

QH
1
B4X
NH

pp. 491-508

12 October 1976

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

CYCLOPOID COPEPODS ASSOCIATED WITH
TRIDACNIDAE (MOLLUSCA, BIVALVIA)
IN THE MOLUCCAS

BY ARTHUR G. HUMES

*Boston University Marine Program
Marine Biological Laboratory
Woods Hole, Massachusetts 02543*



In the Indo-West Pacific several cyclopid copepods are associated with large tridacnid bivalves belonging to the genera *Tridacna* and *Hippopus*. Members of the copepod genera *Anthessius* and *Lichomolgus* live in the mantle cavity of these bivalves, while *Paclabius*, according to Kossmann (1877), inhabits the pericardium. Records of copepod associates of Tridacnidae, including the new information given below, are as follows:

Anthessius solidus Humes and Stock, 1965

from <i>Tridacna squamosa</i>	Madagascar	Humes and Stock
Lamarck		(1965)
	Eniwetok Atoll	Humes (1972)

Anthessius amicalis Humes and Stock, 1965

from <i>Tridacna squamosa</i>	Madagascar	Humes and Stock
		(1965)
	Eniwetok Atoll	Humes (1972)
	New Caledonia	Humes (1973)
from <i>Tridacna elongata</i>	Red Sea	Humes and Stock
Lamarck		(1965)

from <i>Tridacna maxima</i>	New Caledonia	Humes (1973)
(Röding)		

from <i>Hippopus hippopus</i>	Eniwetok Atoll	Humes (1972)
(Linnaeus)		

Anthessius alatus Humes and Stock, 1965

from <i>Tridacna noae</i>	Red Sea	Humes and Stock
(Röding)		(1965)

from <i>Tridacna squamosa</i>	Madagascar	Humes and Stock (1965)
	Eniwetok Atoll	Humes (1972)
	New Caledonia	Humes (1973)
	Moluccas	present paper
from <i>Tridacna maxima</i>	New Caledonia	Humes (1973)
	Eniwetok Atoll	Humes (1972)
from <i>Tridacna gigas</i> (Linnaeus)	Eniwetok Atoll	Humes (1972)
<i>Anthessius discipedatus</i> new species		
from <i>Hippopus hippopus</i>	Moluccas	present paper
<i>Lichomolgus tridacnae</i> Humes, 1972		
from <i>Tridacna gigas</i>	Eniwetok Atoll	Humes (1972)
from <i>Tridacna squamosa</i>	Eniwetok Atoll	Humes (1972)
from <i>Hippopus hippopus</i>	Moluccas	present paper
<i>Lichomolgus hippopi</i> new species		
from <i>Hippopus hippopus</i>	Moluccas	present paper
<i>Paclabius tumidus</i> Kossmann, 1877		
from <i>Tridacna</i> sp.	Philippine Islands	Kossmann (1877)
from <i>Tridacna squamosa</i>	New Caledonia	Humes (1973)

Immediately after collection the Moluccan tridacnids were isolated individually in containers of sea water. Sufficient 95 percent ethyl alcohol was added to make a solution of about 5 percent. The adductor muscles were cut and the mantle cavity rinsed thoroughly. The sediment obtained was then strained through a fine net (mesh 74 holes per inch) and the copepods removed.

The observations and measurements of the two new species were made on specimens cleared in lactic acid. All figures were drawn with the aid of a camera lucida. The letter after the explanation of each figure refers to the scale at which it was drawn. The abbreviations used are: A₁ = first antenna, A₂ = second antenna, L = labrum, MXP₁ = maxilliped, and P₁ = leg 1.

The specimens were collected by the author during the ALPHA HELIX East Asian Bioluminescence Expedition which was supported by the National Science Foundation under grants OFS 74 01830 and OFS 74 02888 to the Scripps Institution of Oceanography and NSF grant BMS 74 23242 to the University of California, Santa Barbara.

I am indebted to Dr. Kenneth J. Boss, Museum of Compara-

tive Zoology, Harvard University, for the identification of the bivalve hosts.

