COPEPODA (POECILOSTOMATOIDA, LICHOMOLGIDAE) ASSOCIATED WITH ALCYONACEAN GENUS *SARCOPHYTON* IN THE INDO-PACIFIC

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With Text-figures 1–25

Abstract

Thirteen species of lichomolgid copepods are reported from ten species of the soft coral *Sarcophyton* in Madagascar, New Caledonia, and the Moluccas. These copepods include *Perosyna indonesica* n. gen., n. sp., eight new species belonging to the genus *Anisomolgus*, one new species in the genus *Paradoridicola*, and new records of *Anisomolgus protentus*, *Anisomolgus incisus*, and *Paramolgus spathophorus*. Two copepods, *Anisomolgus protentus* and *Anisomolgus sarcophyticus*, occur on various species of *Sarcophyton* in all three widely separated geographical areas of collection. Seven of the 13 species occur with a single species of *Sarcophyton*, while the remaining six copepods live with 2–4 species of hosts. *Sarcophyton glaucum* harbors the greatest number of species of copepods, seven in all.

Until now most of the records of lichomolgid copepods associated with the soft coral genus *Sarcophyton* have been from Madagascar (Humes and Frost, 1964; Humes and Ho, 1968a; Humes and Stock, 1973), with the only other record being from New Caledonia (Humes, 1975). The various copepods and their hosts are listed at the conclusion of this work.

In this paper the following new taxa are described: *Perosyna indonesica* n. gen., n. sp., *Paradoridicola spiriulatus* n. sp., *Anisomolgus sarcophyticus* n. sp., *A. pterolobatus* n. sp., *A. relativus* n. sp., *A. dissimilis* n. sp., *A. goniodes* n. sp., *A. petalophorus* n. sp., *A. ensiferus* n. sp., and *A. bicrenatus* n. sp. Range extensions of known species include: *Anisomolgus protentus* and *A. incisus* from the Moluccas, and *Paramolgus spathophorus* from New Caledonia.

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For the identification of the soft corals I am greatly indebted to Dr. J. Verseveldt, Zwolle, The Netherlands. I thank Mr. Thomas Forhan who collected some of the

soft corals in the Moluccas during SCUBA diving.

The alcyonaceans, either entire colonies or fragments of large colonies, were isolated in plastic bags immediately after collection. In the laboratory they were then soaked in sea water to which sufficient ethanol was added to make approximately a 5 per cent solution. After several hours the soft corals were thoroughly rinsed, the water was passed through a fine net (120 holes per 2.5 cm), and the copepods were picked from the sediment retained.

All figures have been 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. The abbreviations used are: A_1=first antenna, A_2=second antenna, MXPD=maxilliped, and P_1=leg 1.

The measurements were made on specimens in lactic acid. The body length does not include the setae on the caudal rami. The lengths of the segments of the first antenna were measured along their posterior nonsetiferous margins. In the formulas for the armature of legs 1–4 the Roman numerals indicate spines and the Arabic numerals represent setae.

Lichomlogidae Kossmann, 1877

Paradoridicola Humes and Stock, 1972

Paradoridicola spinulatus n. sp.

(figs. 1a–h, 2a–l, 3a–h)

Type material.- 12 ♀♀, 10 ♂♂, 2 copepodids from one colony of the alcyonacean *Sarcophyton glaucum* (Quoy and Gaimard), in 5 m, southern shore of Goenoeng Api, Banda Islands, 4°32′05″S, 129°52′30″E, 26 April 1975. Holotype ♀, allotype, and 15 paratypes (8 ♀♀, 7 ♂♂) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.; the remaining paratypes (dissected) in the collection of the author.

Other specimens (all from *Sarcophyton glaucum*). 12 ♀♀, 2 ♂♂ from one colony, in 10 m, southwestern shore of Goenoeng Api, Banda Islands, 4°31′45″S, 129°51′55″E, 28 April 1975; 28 ♀♀, 21 ♂♂, 7 copepodids from one colony, in 10 m, same locality and date; 23 ♀♀, 6 ♂♂ from one colony, in 5 m, same locality and date; 3 ♀♀, 2 ♂♂, 3 copepodids from one colony, in 5 m, Poelau Parang, eastern Ceram, 3°17′00″S, 130°44′48″E, 23 May 1975; 21 ♀♀, 10 ♂♂, 1 copepodid from one colony, in 10 m, same locality and date.

Female.- Body (fig. 1a) moderately slender. Length 1.44 mm (1.36–1.52 mm) and greatest width 0.53 mm (0.50–0.56 mm), based on 10 specimens. Ratio of length to width of prosome 1.81:1. Ratio of length of prosome to that of urosome 1.87:1. Segment of leg 1 separated dorsally from cephalosome by transverse furrow. Posterior corners of epimera of segment of leg 1 rounded, those of segments of legs 2 and 3 ending in sharp thorn, and those of segment of leg 4 broadly rounded (fig.

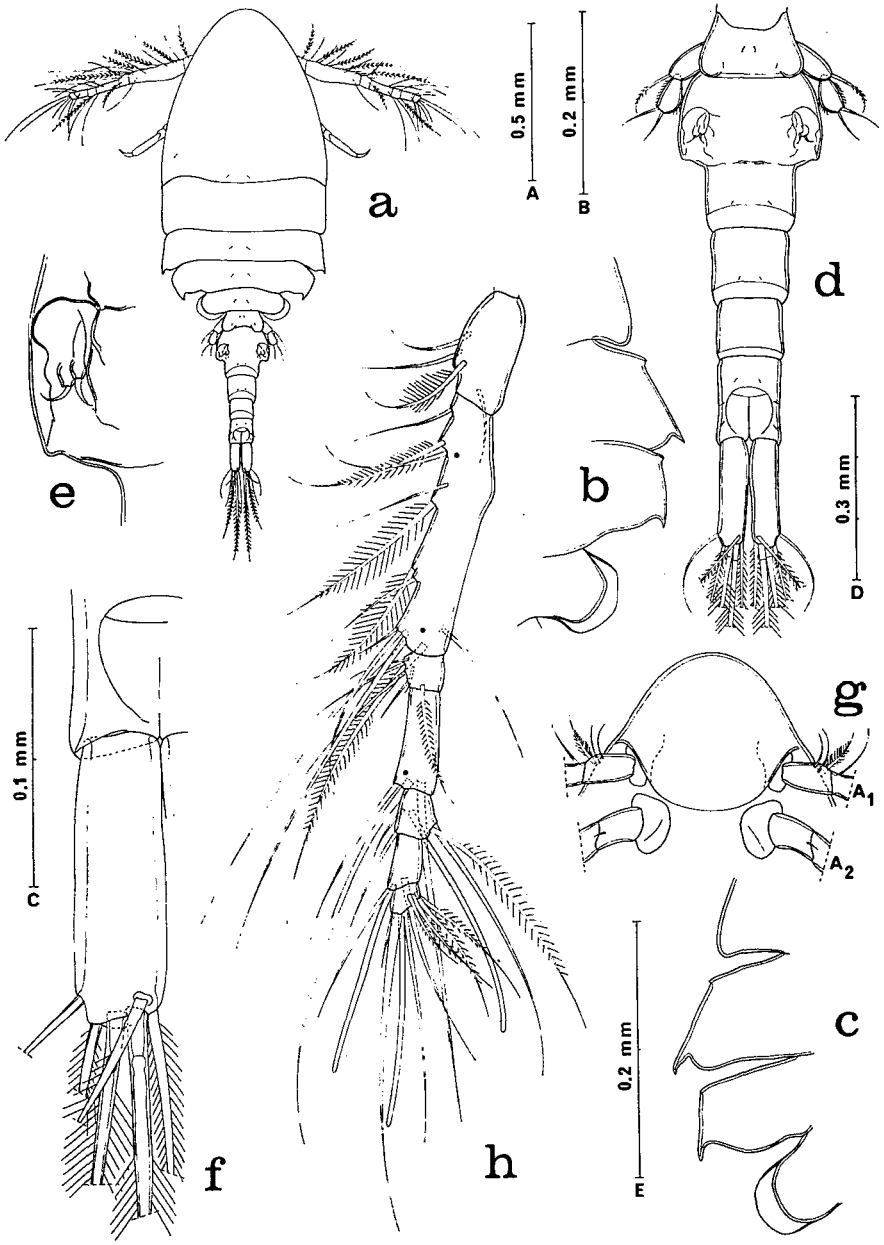

Fig. 1. *Paradoridicola spinulatus*, n. sp., female. a, dorsal (A); b, epimera of segments of legs 1–4, dorsal (B); c, epimera of segments of leg 1–4, dorsal (B); d, urosome, dorsal (B); e, genital area, dorsal (C); f, caudal ramus, dorsal (C); g, rostrum, ventral (D); h, first antenna, with dots indicating positions of aesthetes in male, dorsal (E).

1b, c).

Segment of leg 5 (fig. 1d) 70×174 μm. Genital segment in dorsal view 164 μm long, 150 μm wide in anterior half and 94 μm wide in posterior half, abruptly insected between two halves. Genital areas located in anterior half of segment. Each area (fig. 1e) with two naked setae approximately 14 μm. Three postgenital segments from anterior to posterior 78×78, 62×73, and 91×65 μm. Posteroventral border of anal segment smooth.

Caudal ramus (fig. 1f) unornamented and elongate, 109×33 μm, ratio 3.3:1. Outer lateral seta 83 μm and naked. Dorsal seta 80 μm, outermost terminal seta 107 μm, innermost terminal seta 170 μm, and two long median terminal setae 195 μm (outer) and 286 μm (inner), all five setae with lateral hairs. Small dorsal and ventral terminal flanges smooth.

Body surface bearing few hairs (sensilla) as indicated in figure la.

In all ovigerous females collected egg sacs incomplete. Partial egg sacs containing many small eggs, each about 40 μm in diameter.

Rostrum (fig. 1g) with weak rounded posteroventral margin.

First antenna (fig. 1h) 460 μm long. Lengths of seven segments: 83 (78 μm along anterior margin), 185, 30, 78, 31, 34, and 18 μm respectively. Formula for armature: 4, 13, 6, 3, 4+1 aesthete, 2+1 aesthete, and 7+1 aesthete. Anterior margin of second segment with distinct swelling. Many setae feathered.

Second antenna (fig. 2a) 4-segmented, unornamented, and 319 μm long including claw. Formula: 1, 1, 3, and 1 claw plus 5 setules. Fourth segment 104 μm along outer edge, 70 μm along inner edge, and 21 μm wide. Claw 47 μm.

Labrum (fig. 2b) with two rounded posteroventral lobes. Mandible (fig. 2c) in general resembling that of other species in genus, but having sclerotized bar protruding on convex side of base beyond scalelike area. Paragnath (fig. 2b) small lobe with few hairs. First maxilla (fig. 2d) with three naked setae, subterminal seta very small. Second maxilla (fig. 2e) similar to that of congeners but several proximal setae on convex side of lash unusually long. Maxilliped (fig. 2f) resembling that of other members of genus.

Ventral area between maxillipeds and first pair of legs (fig. 2g) not protuberant.

Legs 1–4 (fig. 2h, i, j, k) with 3-segmented rami except for 2-segmented endopod of leg 4. Armature as follows:

P_1	coxa	0–1	basis	1–0	exp	I–0;	I–1;	III, I, 4
					enp	0–1;	0–1;	I, 5
P_2	coxa	0–1	basis	1–0	exp	I–0;	I–1;	III, I, 5
					enp	0–1;	0–2;	I, II, 3
P_3	coxa	0–1	basis	1–0	exp	I–0;	I–1;	III, I, 5
				enp	0–1;	0–2;		I, II, 2
P_4	coxa	0–1	basis	1–0	exp	I–0;	I–1;	III, I, 5
				enp	0–1;	II		

Basis of leg 1 with distinct outer lobe (fig. 2h). Let 4 (fig. 2k) with exopod

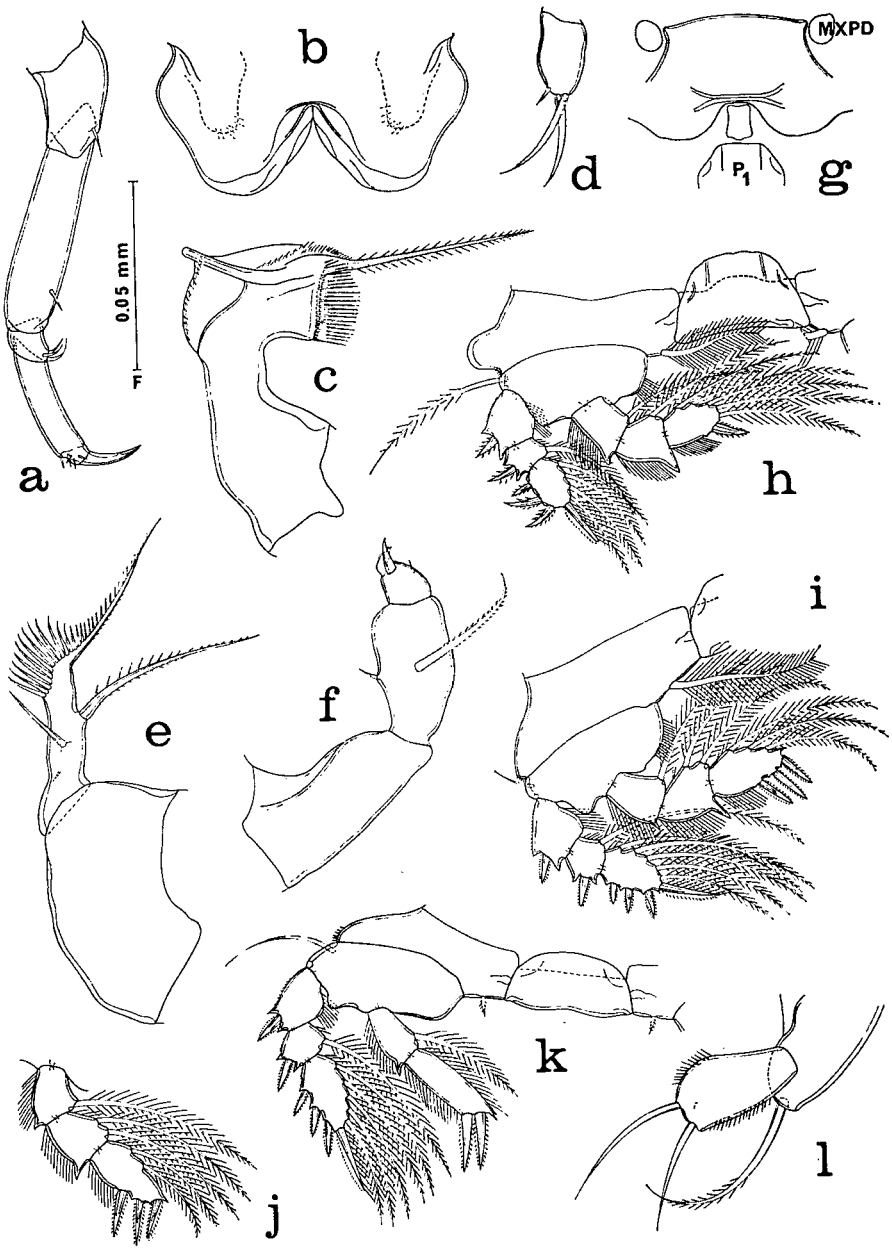

Fig. 2. *Paradoridicola spinulatus*, n. sp. female. a, second antenna, posterior (E); b, labrum, with paragnaths indicated by broken lines, ventral (C); c, mandible, posterior (F); d, first maxilla, posterior (F); e, second maxilla, posterior (C); f, maxilliped, posterior (C); g, area between maxillipeds and first pair of legs, ventral (B); h, leg 1 and intercoxal plate, anterior (E); i, leg 2, anterior (E); j, endopod of leg 3, anterior (E); k, leg 4 and intercoxal plate, anterior (E); l, leg 5, ventral (C).

120 μm long. First segment of endopod 42 × 23 μm (without spiniform process), its inner plumose seta 78 μm; second segment 80 × 23 μm (including spiniform process), its two barbed terminal spines 44 and 43 μm. Both segments with outer hairs and second segment with inner hairs also. Inner coxal seta on leg 4 small, 12 μm, and minutely barbed.

Leg 5 (fig. 21) with relatively small free segment 44 × 24 μm, carried somewhat ventrally. Two naked terminal setae 47 μm and 40 μm. Adjacent seta on body 78 μm and weakly plumose. Free segment with spinules along both sides.

Leg 5 represented by two setae on genital area (fig. 1e).

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

Male.- Body (fig. 3a) resembling in major respects that of female. Length 1.07 mm (1.02–1.12 mm) and greatest width 0.34 mm (0.31–0.39 mm), based on 10 specimens. Ratio of length to width of prosome 1.76: 1. Ratio of length of prosome to that of urosome 1.52:1.

Segment of leg 5 (fig. 3b) 39 × 112 μm. Genital segment 187 μm long without processes, 200 μm with processes, and 185 μm wide. Four postgenital segments from anterior to posterior 42 × 68, 39 × 60, 31 × 55, and 52 × 55 μm.

Caudal ramus similar to that of female, but smaller, 69 × 26 μm.

Rostrum like that of female. First antenna resembling that of female but three aesthetes added (at points indicated by dots in fig. 1h). Formula: 4, 13+2 aesthetes, 6, 3+1 aesthete, 4+1 aesthete, 2+1 aesthete, and 7+1 aesthete. Second antenna (fig. 3c) with second segment showing sexual dimorphism, having row of closely spaced spinules and small inner spines.

Labrum, mandible, paragnath, first maxilla, and second maxilla like those of female. Maxilliped (fig. 3d) 4-segmented and slender. First segment unarmed. Second segment with two setae (one finely barbed) and two rows of spines. Small third segment unarmed. Claw (with proximal half probably representing fourth segment) 180 μm long including terminal lamella, divided about midway, and bearing proximally two very unequal setae.

Ventral area between maxillipeds and first pair of legs as in female.

Legs 1–4 segmented as in female and with same armature except endopod of leg 1 (fig. 3e) with 0–1; 0–1; I, I, 4. Legs 2–4 as in female.

Leg 5 (fig. 3f) resembling that of female but free segment smaller, 23 × 11 μm, and less expanded.

Leg 6 (fig. 3g) consisting of usual posteroventral flap on genital segment carrying two smooth slender setae about 34 μm long.

Spermatophore (fig. 3h) 170 × 96 μm (not including neck), widest distally.

Color in living specimens like that of female.

Etymology.- The specific name *spinulatus,* Latin *spinula*=a thorn and the suffix-*atus*=possessing or pertaining to, alludes to the thornlike epimera on the segments of legs 2 and 3.

Remarks.- Six species are presently known in the genus *Paradoridicola* (see Humes and Stock, 1973, p. 265). The new species may be distinguished from all of these

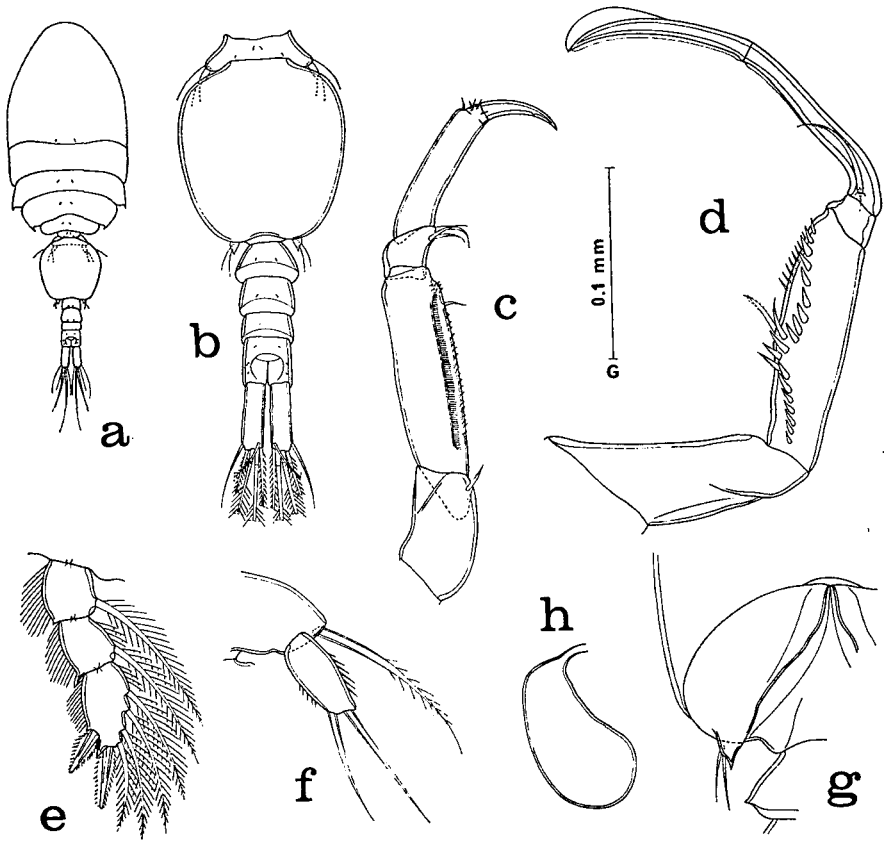

Fig. 3. *Paradoridicola spinulatus*, n. sp., male. a, dorsal (A); b, urosome, dorsal (B); c, second antenna, posterior (G); d, maxilliped, inner (G); e, endopod of leg 1, anterior (G); f, leg 5, ventral (F); g, leg 6, ventral (G); h, spermatophore, dorsal (B).

by two features observable without dissection: (1) the posterior edge of the second segment of the first antenna has a noticeable swelling (this edge being straight in the six congeners), and (2) the epimera of the segments of legs 2 and 3 have a thorn-like process (these epimera more or less rounded in other species). An elongate female caudal ramus similar to that in *Paradoridicola spinulatus* occurs only in *Paradoridicola glabripes* (Humes and Ho, 1968b), the caudal ramus in other species being nearly quadrate or at most with the ratio of length to width about 1.5:1. However, *P. glabripes* has several features by which it may be distinguished from the new species: the genital segment of the female not being insected laterally; the elongate free segment of leg 5 in the female; the relatively short teeth on the lash of the second maxilla; the nature of the sexual dimorphism on the second antenna of the male; and the relatively small number of large eggs in the egg sac.

