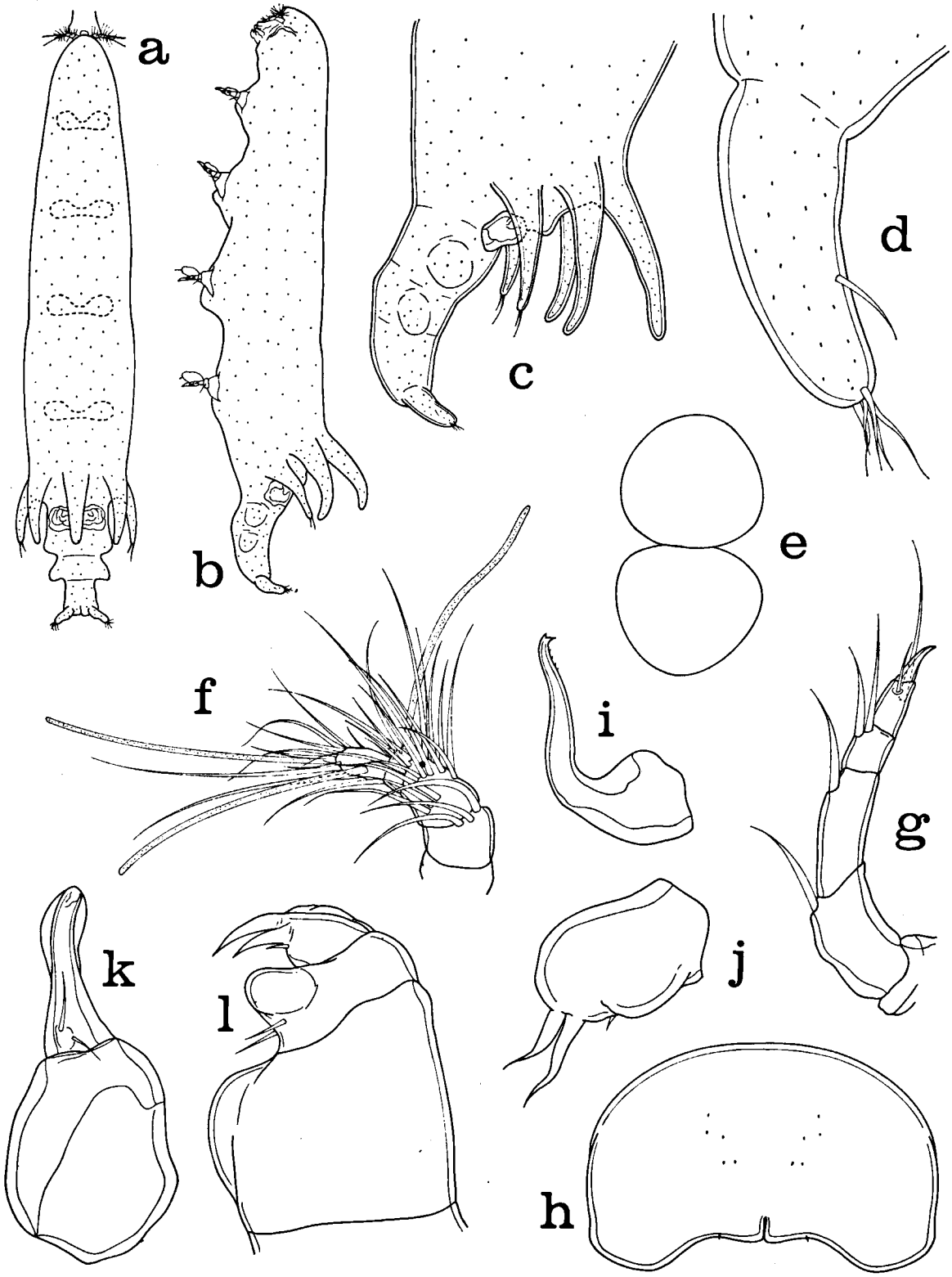

Fig. 46. *Xarifia tumorisa* Misaki, 1978, female. a, dorsal (scale M); b, lateral (M); c, urosome, lateral (J); d, caudal ramus, lateral (F); e, egg sac, lateral (J); f, first antenna, with dot indicating position of aesthete added in male, anterodorsal (F); g, second antenna, dorso-inner (K); h, labrum, ventral (K); i, mandible, ventral (N); j, first maxilla, anteroventral (N); k, second maxilla, antero-inner (N); l, maxilliped, anterior (N).

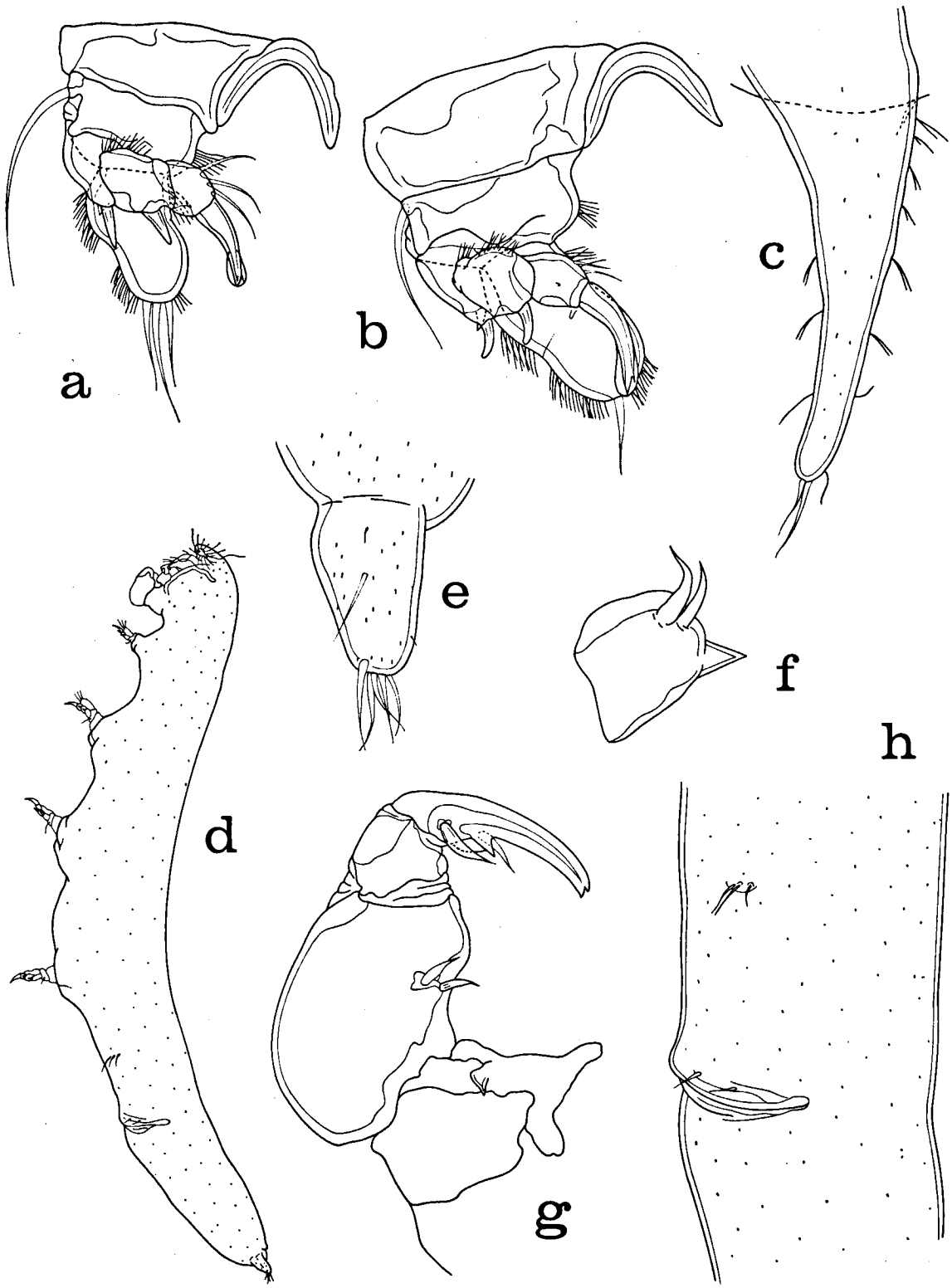

Fig. 47. *Xarifia tumorisa* Misaki, 1978. Female. a, leg 1 and intercoxal plate, posterior (scale F); b, leg 3 and intercoxal plate, posterior (F); c, leg 5, lateral (D). Male. d, lateral (L); e, caudal ramus, lateral (F); f, first maxilla, antero-inner (N); g, maxilliped, inner (F); h, leg 5 and leg 6, lateral (I).

on 7 specimens. Caudal ramus (Fig. 47e) 40 × 22 μm, ratio 1.82:1.

First antenna similar to that of female but 1 aesthete added (at location indicated by dot in Fig. 46f). Second antenna, labrum, and mandible as in female. First maxilla (Fig. 47f) sexually dimorphic, with subterminal element in form of broad spine rather than small slender seta as in female. Second maxilla like that of female. Maxilliped (Fig. 47g) with spiniform process on first segment. Claw 50 μm long with bifid tip, having 2 proximal setae, 1 of them stouter than other, and bearing on its concave margin a low expansion and tooth.

Legs 1-4 as in female.

Leg 5 (Fig. 47h) with 3 small setae.

Leg 6 (Fig. 47h) with 2 setae.

Color as in female.

Remarks. — The lateral processes on the first and second postgenital segments of the female distinguish this species of *Xarifia* from all congeners.

Xarifia tumorisa until now has been known only from Japan in *Acropora pectinata* (Brook). The six species of *Acropora* mentioned above, *Acropora hyacinthus, A. corymbosa,* A. *gravida, A. affinis, A. exilis,* and *A. intermedia,* are new hosts. The range of the species is extended from Japan to Halmahera in the Moluccas and to New Caledonia.