MYICOLIDAE Yamaguti, 1936

Anthessius discipedatus, new species

Figures 1-24

Type material: 2 ♀♀, 6 ♂♂ from one bivalve, *Hippopus hippopus* (Linnaeus), length 26 cm, in 3 m, Gomumu Island, south of Obi, Moluccas, 1°50'00"S, 127°30'54"E, 30 May 1975. Holotype ♀, allotype, and 4 paratype ♂♂ deposited in the National Museum of Natural History (USNM), Washington; the remaining paratypes (dissected) in the collection of the author.

Female: Body (Fig. 1) similar in general shape to the three species of *Anthessius* from *Tridacna* described by Humes and Stock, 1965. Length (not including the setae on the caudal rami) 1.46 mm (1.39–1.54 mm) and the greatest width 0.61 mm (0.58–0.64 mm), based on 2 specimens in lactic acid. Prosoma moderately flattened, with the cephalosome slightly indented near the level of the maxillipeds. Epimeral areas pronounced and rounded. Segment bearing leg 1 separated incompletely from the head by a transverse dorsal furrow. Ratio of the length to the width of the prosoma 1.52:1. Ratio of the length of the prosoma to that of the urosome 1.70:1.

Segment of leg 5 (Fig. 2) $120 \times 348 \mu\text{m}$. Genital segment $198 \times 292 \mu\text{m}$, tapered in its posterior half. Genital areas located laterally on the midregion of the segment. Each area (Fig. 3) with 2 small naked setae approximately $10 \mu\text{m}$ long. Three postgenital segments from anterior to posterior 86×156 , 73×143 , and 83 (114 in middle length) $\times 140 \mu\text{m}$. Genital and first 2 postgenital segments ventrally with a row of delicate spinules along the posterior border. Anal segment with a pair of ventral crescentic groups of 6–8 spines anteriorly (Fig. 4) and with a posteroventral row of minute spinules on either side near the caudal ramus.

