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LICHOMOLGID COPEPODS OF THE GENUS *SCHEDOMOLGUS* (POECILOSTOMATOIDA) ASSOCIATED WITH THE SCLERACTINIAN CORAL *ACROPORA CYMBICYATHUS* (BROOK) IN NEW CALEDONIA

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ABSTRACT

Two poecilostomatoid copepods (Lichomolgidae) are recorded from the hard coral *Acropora cymbicyathus* in New Caledonia: *Schedomolgus tenuatus* n. sp. and *Schedomolgus lobophorus* (Humes & Ho, 1968).

INTRODUCTION

Relatively few poecilostomatoid copepods have been recorded as associates of the common shallow-water Indo-Pacific corals belonging to the genus *Acropora*. Several species of *Xarifia* have been described from species of *Acropora* (see Humes, 1985; Humes & Dojiri, 1982; Humes & Ho, 1968a). Although siphonostomes have often been collected from species in this coral genus by the author, none have as yet been identified or described. Among lichomolgids, two species of *Spaniomolgus* Humes & Stock, 1972, are known from *Acropora* (see Humes, 1979; Humes & Ho, 1968b). Localities where lichomolgids have been recorded from *Acropora* include northwestern Madagascar, New Caledonia, and Enewetak Atoll in the Marshall Islands.

MATERIALS AND METHODS

The copepods were collected by isolating the freshly collected coral in sea water in plastic

bags. Later sufficient 95% ethyl alcohol was added to make approximately a 5% solution. After thoroughly rinsing the coral, the sea water was passed through a fine net and the copepods, dislodged from the surface of the polyps, were retrieved from the sediment retained.

All measurements and dissections were made on specimens in lactic acid. The figures were drawn with the aid of a camera lucida. The letter after the explanation of each figure refer to the scale at which it was drawn. The abbreviations used are: A₁ = first antenna, A₂ = second antenna, L = labrum, MXP_D = maxilliped, and P₁ = leg 1.

Order Poecilostomatoida Thorell, 1859
Lichomolgidae Kossmann, 1877
Schedomolgus Humes & Stock, 1972

***Schedomolgus tenuatus* n. sp.**

Type material. 11 ♀♀, 20 ♂♂ from *Acropora cymbicyathus* (Brook), in 2 m, Ricaudy Reef,

near Noumea, New Caledonia, 22°19'00"S, 166°26'44"E, 25 June 1971. Holotype ♀, allotype, and 23 paratypes (6 ♀, 17 ♂) deposited in the Zoölogisch Museum, Amsterdam.

Female. Body (fig. 1a) slender. Length (not including setae on caudal rami) 1.39 mm (1.32-1.47 mm) and greatest width 0.42 mm (0.31-0.46 mm), based on 10 specimens in lactic acid. Greatest dorsoventral thickness 0.31 mm. Segment bearing leg 1 set off from cephalosome by transverse dorsal suture. Epimera of segment bearing leg 3 more expanded than other epimera. Ratio of length to width of prosome 1.70:1. Ratio of length of prosome to that of urosome 1:1. Dorsal surface of cephalosome with many small sensilla (fig. 1b).

Segment bearing leg 5 (fig. 1c) 104 × 238 μm. Genital segment longer than wide, hourglass-shaped, and slightly arched dorsoventrally (fig. 1d). Length 236 μm, greatest width of anterior part 151 μm, width at constriction 96 μm. Genital areas situated dorsoventrally. Each area (fig. 1d) with 2 very small setae. Three postgenital segments from anterior to posterior 112 × 104, 75 × 88, and 104 × 88 μm. Anal segment with row of small posterolateral ventral spinules near insertion of both caudal rami.

Caudal ramus (fig. 1e) elongate, 180 × 31 μm, ratio 5.8:1. Outer lateral seta 55 μm, dorsal seta 9 μm, outermost terminal seta 26 μm, and innermost terminal seta 34 μm, all smooth. Two median terminal setae 55 μm (outer) and 65 μm (inner), both weakly jointed and having few delicate lateral setules.