Perosyna n. gen.

Diagnosis.- Lichomolgidae. Body slightly modified. Urosome 5-segmented in

female, 6-segmented in male. Caudal ramus with six setae. First antenna 7-segmented, with formula in female: 4, 13, 6, 3, 4+1 aesthete, 2+1 aesthete, and 7+1 aesthete; in male: 4, 13+2 aesthetes, 6, 3+1 aesthete, 4+1 aesthete, 2+1 aesthete, and 7+1 aesthete. Second antenna 4-segmented, with formula: 1, 1, 3, and one claw plus few setules. Mouthparts lichomolgid; mandible with convex side of base entire, without large posteriorly directed process.

Legs 1–4 with 3-segmented rami except for endopod of leg 4 being composed of one or two unarmed segments. Leg 1 in male with same armature as in female, but slight sexual dimorphism in form of endopod. Leg 4 exopod with third segment II, I, 5. Leg 5 with free segment armed with two terminal setae.

Other features as in the species described below.

Associated with Alcyonacea.

Gender feminine.

Type-species.- *Perosyna indonesica* n. sp.

Etymology.- The generic name is formed from the Greek words *peros* meaning crippled or maimed in a leg, alluding to the reduction of the endopod of leg 4, and *syne*, a suffix denoting condition.

Remarks.- *Perosyna* resembles the genus *Haplomolgus* Humes and Ho, 1968c, in having a much reduced endopod in leg 4, with only 1 or 2 unarmed segments. (Only two species of *Haplomolgus* are known, *Haplomolgus montiporae* Humes and Ho, 1968c, and *Haplomolgus subdeficiens* Humes, 1978, both from scleractinian corals.) *Perosyna* differs notably from *Haplomolgus,* however, in lacking the large proximally directed process on the convex side of the mandible and in having the lash of the second maxilla nearly equal in length to the inner (dorsal) seta.

Perosyna indonesica n. sp.

(figs. 4a-j, 5a-j, 6a-l)

Type material.- 8 ♀♀, 5 ♂♂, and 2 copepodids from one colony of *Sarcophyton glaucum* (Quoy and Gaimard), in 5 m, southern shore of Goenoeng Api, Banda Islands, 4°32′05″S, 129°52′30″E, 26 April 1975. Holotype ♀, allotype, and 8 paratypes (5 ♀♀, 3 ♂♂) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.; the remaining paratypes (dissected) in the collection of the author.

Female.- Body (fig. 4a, b) somewhat modified. Length 1.36 mm (1.31–1.39 mm) and greatest width 0.46 mm (0.44–0.49 mm), based on six specimens. Epimera of segments of legs 1–4 rounded. Ratio of length to width of prosome 1.80:1. Ratio of length of prosome to that of urosome 1.49:1.

Segment of leg 5 (fig. 4c) 143×286 μm. Genital segment 187×220 μm, wider than long, in lateral view swollen dorsally (fig. 4d). Genital areas located laterally in anterior half of segment. Each genital area (fig. 4e) with two small naked setae approximately 11 μm. Three postgenital segments from anterior to posterior 104×

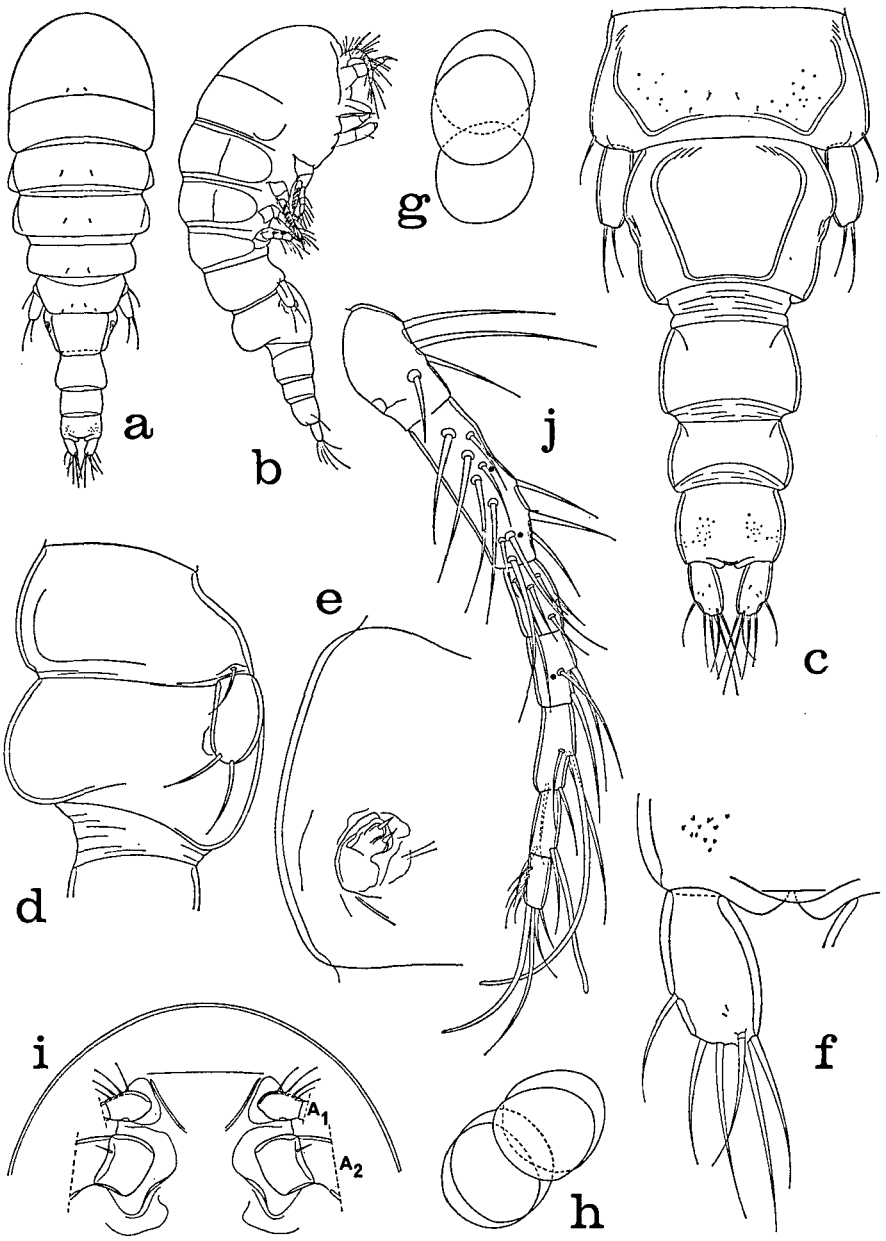

Fig. 4. *Perosyna indonesica*, n. gen., n. sp., female. a, dorsal (A); b, lateral (A); c, urosome, dorsal (B); d, segment of leg 5 and genital segment, lateral (B); e, genital area, lateral (G); f, caudal ramus, dorsal (C); g, egg sac, ventral (D); h, egg sac, ventral (D); i, rostrum, ventral (B); j, first antenna, with dots indicating positions of aesthetes in male, anterodorsal (C).

148, 65×127, and 81×117 μm. Posteroventral margin of anal segment smooth.

Caudal ramus (fig. 4f) moderately elongate, 62×33 μm, ratio 1.88:1. Setae naked and relatively short. Outer lateral seta 40 μm, dorsal seta 50 μm, outermost terminal seta 50 μm, and innermost terminal seta 57 μm. Two median terminal setae 70 μm (outer) and 77 μm (inner).

Body with few hairs (sensilla) and refractile points as in figure 4a, c.

Egg sac (fig. 4g, h) containing 3 or 4 eggs, each egg approximately 154 μm in diameter.

Rostrum (fig. 4i) weakly developed. First antenna (fig. 4j) 236 μm long. Lengths of seven segments: 18 (48 μm along anterior margin), 60, 26, 26, 31, 23, and 22 μm respectively. Formula for armature: 4, 13, 6, 3, 4+1 aesthete, 2+1 aesthete, and 7+1 aesthete. One female with five setae on first segment of one first antenna and four setae on opposite first antenna. All setae naked.

Second antenna (fig. 5a) 4-segmented, 225 μm long. Armature: 1, 1, 3, and one claw with few setules. Fourth segment 48 μm along outer side, 37 μm along inner side, and 25 μm wide. All setae smooth. Claw 54 μm.

Labrum (fig. 5b) with two widely divergent lobes. Mandible (fig. 5c) with region beyond constriction having on its convex side a scalelike area with row of spinules followed by fringe of slender spinules; on its concave side with row of long spinules. Lash relatively short and bearing prominent lateral spinules. Paragnath (fig. 5b) small lobe with few hairs. First maxilla (fig. 5d) with three setae. Second maxilla (fig. 5e) 2-segmented. First segment unornamented. Second segment with prominent setule on outer (ventral) margin, with naked posterior surficial seta, and with long barbed seta on inner (dorsal) margin. Lash about as long as inner seta and similarly ornamented with spinules. Maxilliped (fig. 5f) 3-segmented. First segment unarmed. Second segment with two unequal naked setae. Third segment terminating in short spiniform process and armed with two setae.

Ventral area between maxillipeds and first pair of legs (fig. 5g) not protuberant.

Legs 1–4 (figs. 5h, i, j, 6a) with trimerous rami, except for endopod of leg 4 which is 1- or 2-segmented. Armature as follows:

P_1	coxa	0–1	basis	1–0	exp	I–0;	I–1;	II, I, 4
					enp	0–1;	0–1;	I, 5
P_2	coxa	0–1	basis	1–0	exp	I–0;	I–1;	III, I, 5
					enp	0–1;	0–2;	I, II, 3
P_3	coxa	0–1	basis	1–0	exp	I–0;	I–1;	III, I, 5
					enp	0–1;	0–2;	I, II, 2
P_4	coxa	0–1	basis	1–0	exp	I–0;	I–1;	II, I, 5
					enp	0–0		

Inner coxal seta of legs 1–3 long and feathered but in leg 4 short, 34 μm, and naked. Outer seta on basis in leg 1 long and feathered but in legs 2–4 short and smooth. Leg 4 with exopod 100 μm long. Endopod either 2-segmented (fig. 6a, b) or 1-segmented (fig. 6c); unarmed but ornamented with lateral spinules.

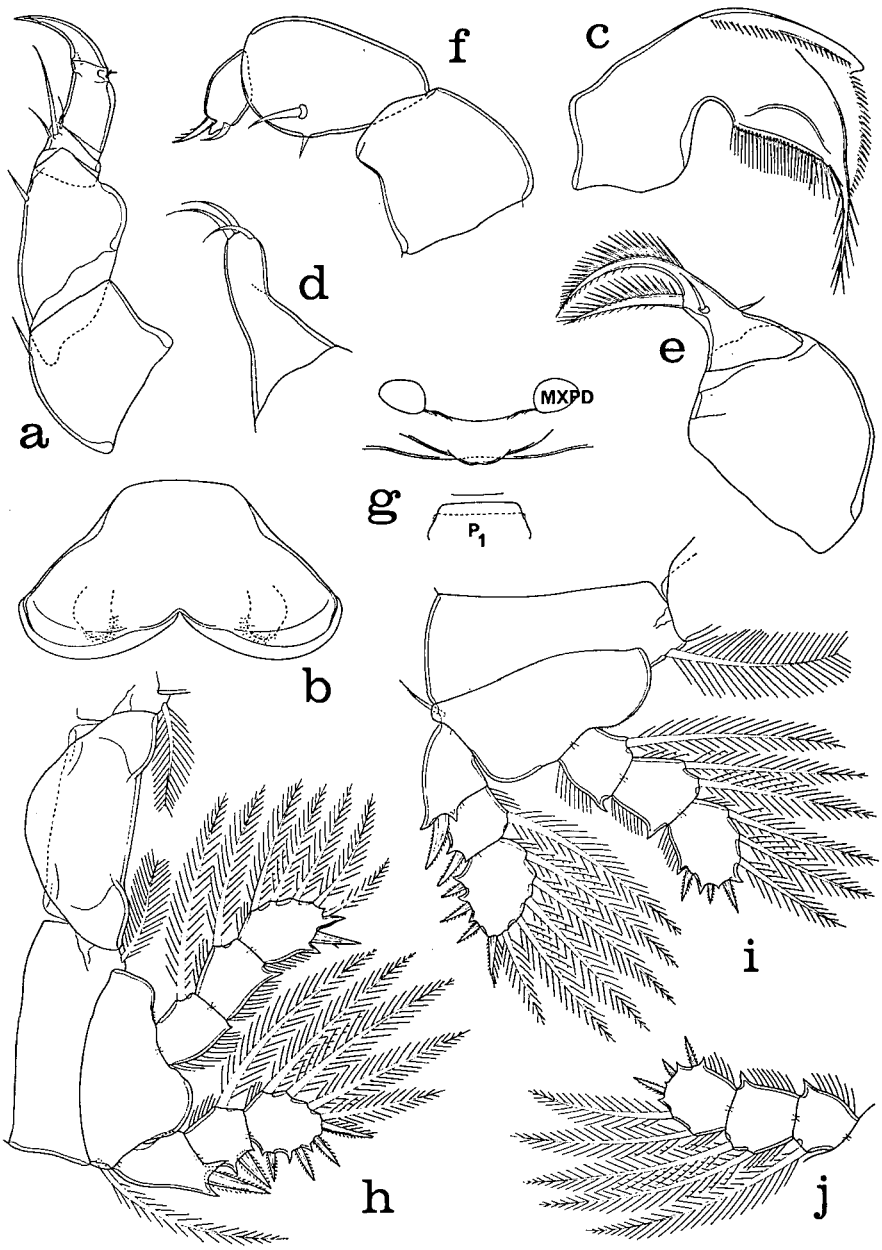

Fig. 5. *Perosyna indonesica*, n. gen., n. sp., female. a, second antenna, posterior (G); b, labrum, with paragnaths indicated by broken lines, ventral (G); c, mandible, posterior (F); d, first maxilla, anterior (F); e, second maxilla, posterior (C); f, maxilliped, posterior (C); g, area between maxillipeds and first pair of legs, ventral (B); h, leg 1 and intercoxal plate, anterior (G); i, leg 2, anterior (G); j, endopod of leg 3, anterior (G).

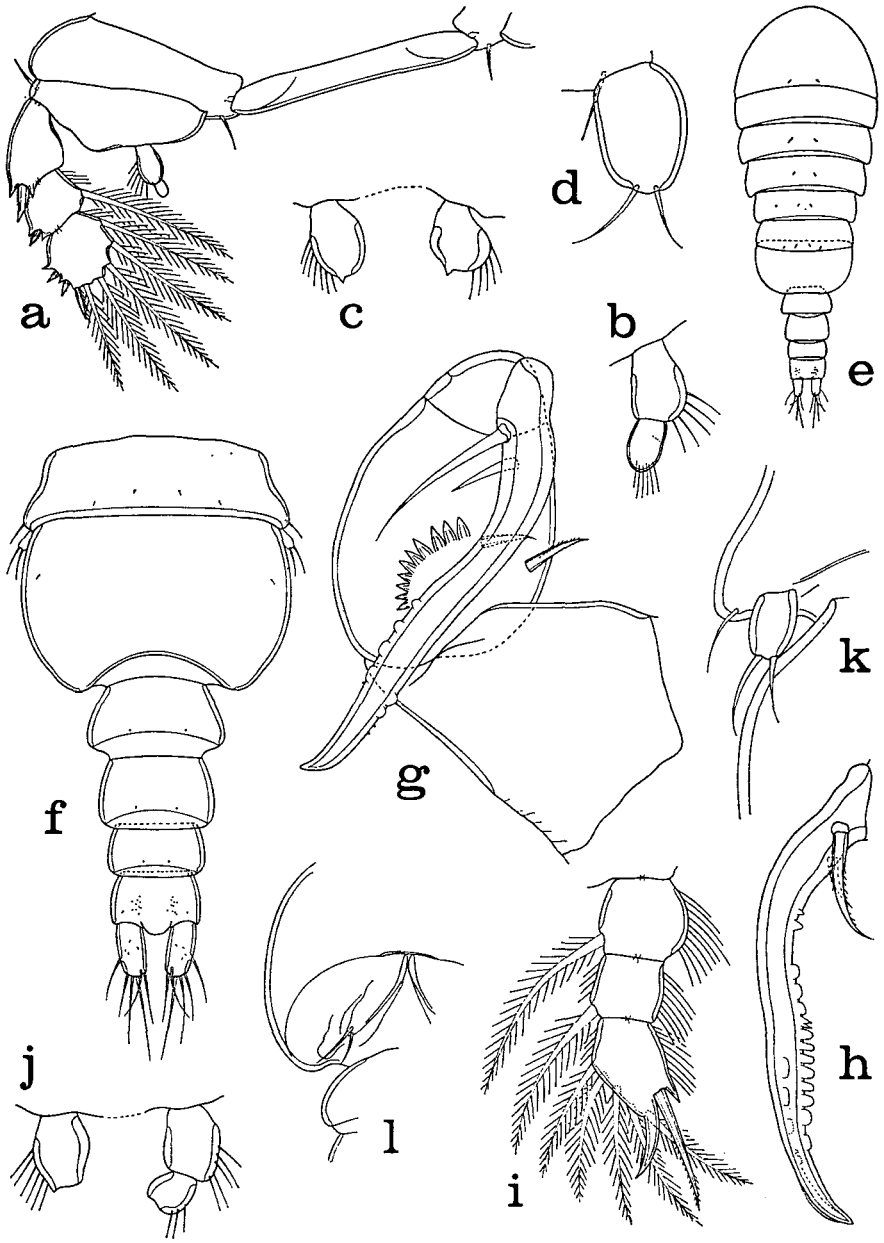

Fig. 6. *Perosyna indonesica*, n. gen., n. sp. Female; a, leg 4 and intercoxal plate, anterior (G); b, endopod of leg 4, anterior (F); c, right and left endopods of leg 4, anterior (F); d, leg 5, ventral (C). Male: e, dorsal (A); f, urosome, dorsal (B); g, maxilliped, postero-inner (F); h, claw of maxilliped, inner (F); i, endopod of leg 1, anterior (C); j, right and left endopods of leg 4, anterior (F); k, leg 5, ventral (C); l, leg 6, ventral (B).

Leg 5 (fig. 6d) with unornamented free segment 91×65 μm, ratio 1.4:1. Two terminal setae 55 μm and 42 μm. Dorsal seta 39 μm. All setae naked.

Leg 6 probably represented by two small setae on genital area (fig. 4e).

Color in life in transmitted light opaque gray, eye red, egg sacs dark gray.

Male. - Body (fig. 6e) resembling in general form that of female. Length 1.13 mm (1.07–1.18 mm) and greatest width 0.43 mm (0.41–0.44 mm), based on five specimens. Ratio of length to width of prosome 1.51:1. Ratio of length of prosome to that of urosome 1.22:1.

Segment of leg 5 (fig. 6f) 81×283 μm. Genital segment 185×295 μm, much wider than long. Four postgenital segments from anterior to posterior 78×153, 75×125, 52×104, and 62×96 μm.

Caudal ramus 60×30 μm, resembling that of female.

Body surface with few sensilla (fig. 6e).

Rostrum like that of female. First antenna similar to that of female but three long stout aesthetes added (at points indicated by dots in fig. 4j), so that formula is: 4, 13+2 aesthetes, 6, 3+1 aesthete, 4+1 aesthete, 2+1 aesthete, and 7+1 aesthete. Second antenna, labrum, mandible, paragnath, first maxilla, and second maxilla like those in female.

Maxilliped (fig. 6g) 4-segmented, assuming that proximal part of claw represents fourth segment. First segment unarmed. Second segment with two setae and crescentic row of scalelike spines. Small third segment unarmed. Claw (fig. 6h) 120 μm, with numerous knobs especially along concave surface and bearing proximally two unequal setae.

Ventral area between maxillipeds and first pair of legs as in female.

Legs 1–4 segmented and armed as in female. Sexual dimorphism in third segment of endopod of leg 1 (fig. 6i), with outer spiniform process adjacent to spine much longer than in female. Endopod of leg 4 either 1- or 2-segmented (fig. 6j).

Leg 5 (fig. 6k) small, free segment 26×15.5 μm, and placed ventrally.

Leg 6 (fig. 6l) a posteroventral flap on genital segment bearing two slender naked setae 32 μm and 22 μm.

Spermatophore not seen.

Color in life as in female.

Etymology.- The specific name *indonesica* alludes to the geographical area where the specimens were found.

Remarks.- The precise habitat of *Perosyna indonesica* on the body of *Sarcophyton* is not known, but on the basis of the modified body form it would appear likely that these copepods live in the polyps of the host.

Anisomolgus sarcophyticus n. sp.

(figs. 7a-k, 8a-i, 9a-e)

Type material.- 5 ♀♀, 3 ♂♂ from one colony of *Sarcophyton glaucum* (Quoy and

Gaimard), in 5 m, southern shore of Goenoeng Api, Banda Islands, 4°32′05″S, 129° 52′30″E, 26 April 1975. Holotype ♀, allotype, and paratypes (3 ♀♀, 1 ♂) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.; the remaining paratypes (dissected) in the collection of the author.