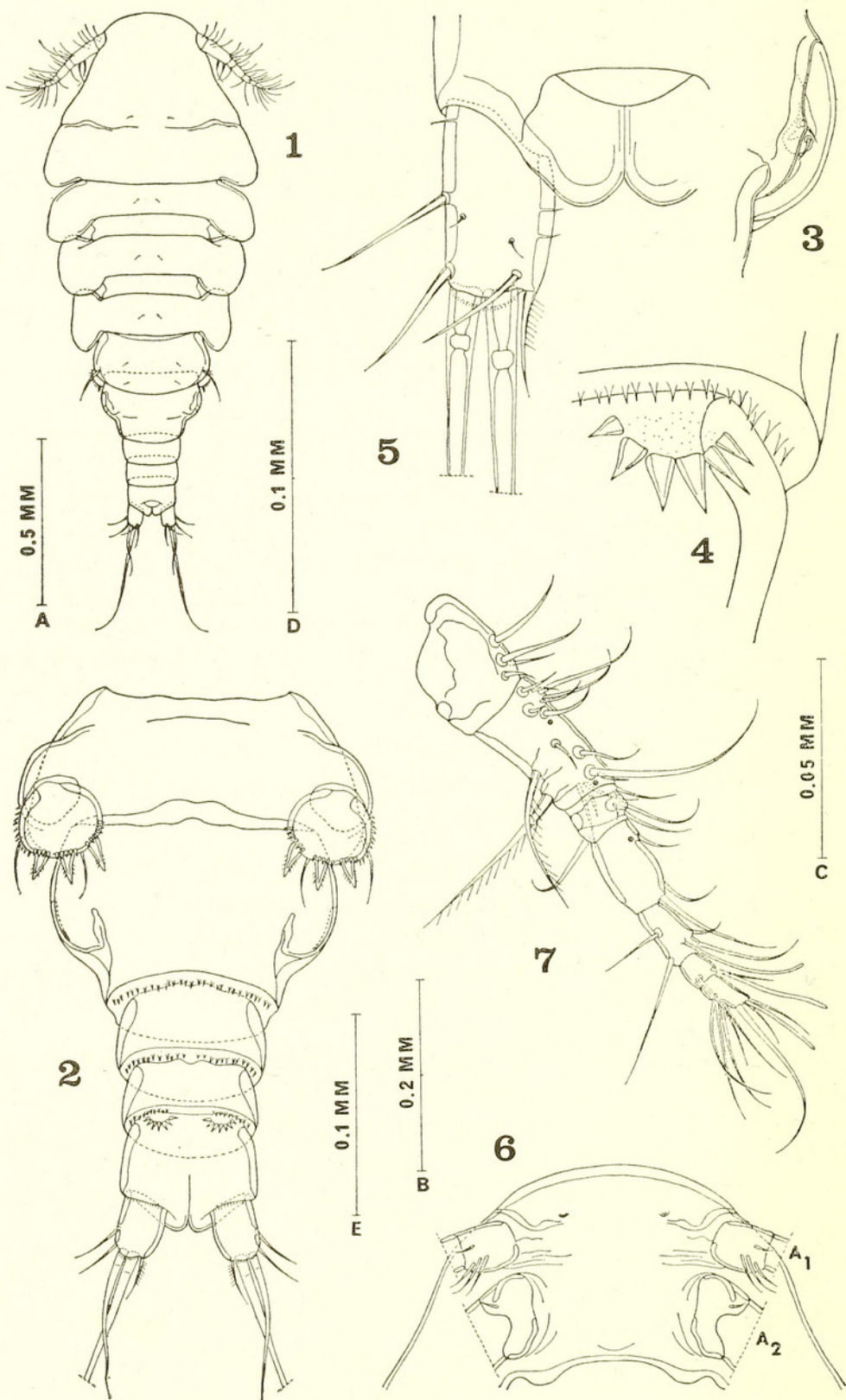
Caudal ramus (Fig. 5) $68 \times 39 \mu\text{m}$, ratio of length to width 1.74:1. Outer lateral seta $52 \mu\text{m}$, dorsal seta $42 \mu\text{m}$, and outermost terminal seta $47 \mu\text{m}$, all naked. Innermost terminal seta $39 \mu\text{m}$ with hairs along the inner margin. Two median naked terminal setae $170 \mu\text{m}$ (outer) and $385 \mu\text{m}$ (inner), both inserted between small dorsal (smooth) and ventral (with a marginal row of very small spinules) flanges.

Body surface with a few hairs (sensilla) as shown in Figure 1.

Egg sac unknown.

Rostrum (Fig. 6) weakly developed.

First antenna (Fig. 7) $242 \mu\text{m}$ long. Lengths of the 7 segments (measured along their posterior margins): 21 ($55 \mu\text{m}$ along the anterior margin), 58, 21, 42, 34, 14, and $18 \mu\text{m}$ respectively. Formula: 4, 15 ($7 + 8$), 6, 3, 4 + 1 aesthete, 2 + 1 aesthete, and 7 + 1 aesthete. All



setae naked except 2 large setae on segment 2 which are feathered along one side.

Second antenna (Fig. 8) 213 μm long including the claws. Each of the first two segments with a small naked seta. Third segment with 3 setae, two of them lightly barbed, and a stout spine. Area representing the fourth segment fused with the third segment and bearing 4 large jointed claws, 2 large barbed setae, and a small naked seta.

Labrum (Fig. 9) with 2 broad posteroventral lobes. Each lobe ornamented on its distal outer margin with a row of small teeth followed by a large spiniform process, and on its inner medial margin by a conical process with a truncated hyaline tip.

Mandible (Fig. 10) slender, resembling in general form that of other *Anthessius* species. Two spines near the base of the apical lash bifurcated (Fig. 11). Between the apical lash and the opposing long setiform element 2 unequal hyaline lobes. Paragnath a small lobe (Fig. 9). First maxilla (Fig. 12), second maxilla, and maxilliped resembling in general form those of other *Anthessius* species.