Egg sac (fig. 1f) globular, 290 × 240 μm, containing 6 or 7 eggs, each egg 120-135 μm in diameter.

Rostrum (fig. 1g) broadly linguiform, First antenna (fig. 1h) 230 μm long and 7-segmented. Lengths of segments (measured along their posterior nonsetiferous margins) as

follows: 18 (34 μm along anterior margin), 61, 17, 40, 39, 23, and 17 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. 1i) 239 μm long and 3-segmented. Both first and second segments with minute inner seta (approximately 2 μm). Third segment 60 μm long, greatest width proximally 18 μm, distinctly more slender in distal third, width here 9 μm. Terminal claw 20 μm.

Labrum (fig. 2a) with 2 broad posteroventral lobes. Mandible (fig. 2b) resembling that of congeners, with 2 very small digitiform processes on convex side of base. Paragnath small lobe. First maxilla (fig. 2c), second maxilla (fig. 2d), and maxilliped (fig. 2e) resembling in major respects those of *Schedomolgus arcuatipes* (Humes & Ho, 1968).

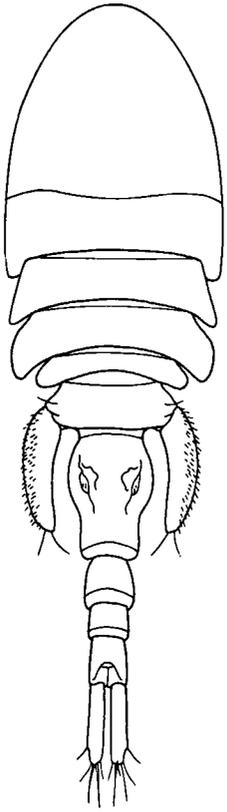
Ventral area between maxillipeds and first pair of legs (fig. 2f) very slightly protuberant.

Legs 1-4 (figs. 2g-i, 3a) with 3-segmented rami except for 2-segmented endopod of leg 4. Formula for armature as follows (Roman numerals indicating spines, Arabic numerals representing setae):

P ₁	coxa 0-1	basis 1-0	exp I-0;	I-1;	III,I,4
			enp 0-1;	0-1;	I,2,3
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 0-1;	II	

Outer seta on basis of all 4 legs minute. Spines on endopod of legs 1 and 2 hyaline except for small sclerotized proximal part. Leg 4 with inner coxal seta short, 18 μm. Exopod 169 μm. Endopod with first segment 35 × 29 μm (40 μm long including spiniform processes), plumose inner distal seta 68 μm. Second segment 60 μm (63 μm with processes),

Fig. 1a-i *Schedomolgus tenuatus* n. sp., female. a, dorsal (scale A); b, portion of surface of cephalosome, dorsal (B); c, urosome, dorsal (B); d, genital segment showing genital area, lateral (C); e, anal segment and caudal ramus, dorsal (C); f, egg sac, dorsal (D); g, rostrum, ventral (B); h, first antenna, dorsal (E); i, second antenna, outer (E).