Xarifia gerlachi Humes, 1962

Fig. 48a-e

Specimens studied. — From *Acropora hyacinthus* (Dana): 2 ♀♀, 7 immature ♀♀, 11 ♂♂, in 0.5 m, western side of Ricaudy Reef, near Noumea, New Caledonia, 22°20′05″S, 166°24′05″E, 19 June 1971; 6 ♀♀, 8 immature ♀♀, 46 ♂♂, from same colony, 25 June 1971. From *Acropora gravida* (Dana): 1 ♀, in 3 m, west of Isle Mando, near Noumea, New Caledonia, 22°18′59″S, 166°09′30″E, 26 June 1971. From *Acropora affinis* (Brook): 2 ♂♂, in 2 m, west of Isle Mando, near Noumea, 5 July 1971. From *Acropora* sp.: 15 ♀♀, 9 ♂♂, in 3 m, Antsamantsara, Nosy Bé, Madagascar, 9 June 1967.

Female. — Body (Fig. 48a, b) about 4.5 times longer than wide. Urosome about 23 per cent of body length.

Male. — Body (Fig. 48c, d) about 11 times longer than wide. Maxilliped (Fig. 48e) with claw attenuated distally.

Remarks. — In comparison to the males of the type specimens from *Acropora corymbosa* collected in Madagascar (Humes, 1962) the present males from *Acropora hyacinthus* from New Caledonia possess a more slender body and a longer, more attenuate maxilliped claw which is not divided at its tip. These differences are thought to be minor and are attributed to intraspecific variation.

Xarifia gerlachi until now has been known only from Madagascar in *Acropora corymbosa* and *Acropora cytherea. Acropora hyacinthus, A. affinis,* and *A. gravida* are thus new hosts for this copepod. These records extend the known range from Madagascar to New Caledonia.

Xarifia infrequens Humes, 1962

Fig. 49a, b

Xarifia infrequens is known from *Acropora corymbosa* (Lamarck) and *Acropora cytherea* (Dana) at Nosy Bé, Madagascar (Humes, 1962). Restudy of original material shows the second segment of the second maxilla of the male to have two minute spinelike processes (Fig. 49a) and to lack sexual dimorphism. The claw of the maxilliped of the male lacks a spiniform process on the middle of the concave margin (Fig. 49b).

A close relationship between *Xarifia infrequens* and *Xarifia sabiuraensis* Misaki, 1978, is apparent, as may be seen by a detailed comparison of the original description of *X. infrequens* with Misaki's description and with the redescription of *X. sabiuraensis* above. The absence of a spiniform process on the middle of the concave margin of the claw of the male maxilliped (in contrast to the presence of such a process in *X. sabiuraensis*) constitutes a clear distinction between the two species. However, we have not been able to discover other reliable distinctions. A comparison of females of *X. infrequens* from *Acropora cytherea* in Madagascar

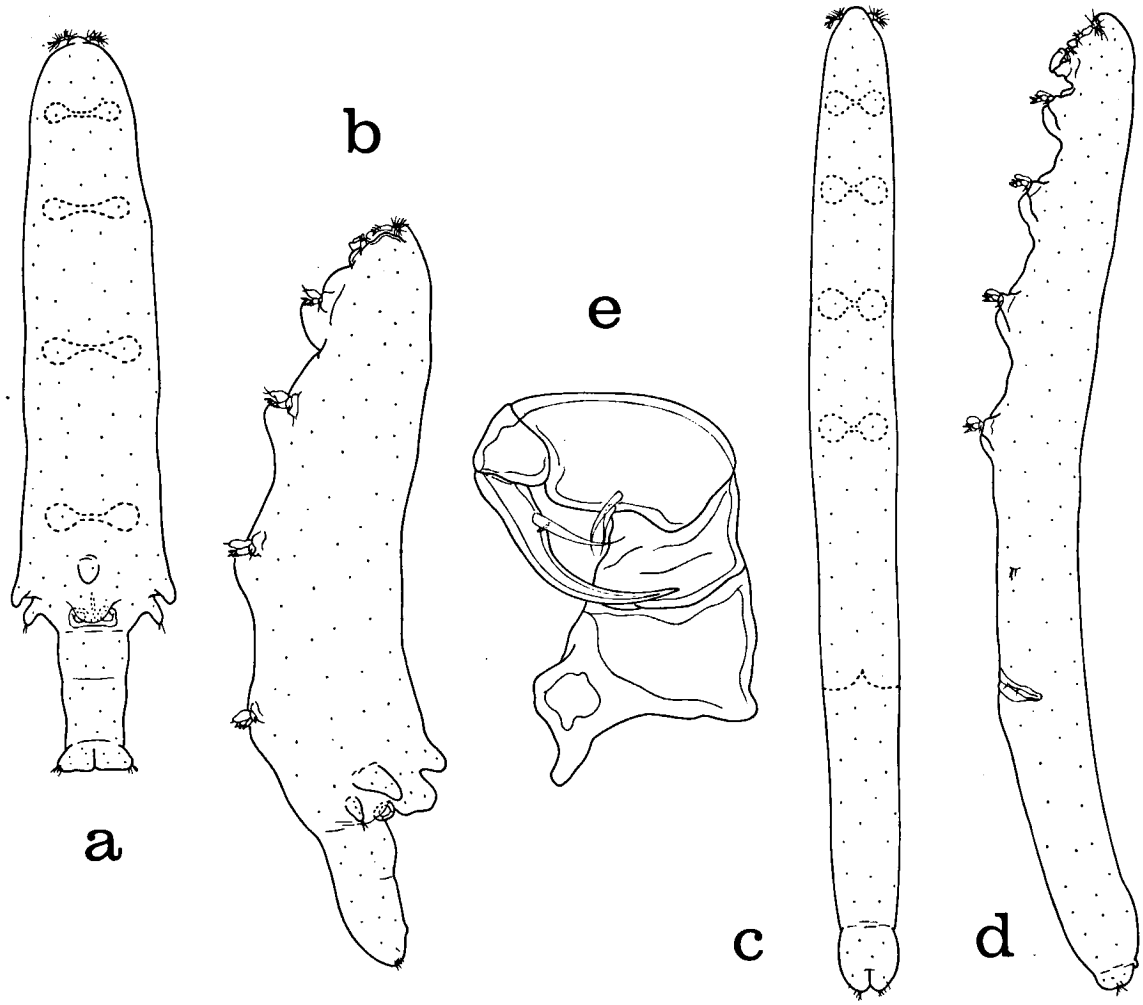

Fig. 48. *Xarifia gerlachi* Humes, 1962. Female. a, dorsal (scale H); b, lateral (H). Male c, dorsal (B); d, lateral (B); e, maxilliped, inner (K).

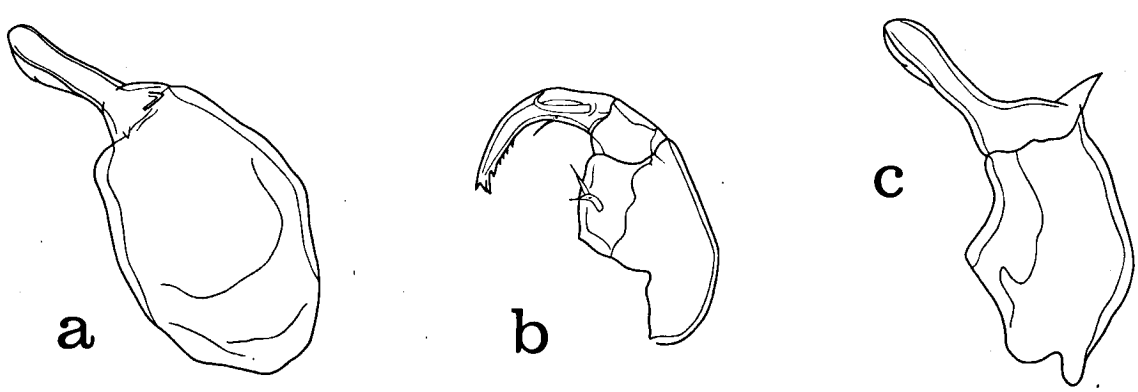

Fig. 49. *Xarifia infrequens* Humes, 1962, male. a, second maxilla, posteroventral (scale N); b, maxilliped (first segment not shown), inner (F). *Xarifia tenuis* Humes, 1962, male. c, second maxilla, antero-inner (N).

with females of *X. sabiuraensis* from *Acropora intermedia* in the Moluccas reveals no important differences. The available specimens of *X. infrequens* are very few in number, and further investigation of the differences or similarities of these two species of *Xarifia* must await the collection of additional new material.

Xarifia tenuis Humes, 1962

Fig. 49c

Xarifia tenuis is known only from the type material collected from *Acropora cytherea* (Dana) at Nosy Bé, Madagascar (Humes, 1962). Distinctive characters include (1) the greatly elongated and slender caudal ramus in the female, ratio about 9:1, (2) the absence of an outer spine on the first segment of the exopod in legs 1-4, and (3) the short claw of the maxilliped of the male with a prominent bidentate process near the middle of the concave margin. Restudy of paratypes has shown that the second maxilla of the male is sexually dimorphic in having a proximal outer spiniform process on the second segment (Fig. 49c), a structure not present in the female. *Xarifia tenuis* is closely related to *Xarifia infrequens* and *Xarifia sabiuraensis.*

Xarifia dispar Humes, 1962

Fig. 50a-k

Specimens studied. — 26 ♀♀, 15 ♂♂ from *Echinopora* sp., in 3 m, Ambatoloaka, Nosy Bé, Madagascar, 23 June 1967. A comparison of these copepods with paratypes of *Xarifia dispar* reveals a few minor discrepancies with the original description. Therefore, a redescription of certain features is given here. The original description of *X. dispar* was based on specimens cleared in glycerol, an inferior medium for observation of fine details compared to lactic acid.