Ventral area between the maxillipeds and the first pair of legs (Fig. 15) not protuberant.

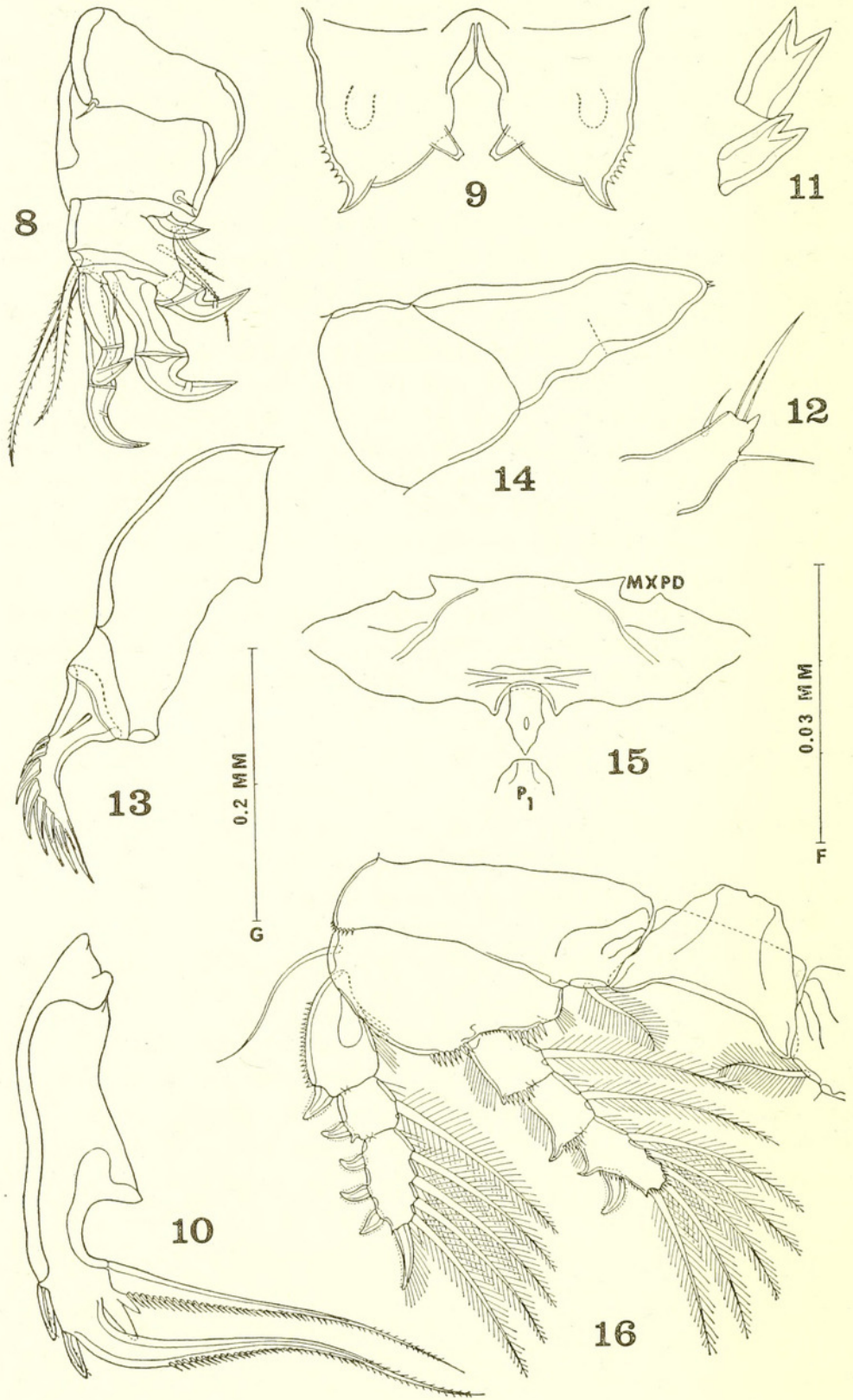
Legs 1-4 segmented as in other *Anthessius* species. Third segment of the exopod of leg 4 with the formula III, I, 5. Spine and setal formula as follows (Roman numerals representing spines, Arabic numerals indicating setae):