Other specimens.- From *Sarcophyton glacum:* 19 ♀♀, 22 ♂♂ from one colony, in 2 m, Pte. à la Fièvre, Nosy Bé, Madagascar, 24 May 1967; 1 ♀ from one colony, in 3 m, Ambariotelo, near Nosy Bé, 6 June 1967. From *Sarcophyton elegans* Moser: 22 ♀♀, 11 ♂♂ from 12 colonies, in 1 m, west of Isle Mando, near Nouméa, New Caledonia, 22°18′59″S, 166°09′30″E, 5 July 1971; 56 ♀♀, 29 ♂♂ from one colony, in 2 m, west of Isle Mando, near Nouméa, 1 July 1971. From *Sarcophyton cornispiculatum* Verseveldt: 1 ♂ from one colony, in 17 m, near black buoy north of Pte. Ambario-Ambarionaomby, Nosy Komba, near Nosy Bé, Madagascar, 5 August 1967. From *Sarcophyton manifestum* Tixier-Durivault: 4 ♀♀, 3 ♂♂ from one colony, in 2 m, western side of Isle Maître, near Nouméa, New Caledonia, 22°20′05″S, 166°24′05″E, 11 June 1971.

Female.- Body (fig. 7a) with moderately slender prosome. Length 1.23 mm (1.21–1.28 mm) and greatest width 0.50 mm (0.47–0.52 mm), based on five specimens. Ratio of length to width of prosome 1.72:1. Ratio of length of prosome to that of urosome 1.96:1. Segment of leg 1 separated dorsally from cephalosome by transverse furrow. Posterior corners of epimera of segments of leg 1–4 rounded.

Segment of leg 5 (fig. 7b) 65×172 μm. Genital segment 169×148 μm, widest at junction of anterior two thirds. Genital areas located dorsolaterally near middle of segment. Each area (fig. 7c) with one smooth seta 15 μm, one finely barbed seta 22 μm, small spiniform process, and elongate sclerotized piece with tripartite tip. Three postgenital segments from anterior to posterior 52×86, 36×79, and 60×81 μm. Posteroventral border of anal segment with extremely small spinules.

Caudal ramus (fig. 7d) 73×36 μm, ratio 2.03:1. Outer lateral seta 52 μ and naked. Dorsal seta 66 μm and plumose. Outermost terminal seta 110 μm, innermost terminal seta 200 μm, and two long median terminal setae 300 μm (outer) and 440 μm (inner), all of these with lateral spinules. Small dorsal and ventral terminal flanges smooth.

Body surface with very few hairs (sensilla) as in figure 7a.

Entire egg sac not seen, but fragments containing many eggs approximately 42 μm in diameter.

Rostrum (fig. 7e) with weak rounded posteroventral margin.

First antenna (fig. 7f) 442 μm long. Lengths of seven segments: 36 (78 μm along anterior margin), 135, 29, 61, 57, 48, and 34 μm respectively. Formula for armature: 4, 13, 6, 3, 4+1 aesthete, 2+1 aesthete, and 7+1 aesthete. All setae smooth.

Second antenna (fig. 7g) 4-segmented, unornamented, and 340 μm long including claw. Formula: 1, 1, 3, and 1 claw plus 5 setules. Fourth segment 130 μm along outer edge, 109 μm along inner edge, and 17 μm wide. Claw 60 μm.

Labrum (fig. 7h) with two broad posteroventral lobes. Mandible (fig. 7i),

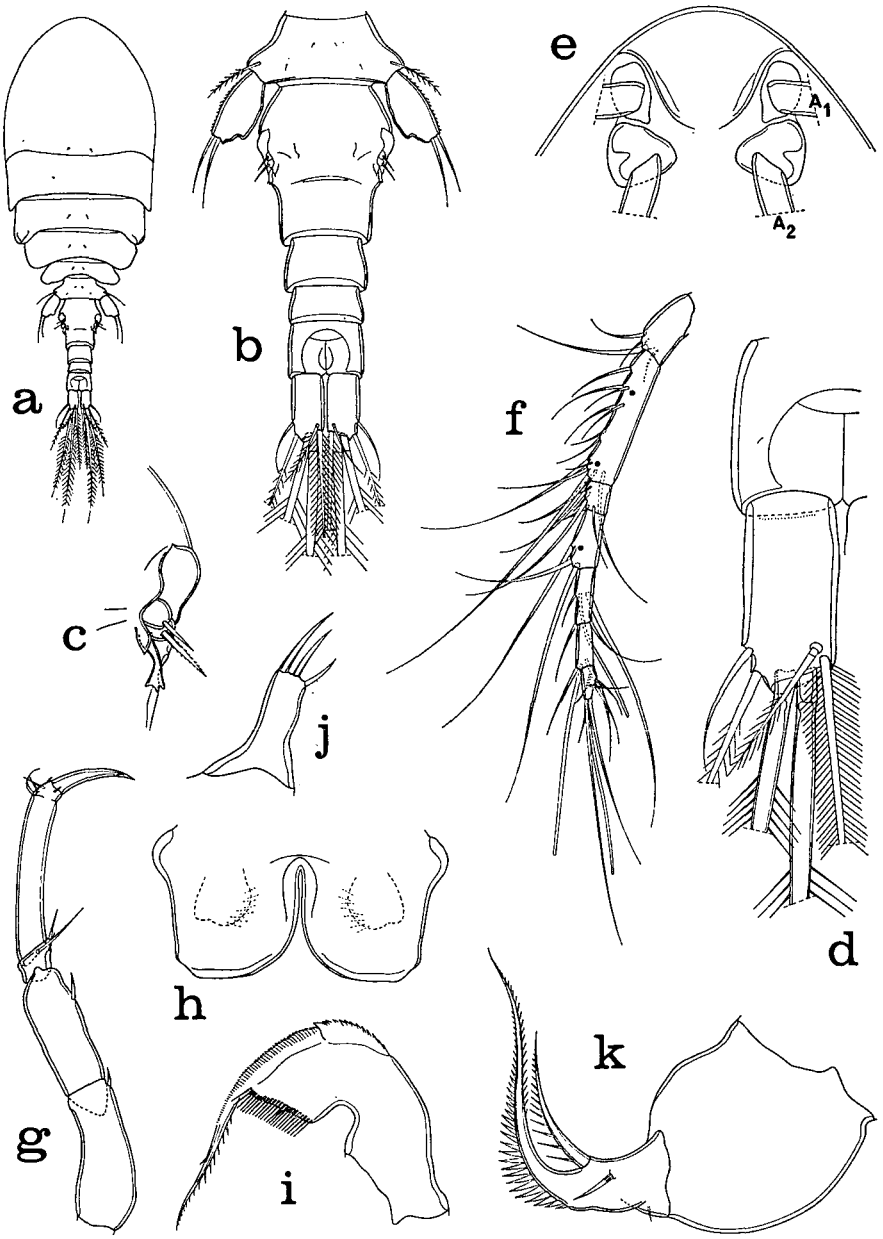

Fig. 7. *Anisomolgus sarcophyticus*, n. sp., female. a, dorsal (A); b, urosome, dorsal (B); c, genital area, dorsal (C); d, caudal ramus, dorsal (C); e, rostrum, ventral (B); f, first antenna, with dots indicating positions of aesthetes in male, dorsal (B); g, second antenna, posterior (E); h, labrum, with paragnaths indicated by broken lines, ventral (C); i, mandible, posterior (C); j, first maxilla, anterior (C): k, second maxilla, posterior (C).

paragnath (fig. 7h), first maxilla (fig. 7j), and second maxilla (fig. 7k) resembling in general form those of other species in genus. Maxilliped (fig. 8a) with second segment bearing one short smooth seta and one longer minutely barbed seta; third segment with one seta, one spine, and one terminal spiniform process, all of these smooth.

Ventral area between maxillipeds and first pair of legs (fig. 8b) not protuberant.

Legs 1–4 (fig. 8c, d, e, f) with 3-segmented rami except for 2-segmented endopod of leg 4. Armature as in *Anisomolgus incisus* (Humes and Ho, 1968a). Coxa of leg 1 with distinct outer lobe (fig. 8c). Leg 4 (fig. 8f) with inner coxal seta 50 μm and haired. Basis with inner row of hairs and outer smooth seta; marginal lobe between rami with row of spinules. Exopod 135 μm, with third segment having II, I, 5. First segment of endopod 39 μm long without spiniform process, 53 μm including process, width 31 μm, inner haired seta 100 μm. Second segment 117 μm long including spiniform processes, 21 μm in greatest width; terminally with small naked outer seta 26 μm and barbed inner spine 50 μm. Outer margins of both segments haired.

Leg 5 (fig. 8g) with free segment 88×42 μm, notched distally on inner margin and with spinules along outer surface. Two terminal smooth setae about 50 μm and 60 μm. Dorsal seta on body near insertion of free segment approximately 40 μm and haired. Few spinules on outer posterior corner of segment near dorsal seta.

Leg 6 represented by two setae on genital area (fig. 7c).

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

Male.- Body (fig. 8h) resembling that of female. Length 0.92 mm (0.89–0.96 mm) and greatest width 0.33 mm (0.32–0.33 mm), based on three specimens. Ratio of length to width of prosome 1.66:1. Ratio of length of prosome to that of urosome 1.42:1.

Segment of leg 5 (fig. 8i) 39×101 μm. Genital segment 213×172 μm. Four postgenital segments from anterior to posterior 34×65, 31×60, 23×58, and 43×64 μm.

Caudal ramus similar to that of female, but smaller, 60×31 μm, ratio 1.94:1.

Rostrum like that of female. First antenna resembling that of female but three aesthetes added (at points indicated by dots in fig. 7f) so that formula is 4, 13+2 aesthetes, 6, 3+1 aesthete, 4+1 aesthete, 2+1 aesthete, and 7+1 aesthete. Second antenna (fig. 9a) showing sexual dimorphism in having small spines on inner margins of first, second, and fourth segments.

Labrum, mandible, paragnath, first maxilla, and second maxilla like those of female. Maxilliped (fig. 9b) resembling in general that of other species in genus; claw 210 μm along its axis.

Ventral area between maxillipeds and first pair of legs as in female.

Legs 1–4 segmented as in female and having same armature except endopod of leg 1 (fig. 9c) with 0–1; 0–1; I, I, 4; outer spine 33 μm, inner spine 24 μm. Legs 2–4 as in female.

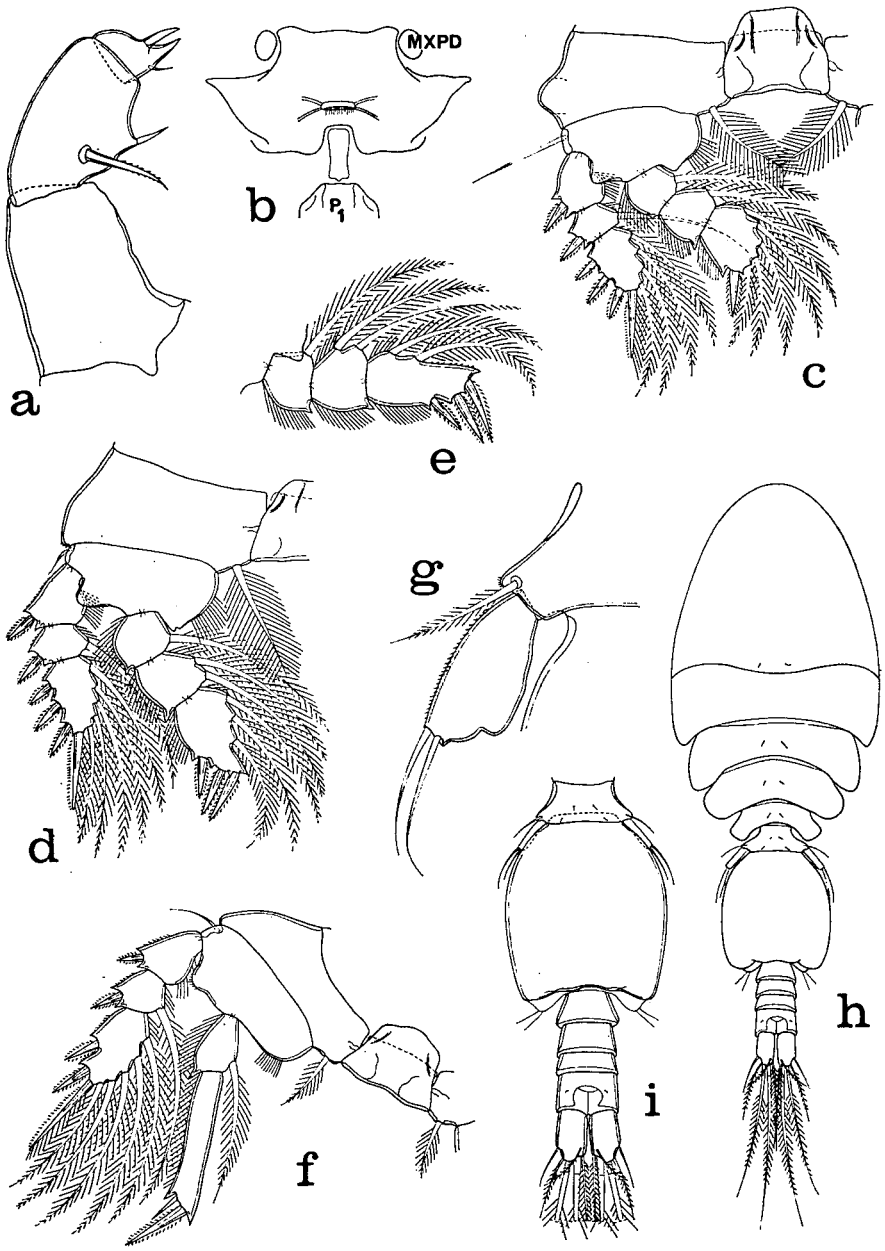

Fig. 8. *Anisomolgus sarcophyticus*, n. sp. Female: a, maxilliped, posterior (C); b, area between maxillipeds and first pair of legs, ventral (B); c, leg 1 and intercoxal plate, anterior (E); d, leg 2, anterior (E); e, endopod of leg 3, anterior (E); f, leg 4 and intercoxal plate, anterior (E); g, leg 5, dorsal (G). Male: h, dorsal (D); i, urosome, dorsal (B).

Leg 5 (fig. 9d) with rectangular unornamented free segment 38 × 7.5 μm.

Leg 6 (Fig. 9e) consisting of usual posteroventral flap on genital segment bearing two smooth setae approximately 47 μm long.

Spermatophore not seen.

Color in living specimens as in female.

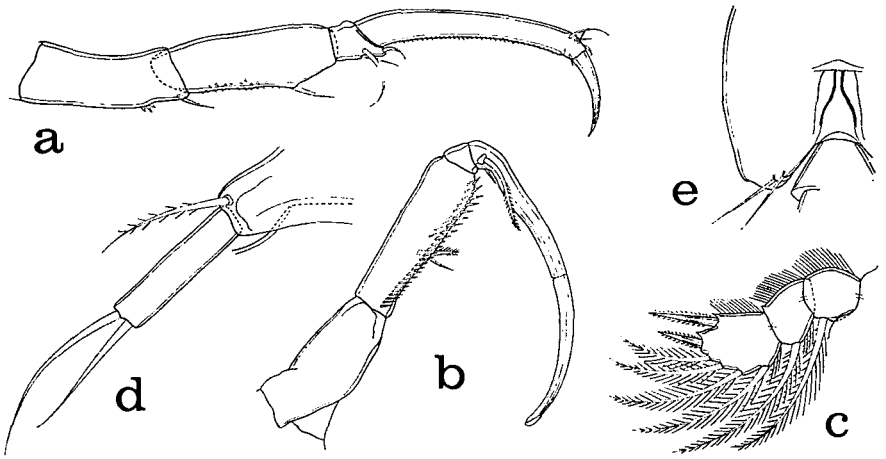

Fig. 9. *Anisomolgus sarcophyticus*, n. sp., male. a, second antenna, posterior (G); b, maxilliped, inner (E); c, endopod of leg 1, anterior (G); d, leg 5, dorsal (F); e, leg 6, ventral (E).

Etymology.- The specific name *sarcophyticus* is a modification of the generic name of the host (adapted from Greek *phytikos*, of plants).

Remarks.- The length of the fourth second antennal segment in relation to the second segment is a distinctive character of the new species. In *Anisomolgus sarcophyticus* the fourth segment is longer than the second segment with the ratio approximately 5:4. In all other congeners the fourth segment is shorter than the second segment or these two segments are equal. A second distinctive feature of *A. sarcophyticus* is the shape of the free segment of leg 5 in the female. In the other species of *Anisomolgus*, the inner edge of the free segment is smooth, not notched as in *A. sarcophyticus*.

Anisomolgus pterolobatus n. sp.

(figs. 10a–l, 11a–k, 12a–e)

Type material.- 142 ♀♀, 121 ♂♂ from 12 colonies of *Sarcophyton elegans* Moser, in in 1 m, west of Isle Mando, near Nouméa, New Caledonia, 22°18′59″S, 166°09′30″E, 5 July 1971. Holotype ♀, allotype, and 259 paratypes (131 ♀♀, 108 ♂♂) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.; the remaining paratypes in the collection of the author.

Other specimens.- From *Sarcophyton elegans*: 52 ♀♀, 105 ♂♂ from one colony, in

2 m, west of Isle Mando, near Nouméa, New Caledonia, 1 July 1971. From *Sarcophyton glaucum* (Quoy and Gaimard): 6 ♀♀ from one colony, in 5 m, southwestern shore of Goenoeng Api, Banda Islands, 4°31′45″S, 129°52′30″E, 28 April 1975; 1 ♀ from one colony, in 5 m, southern shore of Goenoeng Api, 4°32′05″S, 129°52′30″E, 26 April 1975; 2 ♀♀ from one colony, in 10 m, southwestern shore of Goenoeng Api, 4°31′45″S, 129°51′55″E, 28 April 1975; 7 ♀♀ from one colony, in 10 m, same locality and date; 2 ♀♀ from one colony, in 10 m, Poelau Parang, eastern Ceram, 3°17′00″S, 130°44′48″E, 23 May 1975. From *Sarcophyton implanum* Verseveldt: 1 ♀, in 1.5 m, west of Isle Maître, near Nouméa, New Caledonia, 22°20′05″S, 166°24′05″E, 20 June 1971.

Female.- Body (fig. 10a) moderately slender. Length 1.52 mm (1.43–1.62 mm) and greatest width 0.67 mm (0.62–0.72 mm), based on 10 specimens. Ratio of length to width of prosome 1.5:1. Ratio of length of prosome to that of urosome 1.34:1. Posterior corners of epimera of segments of legs 1–3 more or less rounded but those of segment of leg 4 expanded in winglike lobe (fig. 10b).

Segment of leg 5 (fig. 10c) 120×224 μm. Genital segment 169×187 μm, in dorsal view not greatly expanded, greatest width in anterior half. Genital areas located dorsolaterally in anterior third of segment. Each area (fig. 10d) with two small naked setae about 9 μm long. Dorsal surface of segment posterior to genital areas finely pilose. Three postgenital segments from anterior to posterior 83×97, 60×81, 156×78 μm, anal segment much longer than others. Posteroventral border of anal segment with very small spinules.

Caudal ramus (fig. 10e) 94×32 μm, ratio 2.94:1. Outer lateral seta 78 μm and dorsal seta 90 μm, both smooth. Outermost terminal seta 104 μm, innermost terminal seta 172 μm, and two long median terminal setae 308 μm (outer) and 460 μm (inner), all of these with lateral spinules. Few minute spinules around insertion of outer lateral seta. Terminal ventral flange with marginal row of minute spinules.

Body surface with very few hairs (sensilla) as in figure 10a.

Egg sac (fig. 10f) elongate, approximately 660×187 μm, containing about 50 eggs with diameter 65 μm.

Rostrum (fig. 10g) with broadly rounded posteroventral margin.

First antenna (fig. 10h) 489 μm long. Lengths of seven segments: 99 (78 μm along anterior margin), 172, 39, 73, 39, 44, and 23 μm respectively. Formula for armature as in *Anisomolgus sarcophyticus*. All setae smooth.

Second antenna (fig. 10i) 4-segmented, unornamented, and 350 μm long, including claw. Formula: 1, 1, 3, and 1 claw plus 5 setules. Fourth segment 112 μm along outer edge, 78 μm along inner edge, and 21 μm wide at middle. Claw 52 μm.

Labrum (fig. 10j), mandible (fig. 10k), paragnath (fig. 10j), first maxilla (fig. 10l), second maxilla (fig. 11a), and maxilliped (fig. 11b) resembling those of *Anisomolgus protentus* (Humes and Frost, 1964).

Ventral area between maxillipeds and first pair of legs not protuberant (fig. 11c).