Female. — Body (Fig. 50a, b) with segmentation very weakly indicated. Caudal ramus (Fig. 50c) with number of setae varying from 7-11.

Rostrum (Fig. 50d) projecting slightly. First antenna (Fig. 50e) 73 μm long and indistinctly 6-segmented. Lengths of segments (measured along posterior nonsetiferous margins): 14 (23 μm along anterior margin), 16, 10, 8, 11, and 7 μm. Formula for armature: 3, 11, 7, 4 + 1 aesthete, 2 + 1 aesthete, and 7 + 1 aesthete. Second antenna with 3 minute distal spinules (Fig. 50f) in addition to armature originally described.

Labrum (Fig. 50g) broad, with truncate concave posteroventral margin indented medially. Paragnath an elongate lobe with minute spinules distally (Fig. 50g). First maxilla (Fig. 50h) with 3 setae. Second maxilla (Fig. 50i, j) with second segment having 1 seta and prolonged as slightly sigmoid process. Maxilliped (Fig. 50k) generally similar to original description.

Other parts of body as in original description.

Male. — First antenna with 1 aesthete added on third segment, so that formula is: 3, 11, 7 + 1 aesthete, 4 + 1 aesthete, 2 + 1 aesthete, and 7 + 1 aesthete.

Remarks. — *Xarifia dispar* was originally reported (Humes, 1962) from *Echinopora carduus* Klunzinger in Madagascar. Later Humes and Ho (1968) listed two additional hosts, *Echinopora gemmacea* (Lamarck) and *Echinopora lamellosa* (Esper), both in Madagascar. At present *X. dispar* is known only from Madagascar in these various species of *Echinopora.*

Xarifia anomala Humes and Ho, 1968

Fig. 51a-d

Specimens studied. — From *Acropora palifera* (Lamarck): 6 ♀♀, 11 ♂♂, in 10 m, Poelau Gomumu, south of Obi, Moluccas, 1°50'00"S, 127°30'54"E, 30 May 1975; 1 ♀, 1 ♂, in 3 m, west of Isle Mando, near Noumea, New Caledonia, 22°18'59"S, 166°09'30"E, 26 June 1971. From *Acropora corymbosa* (Lamarck): 11 ♀♀, 8 ♂♂, in 1 m, Rocher à la Voile, Noumea, New Caledonia, 22°18'24"S, 166°25'50"E, 15 June 1971. From *Acropora danai* (Milne Edwards and Haime): 6 ♀♀, 2 ♂♂, in 1.5 m, Ricaudy Reef, near Noumea, New Caledonia, 22°19'00"S,

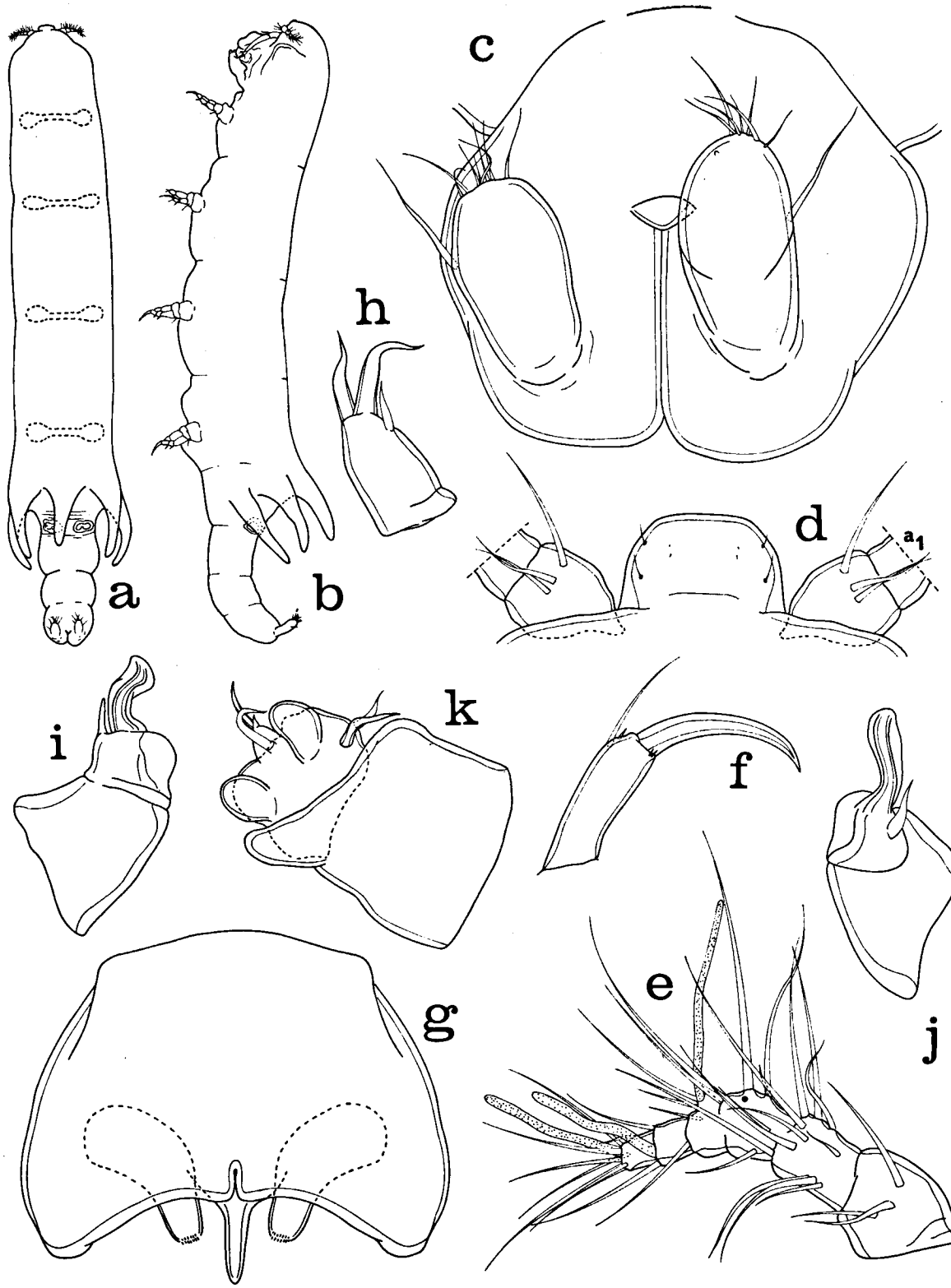

Fig. 50. *Xarifia dispar* Humes, 1962, female. a, dorsal (scale M); b, lateral (M);, c, anal segment, dorsal, and caudal rami, ventral (F); d, rostrum (a_1 = first antenna), dorsal (F); e, first antenna, with dot indicating position of aesthete added in male, anterodorsal (F); f, last segment of second antenna, dorsal (K); g, labrum, paragnaths and medial process (labium ?), ventral (F); h, first maxilla, antero-ventral (F); i, second maxillae postero-inner (F); j, second maxilla, antero-inner (F); k, maxilliped, inner (F).

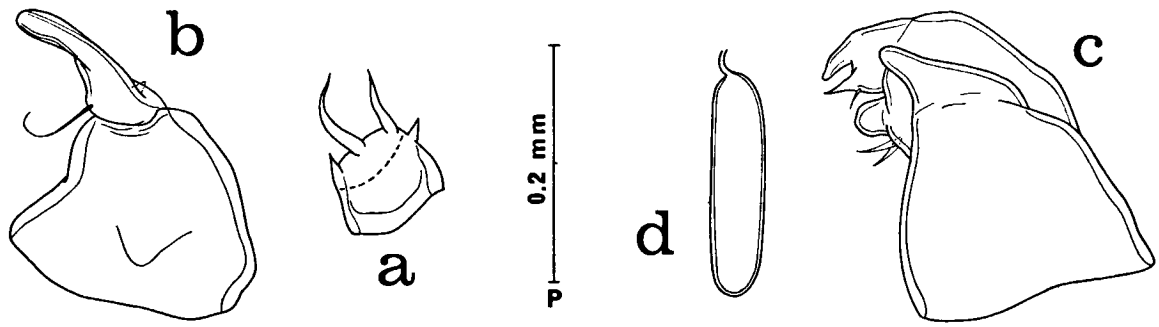

Fig. 51. *Xarifia anomala* Humes and Ho, 1968. Female. a, first maxilla, anteroventral (scale N); b, second maxilla, antero-inner (N); c, maxilliped, outer (N). Male. d, spermatophore, attached to female, lateral (P).

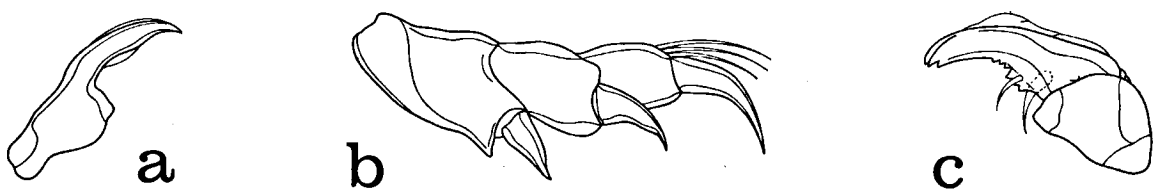

Fig. 52. *Xarifia temnura* Humes and Ho, 1968. Female. a, mandible, ventral (scale N). Male. b, exopod of leg 1 anterior (N); c, third segment and claw of maxilliped, outer (F).