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;	III, 3
P ₃	coxa	0-1	basis	1-0	exp	I-0;	I-1;	III, I, 5
					enp	0-1;	0-2;	IV, 2
P ₄	coxa	0-1	basis	1-0	exp	I-0;	I-1;	III, I, 5
					enp	0-1;	0-2;	IV, 1

Leg 5 (Fig. 20) carried ventrally and largely hidden in dorsal view. Free segment discoid, 70 \times 83 μm , slightly wider than long. Usual 4 elements consisting of 3 stout barbed spines (21, 26, and 31 μm from outer to inner) and a slender naked seta 33 μm . Margin of the segment ornamented with stout spinules. Dorsal seta 38 μm and naked.

←

FIGS. 1-7. *Anthessius discipedatus* new species, female: 1, Dorsal (A); 2, Urosome, ventral (B); 3, Genital area, dorsal (C); 4, Group of spines on anal segment, ventral (C); 5, Caudal ramus, dorsal (D); 6, Rostral area, ventral (B); 7, First antenna, with 3 dots indicating positions of aesthetes added in the male, ventral (E).



Leg 6 represented by the 2 small setae on the genital area (Fig. 3).

Living specimens in transmitted light slightly opaque, the eye red.

Male: Body (Fig. 21) resembling that of the female. Length (excluding the setae on the caudal rami) 1.28 mm (1.25–1.31 mm) and the greatest width 0.50 mm (0.48–0.51 mm), based on 6 specimens in lactic acid. Ratio of the length to the width of the prosome 1.63:1. Ratio of the length of the prosome to that of the urosome 1.50:1.

Segment of leg 5 (Fig. 22) $78 \times 280 \mu\text{m}$. Genital segment $177 \times 263 \mu\text{m}$ (length including leg 6). Four postgenital segments from anterior to posterior 62×178 , 65×159 , 60×143 , and $68 \times 135 \mu\text{m}$. Crescentic groups of spines on ventral surface of anal segment with 7–10 spines.

Caudal ramus similar to that of the female, but smaller, $60 \times 42 \mu\text{m}$, ratio 1.43:1.

Body surface ornamented as in the female.

Rostrum like that of the female. First antenna resembling that of the female but 3 aesthetes added, 2 on the second segment and one on the fourth segment, their positions indicated by small dots in Figure 7, so that the formula is: 4, 15 + 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 as in the female. Maxilliped (Fig. 23) 4-segmented, assuming that the proximal part of the claw represents a modified fourth segment. First segment with a distal postero-inner row of spinules. Second segment with 2 small naked setae and several groups of spines. Small third segment with a finely barbed seta and a spiniform process. Claw (Fig. 24) $139 \mu\text{m}$ along its axis, with a small proximal seta and a distal anterior surficial row of small blunt spinules.

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

Legs 1–4 like those of the female.

Leg 5 (Fig. 22) resembling that of the female. Free segment $62 \times 65 \mu\text{m}$.