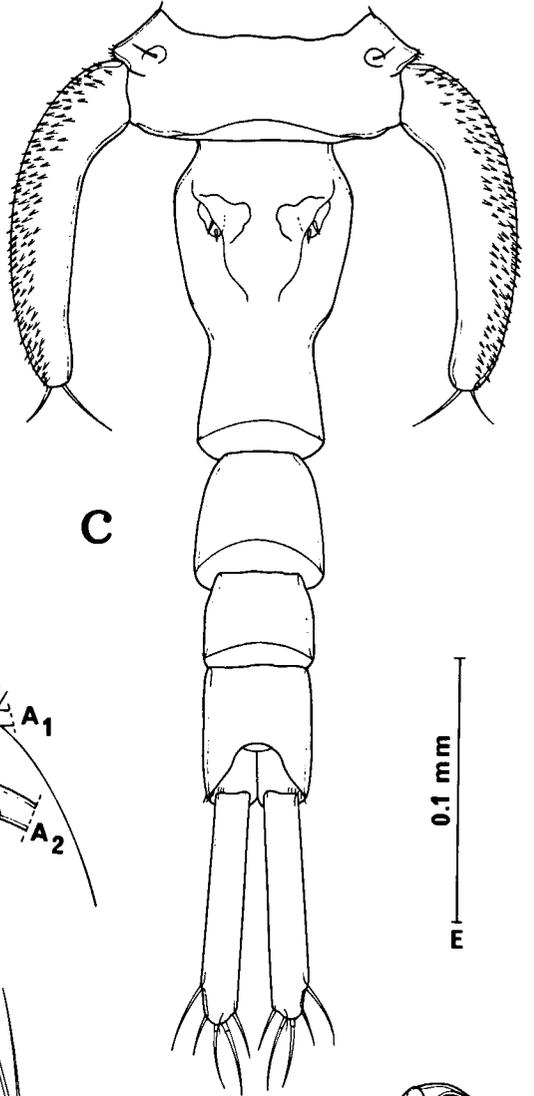


a

0.2 mm
c

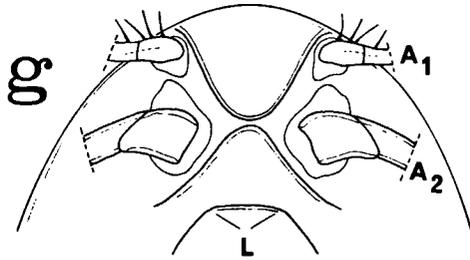


d



c

0.5 mm
A



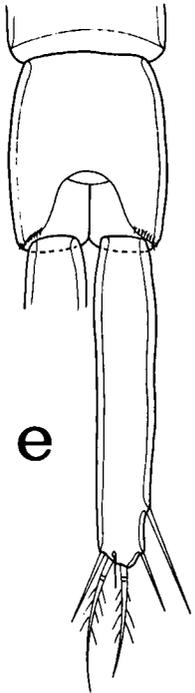
09

A₁

A₂

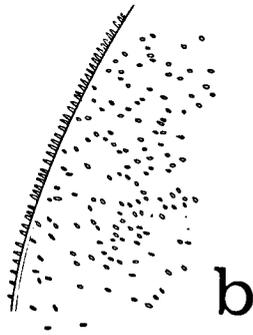
L

0.1 mm
E

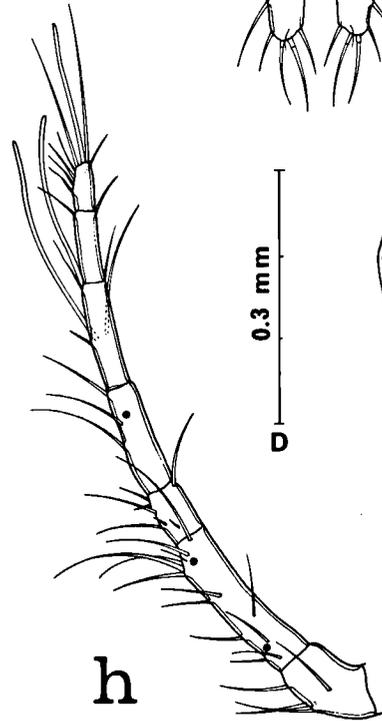


e

0.3 mm
B

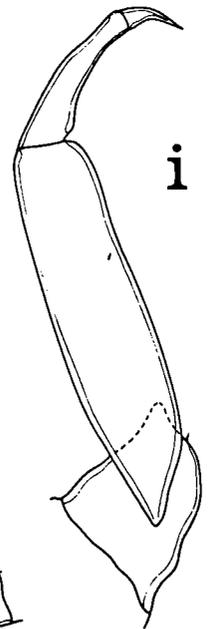


b

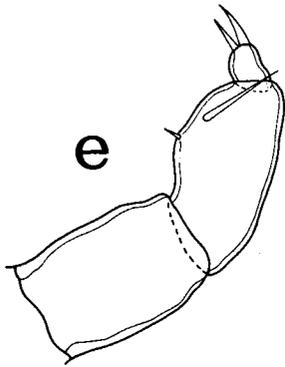