Legs 1–4 (fig. 11d, e, f, g) segmented and armed as in *A. protentus*. Leg 1 with

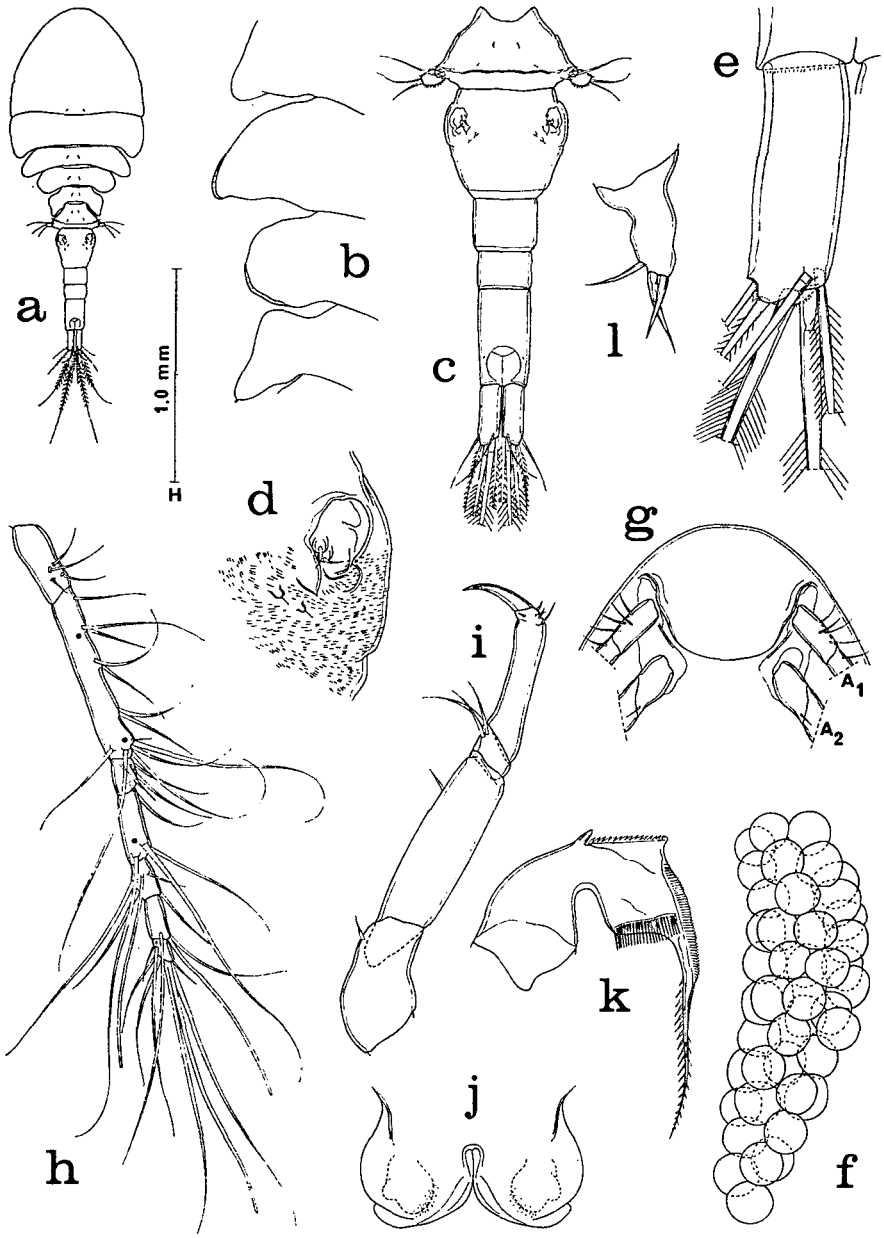

Fig. 10. *Anisomolgus pterolobatus*, n. sp., female. a, dorsal (H); b, epimera of segments of legs 1-4, dorsal (B); c, urosome, dorsal (D); d, genital area, dorsal (C); e, caudal ramus, dorsal (C); f, egg sac, ventral (D); g, rostrum, ventral (D); h, first antenna, with dots indicating positions of aesthetes in male, ventral (B); i, second antenna, posterior (E); j, labrum, ventral (G); k, mandible, posterior (C); l, first maxilla, posterior (C).

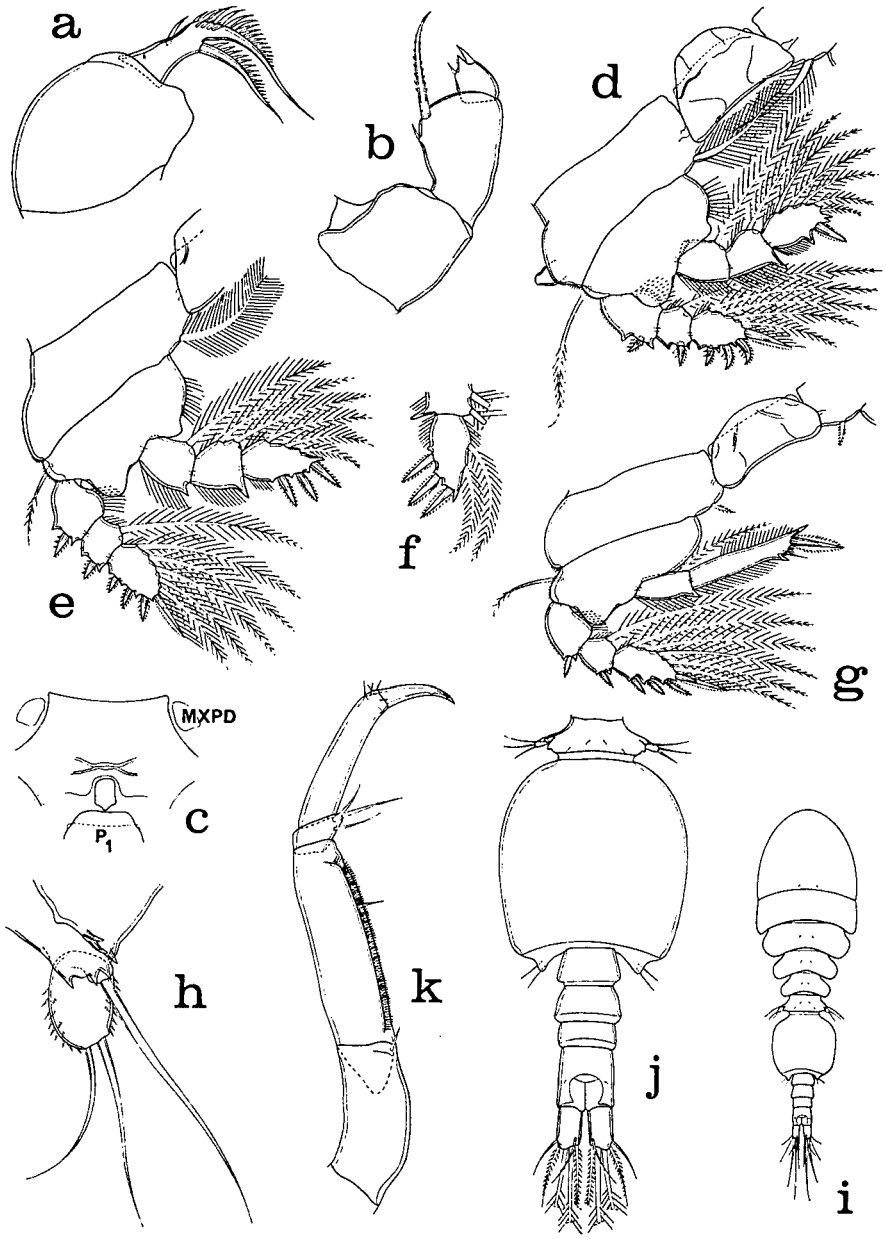

Fig. 11. *Anisomolgus pterolobatus*, n. sp. Female: a, second maxilla, posterior (G); b, maxilliped, posterior (G); c, area between maxillipeds and first pair of legs, ventral (B); d, leg 1 and intercoxal plate, anterior (E); e, leg 2, anterior (E); f, third segment of endopod of leg 3, anterior (E); g, leg 4 and intercoxal plate, anterior (E); h, leg 5, dorsal (C). Male: i, dorsal (A); j, urosome, dorsal (B); k, second antenna, posterior (G).

coxa having prominent outer lobe and third segment of endopod with terminal bifurcate process (fig. 11d). Leg 4 (fig. 11g) with inner coxal seta short, 9 μm, and minutely haired. Basis lacking inner row of spinules. Exopod 107 μm. First endopod segment 36 μm long without spiniform process, 42 μm with process, and 18 μm wide; inner distal plumose seta 72 μm. Second endopod segment 96 μm long including terminal process, 16 μm in greatest width; terminally with barbed spine 41 μm and small slender smooth seta 19 μm. Outer margins of both segments and inner margin of second segment haired.

Leg 5 (fig. 11h) with small oval free segment 36×23 μm, ornamented with spinules on both anterior and posterior surfaces and bearing two naked terminal setae approximately 68 μm and 55 μm. Dorsal seta on body segment 90 μm and smooth. Several small spiniform processes near insertion of dorsal seta.

Leg 6 represented by two setae on genital area (fig. 10d).

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

Male.- Body (fig. 11i) more slender than in female. Length 1.03 mm (0.98–1.08 mm) and greatest width 0.32 mm (0.29–0.34 mm), based on 10 specimens. Ratio of length to width of prosome 1.89:1. Ratio of length of prosome to that of urosome 1.30:1.

Segment of leg 5 (fig. 11j) 42×112 μm. Genital segment 227×195 μm, slightly longer than wide. Four postgenital segments from anterior to posterior 38×65, 37×65, 26×57, and 70×58 μm.

Caudal ramus 52×24 μm, ratio 2.21:1.

Rostrum like that of female. First antenna similar to that of female, but three aesthetes added (at points indicated by dots in fig. 10h), so that formula is same as in male of *Anisomolgus sarcophyticus*. Second antenna (fig. 11k) showing sexual dimorphism with second segment having inner row of spinules.

Labrum, mandible, paragnath, first maxilla, and second maxilla like those of female. Maxilliped (fig. 12a) slender and 4-segmented. First segment unarmed. Second segment with two setae and two rows of spines. Small third segment unarmed. Claw (with proximal half probably representing fourth segment) 185 μm long, incompletely divided about midway, and bearing proximally two setae.

Ventral area between maxillipeds and first pair of legs as in female.

Legs 1–4 segmented as in female and with same armature except third segment of endopod of leg 1 (fig. 12b) with I, I, 4; further sexual dimorphism seen in enlarged ribbed terminal process on this segment. Legs 2–4 as in female.

Leg 5 (fig. 12c) with unornamented free segment 13×9 μm, two terminal setae 34 μm and 30 μm. Adjacent dorsal seta 44 μm.

Leg 6 (fig. 12d) consisting of usual posteroventral flap on genital segment bearing two naked setae approximately 16 μm.

Spermatophore (fig. 12e) 187×77 μm, not including neck.

Etymology.- The specific name *pterolobatus*, derived from the Greek words *pteron*= a wing and *lobos*=a lobe, alludes to the winglike epimera on the segment of leg 4.

Remarks.- *Anisomolgus pterolobatus* may be distinguished from females of other

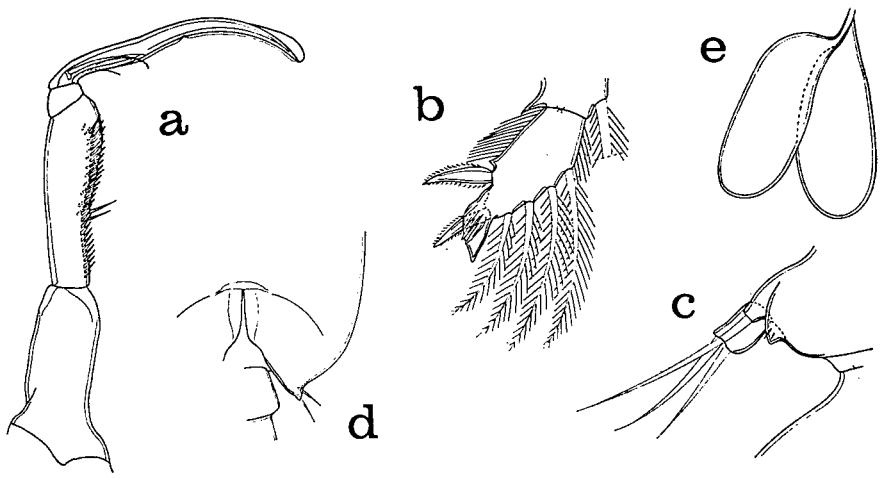

Fig. 12. *Anisomolgus pterolobatus*, n. sp., male. a, maxilliped, inner (E); b, third segment of endopod of leg 1, anterior (E); c, leg 5, dorsal (F); d, leg 6, ventral (E); e, spermatophores, attached to female, ventral (B).

members of the genus by the characteristic winglike epimera on the segment of leg 4. In other species these epimera are rounded or only slightly elongate.

Anisomolgus relativus n. sp.

(fig. 13a-o)

Type material.- 19 ♀♀ from one colony of *Sarcophyton ehrenbergi* Von Marenzeller, in 3 m, Poelau Gomumu, south of Obi, Moluccas, 1°50′00″S, 127°30′54″E, 30 May 1975. Holotype and 15 paratypes deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.; the remaining paratypes (dissected) in the collection of the author.

Other specimens (also from *Sarcophyton ehrenbergi*).- 10 ♀♀, in 1 m, Isle aux Serpents, west of Pte. Denouel, near Nouméa, New Caledonia, 22°16′52″S, 166°25′12″E, 19 July 1971.

Female.- Body (fig. 13a) with prosome broad anteriorly. Length 0.90 mm (0.83–0.97 mm) and greatest width 0.45 mm (0.40–0.47 mm), based on 10 specimens. Ratio of length to width of prosome 1.22:1. Ratio of length of prosome to that of urosome 1.5:1. Posterior corners of epimera of segments of leg 1–4 rounded.

Segment of leg 5 (fig. 13b) 52 × 117 μm. Genital segment 133 × 120 μm, slightly longer than wide, in dorsal view broad in anterior two-thirds and narrow in posterior third. Genital areas situated dorsolaterally slightly forward of middle of segment. Each genital area (fig. 13c) with two very small naked setae approximately 6 μm long. Three postgenital segments from anterior to posterior 49 × 61, 39 × 58, and 52 × 58 μm. Posteroventral border of anal segment smooth.

Caudal ramus (fig. 13d) 67 × 21 μm, ratio 3.19:1. Outer lateral seta 27 μm,

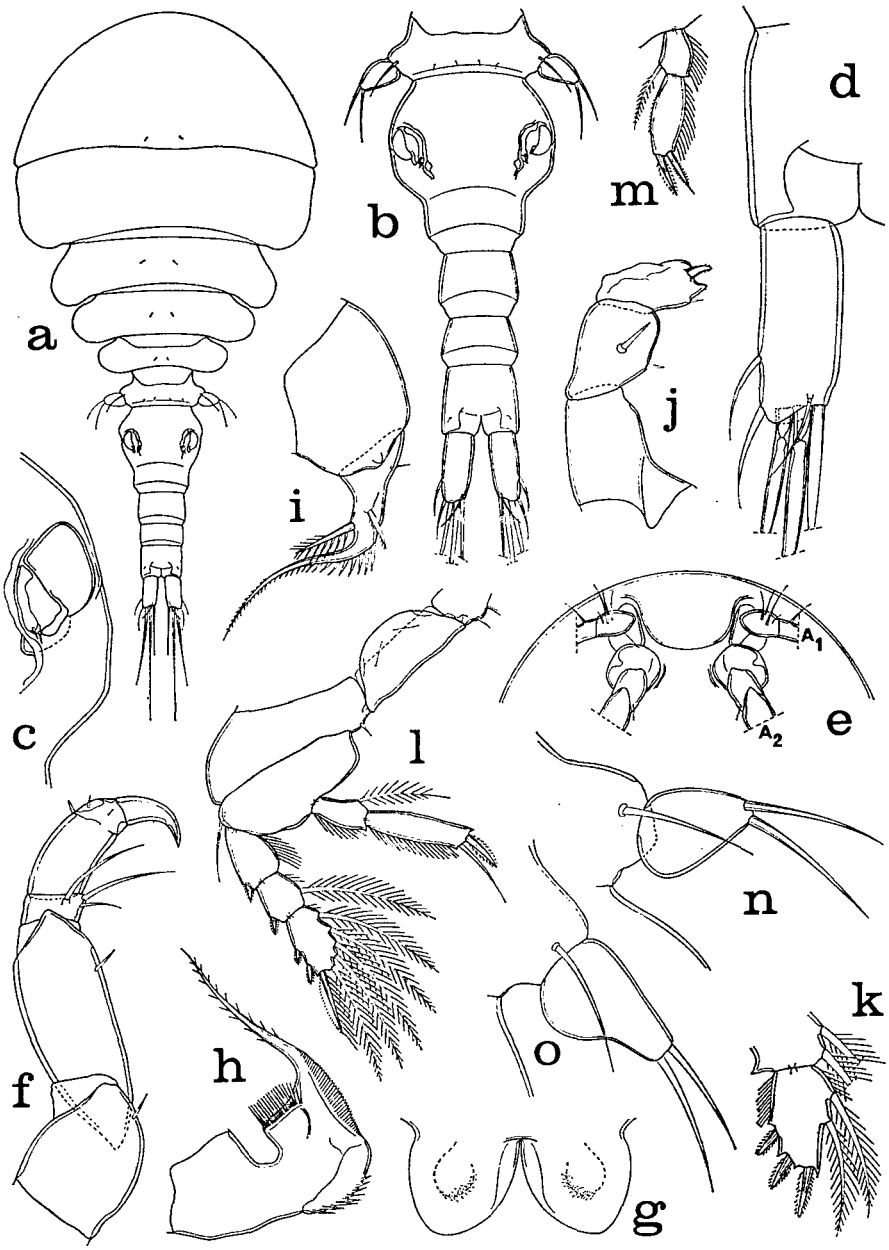

Fig. 13. *Anisomolgus relativus*, n. sp., female. a, dorsal (D); b, urosome, dorsal (E); c, genital area, dorsal (F); d, caudal ramus, dorsal (F); e, rostrum, ventral (B); f, second antenna, posterior (C); g, labrum, with paragnaths indicated by broken lines, ventral (F); h, mandible, posterior (F); i, second maxilla, posterior (C); j, maxilliped, posterior (C); k, third segment of endopod of leg 3, anterior (C); l, leg 4 and intercoxal plate, anterior (G); m, endopod of leg 4, anterior (G); n, leg 5, dorsal (F); leg 5, dorsal (F).

dorsal seta 24 μm, outermost terminal seta 33 μm, innermost terminal seta 72 μm, and two median terminal setae 109 μm (outer) and 190 μm (inner), both inserted between smooth dorsal and ventral flanges. All setae smooth.

Body surface with very few hairs (sensilla) as in figure 13a.

Entire egg sac not observed, but individual eggs approximately 50 μm in diameter.

Rostrum (fig. 13e) broadly rounded posteroventrally.

First antenna similar to that of *Anisomolgus sarcophyticus*. Length 227 μm. Lengths of seven segments 44 (27 μm along anterior margin), 67, 19, 30, 29, 22, and 16 μm respectively.

Second antenna (fig. 13f) 162 μm, segmented and armed as in other species in genus. Fourth segment 47 μm along outer side, 31 μm along inner side, and 21 μm wide. Claw 29 μm.

Labrum (fig. 13g), mandible (fig. 13h), and paragnath (fig. 13g) resembling those of *Anisomolgus incisus* (Humes and Ho, 1968a). First maxilla like that of *A. sarcophyticus*. Second maxilla (fig. 13i) and maxilliped (fig. 13j), with membranous outer edge of third segment, similar to those of *A. incisus*.

Ventral area between maxillipeds and first pair of legs like that of *A. incisus*.

Legs 1 and 2 very similar to those of *A. incisus* with same segmentation and spine and setal formula. Leg 3 also resembling that of *A. incisus* but third segment of endopod somewhat longer (fig. 13k). Leg 4 (fig. 13l) with short smooth inner coxal seta 6 μm. Basis lacking inner row of spinules. Exopod 88 μm, with third segment having II, I, 5. First endopod segment 23.5 $\times$ 14 μm, its inner plumose seta 39 μm. Second segment 50 $\times$ 13 μm, terminally with one barbed spine 22 μm and one smooth seta 36 μm. Outer margins of both segments haired. One female with abnormal left endopod (fig. 13m).

Leg 5 (fig. 13n, o) with small unornamented free segment either subovoid as in fig. 13n, measuring 30 $\times$ 22 μm, or narrow distally as in fig. 13o, dimensions 36 $\times$ 23 μm. One female with right leg 5 as in fig. 13n but left leg 5 more as in fig. 13o. Dorsal seta about 33 μm. Two terminal setae 42 μm and 36 μm. All three setae smooth.

Leg 6 represented by two setae on genital area (fig. 13c).

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

Male.- Unknown.

Etymology.- The specific name *relativus*, Latin meaning adjacent or neighboring, alludes to the many similarities between this species and *A. incisus*.

Remarks.- The broad nature of the prosome, the third segment of the maxilliped with a membranous outer side, and many other similarities suggest a close relationship between *Anisomolgus relativus* and *A. incisus*. Both species occur on the same species of alcyonacean host, *Sarcophyton ehrenbergi*. In *Anisomolgus incisus*, however, the genital segment is a little wider than long, the second segment of the endopod of leg 4 is roughly twice as long as wide (3:1 in the new species), and leg 5 a little more than twice as long as wide.

Anisomolgus dissimilis n. sp.

(figs. 14a-n, 15a-l)

Type material.- 2 8♀♀, 30 ♂♂, and 40 copepodids from one colony of *Sarcophyton acutangulum* (Von Marenzeller), in 25 m, Tany Kely, near Nosy Bé, Madagascar, 14 August 1967. Holotype ♀, allotype, and 51 paratypes (24 ♀♀, 27 ♂♂) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.; the remaining paratypes (dissected) and the copepodids in the collection of the author.

Other specimens (all from *Sarcophyton acutangulum*). - 4 ♀♀, 2 copepodids from 1 colony, in 1 m, off Ampombilava, Nosy Bé, Madagascar, 7 July 1967; 7 ♀♀, 14 ♂♂ from 2 colonies, in 1 m, among *Cymodocea,* Nosy N'Tangam, near Nosy Bé, 21 July 1967; 1 ♀ from one colony, in 3 m, Anse Vata, Nouméa, New Caledonia, 22°18′27″ S, 166°26′30″E, 7 June 1971; 17 ♀♀, 16 ♂♂ from one colony, in 1 m, western side of Isle To N'du, near Nouméa, 22°10′42″S, 166°16′30″E, 29 June 1971; 5 ♀♀, 22 ♂♂, in 4 m, Antsamantsara, Nosy Bé, Madagascar, 9 June 1967. From *Sarcophyton ehrenbergi* Von Marenzeller: 2 ♀♀, in 1 m, Isle aux Serpents, west of Pte. Denouel, near Nouméa, New Caledonia, 22°16′52″S, 166°25′12″E, 19 July 1971.

Female.- Body (fig. 14a) with moderately slender prosome. Length 1.14 mm (1.01–1.27 mm) and greatest width 0.46 mm (0.42–0.50 mm), based on 10 specimens. Ratio of length to width of prosome 1.70:1. Ratio of length of prosome to that of urosome 1.89:1. Segment of leg 1 separated dorsally from cephalosome by transverse furrow. Posterior corners of epimera of segments of legs 1–4 rounded.