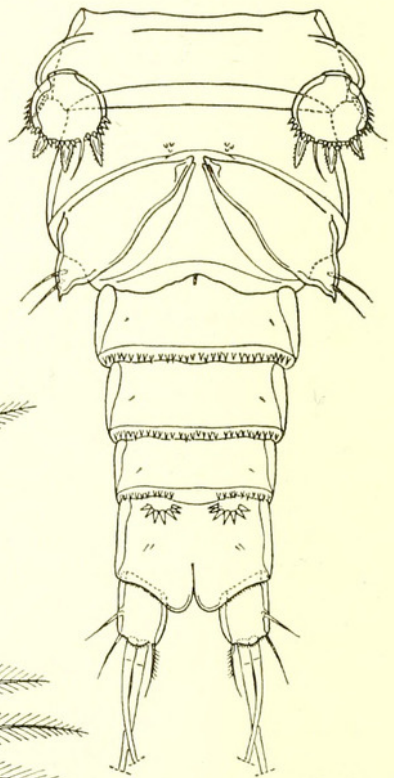
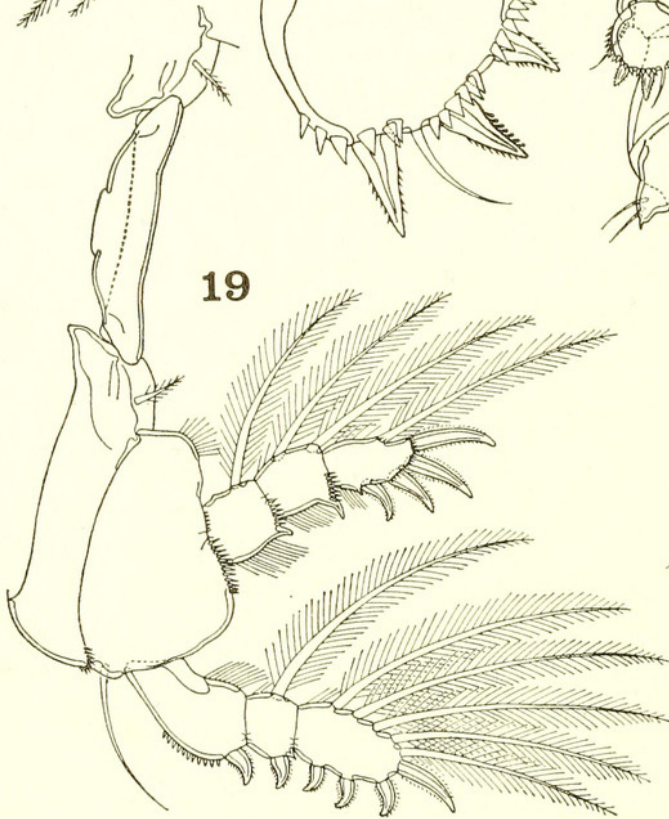
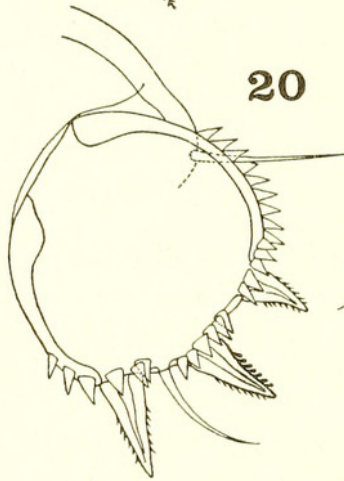
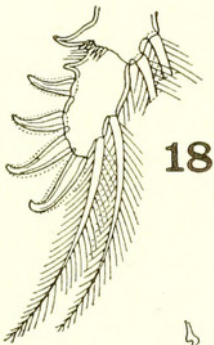
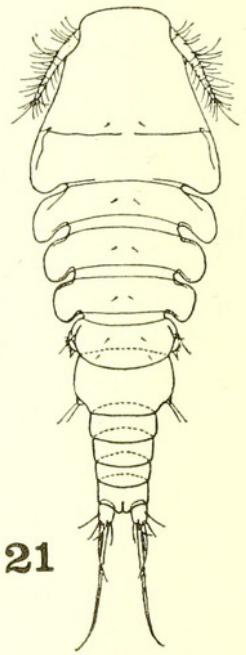
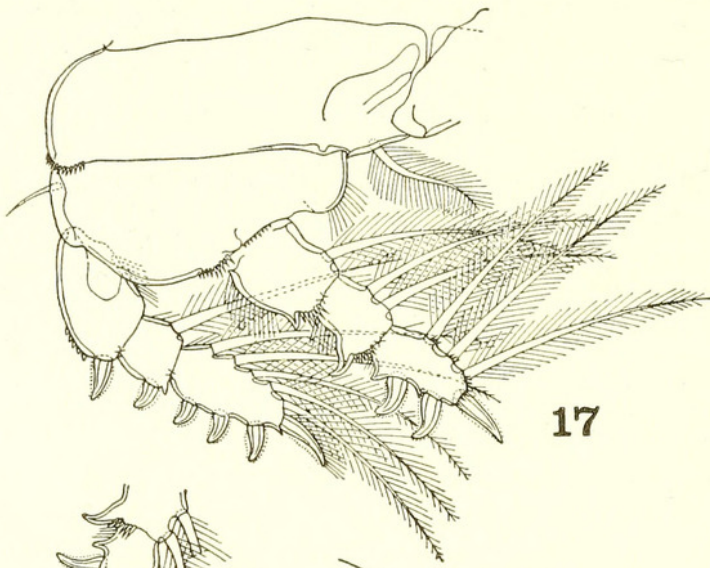
Leg 6 (Fig. 22) a posteroventral flap on the genital segment bearing 2 naked setae $40 \mu\text{m}$ and $35 \mu\text{m}$.