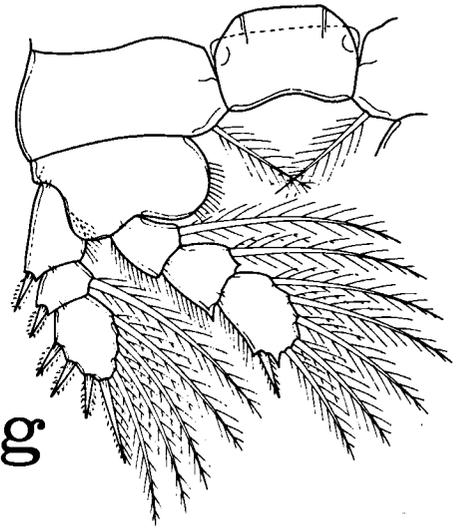
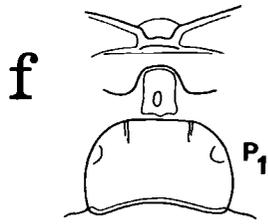
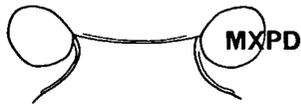
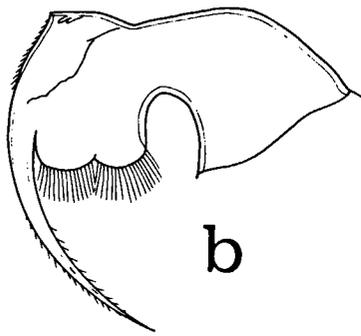


h

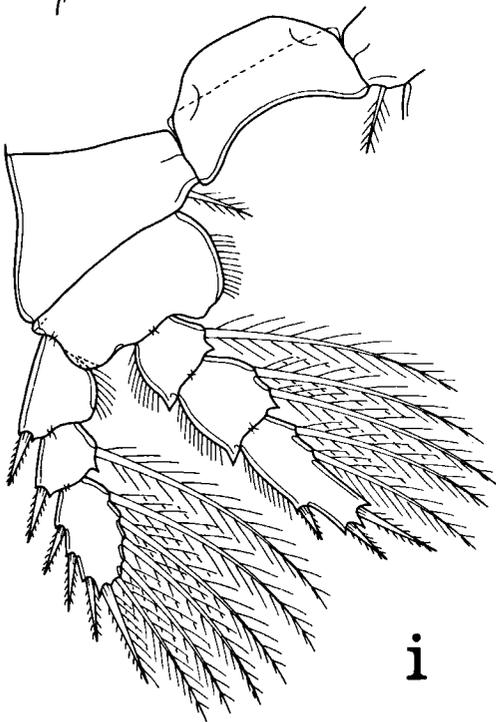
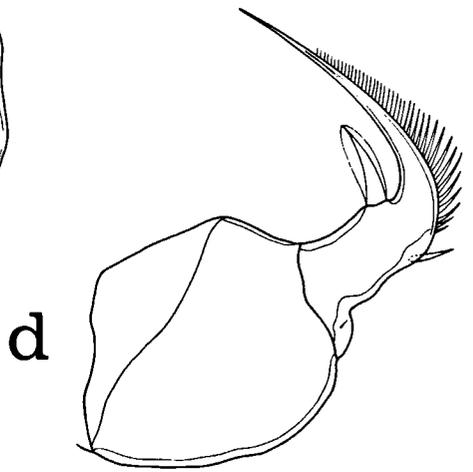
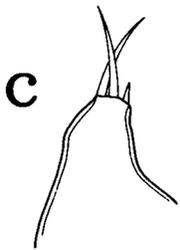
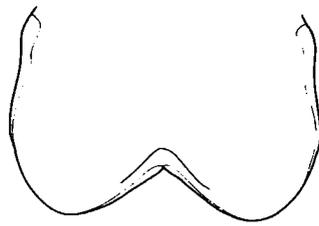
0.3 mm
D