166°26′44″E, 15 June 1971. From *Acropora humilis* (Dana): 1 ♂, in 1.5 m, Rocher à la Voile, Noumea, New Caledonia, 19 June 1971. From *Acropora convexa* (Dana): 2 ♀♀, 2 ♂♂, in 1 m, Rocher à la Voile, Noumea, 28 June 1971. From *Acropora hyacinthus* (Dana): 11 ♀♀, 29 ♂♂, in 0.5 m, western side of Ricaudy Reef, near Noumea, New Caledonia, 22°20′05″S, 166°24′05″E, 19 June 1971; 43 ♀♀, 47 ♂♂, 1 immature specimen, from same colony, 25 June 1971; 2 ♀♀, in 1.5-2 m, Rocher à la Voile, Noumea, 19 June 1971; 15 ♀♀, 7 ♂♂, in 10 m, Poelau Parang, eastern Ceram, 3°17′00″S, 130°44′48″E, 23 May 1975. From *Acropora intermedia* (Brook): 1 ♂, in 2 m, Karang Mie, eastern central Halmahera, Moluccas, 00° 20′07″N, 128°25′00″E, 19 May 1975. From *Acropora gravida* (Dana): 4 ♀♀, 5 ♂♂, in 3 m, west of Isle Mando, near Noumea, New Caledonia, 22°18′59″S, 166°09′30″E, 26 June 1971. From *Acropora affinis* (Brook): 1 ♂, in 2 m, west of Mando, near Noumea, New Caledonia, 5 July 1971. From *Acropora* sp.: 45 ♀♀, 2 immature ♀♀, and 27 ♂♂, in 2 m, western shore of Nosy Komba, opposite Andraikarekabé, Madagascar, 4 June 1967.

Remarks. — Specimens of *Xarifia anomala* from *Acropora hyacinthus* at Poelau Parang, Ceram, conform closely to the original description of the species. Slight differences were observed, however. The first maxilla (Fig. 51a) has 2 setae and 2 small spiniform processes. The second segment of the second maxilla (Fig. 51b) has one long seta and one small spiniform process. The maxilliped (Fig. 51c) has on the third segment a small seta in addition to the two processes. The spermatophore (Fig. 51d) is elongate, 190 × 46 μm.

Xarifia anomala has until now been known only from *Acropora palifera* in Madagascar. Eight new host species of *Acropora* are now reported: *Acropora corymbosa, A. danai, A. humilis, A. convexa, A. hyacinthus, A. intermedia, A. affinis,* and *A. gravida.* The range

of *Xarifia anomala* is extended from Madagascar to the Moluccas and New Caledonia.

Xarifia temnura Humes and Ho, 1968

Fig. 52a-c

Specimens studied. — 7 ♀♀, 1 immature ♀, 10 ♂♂ from *Montipora* sp. cf. *M. undata* Bernard, in 10 m, Poelau Parang, eastern Ceram, Moluccas, 3°17′00″S, 130°44′44″E, 23 May 1975; 1 ♀, 3 ♂♂ from *Montipora ramosa* Bernard, in 2 m, midway between Isle Noumbo and Isle Ndié, Baie Dumbea, near Noumea, New Caledonia, 22°12′47″S, 166°24′41″E, 9 July 1971.

These specimens agree in all important respects with the original description of *Xarifia temnura*. Slight variations were observed, however, in the Moluccan specimens. The mandible (Fig. 52a) has narrow lamellae. In the claw of the maxilliped of the male (Fig. 52c) the convex side has a small lamella and the serrations on the concave side are irregular. The spines on the exopod of leg 1 of the male (Fig. 52b) are relatively longer than those shown in the original description (compare with Humes and Ho's Fig. 144) of the female.

Lipochrus n. gen.

Diagnosis. — Xarifiidae. *Female.* — Body elongate, slender. External segmentation very weakly defined. Dorsal area between fourth pair of legs and genital openings without processes.

First antenna 3-segmented, short. Second antenna 3-segmented with terminal claw. Labrum prominent. Mandible a simple blade with spinules. First maxilla with 2 setae. Second maxilla with single terminal seta. Maxilliped probably 2-segmented, with reduced armature consisting of 1 subterminal seta.

Legs 1-4 with 3-segmented exopods but endopods represented only by rudiments. Each exopod segment of legs with clawlike outer spine, except in legs 2-4 second exopod segment lacking outer spine. Legs 5 and 6 absent.

Living with scleractinian corals (*Acropora*).

Male. — Unknown.

Type-species. — *Lipochrus acroporinus* n. sp.

Etymology. — The generic name is formed from Greek *leipo*, to be wanting or lacking, and *chros*, body surface alluding to the reduced armature of the maxilliped, the rudimentary endopods in legs 1-4, the absence of body processes, and the absence of leg 5.

Comparison with other xarifiid genera. — The two presently known genera of the Xarifiidae are readily distinguished from *Lipochrus* even without dissection. In females of *Xarifia* Humes, 1960, with few exceptions the region dorsal to the fifth pair of legs bears three posteriorly directed processes, the endopod of legs 1-4 consists of one or two segments, and leg 5 is present though reduced (but leg 5 absent in *Xarifia anopla*). In females of *Orstomella* Humes and Ho, 1968, the region dorsal to the fifth pair of legs lacks processes, but in legs 1-4 the exopods and in legs 1 and 2 the endopods are 2-segmented, the endopods of legs 3 and 4 are absent, and leg 5 is present.

Lipochrus acroporinus n. sp.

Figs. 53a-l, 54a-e

Type material. — 1 ♀, holotype, from *Acropora rosaria* (Dana), in 2 m, west of Isle Mando, near Noumea, New Caledonia, 22°18′59″S, 166°09′30″E, 1 July 1971; 1 ♀, paratype (dissected), from *Acropora patula* (Brook), in 1.5 m, Ricaudy Reef, near Noumea, 22°19′00″S, 166°26′44″E, 15 June 1971. Both ♀♀ deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.

Female. — Body (Fig. 53a, b) elongate, slender, about 12.7 times longer than wide. Length (including caudal rami) 2.09 mm and greatest width 0.18 mm, based on single female. External segmentation very weakly defined. Dorsal area between fourth pair of legs and genital openings without processes (Fig. 53c). Part of body posterior to genital openings nearly one-third of body length. Genital area located dorsolaterally. Caudal ramus (Fig. 53d) moderately elongate, 59 × 24 μm, ratio 2.46:1, with 3 terminal setae, 1 subterminal seta, and 1 lateral seta, and several surficial setules. Egg sac not seen. Body surface with minute setules.

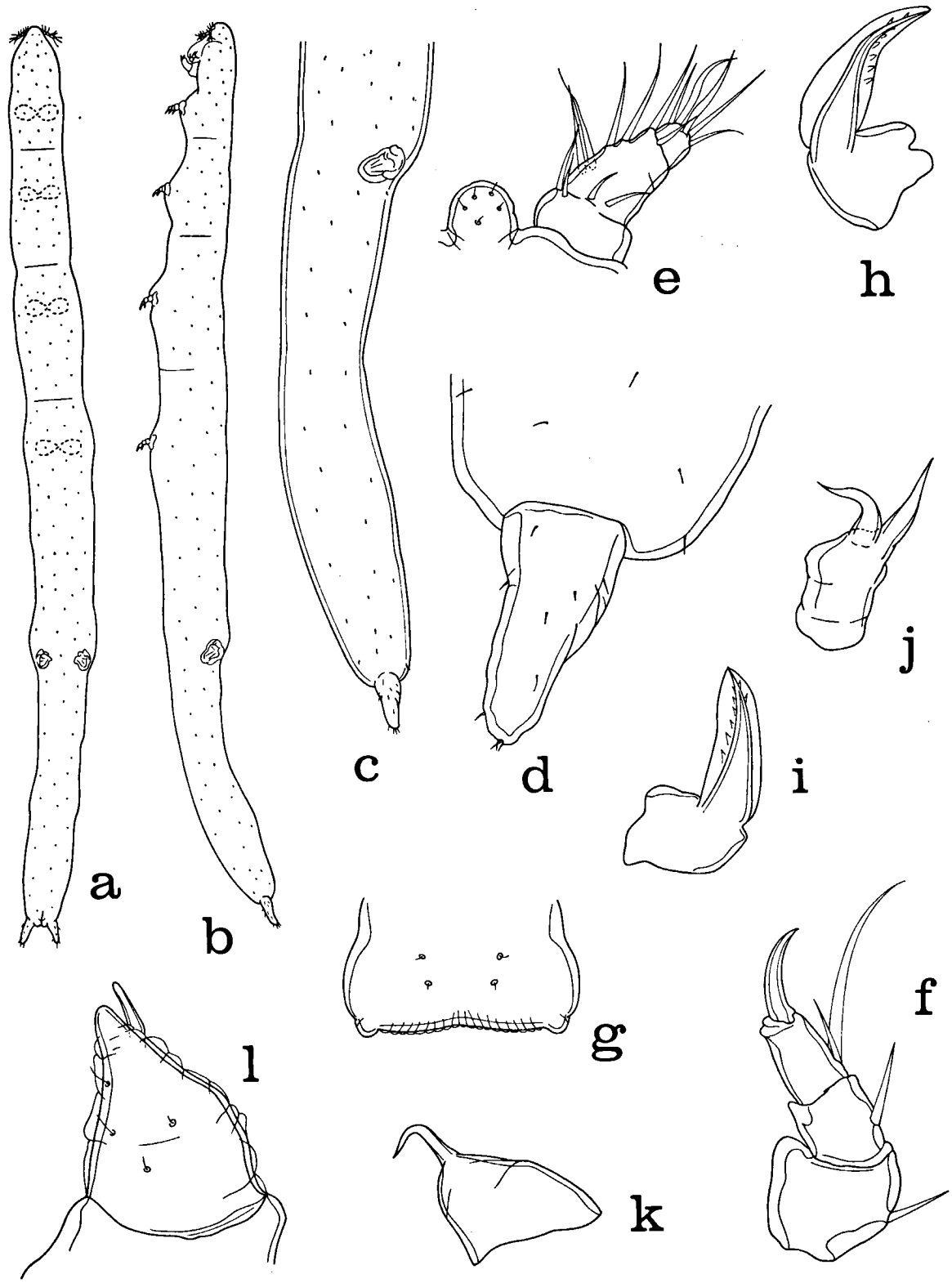

Fig. 53. *Lipochrus acroporinus* n. gen., n. sp., female. a, dorsal (scale M); b, lateral (M); c, urosome, lateral (J); d, caudal ramus, lateral (F); e, rostrum and first antenna, dorsal (K): f, second antenna, dorsal (N); g, labrum ventral (F); h, mandible, ventral (N); i, mandible, ventral (N); j, first maxilla, ventral (N); k, second maxilla outer (N); l, maxilliped, postero-outer (N).