Segment of leg 5 (fig. 14b) 81 × 133 μm. Genital segment elongate, 140 × 112 μm, in dorsal view with two slight lateral swellings. Genital areas located just anterior to middle of segment. Each area (fig. 14c) with two small naked setae approximately 8 μm. Three postgenital segments from anterior to posterior 52 × 68, 36 × 65, and 55 × 62 μm. Posteroventral border of anal segment smooth.

Caudal ramus (fig. 14d) short, 36 × 28 μm, ratio 1.31:1. Outer lateral seta 53 μm and naked. Dorsal seta 60 μm, outermost terminal seta 101 μm, innermost terminal seta 200 μm, and two long median terminal setae 340 μm (outer) and 550 μm (inner), all with lateral spinules. Small dorsal and ventral terminal flanges smooth.

Body surface with only a few hairs (sensilla) as in figure 14a.

Entire egg sac not seen, but each egg about 49 μm in diameter.

Rostrum (fig. 14e) with rounded posteroventral margin.

First antenna (fig. 14f) 407 μm long. Lengths of seven segments: 32 (65 μm along anterior margin), 138, 29, 55, 49, 37, and 26 μm respectively. Formula for armature as in *Anisomolgus sarcophyticus*. All setae smooth.

Second antenna (fig. 14g) 230 μm long, segmented and armed as in *A. sarcophyticus*. Fourth segment 66 μm along outer side, 46 μm along inner side, and 18 μm wide. Claw 44 μm along its axis.

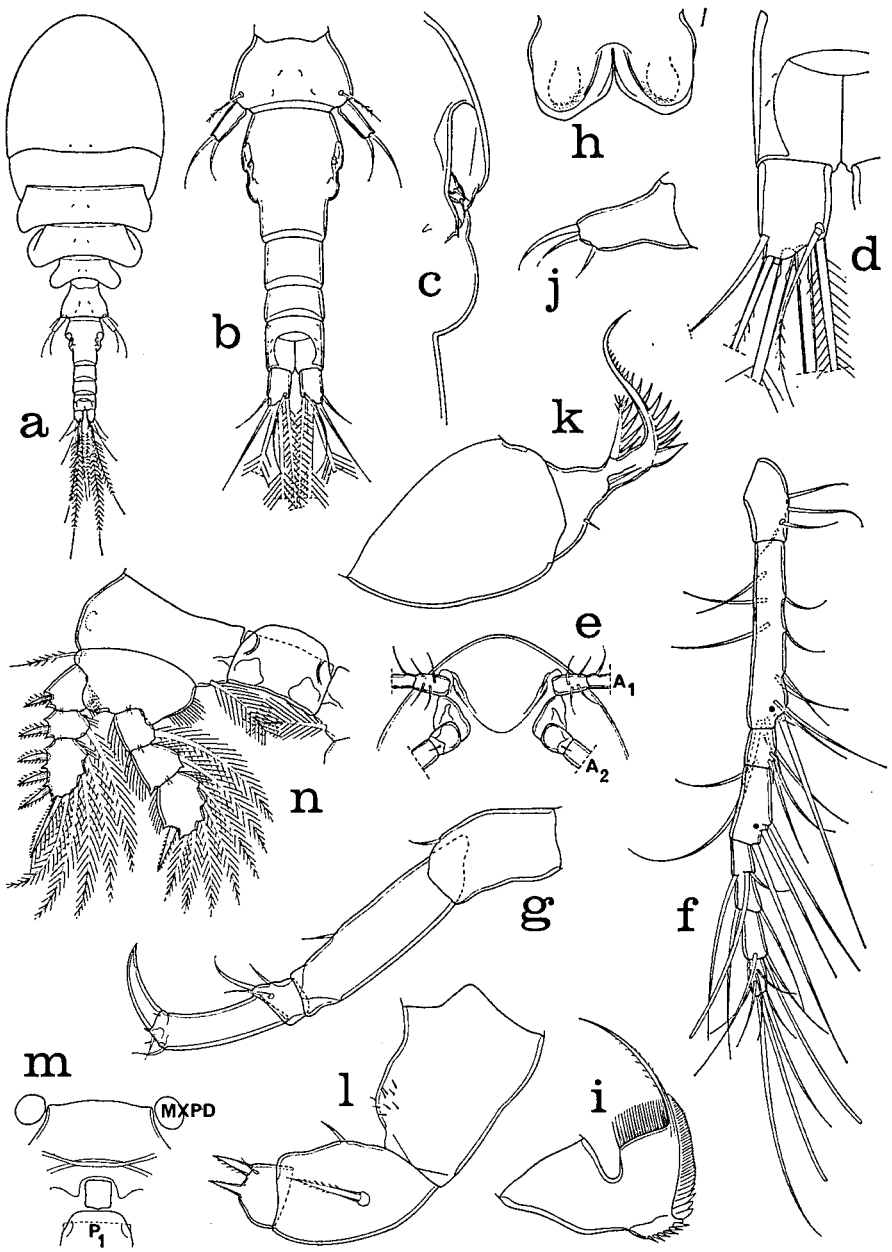

Fig. 14. *Anisomolgus dissimilis*, n. sp., female. a, dorsal (A); b, urosome, dorsal (B); c, genital area, dorsal (F); d, caudal ramus, dorsal (C); e, rostrum, ventral (D); f, first antenna, with dots indicating positions of aesthetes in male, dorsal (E); g, second antenna, posterior (G); h, labrum, with paragnaths indicated by broken lines, ventral (G); i, mandible, anterior (C); j, first maxilla, anterior (C); k, second maxilla, posterior (C); l, maxilliped, posterior (C); m, area between maxillipeds and first pair of legs, ventral (B); n, leg 1 and intercoxal plate, anterior (E).

Labrum (fig. 14h) with two rounded posteroventral lobes. Mandible (fig. 14i) with convex side having spinules on scalelike area unusually prominent and with first few serrations in fringe larger than succeeding ones. Paragnath (fig. 14h) a small hairy lobe. First maxilla (fig. 14j) with 3 setae. Second maxilla (fig. 14k) resembling that of congeners but first spine on outer convex side of lash much larger than more distal spines and dentiform. Maxilliped (fig. 14l) similar to that of *A. sarcophyticus* but first segment bearing group of spinules.

Ventral area between maxillipeds and first pair of legs (fig. 14m) not protuberant.

Legs 1–4 (figs. 14n, 15a, b, c) segmented and armed as in *A. incisus*. Inner coxal seta of leg 4 small, 17 μm, and barbed. Exopod of leg 4 122 μm, with third segment having II, I, 5. First segment of endopod 36×21 μm without processes, 41 μm long with processes, and inner plumose seta 65 μm; second segment 73×13 μm, length with processes 84 μm, and terminally with naked outer seta 19 μm and inner barbed spine 62 μm. Outer margin of both segments of endopod haired.

Leg 5 (fig. 15d) with unornamented free segment 43 μm long, 14 μm wide proximally, 12 μm wide distally. Two terminal smooth setae 34 μm and 52 μm. Dorsal seta on body near insertion of free segment 39 μm and weakly plumose.

Leg 6 represented by two setae on genital area (fig. 14c).

Color of living specimens very light gray, eye red, eggs gray.

Male.- Body (fig. 15e) with proportions as in female. Length 0.83 mm (0.79–0.89 mm) and greatest width 0.28 mm (0.28–0.31 mm), based on 10 specimens. Ratio of length to width of prosome 1.74:1. Ratio of length of prosome to that of urosome 1.56:1.

Segment of leg 5 (fig. 15f) 34×73 μm. Genital segment 153×127 μm, a little longer than wide. Four postgenital segments from anterior to posterior 31×55, 31×50, 23×47, and 31×49 μm.

Caudal ramus resembling that of female but smaller, 30×22 μm, ratio 1.5:1.

Rostrum as in female. First antenna similar to that of female but one aesthete added on second segment and another on fourth segment (at points indicated by dots in fig. 14f), so that formula is: 4, 13+1 aesthete, 6, 3+1 aesthete, 4+1 aesthete, 2+1 aesthete, and 7+1 aesthete. Second antenna (fig. 15g) showing seuxal dimorphism in having long spinules along inner margins of first and second segments, with second segment having in addition group of spinules on distal anterior surface.

Labrum, mandible, paragnath, first maxilla, and second maxilla like those of female. Maxilliped (fig. 15h) resembling in general form that of congeners. Claw 174 μm.

Ventral area between maxillipeds and first pair of legs as in female.

Legs 1–4 segmented as in female and with same armature except endopod of leg 1 (fig. 15i) with 0–1; 0–1; I, I, 4, outer spine 31 μm, inner spine 36 μm. Legs 2–4 as in female.

Leg 5 (fig. 15j) with small free segment 16×7 μm.

Leg 6 (fig. 15k) consisting of posteroventral flap on genital segment bearing two

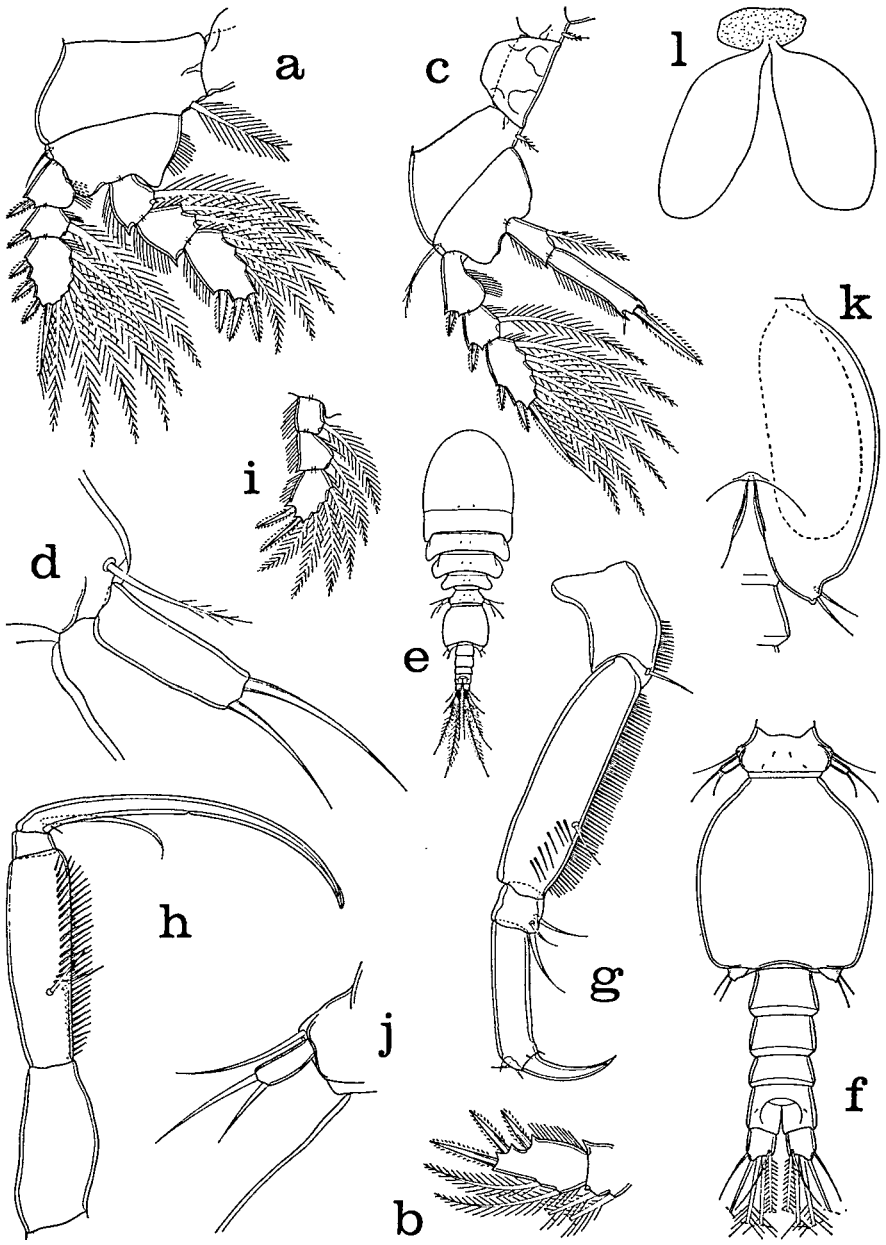

Fig. 15. *Anisomolgus dissimilis*, n. sp. Female: a, leg 2, anterior (E); b, third segment of endopod of leg 3, anterior (E); c, leg 4 and intercoxal plate, anterior (E); d, leg 5, dorsal (F). Male: e, dorsal (A); f, urosome, dorsal (E); g, second antenna, anterior (C); h, maxilliped, outer (G); i, endopod of leg 1, anterior (C); j, leg 5, dorsal (F); k, leg 6, ventral (G); l, spermatophores, attached to female, ventral (E).

naked setae about 22 μm.

Spermatophore (fig. 151), attached to female in pair, 132×55 μm.

Color in living specimens as in female.

Etymology.- The specific name *dissimilis,* Latin meaning unlike or dissimilar, alludes to the enlarged dentiform first spine on the lash of the second maxilla.

Remarks.- Anisomolgus dissimilis appears to be closely related to *Anisomolgus bicrenatus,* described below. However, females of the present species may be distinguished from *A. bicrenatus* by the contour of the sides of the genital segment and by the length of the caudal ramus (compare figs. 14b and 24b).

The male of *A. dissimilis* differs from that of *A. bicrenatus* in lacking spines on the first segment of the second maxilla.

Both species have an enlarged dentiform first spine on the lash of the second maxilla.

Anisomolgus goniodes n. sp.

(figs. 16a-m, 17a-j, 18a-f)

Type material.- 19 ♀♀, 18 ♂♂ from *Sarcophyton manifestum* Tixier-Durivault, in 2 m, western side of Isle Maître, near Nouméa, New Caledonia, 22°20′05″S, 166°24′05″E, 11 June 1971. Holotype ♀, allotype, and 32 paratypes (16 ♀♀, 16 ♂♂) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.; the remaining paratypes (dissected) in the collection of the author.

Other specimens.- From *Sarcophyton manifestum:* 3 ♀♀, 2 ♂♂ from host exposed to air intertidally, reef 5 km south of Yaté, southeastern New Caledonia, 22°11′00″S, 166°59′00″E, 23 June 1971. From *Sarcophyton trocheliophorum* Von Marenzeller: 4 ♀♀, 3 ♂♂, in 2 m, Pte. Pontillion, Nouméa, New Caledonia, 22°18′24″S, 166°25′50″E, 3 June 1971; 6 ♀♀, 9 ♂♂ from same host, in 2 m, western side of Isle Maître, near Nouméa, 22°20′05″S, 166°24′05″E, 11 June 1971.

Female.- Body (fig. 16a) not unusually broad. Length 1.23 mm (1.14–1.31 mm) and greatest width 0.58 mm (0.53–0.61 mm), based on 10 specimens. Ratio of length to width of prosome 1.67:1. Ratio of length of prosome to that of urosome 2.02:1. Segment of leg 1 separated from head by transverse dorsal furrow. Posterior corners of epimera as shown in fig. 16b; epimera of segment of leg 4 bilobed (fig. 16c) with patch of minute scales ventrally.

Segment of leg 5 (fig. 16d) 94×143 μm. Genital segment 143×177 μm, wider than long, in dorsal view with lateral margins distinctly angular just posterior to middle of segment. Genital areas situated dorsolaterally in anterior half of segment. Each area (fig. 16e) with two small naked setae approximately 10 μm long; posterior to these three small spiniform processes, two of them bearing minute setule. Three postgenital segments from anterior to posterior 78×89, 52×81, and 78×73 μm. Posteroventral border of anal segment smooth.

Caudal ramus (fig. 16f) moderately elongate, 57×29 μm, ratio 1.97:1. Outer

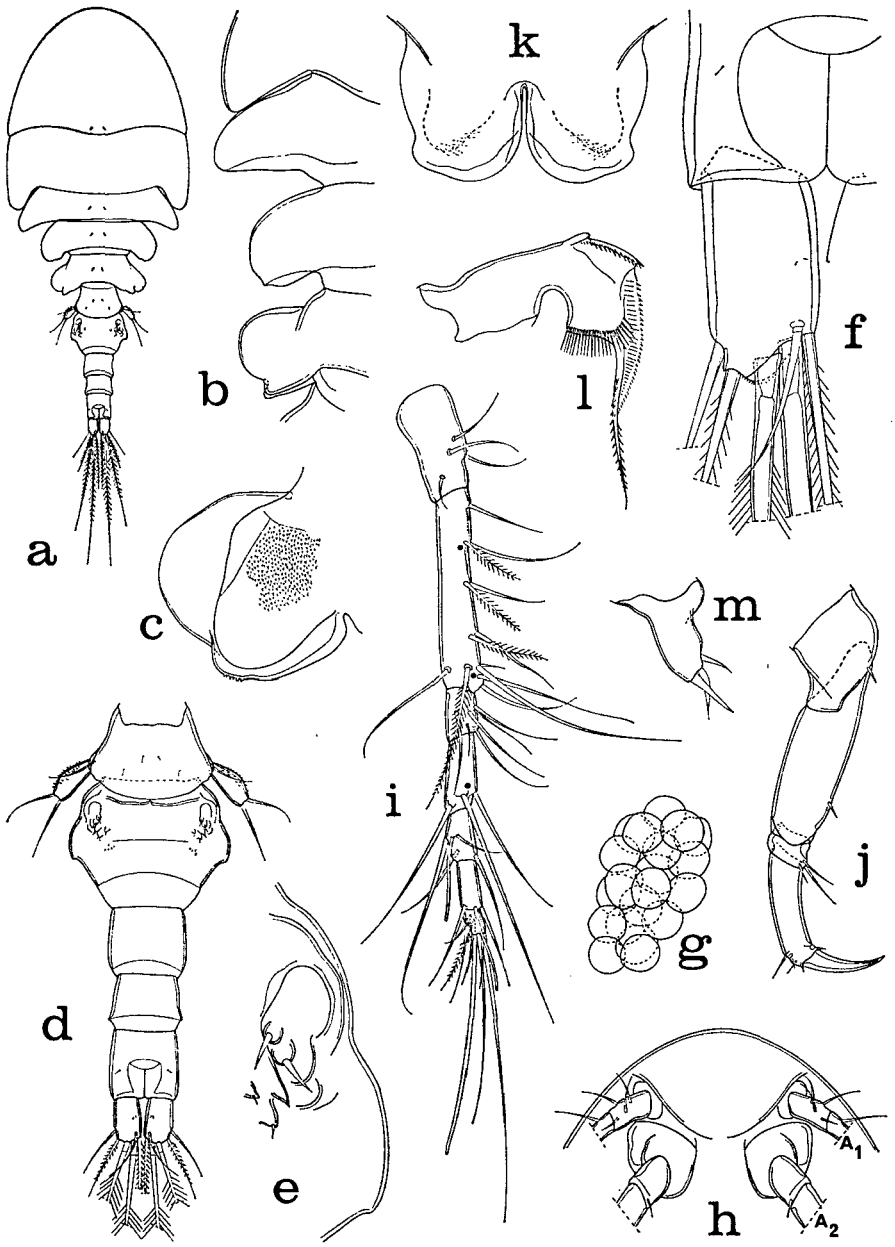

Fig. 16. *Anisomolgus goniodes*, n. sp., female. a, dorsal (A); b, epimera of segments of legs 1–4, dorsal (B); c, epimeron of segment of leg 4, ventral, (G); d, urosome, dorsal (B); e, genital area, dorsal (F); f, caudal ramus, dorsal (F); g, egg sac, ventral (D); h, rostrum, ventral (D); i, first antenna, with dots indicating positions of aesthetes in male, ventral (E); j, second antenna, posterior (E); k, labrum, with paragnaths indicated by broken lines, ventral (C); l, mandible, posterior (C); m, first maxilla, anterior (C).

lateral seta 60 μm and dorsal seta 26 μm, both naked. Outermost terminal seta 81 μm, innermost terminal seta 138 μm, and two long median terminal setae 320 μm (outer) and 440 μm (inner), all with lateral spinules. Ventral terminal flange with minute marginal spinules, dorsal flange smooth.

Body surface with very few hairs (sensilla) as in figure 16a.

Egg sac (fig. 16g) approximately 300 × 165 μm, containing about 20 eggs, with their diameters 57–65 μm.

Rostrum (fig. 16h) with weak rounded posteroventral margin.

First antenna (fig. 16i) 418 μm long. Lengths of seven segments: 73 (78 μm along anterior margin), 140, 35, 55, 36, 36, and 23 μm respectively. Formula for armature as in *Anisomolgus sarcophyticus*. Majority of setae smooth, but few delicately feathered.

Second antenna (fig. 16j) 285 μm long, segmented and armed as in *A. sarcophyticus*. Fourth segment 94 μm along outer side, 68 μm inner side, and 21 μm wide. Claw 52 μm along its axis.

Labrum (fig. 16k) with two broad posteroventral lobes. Mandible (fig. 16l) in general aspects similar to other species of genus, but with hyaline digitiform process at proximal end of scalelike area. Paragnath a small hairy lobe (fig. 16k). First maxilla (fig. 16m) with 3 naked setae. Second maxilla (fig. 17a) resembling closely that of *A. sarcophyticus*. Maxilliped (fig. 17b) as in congeners but terminal process short, round, and with few minute marginal spinules.

Ventral area between maxillipeds and first pair of leg (fig. 17c) not protuberant.

Legs 1–4 (fig. 17d, e, f, g) segmented and armed as in *A. protentus*. Leg 1 with outer round protuberance on coxa and outer seta on basis long, 143 μm. Inner margin of basis of legs 2–4 smooth. Leg 4 with inner coxal seta small, 7 μm, and naked. Exopod of leg 496 μm long, third segment with III, I, 5. First segment of endopod 39 × 18 μm, its inner distal seta 66 μm. Second segment 78 × 15.5 μm, including spiniform process, and bearing terminally one strong barbed spine 32 μm and one small slender naked seta 12 μm. Outer margin of first segment and both outer and inner margins of second segment haired.

Leg 5 (fig. 17h) with free segment 55 × 23 μm bearing two terminal smooth setae 65 μm and 56 μm. Segment ornamented outwardly with small spinules. Dorsal seta 49 μm and smooth.