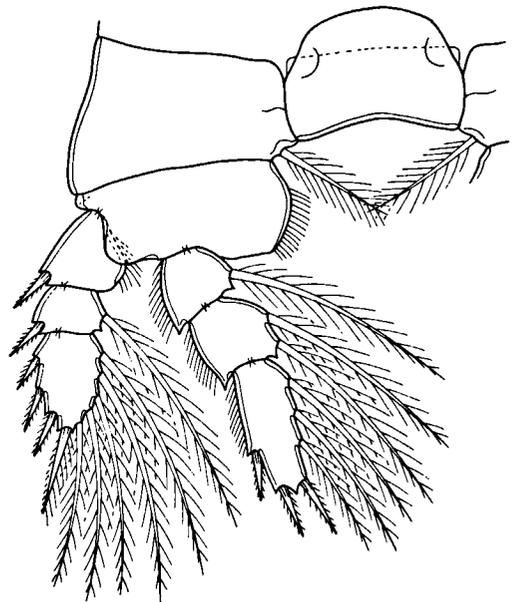
i

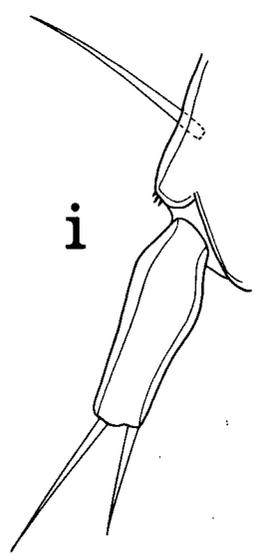
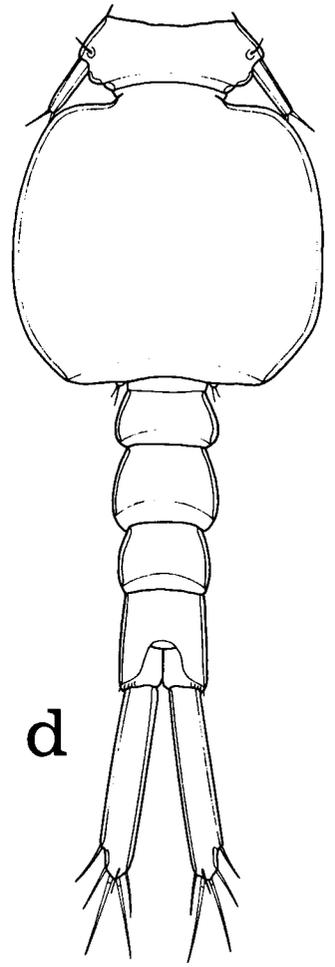
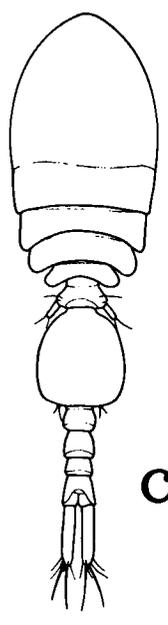
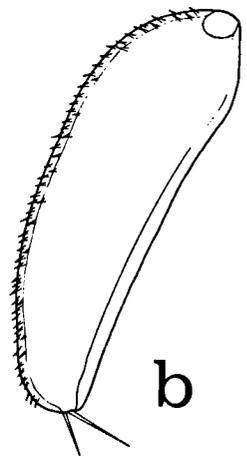
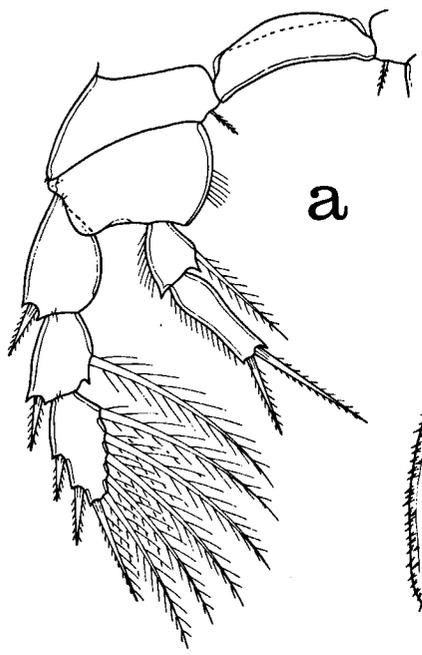