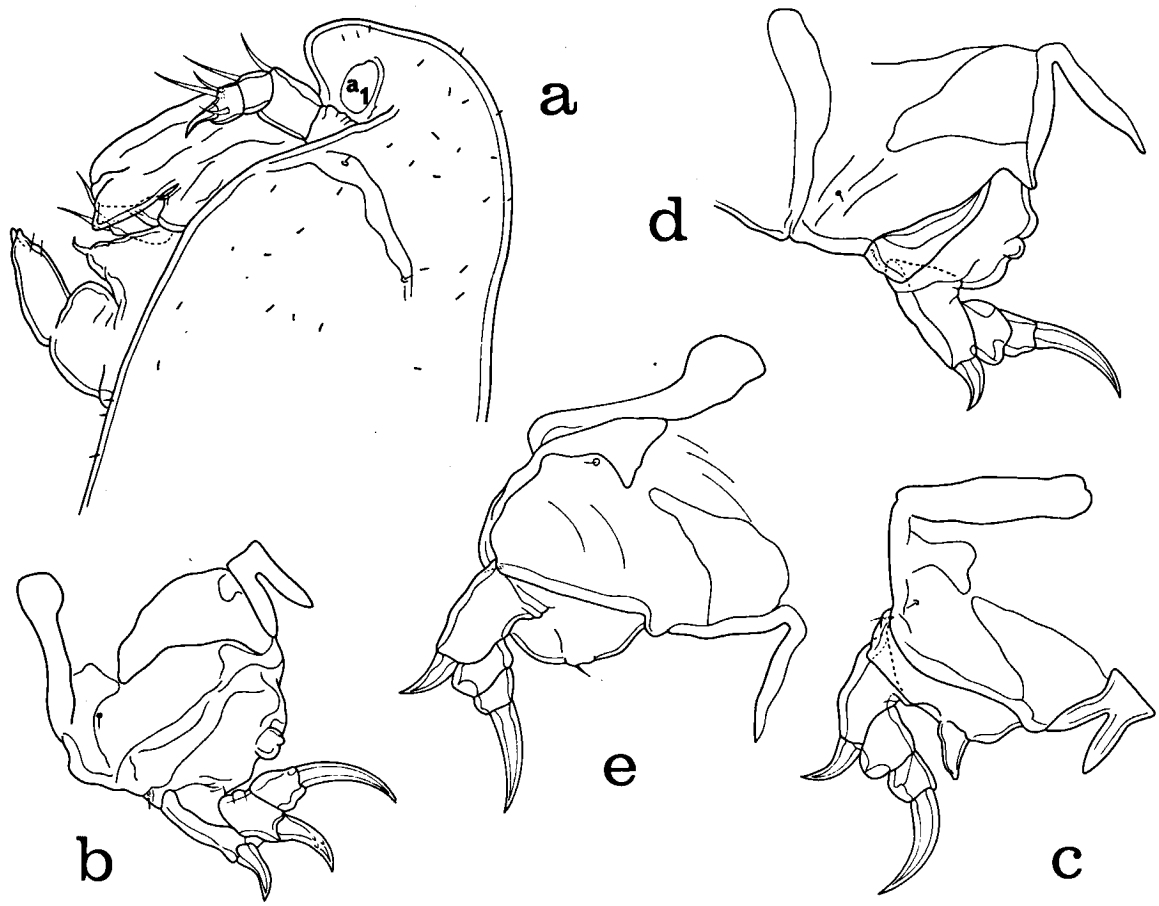

Fig. 54. *Lipochrus acroporinus* n. gen., n. sp., female. a, head, lateral (a_1 = position of first antenna) (scale E); b, leg 1 and intercoxal plate, anterior (F); c, leg 2 and intercoxal plate, anterior (F); d, leg 3 and intercoxal plate, anterior (F); e, leg 4 and intercoxal plate, anterior (F).

Rostrum (Fig. 53e) rounded. First antenna (Fig. 53e) short, 26 μm, 3-segmented. Lengths of segments (measured along posterior nonsetiferous margins): 7, 12, and 6 μm, respectively. Armature: 2, 8, and 5, with all setae smooth. Second antenna (Fig. 53f) 3-segmented, 41 μm long including claw. Armature: 1, 1, and 2 + I. Terminal claw 9.6 μm. Holotype with last segment having 1 seta adjacent to claw, formula for this segment being 2 + I + 1. All setae smooth.

Labrum (Fig. 53g) prominent, with posteroventral margin truncate and rugate. Mandible (Fig. 53h, i) falcate with row of small teeth. Paragnath not identified. First maxilla (Fig. 53j) with 2 setae. Second maxilla (Fig. 53k) with single seta. Maxilliped (Fig. 53l) probably 2-segmented, with reduced armature, having subterminal obtuse seta. Arrangement of mouthparts as in Fig. 54a.

Legs 1-4 (Fig. 54b-e) with 3-segmented exopods and rudimentary endopods. Spine and setal formula as follows (Roman numerals indicating spines, Arabic numerals representing setae):

P_1	coxa	o-o	basis	1-o	exp	I-o;	I-o;	I
					enp	—		
P_{2-4}	coxa	o-o	basis	1-o	exp	I-o;	o-o;	I
					enp	—		

Leg 5 absent.

Color in living specimens in transmitted light opaque gray, eye red.

Male. — Unknown.

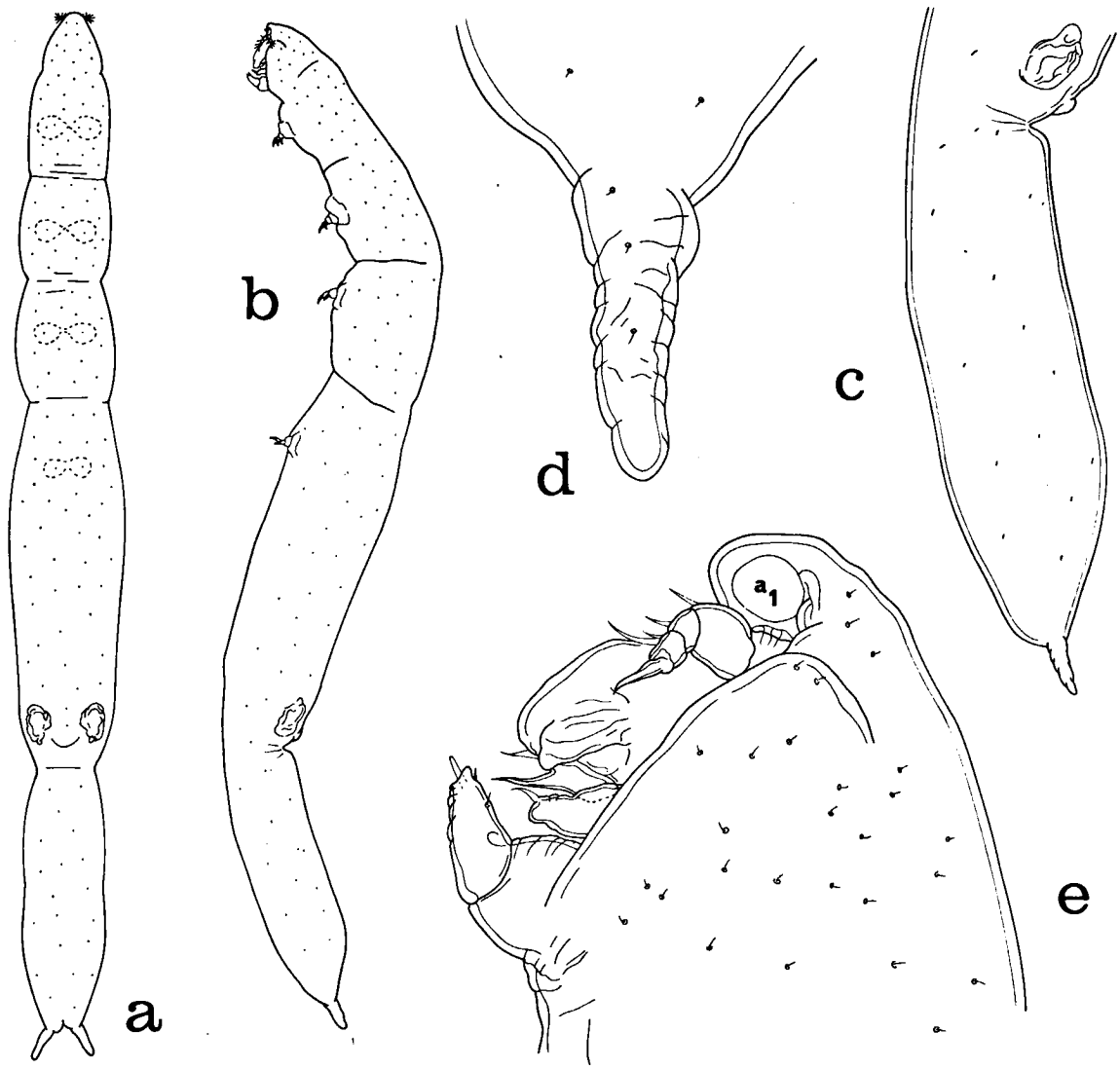

Fig. 55. *Lipochrus* sp., female. a, dorsal (scale M); b, lateral (M); c, urosome, lateral (J); d, caudal ramus, lateral (F) ;e, head and mouthparts, (a_1 = position of first antenna) lateral (E).