Leg 6 represented by two setae on genital area (fig. 16e).

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

Male.- Body (fig. 17i) with prosome a little less pointed anteriorly than in female. Length 0.99 mm (0.95–1.02 mm) × 0.35 mm (0.33–0.39 mm), based on 10 specimens. Ratio of length to width of prosome 1.6:1. Ratio of length of prosome to that of urosome 1.31:1. Epimera of segments of legs 1–4 rounded, those of segment of leg 4 not bilobed and ventrally squamous as in female.

Segment of leg 5 (fig. 17j) 39 × 91 μm. Genital segment elongate, 218 × 195 μm. Four postgenital segments from anterior to posterior 39 × 62, 39 × 60, 26 × 56, and

43 × 60 μm.

Caudal ramus resembling that of female but smaller, 37 × 25 μm, ratio 1.48:1. Rostrum as in female. First antenna like that of female but three aesthetes added,

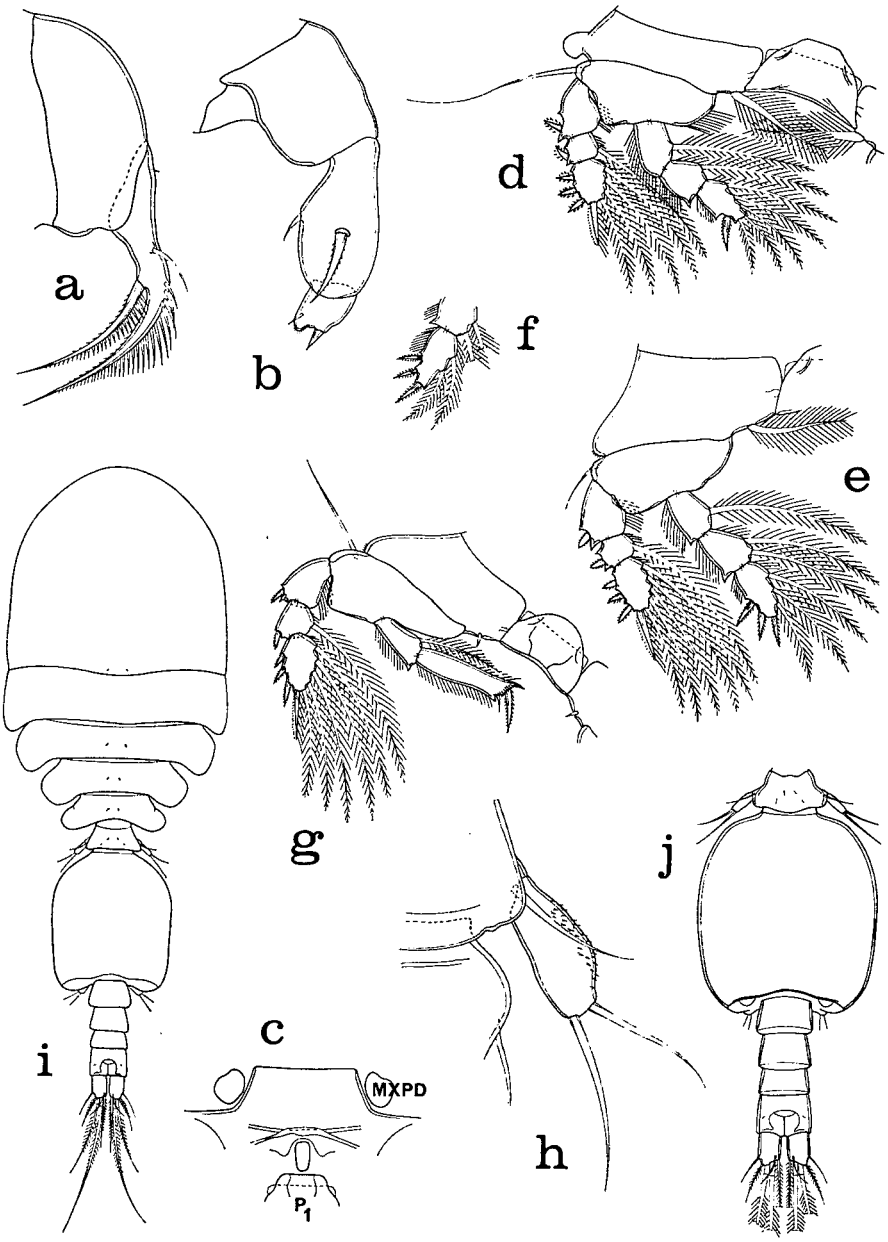

Fig. 17. *Anisomolgus goniodes*, n. sp. Female: a, second maxilla, posterior (C); b, maxilliped, posterior (C); c, area between maxillipeds and first pair of legs, ventral (B); d, leg 1 and interxcoxal plate, anterior (E); e, leg 2, anterior (E); f, third segment of endopod of leg 3, anterior (E); g, leg 4 and intercoxal plate, anterior (E); h, leg 5, dorsal (C). Male: i, dorsal (D); j, urosome, dorsal (B).

two on segment 2, and one on segment 4 so that formula is same as in *Anisomolgus dissimilis* and other species. Second antenna, labrum, mandible, paragnath, first maxilla, and second maxilla as in female.

Maxilliped (fig. 18a) generally similar to that of *A. dissimilis*. Claw 164 μm and slightly sinuous.

Ventral area between maxillipeds and first pair of legs as in female.

Legs 1–4 segmented as in female and with same armature except for sexual dimorphism in third segment of endopod of leg 1 (fig. 18b) where formula is I, I, 4, and distal end of segment is prolonged in bulbous spinulose process (fig. 18c). Legs 2–4 as in female.

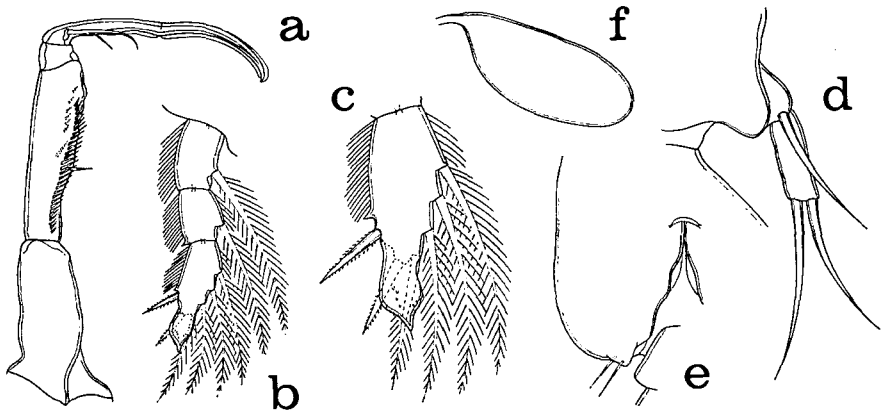

Fig. 18. *Anisomolgus goniodes*, n. sp., male. a, maxilliped, inner (E); b, endopod of leg 1, anterior (G); c, third segment of endopod of leg 1, anterior (F); d, leg 5, dorsal (F); e, leg 6, ventral (E); f, spermatophore, attached to female, ventral (B).

Leg 5 (fig. 18d) with unornamented free segment 23 × 8 μm.

Leg 6 (fig. 18e) represented by posteroventral flap on genital segment bearing two slender naked setae about 26 μm.

Spermatophore (fig. 18f) elongate, 210 × 88 μm not including neck.

Color in living specimens as in female.

Etymology.- The specific name *goniodes*, Greek meaning having angles, alludes to the shape of the genital segment in the female.

Remarks.- The only other species of *Anisomolgus* with the formula III, I, 5 for the third segment of the exopod of leg 4 and with an angular genital segment in the female is *Anisomolgus spinipes* (Sewell, 1949). In this Indian Ocean species, however, the caudal ramus of the female is wider than long, not about 2:1 as in the new species.

Anisomolgus petalophorus n. sp.

(figs. 19a–k, 20a–i, 21a–i)

Type material.- 2 ♀♀, 9 ♂♂ from *Sarcophyton acutangulum* (Von Marenzeller), in

3 m, Ansa Vata, Nouméa, New Caledonia, 22°18′27″S, 166°26′30″E, 7 June 1971. Holotype ♀, allotype, and 8 paratypes (1 ♀, 7 ♂♂) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.; the remaining paratype (dissected) in the collection of the author.

Other specimens.- 1 ♀, 2 ♂♂ from *Sarcophyton acutangulum*, exposed at low tide, Ricaudy Reef, near Nouméa, 22°19′00″S, 166°26′44″E, 9 June 1971.

Female.- Body (fig. 19a) with broad prosome. Length 1.41 mm (1.34–1.46 mm) and greatest width 0.66 mm (0.62–0.70 mm), based on three specimens. Ratio of length to width of prosome 1.31:1. Ratio of length of prosome to that of urosome 1.77:1. Segment of leg 1 separated from head by very weak transverse dorsal furrow. Epimera of segments of legs 1 and 2 projected and elongate, those of segments of leg 3 and 4 rounded.

Segment of leg 5 (fig. 19b) 90×180 μm. Genital segment 203×192 μm, slightly longer than wide, in dorsal view broadest just posterior to midregion. Genital areas located dorsolaterally in anterior half of segment. Each area (Fig. 19c) with two small naked setae about 12 μm long. Three postgenital segments from anterior to posterior 88×86, 57×75, and 86×78 μm. Posteroventral border of anal segment smooth.

Caudal ramus (fig. 19d) 44×34 μm, ratio 1.29:1. Outer lateral seta 65 μm and smooth. Dorsal seta 62 μm with lateral spinules. Outermost terminal seta 108 μm and innermost terminal seta 286 μm, both with lateral spinules. Two long median smooth terminal setae 500 μm (outer) and 770 μm (inner). Ventral terminal flange with minute marginal spinules.

Body surface with very few hairs (sensilla) as in figure 19a.

Egg sac (fig. 19e) elongate, approximately 550×240 μm, containing about 80 eggs, their diameters 57–65 μm.

Rostrum (fig. 19f) with weakly defined posteroventral border.

First antenna (fig. 19g) 490 μm long. Lengths of seven segments: 60 (73 μm along anterior margin), 185, 34, 70, 36, 39, and 26 μm respectively. Formula for armature as in *Anisomolgus sarcophyticus*. Most setae smooth but few on terminal segment feathered.

Second antenna (fig. 19h) 300 μm long, segmented and armed as in *A. sarcophyticus*. Fourth segment 99 μm along outer side, 75 μm along inner side, and 22 μm wide. Claw short, 24 μm along its axis.

Labrum (fig. 19i) with two diverging posteroventral lobes. Mandible (fig. 19j) resembling that of congeners but with conspicuous hyaline petal-like lobe near base of scalelike area on outer convex margin. Paragnath a small hairy lobe (fig. 19i). First maxilla (fig. 19k) with three smooth setae. Second maxilla (fig. 20a) with second segment bearing prominent stout hyaline seta on outer margin and proximalmost tooth on lash enlarged. Postoral area between mandibles and second maxillae having two lobes bearing petal-like setae (fig. 19i). Maxilliped (fig. 20b) with second segment bearing two very unequal smooth setae; third segment with smooth spine, small seta, and short rounded smooth terminal process.

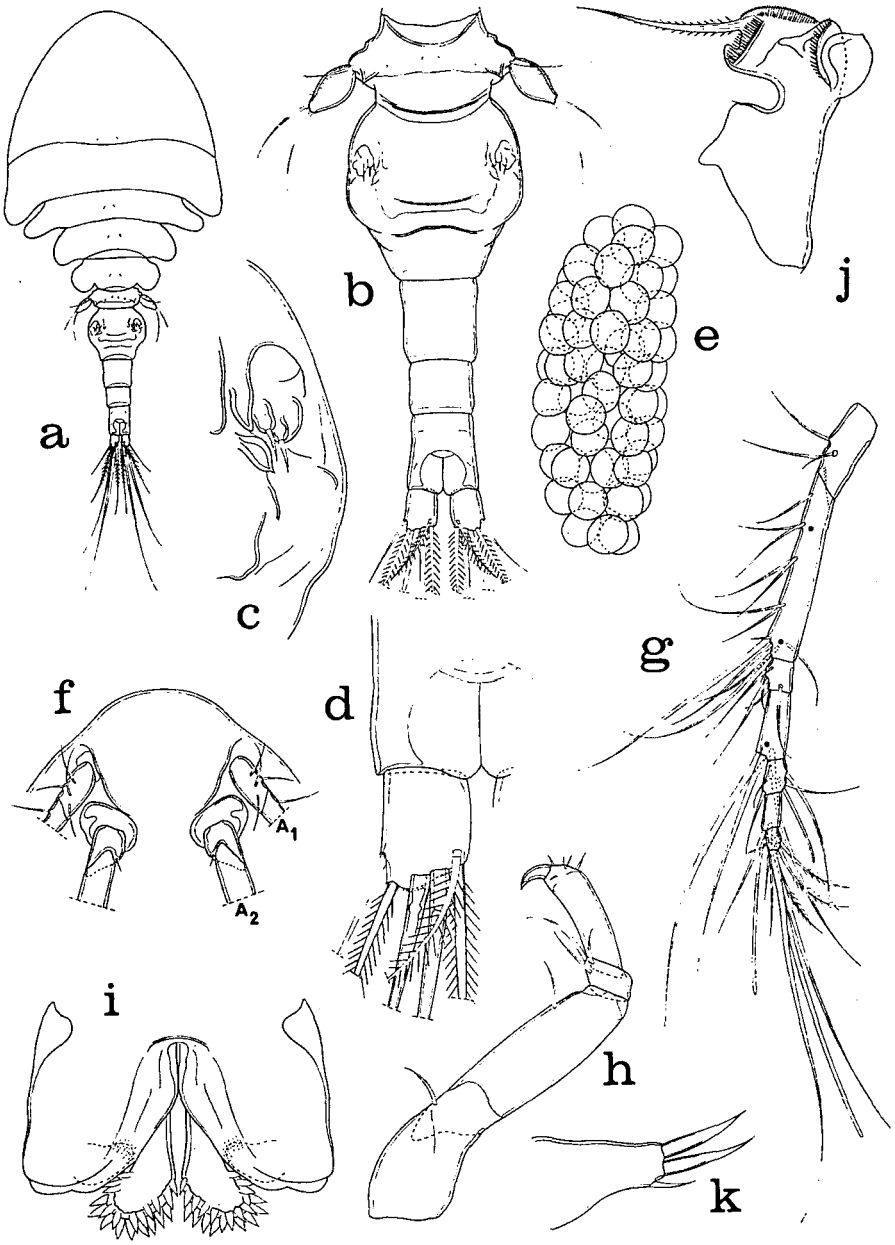

Fig. 19. *Anisomolgus petalophorus*, n. sp., female. a, dorsal (A); b, urosome, dorsal (B); c, genital area, dorsal (C); d, caudal ramus, dorsal (C); e, egg sac, ventral (D); f, rostrum, ventral (D); g, first antenna, with dots indicating positions of aesthetes in male, dorsal (B); h, second antenna, posterior (E); i, labrum and postoral lobes, with paragnaths indicated by broken lines, ventral (C); j, mandible, posterior (C); k, first maxilla, anterior (F).

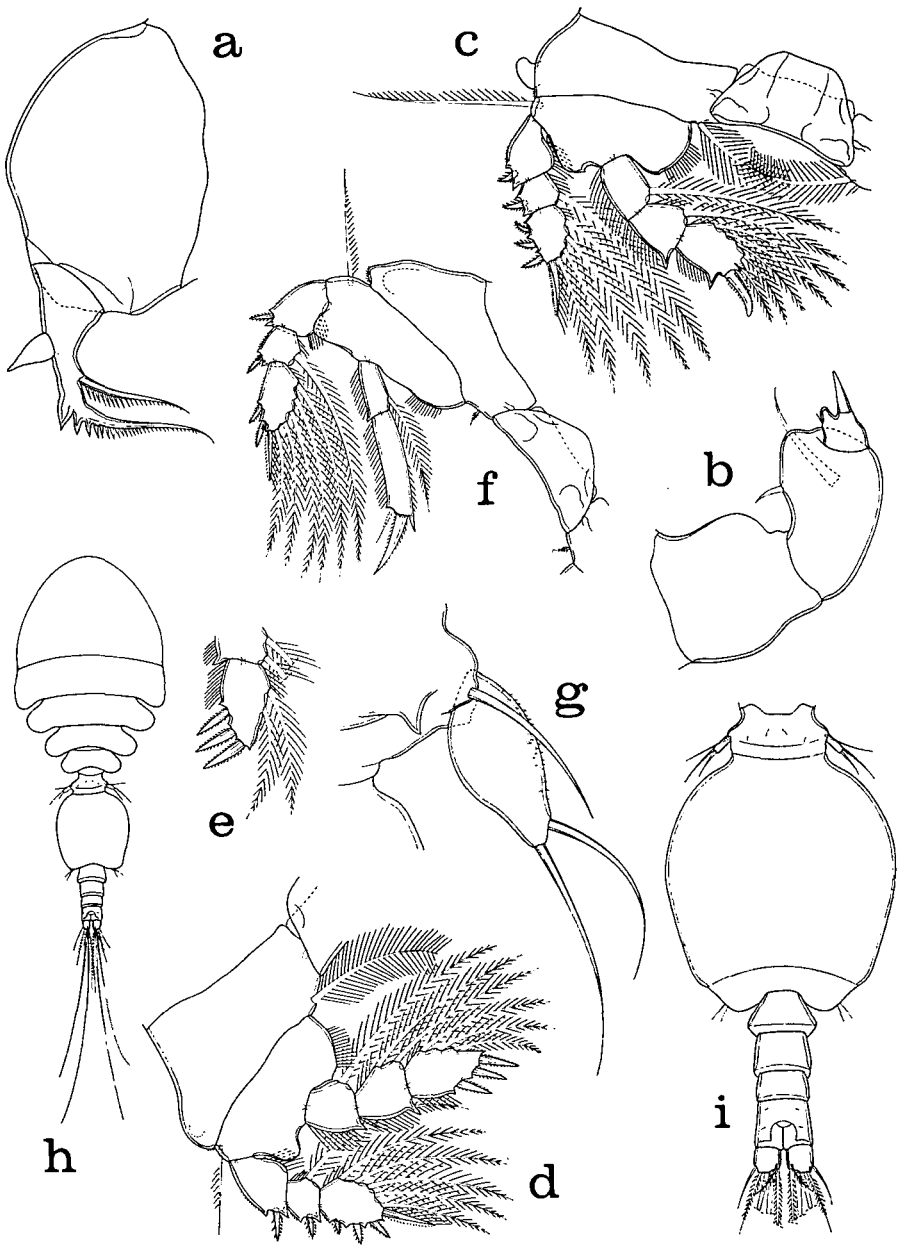

Fig. 20. *Anisomolgus petalophorus*, n. sp. Female: a, second maxilla, posterior (C); b, maxilliped, anterior (C); c, leg 1 and intercoxal plate, anterior (E); d, leg 2, anterior (E); e, third segment of endopod of leg 3, anterior (E); f, leg 4 and intercoxal plate, anterior (E); g, leg 5, dorsal (C). Male: h, dorsal (A); i, urosome, dorsal (B).

Ventral area between maxillipeds and first pair of legs resembling that of *Anisomolgus dissimilis*.

Leg 1–4 (figs. 20c, d, e, f) segmented and armed as in *A. incisus* (Humes and Ho, 1968a). Coxa of leg 1 with prominent lobe arising on outer posterior surface; this lobe reduced and inconspicuous in legs 2–4. Leg 4 with inner coxal seta small, 9 μm, and barbed. Exopod of leg 4 119 μm long, third segment with formula II, I, 5. First segment of endopod 42 μm long (without spiniform process) and 19 μm wide, its inner plumose seta 79 μm. Second segment 91 μm (including terminal spiniform process) $\times$ 18 μm, terminally with inner barbed spine 44 μm and very slender, minutely barbed seta 24 μm. Outer margin of first segment and both outer outer and inner margins of second segment haired.

Leg 5 (fig. 20g) with free segment 73 $\times$ 33 μm, broad proximally but tapered distally, bearing terminally two smooth setae 96 μm and 78 μm and ornamented along outer surface with small spines. Dorsal seta 60 μm and smooth. Medial to leg 5 a dorsal toothlike process.

Leg 6 represented by two setae on genital area (fig. 19c).

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

Male.- Body (fig. 20h) with prosome less expanded than in female. Length 1.13 mm (1.06–1.17 mm) and greatest width 0.44 mm (0.42–0.51 mm), based on 10 specimens. Ratio of length to width of prosome 1.46:1. Ratio of length of prosome to that of urosome 1.37:1.

Segment of leg 5 (fig. 20i) 52 $\times$ 105 μm. Genital segment 270 $\times$ 226 μm, longer than wide. Four postgenital segments from anterior to posterior 47 $\times$ 72, 47 $\times$ 64, 26 $\times$ 57, and 51 $\times$ 65 μm.

Caudal ramus similar to that of female but smaller, 31 $\times$ 25 μm, ratio 1.24:1.

Rostrum as in female. First antenna like that of female but three aesthetes added (at points indicated by dots in fig. 19g). Second antenna (fig. 21a) resembling that of female but second segment with inner row of short slender spinules.

Labrum, mandible, paragnath, first maxilla, second maxilla, and postoral area as in female. Maxilliped (fig. 21b) with second segment bearing two smooth setae, one seta arising from anvil-shaped base (fig. 21c), and ornamented with row of spinules and interrupted row of small spines. Claw 161 μm with two smooth unequal proximal setae.

Ventral area between maxillipeds and first pair of legs as in *Anisomolgus dissimilis*.

Legs 1–4 segmented as in female and having same armature except I, I, 4 on last segment of endopod of leg 1. Sexual dimorphism present in spinose lobate prolongation of third segment of endopod of leg 1 (fig. 21d), and in stout middle spine on third segment of endopod of leg 2 (fig. 21e) and leg 3 (fig. 21f). Endopod of leg 4 (fig. 21g) with first segment 33 μm long (without process) $\times$ 15 μm wide. Terminally with barbed spine 33 μm and slender seta 12 μm.