0.05 mm
G

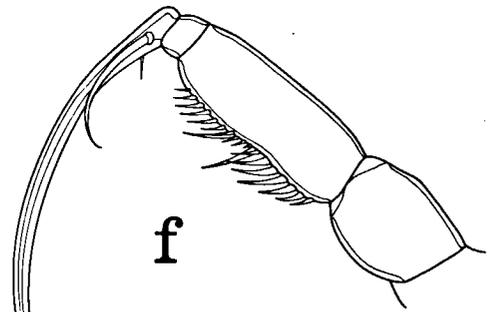
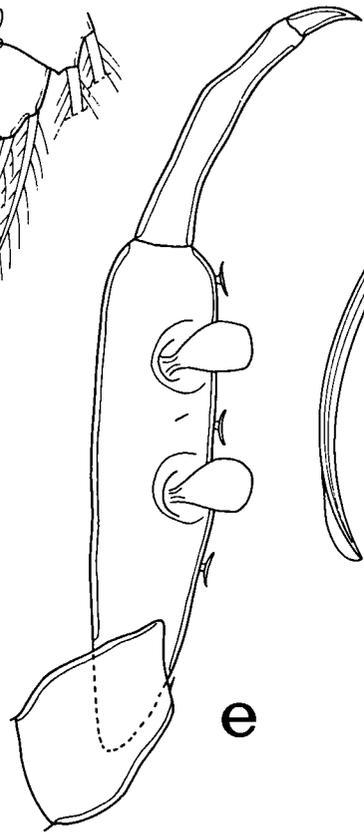


0.1 mm
F

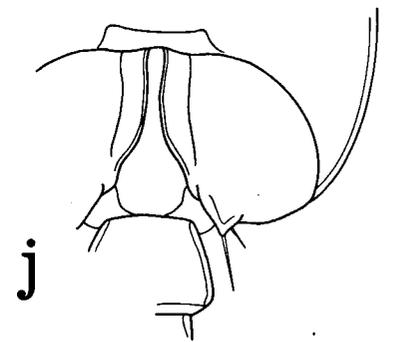
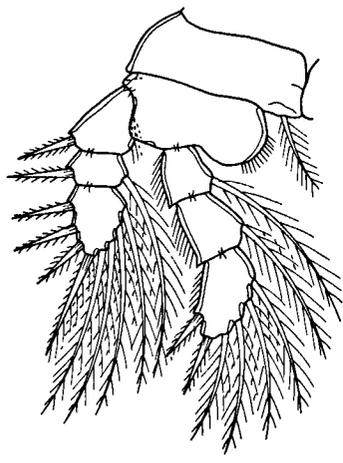




h



f



21 μm wide proximally, 14 μm wide distally. Two terminal barbed spines 44 μm (outer) and 78 μm (inner).

Leg 5 (figs. 1c, 3b) with long slightly arched free segment 260 \times 49 μm in dorsal view, but in another specimen 242 \times 43 μm in flat inner view. Two terminal setae 18 μm and 30 μm . Adjacent dorsal seta minute. Free segment ornamented with many slender spinules along outer surface.

Leg 6 represented by 2 minute setae on genital area (fig. 1d).

Color of living specimens in transmitted light slightly tan with often reddish spots ventrally in prosome, eye red, egg sacs dark gray.

Male. Body (fig. 3c) slender. Length 1.19 mm (1.02-1.33 mm) and greatest width 0.32 mm (0.28-0.36 mm), based on 10 specimens in lactic acid. Greatest dorsoventral thickness 0.28 mm. Ratio of length to width of prosome 1.88:1. Ratio of length of prosome to that of urosome 1:0.97.

Segment bearing leg 5 (fig. 3d) 52 \times 146 μm . Genital segment 226 \times 240 μm . Four postgenital segments from anterior to posterior 49 \times 79, 68 \times 77, 52 \times 68, and 78 \times 73 μm .

Caudal ramus as in female but smaller, 153 \times 28 μm , ratio 5.46:1.