Etymology. — The specific name *acroporinus* is formed from the generic name of the host coral and the Latin suffix *-inus*, meaning pertaining to.

Lipochrus sp.

Fig. 55a-e

One female, representing a second species of *Lipochrus*, was recovered from *Acropora rambleri* (Bassett-Smith), in 15 m, Parang Island, eastern Ceram, 3°17'00"S, 130°44'48"E, 23 May 1975. Owing to the lack of material for study this copepod is left undescribed except for the following brief notes.

Body (Fig. 55a, b) with prosomal segmentation more distinct than in *Lipochrus acroporinus*, but lacking in urosome (Fig. 55c). Caudal ramus (Fig. 55d) elongate, 59 × 22 µm, ratio 2.68:1, without setae but with few surficial setules. Second antenna (Fig. 55e) with armature: 1, 1, and 2 + I. Second maxilla with terminal lobe adjacent to seta. Maxilliped with second segment having terminal conical lobe, large

blunt seta, and small adjacent seta. Other parts, including legs 1-4, like those of *Lipochrus acroporinus* as far as could be seen in undissected specimen.

DISCUSSION

Including the present account, there are 39 species of *Xarifia* Humes, 1960, two species of *Orstomella* Humes and Ho, 1968, and one species of *Lipochrus*, new genus described above. These three genera may be separated from each other by the structure of their antennae, second maxillae, legs 1-4, and the nature of leg 5 (absent in *Lipochrus*). The following key will serve to separate these three genera.

KEY TO THE GENERA OF THE XARIFIIDAE

1. Leg 1 with 3-segmented exopod 2
   Leg 1 with 2-segmented exopod . . . *Orstomella*

2. Legs 1-4 with endopods 1- or 2-segmented *Xarifia*
   Legs 1-4 with endopods rudimentary or absent . . . . . *Lipochrus*

Although the xarifiids are greatly modified copepods with reduced appendages, a number of taxonomic characters can be used to distinguish the species. With the discovery of 17 new species of *Xarifia*, certain comments concerning the external morphology of the genus can be made.

The general habitus of *Xarifia* is invariably vermiform with the majority of the species exhibiting a body pattern similar to that of *X. echinoporae*, *X. villosa*, or *X. anomala*. However, several species have diverged from this basic pattern to form long slender bodies (e.g., *X. extensa*, *X. temnura*, and *X. mucronata* among others), stout plump bodies (e.g., *X. pectinea* and *X. obesa*), or bodies with very short urosomes (e.g., *X. syntoma*, *X. diminuta*, and *X. brevicauda*).

There are usually three processes (two lateral and one medial) dorsal to the fifth legs in females of *Xarifia* (Table 3). Typically these processes are relatively long and conspicuous, but they may be reduced to short processes or lobes as in *X. trituberata*, *X. gerlachi*, and *X. guttulifera*. The medial process (lobe) is the only one that remains in *X. mediolobata*; this is further reduced to a small medial protrusion in *X. exuta*, *X. lissa*, and *X. serrata*. Others retain their paired lateral processes but have lost their medial process (e.g., *X. fimbriata* and *X. obesa*). There are four described species that have lost all processes and lobes dorsal to the fifth pair of legs. They are: *X. anopla*, *X. extensa*, *X. reducta*, and *X. temnura*. It is noteworthy that, although the presence or absence of these processes is a reliable taxonomic character, the relative lengths of the processes may not be. For instance, the processes in various specimens of *Xarifia sabiuraensis* varied a great deal (see Fig. 43a-j and Fig. 44a-j). The body of the male is usually similar in shape to that of the female, though often slightly more slender, but does not possess processes or lobes dorsal to the fifth pair of legs as in the opposite sex.

The lateral expansions on the first two postgenital segments of *Xarifia tumorisa* are diagnostic of this species, since these structures have not yet been found in other species of *Xarifia*.

The caudal ramus may be extremely short as in *Xarifia breviramea* or completely fused to the anal segment as in *X. trituberata*, *X. exuta*, *X. anopla*, among others. In some species of *Xarifia* such as *X. ablusa*, *X. heteromeles*, and *X. anomala*, the female possesses a normal caudal ramus, but the caudal ramus in the male is completely fused with the anal segment.

The bodies of both females and males have varying numbers of setules (sensilla) depending upon the species. *Xarifia mediolobata*, *X. decorata*, and *X. sabiuraensis* are examples of species that possess a great many setules on their bodies. The most extreme condition is displayed by *X. villosa* whose body is covered with conspicuous, multibranched setules (see Fig. 4a-c).

The segments of the first antenna are difficult to count. This is partly due to the small size of the appendage, but also to the partial fusion

of segments. This appendage is either 3-, 4-, 5-, or 6-segmented with varying armature depending upon the species of *Xarifia*. The segmentation of the male first antenna is the same as that of the female. In fact, the two are almost identical, except that in most species examined the male has an additional aesthete.

The second antenna is either 3- or 4-segmented (Table 3). However, in some cases (e.g., *X. gerlachi* and *X. sabiuraensis*), the third and fourth segments have become only partially fused. The armature for a 4-segmented second antenna is usually 1, 1, 2, and I + 1 + varying number of setules. The setae on the first and second segments may be absent as in *X. exuta* and *X. guttulifera*. The nature of the claw, whether stout as in *X. pectinea* or slender as in *X. sabiuraensis*, may be useful as a distinguishing feature. The unusual appearance of the terminal portion of the second antenna of *X. trituberata* helps to distinguish this species from all its congeners. In two species, *X. mucronata* and *X. syntoma*, the terminal segment of the second antenna is armed with a seta instead of a claw. This appendage is not sexually dimorphic.

In many species the labrum is simply a posteroventral flap with a medial indentation as in *Xarifia echinoporae* (see Fig. 2a). In some species, however, the labrum may be a taxonomically useful character as in *X. mediolobata* and *X. anopla* which possess a pair of long medial processes (see Figs. 28a and 37g). In *X. lissa* and *X. exuta* a large rounded medial lobe covers the medial indentation (see Fig. 17g). The labrum is unique in *X. extensa* where it possesses four small knoblike structures along the posterior margin. The labrum is sometimes sexually dimorphic with the labrum of the male possessing spinelike structures on the posterolateral corners. So far as known five species of *Xarifia* exhibit sexual dimorphism in the labrum. They are: *X. villosa, X. breviramea, X. syntoma, X. anopla,* and *X. decorata.*

The mandibles of most species of *Xarifia* are falciform and without denticles (e.g., *X. villosa, X. breviramea, X. ablusa,* among many others). Often these species possess large membranes or flanges along the edges of the mandibles as in *X. mediolobata.* The mandibles are bilaterally denticulate only in *X. lissa* and *X. obesa.* The remaining species with denticulate mandibles have teeth only on one side. So far as known the mandible of the male is identical to that of the female in all described species of *Xarifia.*

All known species of *Xarifia* have either two or three setae on the first maxilla. In addition, a conical process may or may not be present depending upon the species. For example, *X. echinoporae* bears 3 setae + 1 conical process, but *X. villosa* carries only 2 setae on its first maxilla. The male first maxilla sometimes differs from that of the female by the presence of a large process (e.g., *X. villosa, X. pectinea,* and *X. breviramea,* among others).

The second maxilla may vary considerably from species to species. In some species the second segment of this appendage ends in an acuminate tip (e.g., *X. echinoporae, X. exuta,* and *X. guttulifera,* among others) or a digitiform whip as in *X. trituberata.* In others the shape of the second segment may be diagnostic, as in the second maxillae of *X. rosariae* and *X. radians* which have a constriction at midlength and a very broad terminal portion. In addition, *X. radians* has two large spiniform processes on this segment. The sigmoidal, spinelike second segment of the second maxilla of *X. dispar* is one of the distinctive features of this species. In several species (e.g., *X. villosa, X. guttulifera,* and *X. rosariae,* among others) the second maxilla is sexually dimorphic with spinelike processes on the proximal portion of the second segment.

The maxilliped of the female may vary a great deal within the genus *Xarifia.* The interspecific variation is seen in the number of lobes on the first and second segments and the number of setae and spinelike elements on the terminal segment. Although usually 3-segmented, this appendage is 2-segmented in a few species (e.g., *X. syntoma* and *X. sabiuraensis*). The variation among female maxillipeds may be great (compare *X. pectinea, X. breviramea, X. trituberata, X. radians,* and *X. sabiuraensis*).

Table 3. Selected distinguishing features of the species of *Xarifia*.