Leg 5 (fig. 21h) with unornamented free segment 28 $\times$ 12 μm.

Leg 6 (fig. 21i) represented by posteroventral flap on genital segment bearing two slender smooth setae about 29 μm.

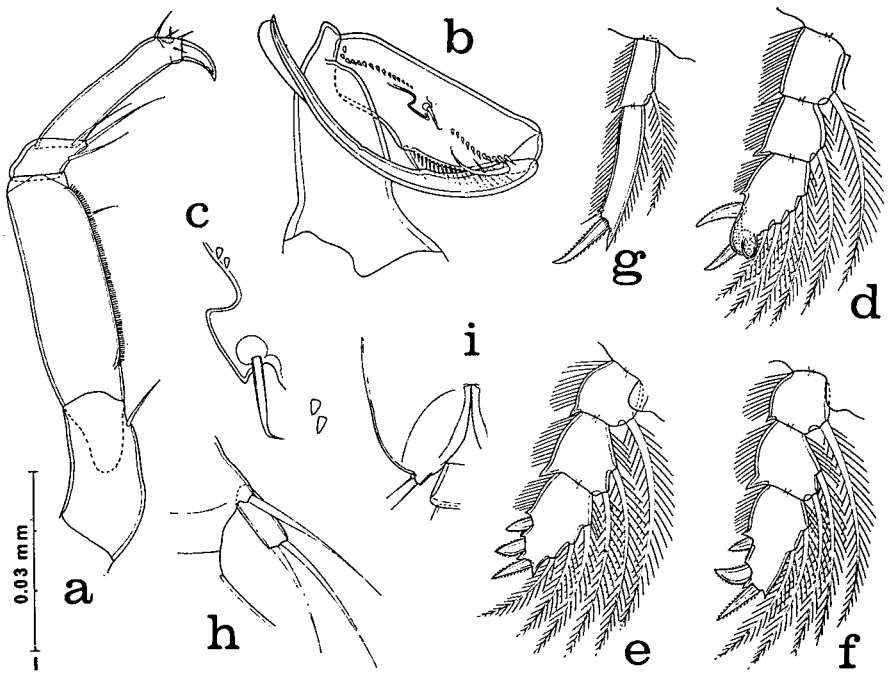

Fig. 21. *Anisomolgus petalophorus,* n. sp., male. a, second antenna, posterior (G); b, maxilliped, inner (G); c, modified seta on second segment of maxilliped, inner (I); d, endopod of leg 1, anterior (G); e, endopod of leg 2, anterior (G); f, endopod of leg 3, anterior (G); g, endopod of leg 4, anterior (G); h, leg 5, dorsal (C); i, leg 6, ventral (B).

Spermatophore not seen.

Color in living specimens as in female.

Etymology.- The specific name *petalophorus,* from Greek *petalon,* a petal, and *phoreo,* to carry, refers to the petal-like lobe on the mandible and to the petal-like setae on the postoral lobes.

Remarks.- *Anisomolgus petalophorus* may be distinguished from its congeners that also have the formula II, I, 5 on the third segment of the endopod of leg 4 by a combination of the following features: its shorter caudal ramus, and its relatively large ornamented distally tapered free segment of leg 5.

The petal-like lobe on the mandible, the petal-like setae on the postoral lobes, and the prominent stout hyaline seta on the outer margin of the second segment of the second maxilla are distinctive features of the new species.

Anisomolgus ensiferus n. sp.

(figs. 22a–k, 23a–n)

Type material.- 6 ♀♀, 7 ♂♂ from *Sarcophyton glaucum* (Quoy and Gaimard), in 1 m, west of Isle Mando, near Nouméa, New Caledonia, 22°18′59″S, 166°09′30″E,

5 July 1971. Holotype ♀, allotype, and 9 paratypes (4 ♀♀, 5 ♂♂) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.; the remaining paratypes (dissected) in the collection of the author.

Female.- Body (fig. 22a) with broad flat prosome. Length 2.02 mm (1.92–2.18 mm) and greatest width 0.80 mm (0.70–0.90 mm), based on six specimens. Ratio of length to width of prosome 1.42:1. Ratio of length of prosome to that of urosome 1.19:1. Epimera of segment of leg 1 narrowly rounded, those of segment of leg 2 pointed and extended laterally, those of segment of leg 3 broadly rounded, and those of segment of leg 4 rounded and bilobed. Segments of legs 3 and 4 distinctly narrower than preceding segment.

Segment of leg 5 (fig. 22b) 122×211 μm. Genital segment 226×211 μm, only slightly longer than wide, with nearly parallel lateral margins. Genital areas located dorsolaterally in anterior half of segment. Each area (fig. 22c) with two small naked setae about 13 μm long. Three postgenital segments from anterior to posterior 177×130, 96×104, and 185×100 μm. Anal segment unusually long with smooth posteroventral border.

Caudal ramus (fig. 22d) elongate, 174×35 μm, ratio 5:1. Outer lateral seta 42 μm and smooth. Dorsal seta 40 μm, outermost terminal seta 70 μm, innermost terminal seta 81 μm, two long median terminal setae 200 μm (outer) and 440 μm (inner), all these setae with lateral spinules. Ventral terminal flange with few extremely small spinules.

Body surface with hairs (sensilla) and refractile points as in figure 22a.

Complete egg sac not seen, but eggs about 60 μm in diameter.

Rostrum (fig. 22e) with weak posteroventral edge.

First antenna (fig. 22f) 627 μm long. Lengths of seven segments: 114 (96 μm along anterior margin), 230, 47, 86, 52, 54, and 27 μm respectively. Formula for armature as in *Anisomolgus sarcophyticus*. Majority of setae naked but few lightly feathered.

Second antenna (fig. 22g) 440 μm long, segmented and armed as in *A. sarcophyticus*. Fourth segment elongate, 140 μm along outer side, 100 μm along inner side, and 26 μm wide.

Labrum (fig. 22h) with two broad posteroventral lobes. Mandible (fig. 22i) resembling that of *A. sarcophyticus*, but scalelike area on base projecting slightly distally. Paragnath a small hairy lobe. First maxilla (fig. 22j) with three smooth setae. Second maxilla (fig. 22k) and maxilliped (fig. 23a) similar in major respects to those of *A. sarcophyticus*.

Ventral area between maxillipeds and first pair of legs (fig. 23b) not protuberant.

Legs 1–4 (fig. 23c, d, e, f) segmented and armed as in *Anisomolgus pterolobatus*. Coxa of leg 1 with prominent outer lobe arising on posterior surface; this lobe small in leg 2 and absent in legs 3 and 4. Leg 4 with exopod 140 μm long, third segment having III, I, 5. First segment of endopod 49 μm long (without spiniform process) and 26 μm wide, its inner seta 94 μm. Second segment 117 μm long including spiniform process and 24 μm wide; terminally with inner barbed spine 57 μm and

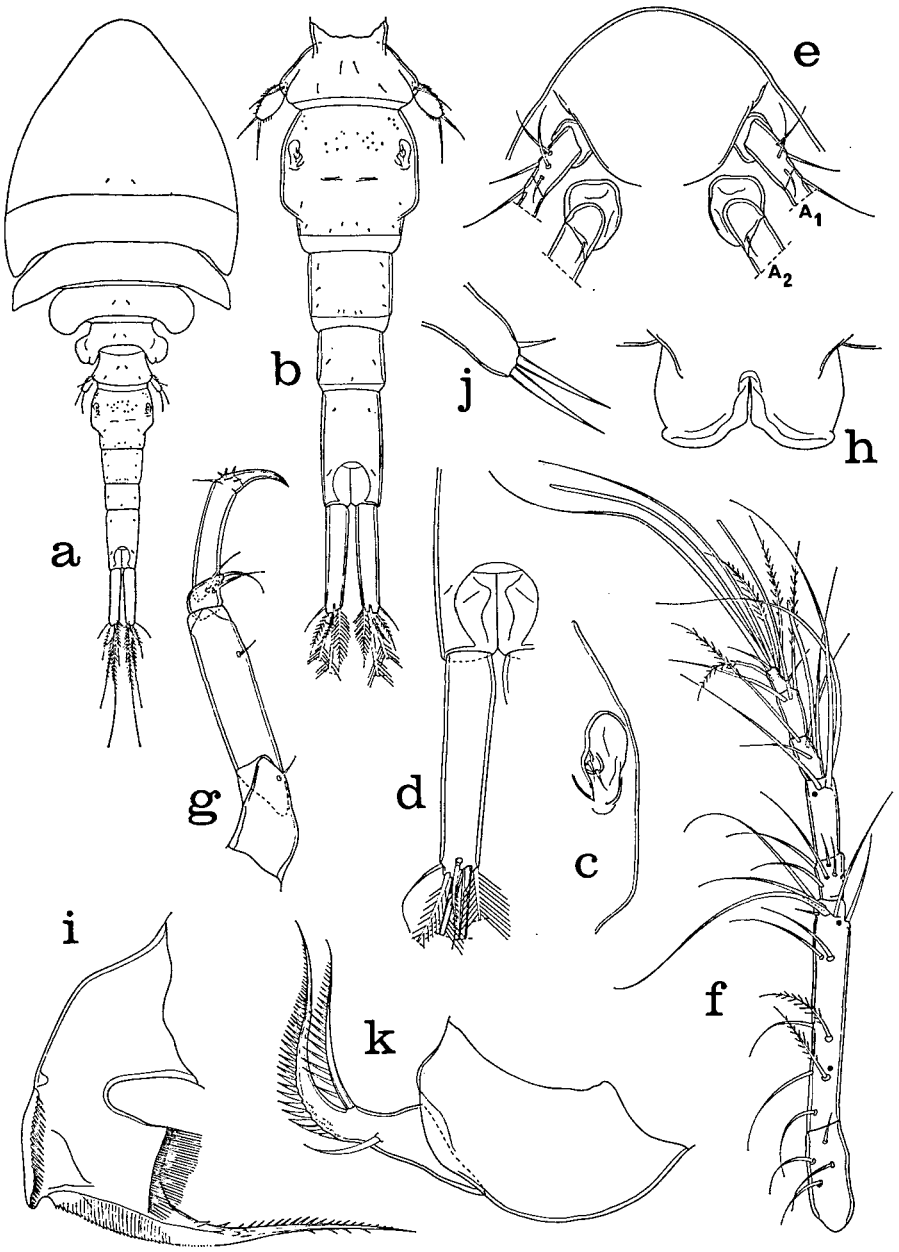

Fig. 22. *Anisomolgus ensiferus*, n. sp., female. a, dorsal (A); b, urosome, dorsal (D); c, genital area, dorsal (G); d, caudal ramus, dorsal (E); e, rostrum, ventral (D); f, first antenna, with dots indicating positions of aesthetes in male, ventral (B); g, second antenna, posterior (B); h, labrum, ventral (E); i, mandible, posterior (C); j, first maxilla, posterior (C); k, second maxilla, posterior (G).

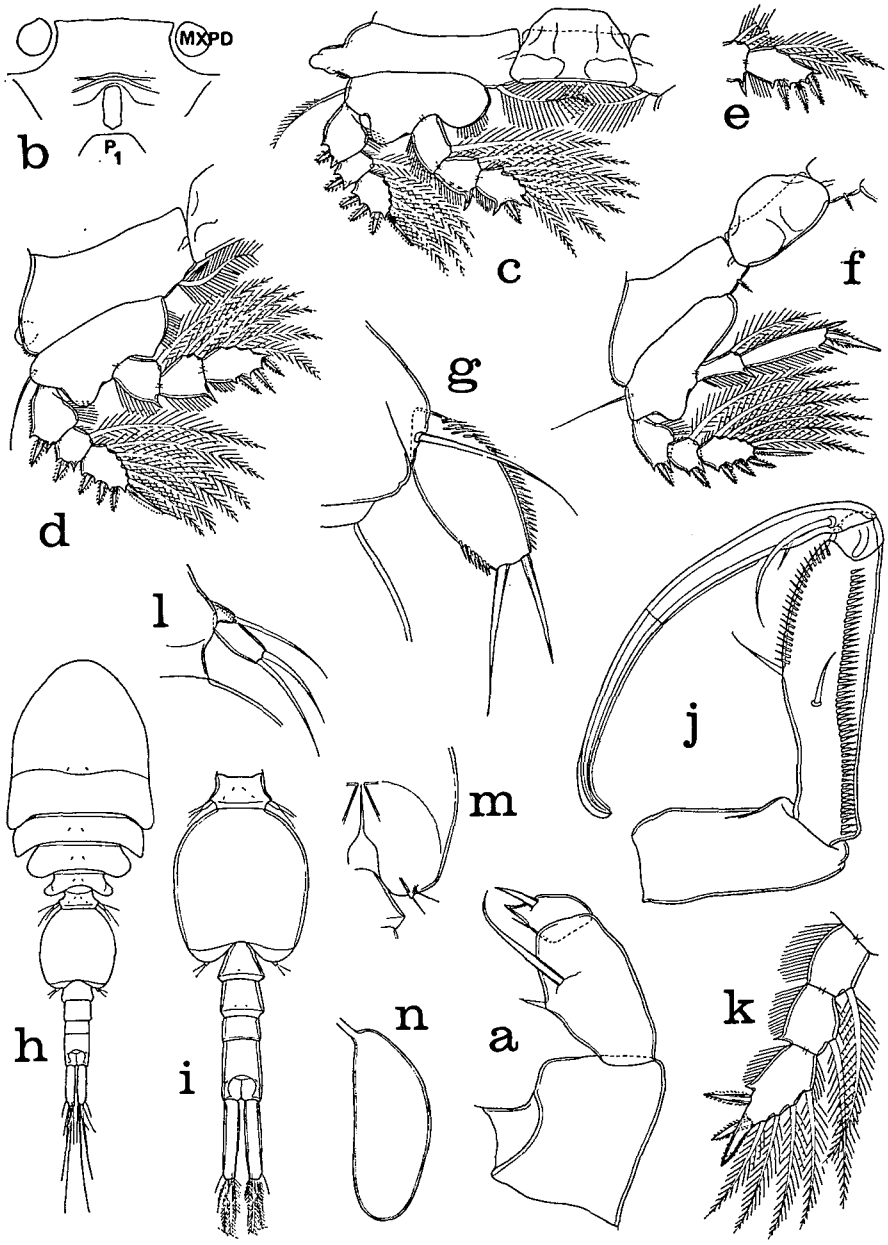

Fig. 23. *Anisomolgus ensiferus*, n. sp. Female: a, maxilliped, posterior (G); b, area between maxillipeds and first pair of legs, ventral (D); c, leg 1 and intercoxal plate, anterior (B); d, leg 2, anterior (B); e, third segment of endopod of leg 3, anterior (B); f, leg 4 and intercoxal plate, anterior (B); g, leg 5, dorsal (C). Male: h, dorsal (A); i, urosome, dorsal (D); j, maxilliped, inner (G); k, endopod of leg 1, anterior (G); l, leg 5, dorsal (C); m, leg 6, ventral (B); n, spermatophore, attached to female, dorsal (B).

outer slender naked seta 23 μm. Outer margin of first segment and both outer and inner margins of second segment haired.

Leg 5 (fig. 23g) with oval free segment 68 × 31 μm, ratio 2.19:1, bearing terminally two smooth setae 60 μm and 44 μm, and ornamented along outer margin and distal part of inner margin with spinules. Adjacent dorsal seta 65 μm and smooth.

Leg 6 represented by two setae on genital area (fig. 22c).

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

Male.- Body (fig. 23h) more slender than in female. Length 1.36 mm (1.25–1.47 mm) and greatest width 0.42 mm (0.40–0.44 mm), based on seven specimens in lactic acid. Ratio of length to width of prosome 1.61:1. Ratio of length of prosome to that of urosome 1.06:1. Difference in width of segments of legs 2 and 3 not as great as in female. Epimera of segment of leg 4 rounded, not bilobed.

Segment of leg 5 (fig. 23i) 49 × 101 μm. Genital segment 237 × 205 μm, longer than wide. Four postgenital segments from anterior to posterior 55 × 78, 55 × 70, 23 × 60, and 101 × 62 μm.

Caudal ramus resembling that of female, 125 × 23 μm, ratio 5.43:1.

Rostrum as in female. First antenna like that of female, but three aesthetes added (at points indicated by dots in fig. 22f). Second antenna with row of small spinules on second segment as in male of *Anisomolgus petalophorus*.

Labrum, mandible, paragnath, first maxilla, and second maxilla as in female. Maxilliped (fig. 23j) resembling in general form that of *Anisomolgus dissimilis*. Claw 211 μm including terminal lamella.

Ventral area between maxillipeds and first pair of legs as in female.

Legs 1–3 segmented and armed as in female, but third segment of endopod of leg 1 (fig. 23k) with I, I, 4 and with elongate terminal swordlike process.

Leg 5 (fig. 23l) with unornamented free segment 22 × 9 μm.

Leg 6 (fig. 23m) represented by posteroventral flap on genital segment bearing two smooth setae approximately 25 μm.

Spermatophore (fig. 23n) 205 × 81 μm.

Color of living specimens as in female.

Etymology.- The specific name *ensiferus*, from Latin *ensis*, a two-edged sword, and *fero*, to carry, refers to the swordlike terminal process on the third segment of the endopod of leg 1 in the male.

Remarks.- *Anisomolgus ensiferus* may be separated from all other species in the genus by its elongate caudal ramus, with a ratio of about 5:1 in the female. Congeners have ratios of 3.5:1 or less. The male of the new species may be recognized by the swordlike terminal process on the third segment of the endopod of leg 1.

Anisomolgus bicrenatus n. sp.

(figs. 24a–k, 25a–n)

Type material.- 11 ♀♀, 16 ♂♂ from *Sarcophyton ehrenbergi* Von Marenzeller, in

1 m, Isle aux Serpents, west of Pte. Denouel, near Nouméa, New Caledonia, 22° 16′52″S, 166°25′12″E, 19 July 1971. Holotype ♀, allotype, and 21 paratypes (8 ♀♀, 13 ♂♂) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.; the remaining paratypes (dissected) in the collection of the author.

Female.- Body (fig. 24a) moderately slender. Length 1.32 mm (1.17–1.46 mm) and greatest width 0.47 mm (0.44–0.51 mm), based on 10 specimens. Ratio of length to width of prosome 1.88:1. Ratio of length of prosome to that of urosome 1.68:1. Segment of leg 1 separated from head by dorsal transverse furrow. Posterior corners of epimera of segments of legs 1–4 rounded.

Segment of leg 5 (fig. 24b) 75 × 143 μm. Genital segment 169 × 133 μm, longer than wide, in dorsal view with lateral margins insected at midlength of segment and again at three-fourths length. Genital areas situated dorsolaterally just in front of middle of segment. Each area (fig. 24c) with two smooth setae 11 μm and 8 μm and spiniform process. Three postgenital segments from anterior to posterior 65 × 75, 47 × 68, and 70 × 65 μm. Posteroventral border of anal segment smooth.

Caudal ramus (fig. 24d) elongate, 78 × 26 μm, ratio 3:1. Outer lateral seta 52 μm and dorsal seta 40 μm, both smooth. Outermost terminal seta 101 μm, innermost terminal seta 164 μm, and two long median terminal setae 255 μm (outer) and 420 μm (inner), all four of these with lateral spinules. Small dorsal and ventral flanges smooth.

Body surface with very few hairs (sensilla) as in figure 24a.

Rostrum (fig. 24e) with rounded posteroventral margin.

First antenna (fig. 24f) 415 μm long. Lengths of seven segments: 49 (60 μm along anterior margin), 127, 30, 59, 52, 42, and 29 μm respectively. Formula for armature: 4, 13, 6, 3, 4+1 aesthete, 2+1 aesthete, and 7+1 aesthete. All setae smooth.

Second antenna (fig. 24g) 277 μm long, segmented and armed as in *A. sarcophyticus*. Fourth segment 88 μm along outer edge, 65 μm along inner edge, and 25 μm wide. Claw 68 μm.

Labrum (fig. 24h), mandible (fig. 24i), paragnath (fig. 24h), first maxilla (fig. 24j), second maxilla (fig. 24k), and maxilliped (fig. 25a) resembling in major respects those of *A. sarcophyticus*.

Ventral area between maxillipeds and first pair of legs as in *A. dissimilis*.

Legs 1–4 (fig. 25b, c, d, e) segmented and armed as in *A. sarcophyticus*. Leg 4 (fig. 25e) with exopod 124 μm, third segment having II, I, 5. First segment of endopod 36 × 26 μm without spiniform process, 42 μm long including process, its inner plumose seta 52 μm. Second segment 86 μm long including processes, 16 μm wide at midregion; terminally with outer naked seta 24 μm, and inner barbed spine 60 μm. Outer margins of both segments and inner margin of second segment haired.

Leg 5 (fig. 25f) with unornamented free segment 83 × 35 μm. Two terminal smooth setae 42 μm and 55 μm. Adjacent dorsal seta on body about 40 μm and smooth.