Rostrum as in female. First antenna similar to that of female but 3 long 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. 3e) sexually dimorphic. Second segment with 2 balloon like hyaline processes on postero-inner surface and 3 or 4 saucer like processes borne on short stalks on inner margin.

Labrum, mandible, paragnath, first maxilla, and second maxilla like those of female. Maxilliped (fig. 3f) similar to that of congeners. Claw 230 μm long.

Legs 1-4 segmented and armed as in female, but third segment of endopod of leg 1 with I,I,4 (fig. 3g) and third segment of endopod of leg 2 (fig. 3h) with outer of 2 terminal spines modified (slightly recurved with strong spinules along outer edge). Spines on exopod of leg 1 somewhat less hyaline than in female.

Leg 5 (fig. 3i) with free segment 42 \times 13 μm in greatest dimensions. Two terminal setae 26 μm (outer) and 18 μm (inner). Adjacent dorsal seta 36 μm .

Leg 6 (fig. 3j) posteroventral flap on genital segment bearing 2 small setae 18 μm and 11 μm .

Spermatophore not seen.

Color as in female.

Etymology. — The specific name *tenuatus*, past participle of the Latin verb *tenuo*, to make slender or diminish, alludes to the distally narrowed third segment of the second antenna.

Remarks. — At present, two species have been referred to the genus *Schedomolgus*, *S. arcuatipes* (Humes & Ho, 1968) and *S. lobophorus* (Humes & Ho, 1968). Both of these congeners differ from the new species in several respects. In them (1) the genital segment of the female is subquadrate, not longer than wide and hourglass-shaped as in *S. tenuatus*; (2) the first antenna is distinctly longer than the second antenna, instead of both antennae having nearly the same length as in *S. tenuatus*; (3) the third segment of the second antenna is not narrowed distally as it is in the new species; (4) the second segment of the second antenna of the

Fig. 2a-i. *Schedomolgus tenuatus* n. sp., female. a, labrum, ventral (scale F); b, mandible, posterior (G); c, first maxilla, posterior (G); d, second maxilla, anterior (F); e, maxilliped, posterior (F); f, area between maxillipeds and first pair of legs, ventral (C); g, leg 1 and intercoxal plate, anterior (C); h, leg 2 and intercoxal plate, anterior (C); i, leg 3 and intercoxal plate, anterior (C).

Fig. 3a-j. *Schedomolgus tenuatus* n. sp. Female. a, leg 4 and intercoxal plate, anterior (scale C); b, free segment of leg 5, flat inner view (C). Male. c, dorsal (A); d, urosome, dorsal (B); e, second antenna, postero-inner (F); f, maxilliped, inner (C); g, leg 1, anterior (C); h, third segment of endopod of leg 2, anterior (E); i, leg 5, ventral (G); j, leg 6, ventral (C).

male has two small protuberances and minute knobs, instead of two balloonlike processes and several stalked saucerlike processes as in *S. tenuatus*; and (5) the spines on the third segment of the endopod of leg 2 in the male are not modified.

In addition, in *S. arcuatipes* leg 5 in the female is strongly arched, and in *S. lobophorus* the first postgenital segment of the female and the second postgenital segment of the male have a ventral lobe.

All three species of *Schedomolgus* are associated with species of *Acropora*: *S. arcuatipes* with *A. palifera* (Lamarck) in Madagascar (Humes & Ho, 1968b); *A. lobophorus* with *A. scherzeriana* Brueggemann, *A. cytherea* Dana, and *A. sp.* in Madagascar (Humes & Ho, 1968b), *A. florida* (Dana) at Enewetak Atoll in the Marshall Islands (Humes & Stock, 1973), and *A. cymbicyathus* (Brook) in New Caledonia (present paper); and *S. tenuatus* with *A. cymbicyathus* (Brook) in New Caledonia (present paper).

Schedomolgus lobophorus (Humes & Ho, 1968)

Specimens examined. — 1 ♀, 1 ♂ from *Acropora cymbicyathus* (Brook) with same collection data as *S. tenuatus* and from same host colony.

ACKNOWLEDGEMENTS

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