Spermatophore not seen.

Color as in the female.

←

FIGS. 8–16. *Anthessius discipedatus* new species, female: 8, Second antenna, antero-inner (E); 9, Labrum, with position of paragnaths indicated by broken lines, ventral (D); 10, Mandible, anterior (C); 11, Two spines on mandible near base of apical lash, ventral (F); 12, First maxilla, posterior (C); 13, Second maxilla, posterior (C); 14, Maxilliped, inner (C); 15, Area between maxillipeds and first pair of legs, ventral (G); 16, Leg 1 and intercoxal plate, anterior (E).



Etymology: The specific name *discipedatus*, from Latin *discus* = a disk or plate and *pedatus* = provided with feet, alludes to the discoid form of leg 5.

Comparison with other species: In the genus *Anthessius* 32 species are recognized (not including the new species described here). Twenty-three were listed by Stock, Humes, and Gooding (1963). Since then 9 more have been described: *A. saecularis* Stock, 1964, *A. solidus* Humes and Stock, 1965, *A. amicalis* Humes and Stock, 1965, *A. alatus* Humes and Stock, 1965, *A. dolabellae* Humes and Ho, 1965, *A. stylocheili* Humes and Ho, 1965, *A. distensus* Humes and Ho, 1965, *A. mytilicolus* Reddiah, 1966, and *A. pinctadae* Humes, 1973.

Three features of *A. discipedatus* are distinctive and serve as useful recognition characters, since in no other species in the genus, as far as known, are all 3 of these features present. In the first place, the discoid free segment is not found elsewhere, although the fifth legs of *A. amicalis* approach the discoidal form, especially in the male. Secondly, the ornamented labrum is unique, although it should be stated that the form of the labrum is unknown in half the species described. Thirdly, one of the 4 subterminal elements on the third segment of the second antenna is a strong stout spine. In the 3 species from *Tridacna* (*A. solidus*, *A. amicalis*, and *A. alatus*) one of these elements is a very weak spine. In all other species, as far as known, all 4 elements are setae.

The new species shows 2 features characteristic of other *Anthessius* associated with *Tridacnidae* (*A. solidus*, *A. amicalis*, and *A. alatus*): 1) the indentation of the cephalosome near the level of the maxillipedes and 2) the development of the epimeral areas on the prosome.