Species of *Xarifia*	Processes dorsal to fifth legs in ♀	Number of segments in A_2	Number of segments endopods legs 1-4	Terminal armature of these endopods	Number of setae on leg 5 free segment ♀
ablusa	3	4	2	3, 3, 0, 1	2
anomala	3	4	2	0, 3, 0, 0	2
anopla	none	indistinctly 4	1	2, 2, 0, 0	leg 5 absent
brevicauda	3	4	2	2, 2, 0, 0	2
breviramea	3	3	1	3, 3, 1, 1	2
comata	3	4	2	2, 2, 2, 1	2
decorata	3	4	2	3, 3, 1, 1	2
diminuta	3	4	2	2, 2, 0, 2	2
dispar	3	4	2	2, 2, 1, 1	2
echinoporae	3	4	2	3, 3, 1, 1	2
exigua	3	4	1	2, 2, 1, 1	2
extensa	none	4	1	1, 1, 0, 0	no free segment
exuta	medial lobe	indistinctly 4	1	3, 3, 1, 1	1
fastigiata	3	indistinctly 4	2	3, 3, 1, 1	2
fimbriata	2	4	1	2, 2, 2, 2	no free segment
gerlachi	3	indistinctly 4	1	2, 2, 1, 1	2
guttulifera	3	4	1	3, 3, 0, 0	1
hamata	3	4	2	2, 1+I, I, I	2
heteromeles	3	3	1	1, 1, 0, 0	1
infrequens	3	indistinctly 4	1	0, 0, 0, 0	2
lamellispinosa	3	4	2	2, 2, 1, 1	2
lissa	medial lobe	4	1	3, 3, 1, 1	2
longipes	3	4	1	2, 1, 1, 1	2
maldivensis	3	3	1	3, 3, 1, 1	2
mediolobata	1	4	2	3, 3, 0, 0	2
mucronata	3	3	♀ 1, 2, 1, 1 ♂ 2, 2, 1, 2	3, 3, 1, 1	2
obesa	2	3	1	3, 3, 1, 1	2
pectinea	3	4	1	3, 3, 1, 1	2
radians	3	4	2	3, 3, 1, 1	2
reducta	none	4	1	2, 2, 1, 1	2
rosariae	3	3	1	0, 0, 0, 0	2
sabiuraensis	3	indistinctly 4	1	0, 0, 0, 0	2
serrata	medial lobe	4	1	3, 2, 1, 1	2
syntoma	3	4	1	1, 2, 0, 0	no free segment
temnura	none	indistinctly 4	1	1, 1, 0, 0	2
tenuis	3	indistinctly 4	1	0, 0, 0, 0	2
trituberata	3	4	1	3, 2, 1, 1	2
tumorisa	3	4	1	3, 3, 1, 1	2
villosa	3	4	2	3, 3, 1, 1	2

The exopods of legs 1-4 of all known species of *Xarifia* are 3-segmented, although the second segment is not clearly defined in the exopods of legs 2-4 in *X. temnura* and *X. extensa*. The armature of the exopods of legs 1-4 may vary considerably from species to species and therefore may be used in distinguishing species. In many species the second exopod spine is larger than the first as in *X. breviramea*, *X. mediolobata*, *X. radians*, *X. syntoma*, among others. In these species the exopod spines increase in size from the proximal to the distal exopod spine. In others, however, the first exopod spine may be larger than the second (e.g., *X. villosa* and *X. heteromeles*) or the two spines may be roughly equal in size (e.g., *X. trituberata*, *X. exuta*, *X. mucronata*, and *X. guttulifera*). Often the shape of the exopod spines help to distinguish a species. For instance, the very short stout spines of *X. gerlachi*, *X. temnura*, and *X. extensa* help to separate taxonomically these species from their congeners. The accessory tine or bifid tip of the exopod spines of such species as *X. radians*, *X. heteromeles*, and *X. anopla* is an important feature of some species of *Xarifia*. On the distal portions of the exopod spines of many species there are transparent membranes. These membranes or lamellae are most highly developed in *Xarifia lamellispinosa* and provide the species with its name. In only one species, *X. ablusa*, the first exopod segment bears an outer seta instead of a spine. In *X. obesa*, *X. hamata*, and in legs 2-4 in *X. decorata* the second exopod segment bears an outer seta instead of a spine. However, in some species (e.g., *X. pectinea*, *X. fastigiata*, and *X. dispar*) both the first and second segments possess outer setae in place of spines. In some species the spine of the second exopod segment is reduced to a minute element (e.g., *X. rosariae* and *X. sabiuraensis*) or may be absent as in *X. serrata*, *X. comata*, *X. infrequens*, *X. tenuis*, and in legs 3 and 4 of *X. extensa* and *X. temnura*. Legs 1-4 of the male are like those of the female except for the sexually dimorphic leg 1 of *X. mucronata* and *X. heteromeles*.

The number of segments of the endopod and the terminal armature are good taxonomic characters (Table 3). Also the presence of a free segment and the number of setae on leg 5 can be helpful in distinguishing species (Table 3).

The maxilliped of the male is always sexually dimorphic. It consists of a generally unarmed first segment, although this segment may bear a seta (e.g., *X. villosa*) or spine (e.g., *X. pectinea*, *X. heteromeles*, and *X. tumorisa*). The second segment is robust, often swollen, and almost invariably carries two inner setae. The third segment is always small and unornamented. The fourth segment is a recurved claw with two setae. Teeth may or may not be present on the concave side of the claw. *Xarifia echinoporae*, *X. trituberata*, and *X. exuta*, among many others, do not bear teeth on their claws. Some species are armed with one large inner tooth as in *X. pectinea*, *X. fastigiata*, and *X. tumorisa*. Other species have many teeth (e.g., *X. villosa*, *X. rosariae*, and *X. syntoma*). The tip of the claw may be bifid (e.g., *X. ablusa*, *X. exuta*, *X. guttulifera*, *X. mediolobata*, etc.), or trifid (e.g., *X. anopla* and *X. extensa*).

In most species the setae of leg 5 of the male arise directly from the body wall and not from a free segment (e.g., *X. echinoporae*, *X. pectinea*, *X. breviramea*, etc.). However, there are a few species in which males possess a distinct free segment of leg 5 (refer to *X. villosa*, *X. trituberata*, *X. maldivensis*, *X. dispar*, *X. lamellispinosa*, *X. exigua*, and *X. obesa*). Whether or not a free segment is present, leg 5 is represented by two or three setae. However, leg 5 is completely absent in the male of *X. anopla*.

Leg 6 of the male consists of either two or three setae (two in almost all species) on the posteroventral flap of the genital area.

Based on the parasite-host list below, xarifiid copepods appear to be host specific. Although each species is not restricted to a single host species, these parasites appear to inhabit species of the same genus (and are thus genera specific). For example, *Xarifia breviramea* was collected from 11 different species of the genus *Acropora* from several localities, but was not found in species of other scleractinian genera. Although *Xarifia pectinea* was obtained from

seven species of *Acropora* and one species of *Montipora*, the record from *Montipora* is considered to represent an accidental infestation, since only one male of *X. pectinea* was collected from this genus of coral.

Most of the coral species harbored more than one species of xarifiid. In fact, *Acropora affinis*, *A. gravida*, and *A. hyacinthus* were each parasitized by seven different species of xarifiids from the same locality (New Caledonia).

The known zoogeographic distribution of xarifiids is the Indo-West Pacific [Madagascar, Red Sea, Maldive Archipelago, Japan, Enewetak Atoll (Marshall Islands), the Moluccas, and New Caledonia].

XARIFIID COPEPODS ASSOCIATED WITH THE CORAL GENERA ACROPORA, MONTIPORA, ALVEOPORA, CYPHASTREA, and ECHINOPORA
(new associations reported in this paper unless otherwise indicated)

Xarifia ablusa n. sp.	
from *Acropora corymbosa*	New Caledonia
from *Acropora exilis*	New Caledonia
from *Acropora rambleri*	Ceram
from *Acropora rosaria*	New Caledonia
Xarifia anomala Humes and Ho, 1968	
from *Acropora affinis*	New Caledonia
from *Acropora convexa*	New Caledonia
from *Acropora corymbosa*	New Caledonia
from *Acropora danai*	New Caledonia
from *Acropora gravida*	New Caledonia
from *Acropora humilis*	New Caledonia
from *Acropora hyacinthus*	New Caledonia, Ceram
from *Acropora intermedia*	Halmahera
from *Acropora palifera*	Madagascar (Humes and Ho, 1968), New Caledonia, Moluccas
from *Acropora* sp.	Madagascar
Xarifia anopla n. sp.	
from *Montipora* sp. cf. *M. undata*	Ceram
from *Montipora* sp.	Madagascar
Xarifia breviramea n. sp.	
from *Acropora affinis*	New Caledonia
from *Acropora corymbosa*	New Caledonia
from *Acropora danai*	New Caledonia
from *Acropora exigua*	New Caledonia
from *Acropora florida*	Enewetak Atoll
from *Acropora gravida*	New Caledonia
from *Acropora hyacinthus*	New Caledonia
from *Acropora intermedia*	Halmahera
from *Acropora rambleri*	Ceram
from *Acropora squamosa*	New Caledonia
from *Acropora valida*	New Caledonia
Xarifia echinoporae n. sp.	
from *Echinopora horrida*	New Caledonia
from *Echinopora lamellosa*	Halmahera