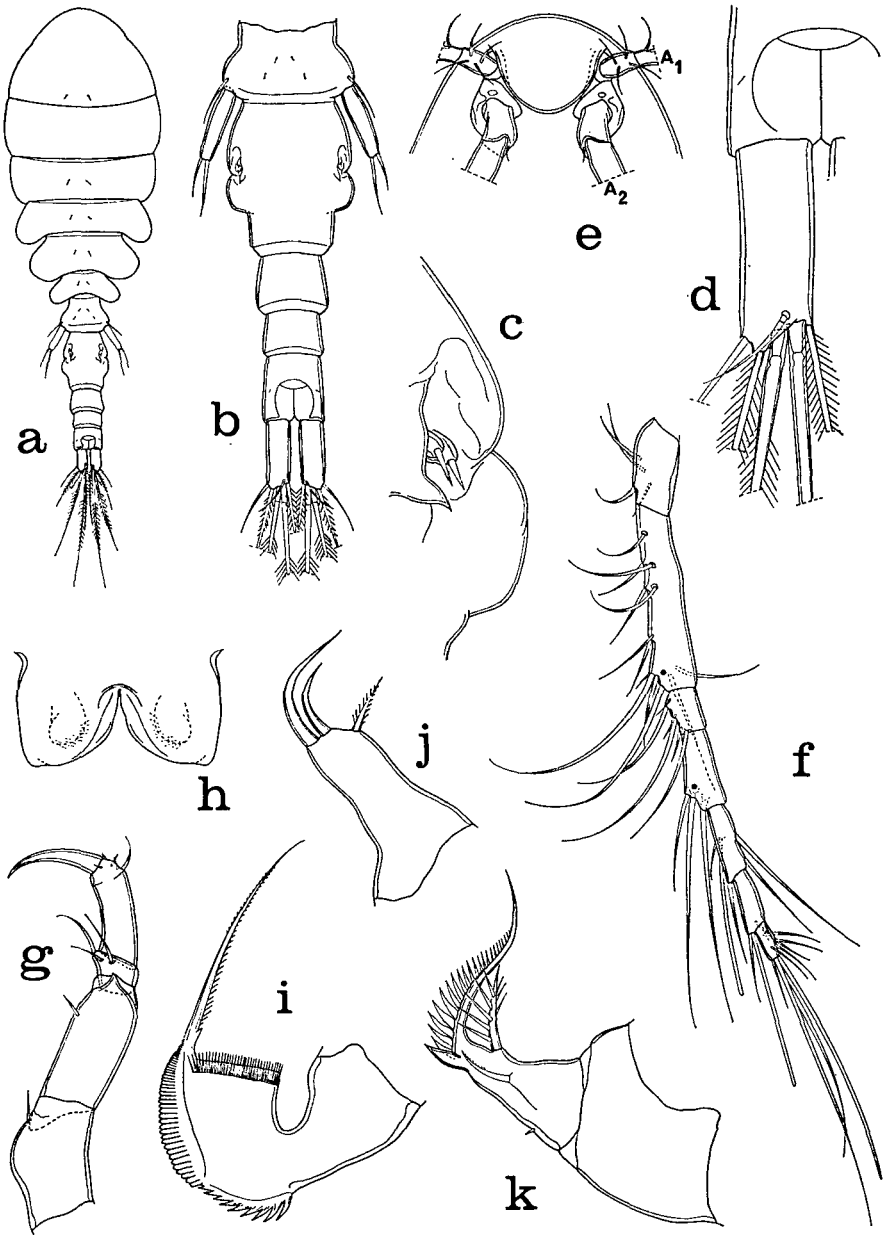

Fig. 24. *Anisomolgus bicrenatus*, n. sp., female. a, dorsal (A); b, urosome, dorsal (B); c, genital area, dorsal (F); d, caudal ramus, dorsal (C); e, rostrum, dorsal (D); f, first antenna, with dots indicating positions of aesthetes in male, dorsal (E); g, second antenna, posterior (E); h, labrum, with paragnaths indicated by broken lines, ventral (G); i, mandible, posterior (F); j, first maxilla, anterior (F); k, second maxilla, posterior (C).

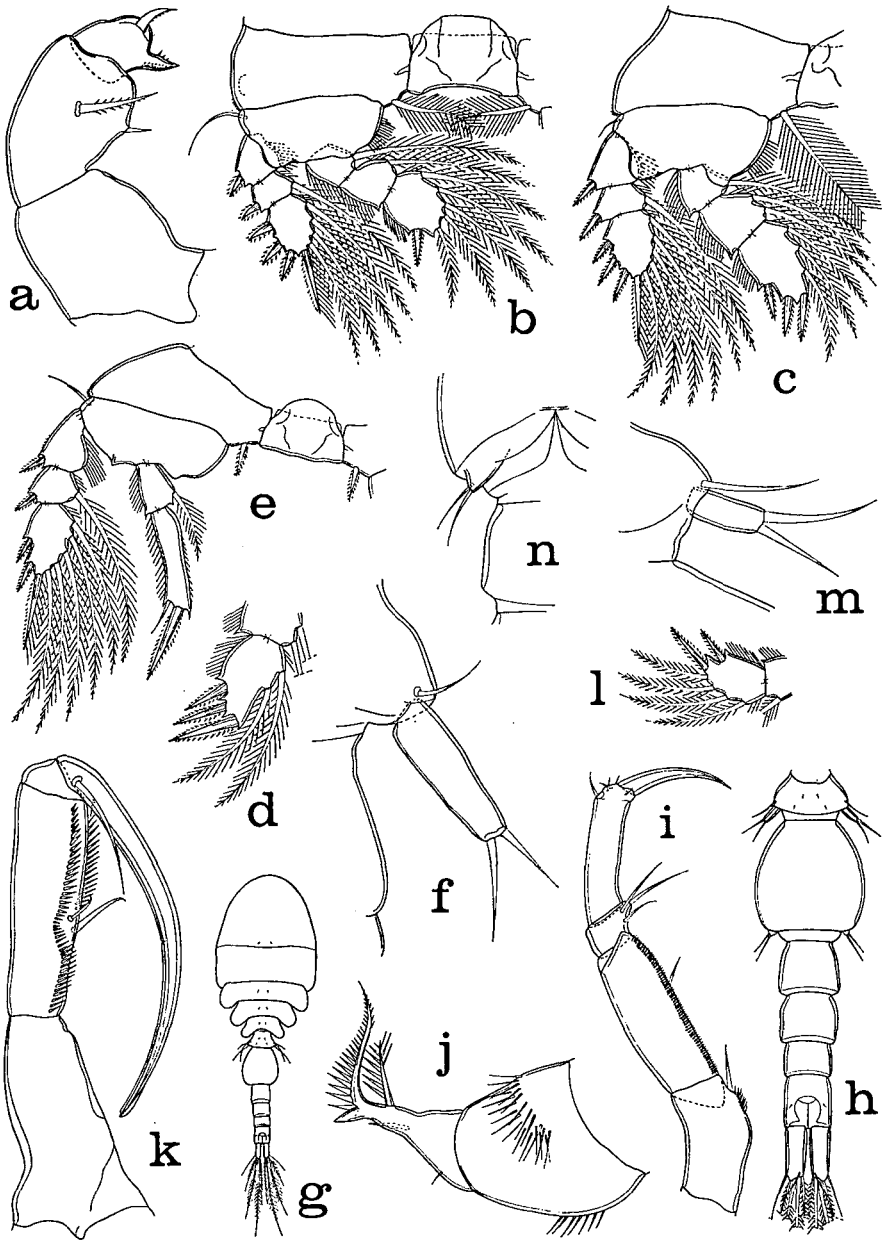

Fig. 25. *Anisomolgus bicrenatus*, n. sp. Female: a, maxilliped, posterior (C); b, leg 1 and intercoxal plate, anterior (E); c, leg 2, anterior (E); d, third segment of endopod of leg 3, anterior (E); e, leg 4 and intercoxal plate, anterior (E); f, leg 5, dorsal (G). Male: g, dorsal (A); h, urosome, dorsal (B); i, second antenna, posterior (G); j, second maxilla, anterior (C); k, maxilliped, inner (G); l, third segment of endopod of leg 1, anterior (E); m, leg 5, dorsal (F); n, leg 6, ventral (G).

Leg 6 represented by two setae on genital area (fig. 24c).

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

Male.- Body (fig. 25g) similar in form to that of female. Length 0.92 mm (0.85–1.06 mm) and greatest width 0.31 mm (0.30–0.34 mm), based on 10 specimens. Ratio of length to width of prosome 2.14:1. Ratio of length of prosome to that of urosome 1.25:1.

Segment of leg 5 (fig. 25h) 44×82 μm. Genital segment 138×120 μm, slightly longer than wide. Four postgenital segments from anterior to posterior 55×66, 52×57, 39×52, and 57×21 μm.

Caudal ramus resembling that of female, but smaller, 64×24 μm, ratio 2.67:1.

Rostrum like that of female. First antenna similar to that of female, but two short aesthetes added (at points indicated by dots in fig. 24f), so that formula is 4, 13+1 aesthete, 6, 3+1 aesthete, 4+1 aesthete, 2+1 aesthete, and 7+1 aesthete. Second antenna (fig. 25i) showing sexual dimorphism. First segment with group of small spines near seta. Second segment with inner comblike row of closely spaced spinules. Fourth segment of slightly different proportions than in female: 70 μm along outer side, 52 μm along inner side, and 16 μm wide. Claw 55 μm.

Labrum, mandible, paragnath, and first maxilla like those in female. Second maxilla (fig. 25j) sexually dimorphic, with long slender spinules on first segment. Maxilliped (fig. 25k) slender and resembling that of *A. dissimilis*. Claw 190 μm.

Ventral area between maxillipeds and first pair of legs as in female.

Legs 1–4 segmented as in female and having same armature except endopod of leg 1 (fig. 25l) with third segment having formula I, I, 4. Legs 2–4 as in female.

Leg 5 (fig. 25m) with free segment 20×8 μm.

Leg 6 (fig. 25n) consisting of posteroventral flap on genital segment bearing two smooth setae 23 μm and 26 μm.

Spermatophore not seen.

Color in living specimens as in female.

Etymology.- The specific name *bicrenatus,* from Latin *bi-*=two, *crena*=a notch, and *-atus*=pertaining to or having the nature of, alludes to the two notches on the side of the genital segment in the female.

Remarks.- Anisomolgus bicrenatus resembles *A. dissimilis* in several ways. Although these two species differ from congeners in having two lateral notches on the genital segment of the female, in *A. bicrenatus* these notches are deeper and the contour of the segment is different. *A. bicrenatus* may be further distinguished from *A. dissimilis* by its longer caudal ramus and the sexual dimorphism in the second maxilla.

Anisomolgus protentus (Humes and Frost, 1964)

Specimens collected.- From *Sarcophyton glaucum* (Quoy and Gaimard): 6 ♀♀, 5 ♂♂ from 1 colony, in 5 m, southwestern shore of Goenoeng Api, Banda Islands, 4°31′45″S, 129°51′55″E, 28 April 1975; 1 ♀, 3 ♂♂ from 1 colony, in 10 m, same locality

and date; 3 ♂♂ from 1 colony, in 5 m, southern shore of Goenoeng Api, 4°32′03″S, 129°52′30″E, 26 April 1975; 1 ♀, 3 ♂♂ from 1 colony, in 5 m, Poelau Parang, eastern Ceram, 3°17′00″S, 130°44′48″E, 23 May 1975; 2 ♀♀, 4 ♂♂ from 1 colony, in 10 m, same locality and date; 4 ♀♀, 5 ♂♂ from 1 colony, in 2 m, Pte. à la Fièvre, Nosy Bé, Madagascar, 24 May 1967; 21 ♀♀, 7 ♂♂ from 1 colony, in 3 m, Ambariotelo, near Nosy Bé, Madagascar, 6 June 1967; 7 ♂♂ from 1 colony, in 2 m, Nosy N'Tangam, near Nosy Bé, Madagascar, 24 June 1967. From *Sarcophyton trocheliophorum* Von Marenzeller: 3 ♀♀, 12 ♂♂ from 1 colony, in 2 m, western side of Isle Maître, near Nouméa, New Caledonia, 22°20′05″S, 166°24′05″E, 11 June 1971.

Remarks.- This species has been reported from *Sarcophyton globosum* Tixier-Durivault and *Sarcophyton glaucum* (Quoy and Gaimard) in Madagascar (Humes and Frost, 1964; Humes and Stock, 1973), and from *Sarcophyton elegans* Moser in New Caledonia (Humes, 1975).

Anisomolgus incisus (Humes and Ho 1968a)

Specimens collected.- 3 ♀♀ from 1 colony of *Sarcophyton ehrenbergi* Von Marenzeller, 3 m, Poelau Gomumu, south of Obi, Moluccas, 1°50′00″S, 127°30′54″E, 30 May 1975.

Remarks.- This species has been previously reported from *Sarcophyton ehrenbergi* at Nosy Bé, Madagascar (Humes and Ho, 1968a).

Key to the females of the genus *Anisomolgus*

1. Third segment of endopod of leg 4 with formula II, I, 5..... 2
   Third segment of endopod of leg 4 with formula III, I, 5..... 8
2. Caudal ramus with ratio 3:1 or more..... 3
   Caudal ramus with ratio not more than 2.03:1..... 5
3. Maxilliped with outer side of third segment swollen and membranous..... 4
   Maxilliped with outer side of third segment not swollen and membranous ..... *A. bicrenatus*
4. Free segment of leg 5 34×15 μm, ratio 2.27:1, not expanded proximally; genital segment 114×121 μm, only a little wider than long.....*A. incisus*
   Free segment of leg 5 30×22 μm or 36×23 μm, ratio 1.36:1 or 1.57:1, broadest proximally; genital segment 133×120 μm, slightly longer than wide.....*A. relativus*
5. Free segment of leg 5 at least 3:1 and unornamented..... 6
   Free segment of leg 5 not more than 2.21:1 and bearing spinules on outer surface 7
6. Genital segment with sides smoothly rounded; second segment of endopod of leg 4 with spine 35 μm and seta 25 μm.....*A. insolens*
   Genital segment with sides having two slight swellings; second segment of endopod of leg 4 with spine 62 μm and seta 19 μm.....*A. dissimilis*

7. Caudal ramus 73 × 36 μm, ratio 2.03:1; free segment of leg 5 notched on inner margin..... *A. sarcophyticus*
   Caudal ramus 44 × 43 μm, ratio 1.29:1; free segment of leg 5 without notch on inner margin..... *A. petalophorus*
8. Caudal ramus wider than long; genital segment abruptly narrowed in posterior third, forming notches in dorsal view..... *A. spinipes*
   Caudal ramus longer than wide; genital segment not abruptly narrowed in posterior third 9
9. Caudal ramus long and slender, ratio about 5:1..... *A. ensiferus*
   Caudal ramus shorter, not more than 3:1..... 10
10. Epimera of segment of leg 4 large, subauricular, and winglike; free segment of leg 5 with spinules on both anterior and posterior margins... *A. pterolobatus*
    Epimera of segment of leg 4 smaller, more or less rounded; leg 5 with spinules on anterior margin only..... 11
11. Genital segment longer than wide; second segment of first antenna without plumose setae..... *A. limbatus*
    Genital segment wider than long; segment of first antenna with four plumose setae 12
12. Genital segment in dorsal view with rounded lateral margins... *A. protentus*
    Genital segment in dorsal view with angular lateral margins..... *A. goniodes*

Paramolgus spathophorus (Humes and Ho, 1968)

Specimens collected.- From *Sarcophyton elegans* Moser: 11 ♀♀, 3 ♂♂ from 12 colonies, in 1 m, west of Isle Mando, near Nouméa, New Caledonia, 22°18′59″S, 166°09′30″E, 5 July 1971; 26 ♀♀, 3 ♂♂ from 1 colony, in 2 m, west of Isle Mando, near Nouméa, 1 July 1971. From *Sarcophyton glaucum* (Quoy and Gaimard): 3 ♀♀, 1 ♂, in 3 m, Ambariotelo, near Nosy Bé, Madagascar, 6 June 1967; 1 ♀, in 1 m, west of Isle Mando, near Nouméa, New Caledonia, 22°18′59″S, 166°09′30″E, 5 July 1971; 1 ♀ from 1 colony, in 17 m, pass between Nosy Bé and Nosy Komba, Nosy Bé, Madagascar, 16 August 1967. From *Sarcophyton acutangulum* (Von Marenzeller): 41 ♀♀, 39 ♂♂, 17 copepodids from 1 colony, exposed at low tide, Ricaudy Reef, near Nouméa, New Caledonia, 22°19′00″S, 166°26′44″E, 9 June 1971; 2 ♀♀, 3 ♂♂ from 1 colony, in 3 m, Anse Vata, Nouméa, New Caledonia, 22°18′27″S, 166°26′30″E, 7 June 1971; 1 ♀, 4 ♂♂, in 4 m, Antsamantsara, Nosy Bé, Madagascar, 9 June 1971. From *Sarcophyton stolidotum* Verseveldt: 8 ♀♀, from 1 colony, in 17 m, pass between Nosy Bé and Nosy Komba, Madagascar, 16 August 1967.

Remarks. - This species has been reported from *Sarcophyton glaucum* in Madagascar (Humes and Ho, 1968a) and from *Lobophytum crebriplicatum* Von Marenzeller in New Caledonia (Humes, 1975).

Discussion.- Copepods belonging to the genus *Anisomolgus* show a distinct preference for soft corals as hosts, particularly those of the genus *Sarcophyton*. *Anisomolgus* contains 13 species, of which 12 occur with alcyonaceans. One species,

Anisomolgus spinipes (Sewell, 1949), is known only from a single female found in "weed-washings" in the Nicobar Islands (Sewell, 1949). Among the 12 species living with soft corals ten are associated with various species of the genus *Sarcophyton* (see list below). Two species live with the soft coral genus *Lobophytum, -Anisomolgus insolens* (Humes and Ho, 1968) with *Lobophytum crassum* Von Marenzeller in Madagascar (Humes and Ho, 1968a) and the Moluccas (Humes and Dojiri, 1979) and *Anisomolgus limbatus* Humes and Dojiri, 1979, with *Lobophytum crassum* in the Moluccas (Humes and Dojiri, 1979).

Several species of copepods may be associated with a single species of *Sarcophyton*. For example, *Sarcophyton glaucum* harbors seven species of copepods in four genera (*Anisomolgus, Paradoridicola, Paramolgus,* and *Perosyna*) (see list below). Seven of the 13 species reported here occur with a single species of *Sarcophyton,* while the remaining six copepods live with 2–4 species of hosts.

The genus *Sarcophyton* extends from the Red Sea and the Indian Ocean to the Pacific Ocean. Probably copepods occur throughout the geographical ranges of the various host species, but at present collections have been made from only a few areas (Madagascar, New Caledonia, and the Moluccas). Two species of *Anisomolgus, A. protentus* and *A. sarcophyticus,* occur on *Sarcophyton* in all three areas. *Anisomolgus relativus* and *A. pterolobatus* occur both in the Moluccas and New Caledonia. *Anisomolgus dissimilis* occurs in Madagascar and New Caledonia. *Anisomolgus incisus* is known from Madagascar and the Moluccas.

Copepods and their hosts in the genus *Sarcophyton*

Anisomolgus bicrenatus	
Sarcophyton ehrenbergi	New Caledonia
Anisomolgus dissimilis	
Sarcophyton acutangulum	Madagascar, New Caledonia
Sarcophyton ehrenbergi	New Caledonia
Anisomolgus ensiferus	
Sarcophyton glaucum	New Caledonia
Anisomolgus goniodes	
Sarcophyton manifestum	New Caledonia
Sarcophyton trocheliophorum	New Caledonia
Anisomolgus incisus	
Sarcophyton ehrenbergi	Madagascar (Humes and Ho, 1968a), Moluccas
Anisomolgus petalophorus	
Sarcophyton acutangulum	New Caledonia
Anisomolgus protentus	
Sarcophyton elegans	New Caledonia (Humes, 1975)
Sarcophyton glaucum	Madagascar, Moluccas
Sarcophyton globosum	Madagascar (Humes and Frost, 1964)
Sarcophyton trocheliophorum	New Caledonia

Anisomolgus pterolobatus	
Sarcophyton elegans	New Caledonia
Sarcophyton glaucum	Moluccas
Sarcophyton implanum	New Caledonia
Anisomolgus relativus	
Sarcophyton ehrenbergi	Moluccas, New Caledonia
Anisomolgus sarcophyticus	
Sarcophyton cornuspiculatum	Madagascar
Sarcophyton elegans	New Caledonia
Sarcophyton glaucum	Moluccas, Madagascar
Sarcophyton manifestum	New Caledonia
Paradoridicola spinulatus	
Sarcophyton glaucum	Moluccas
Paramolgus spathophorus	
Sarcophyton acutangulum	Madagascar, New Caledonia
Sarcophyton elegans	New Caledonia
Sarcophyton glaucum	Madagascar (Humes and Ho, 1968a), New Caledonia
Sarcophyton stolidotum	Madagascar
Perosyna indonesica	
Sarcophyton glaucum	Moluccas

Species of *Sarcophyton* with lichomolgid copepods

Sarcophyton acutangulum	
Anisomolgus dissimilis	Madagascar, New Caledonia
Anisomolgus petalophorus	New Caledonia
Paramolgus spathophorus	Madagascar, New Caledonia
Sarcophyton cornuspiculatum	
Anisomolgus sarcophyticus	Madagascar
Sarcophyton ehrenbergi	
Anisomolgus bicrenatus	New Caledonia
Anisomolgus dissimilis	New Caledonia
Anisomolgus incisus	Madagascar (Humes and Ho, 1968a), Moluccas
Anisomolgus relativus	Moluccas, New Caledonia
Sarcophyton elegans	
Anisomolgus protentus	New Caledonia (Humes 1975)
Anisomolgus pterolobatus	New Caledonia
Anisomolgus sarcophyticus	New Caledonia
Paramolgus spathophorus	New Caledonia
Sarcophyton glaucum	
Anisomolgus ensiferus	New Caledonia
Anisomolgus protentus	Madagascar, Moluccas

Anisomolgus pterolobatus	Moluccas
Anisomolgus sarcophyticus	Moluccas, Madagascar
Paradoridicola spinulatus	Moluccas
Paramolgus spathophorus	Madagascar (Humes and Ho, 1968a), New Caledonia
Perosyna indonesica	Moluccas
Sarcophyton globosum	
Anisomolgus protentus	Madagascar (Humes and Frost, 1964)
Sarcophyton implanum	
Anisomolgus pterolobatus	New Caledonia
Sarcophyton manifestum	
Anisomolgus goniodes	New Caledonia
Anisomolgus sarcophyticus	New Caledonia
Sarcophyton stolidotum	
Paramolgus spathophorus	Madagascar
Sarcophyton trocheliophorum	
Anisomolgus goniodes	New Caledonia
Anisomolgus protentus	New Caledonia

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