Xarifia extensa n. sp.	
from *Montipora* sp.	Madagascar
Xarifia exuta n. sp.	
from *Acropora palifera*	Moluccas
Xarifia fastigiata n. sp.	
from *Acropora exilis*	New Caledonia
from *Acropora rosaria*	New Caledonia
Xarifia gerlachi Humes, 1962	
from *Acropora affinis*	New Caledonia
from *Acropora corymbosa*	Madagascar (Humes, 1962)
from *Acropora cytherea*	Madagascar (Humes, 1962)
from *Acropora gravida*	New Caledonia
from *Acropora hyacinthus*	New Caledonia
from *Acropora* sp.	Madagascar
from *Acropora* sp. cf. *A. teres*	Madagascar (Humes, 1962)
Xarifia guttulifera n. sp.	
from *Acropora palifera* (incl. fo. *alpha*)	New Caledonia
Xarifia heteromeles n. sp.	
from *Montipora* sp. cf. *M. undata*	Ceram
Xarifia infrequens Humes, 1962	
from *Acropora corymbosa*	Madagascar (Humes, 1962)
from *Acropora cytherea*	Madagascar (Humes, 1962)
Xarifia mediolobata n. sp.	
from *Alveopora mortenseni*	Halmahera
Xarifia mucronata n. sp.	
from *Acropora palifera*	Moluccas
from *Acropora palifera* forma *alpha*	New Caledonia
Xarifia pectinea n. sp.	
from *Acropora affinis*	New Caledonia
from *Acropora gravida*	New Caledonia
from *Acropora humilis*	New Caledonia
from *Acropora hyacinthus*	New Caledonia, Ceram
from *Acropora intermedia*	Halmahera
from *Acropora patula*	New Caledonia
from *Acropora rambleri*	Ceram
from *Montipora ramosa*	New Caledonia
Xarifia radians n. sp.	
from *Alveopora mortenseni*	Halmahera
Xarifia rosariae n. sp.	
from *Acropora rosaria*	New Caledonia
Xarifia sabiuraensis msaki, 1978	
from *Acropora affinis*	New Caledonia
from *Acropora convexa*	New Caledonia
from *Acropora danai*	New Caledonia
from *Acropora florida*	Enewetak Atoll
from *Acropora gravida*	New Caledonia
from *Acropora hyacinthus*	New Caledonia, Ceram
from *Acropora intermedai*	Halmahera

from *Acropora patula*	New Caledonia
from *Acropora pectinata*	Japan (Misaki, 1978)
from *Acropora rambleri*	Ceram
Xarifia syntoma n. sp.	
from *Montipora* sp. cf. *M. undata*	Ceram
Xarifia temnura Humes and Ho, 1968	
from *Montipora ramosa*	New Caledonia
from *Montipora sinensis*	Madagascar (Humes and Ho, 1968)
from *Montipora* sp. cf. *M. undata*	Ceram
Xarifia tenuis Humes, 1962	
from *Acropora cytherea*	Madagascar (Humes, 1962)
Xarifia trituberata n. sp.	
from *Acropora affinis*	New Caledonia
from *Acropora corymbosa*	New Caledonia
from *Acropora danai*	New Caledonia
from *Acropora gravida*	New Caledonia
from *Acropora humilis*	New Caledonia
from *Acropora hyacinthus*	New Caledonia, Ceram
from *Acropora intermedia*	Halmahera
from *Acropora patula*	New Caledonia
from *Acropora rambleri*	Ceram
Xarifia tumorisa Misaki, 1978	
from *Acropora affinis*	New Caledonia
from *Acropora corymbosa*	New Caledonia
from *Acropora exilis*	New Caledonia
from *Acropora gravida*	New Caledonia
from *Acropora hyacinthus*	New Caledonia
from *Acropora intermedia*	Halmahera
from *Acropora pectinata*	Japan (Misaki, 1978)
Xarifia villosa n. sp.	
from *Cyphastrea chalcidicum*	New Caledonia
Lipochrus acroporinus n. gen., n. sp.	
from *Acropora rosaria*	New Caledonia
from *Acropora patula*	New Caledonia
Lipochrus sp.	
from *Acropora rambleri*	Ceram

FIVE CORAL GENERA AND THEIR ASSOCIATED XARIFIID COPEPODS

Acropora affinis	
Xarifia anomala Humes and Ho, 1968	New Caledonia
Xarifia breviramea n. sp.	New Caledonia
Xarifia gerlachi Humes, 1962	New Caledonia
Xarifia pectinea n. sp.	New Caledonia
Xarifia sabiuraensis Misaki, 1978	New Caledonia
Xarifia trituberata n. sp.	New Caledonia
Xarifia tumorisa Misaki, 1978	New Caledonia

Acropora convexa	
Xarifia anomala Humes and Ho, 1968	New Caledonia
Xarifia sabiuraensis Misaki, 1978	New Caledonia
Acropora corymbosa	
Xarifia ablusa n. sp.	New Caledonia
Xarifia anomala Humes and Ho, 1968	New Caledonia
Xarifia breviramea n. sp.	New Caledonia
Xarifia gerlachi Humes, 1962	Madagascar (Humes, 1962)
Xarifia infrequens Humes, 1962	Madagascar (Humes, 1962)
Xarifia trituberata n. sp.	New Caledonia
Xarifia tumorisa Misaki, 1978	New Caledonia
Acropora cytherea	
Xarifia gerlachi Humes, 1962	Madagascar (Humes, 1962)
Xarifia infrequens Humes, 1962	Madagascar (Humes, 1962)
Xarifia tenuis Humes, 1962	Madagascar (Humes, 1962)
Acropora danai	
Xarifia anomala Humes and Ho, 1968	New Caledonia
Xarifia breviramea n. sp.	New Caledonia
Xarifia sabiuraensis Misaki, 1978	New Caledonia
Xarifia trituberata n. sp.	New Caledonia
Acropora exigua	
Xarifia breviramea n. sp.	New Caledonia
Acropora exilis	
Xarifia ablusa n. sp.	New Caledonia
Xarifia fastigiata n. sp.	New Caledonia
Xarifia tumorisa Misaki, 1978	New Caledonia
Acropora florida	
Xarifia breviramea n. sp.	Enewetak Atoll
Xarifia sabiuraensis Misaki, 1978	Enewetak Atoll
Acropora gravida	
Xarifia anomala Humes and Ho, 1968	New Caledonia
Xarifia breviramea n. sp.	New Caledonia
Xarifia gerlachi Humes, 1962	New Caledonia
Xarifia pectinea n. sp.	New Caledonia
Xarifia sabiuraensis Misaki, 1978	New Caledonia
Xarifia trituberata n. sp.	New Caledonia
Xarifia tumorisa Misaki, 1978	New Caledonia
Acropora humilis	
Xarifia anomala Humes and Ho, 1968	New Caledonia
Xarifia pectinea n. sp.	New Caledonia
Xarifia trituberata n. sp.	New Caledonia
Acropora hyacinthus	
Xarifia anomala Humes and Ho, 1968	New Caledonia, Ceram
Xarifia breviramea n. sp.	New Caledonia
Xarifia gerlachi Humes, 1962	New Caledonia
Xarifia pectinea n. sp.	New Caledonia, Ceram
Xarifia sabiuraensis Misaki, 1978	New Caledonia, Ceram
Xarifia trituberata n. sp.	New Caledonia, Ceram

Xarifia tumorisa Misaki, 1978	New Caledonia
Acropora intermedia	
Xarifia anomala Humes and Ho, 1968	Halmahera
Xarifia breviramea n. sp.	Halmahera
Xarifia pectinea n. sp.	Halmahera
Xarifia sabiuraensis Misaki, 1978	Halmahera
Xarifia trituberata n. sp.	Halmahera
Xarifia tumorisa Misaki, 1978	Halmahera
Acropora palifera	
Xarifia anomala Humes and Ho, 1968	Madagascar (Humes and Ho, 1968), New Caledonia, Moluccas
Xarifia exuta n. sp.	Moluccas
Xarifia guttulifera n. sp.	New Caledonia
Xarifia mucronata n. sp.	Moluccas
Acropora palifera forma *alpha*	
Xarifia mucronata n. sp.	New Caledonia
Xarifia guttulifera n. sp.	New Caledonia
Acropora patula	
Lipochrus acroporinus n. gen., n. sp.	New Caledonia
Xarifia pectinea n. sp.	New Caledonia
Xarifia sabiuraensis Misaki, 1978	New Caledonia
Xarifia trituberata n. sp.	New Caledonia
Acropora pectinata	
Xarifia sabiuraensis Misaki, 1978	Japan (Misaki, 1978)
Xarifia tumorisa Misaki, 1978	Japan (Misaki, 1978)
Acropora rambleri	
Lipochrus sp.	Ceram
Xarifia ablusa n. sp.	Ceram
Xarifia breviramea n. sp.	Ceram
Xarifia pectinea n. sp.	Ceram
Xarifia sabiuraensis Misaki, 1978	Ceram
Xarifia trituberata n. sp.	Ceram
Acropora rosaria	
Lipochrus acroporinus n. gen., n. sp.	New Caledonia
Xarifia ablusa n. sp.	New Caledonia
Xarifia fastigiata n. sp.	New Caledonia
Xarifia rosariae n. sp.	New Caledonia
Acropora sp.	
Xarifia anomala Humes and Ho, 1968	Madagascar
Xarifia gerlachi Humes, 1962	Madagascar
Acropora squamosa	
Xarifia breviramea n. sp.	New Caledonia
Acropora sp. cf. *A. teres*	
Xarifia gerlachi Humes, 1962	Madagascar (Humes, 1962)
Acropora valida	
Xarifia breviramea n. sp.	New Caledonia
Alveopora mortenseni	
Xarifia mediolobata n. sp.	Halmahera

Xarifia radians n. sp.	Halmahera
Cyphastrea chalcidicum	
Xarifia villosa n. sp.	New Caledonia
Echinopora horrida	
Xarifia echinoporae n. sp.	New Caledonia
Echinopora lamellosa	
Xarifia echinoporae n. sp.	Halmahera
Montipora ramosa	
Xarifia pectinea n. sp.	New Caledonia
Xarifia temnura Humes and Ho, 1968	New Caledonia
Montipora sinensis	
Xarifia temnura Humes and Ho, 1968	Madagascar (Humes and Ho, 1968)
Montipora sp.	
Xarifia anopla n. sp.	Madagascar
Xarifia extensa n. sp.	Madagascar
Montipora sp. cf. *M. undata*	
Xarifia anopla n. sp.	Ceram
Xarifia heteromeles n. sp.	Ceram
Xarifia syntoma n. sp.	Ceram
Xarifia temnura Humes and Ho, 1968	Ceram

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