Anthessius alatus Humes and Stock, 1965

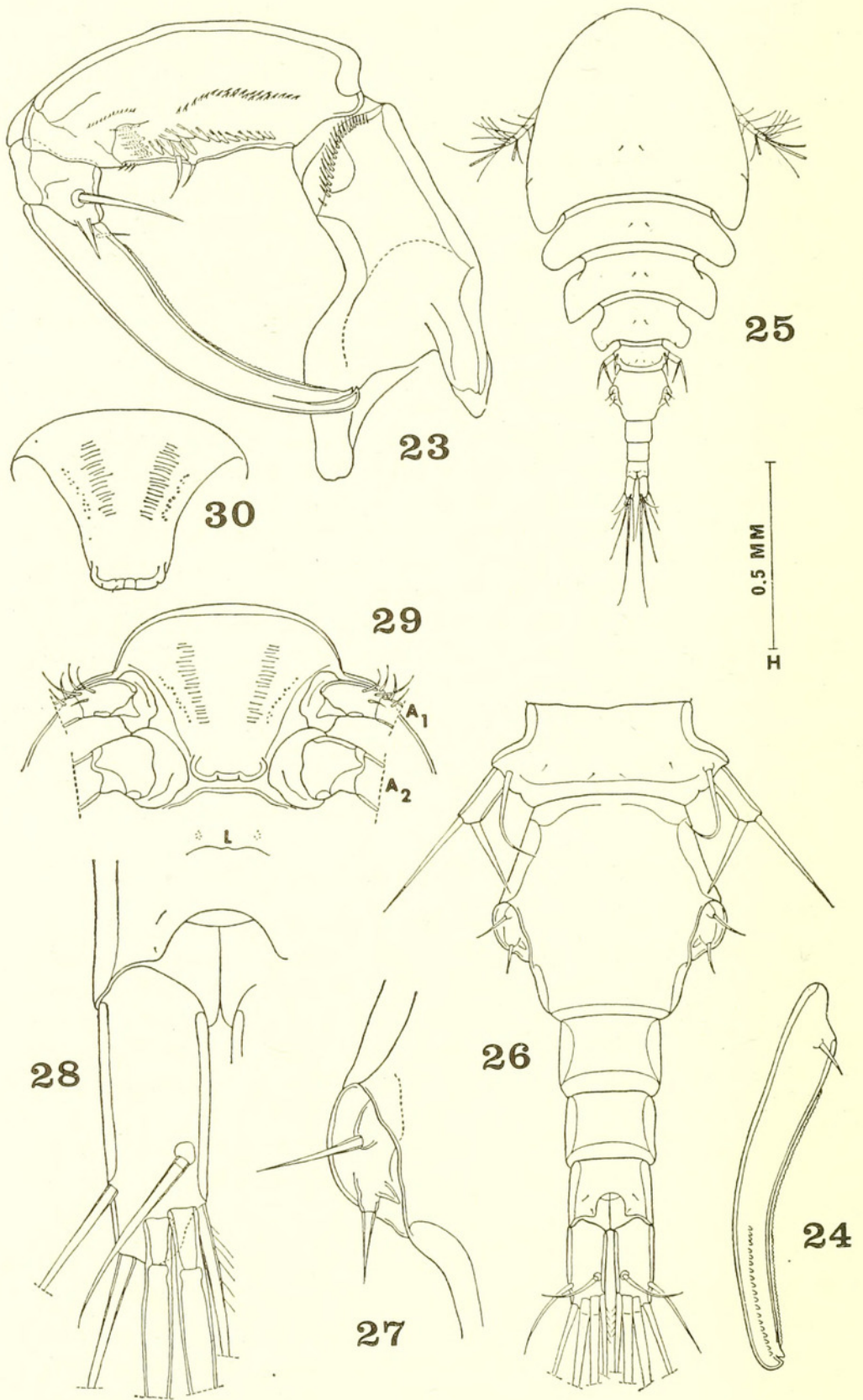
This copepod has been reported from *Tridacna noae* (Röding) in the Red Sea (Humes and Stock, 1965), from *Tridacna squamosa* Lamarck in Madagascar (Humes and Stock, 1965), at Eniwetok Atoll (Humes, 1972), and in New Caledonia (Humes, 1973), from *Tridacna maxima* (Röding) at Eniwetok Atoll (Humes, 1972) and in New Caledonia (Humes, 1973), and from *Tridacna gigas* (Linnaeus) at Eniwetok Atoll (Humes, 1972).

Specimens collected: From *Tridacna squamosa*: 4 ♀♀, 5 ♂♂, 4 copepodids from one host, length 14 cm, in 10 m, southern shore of

←

FIGS. 17-20. *Anthessius discipedatus* new species, female: 17, Leg 2, anterior (E); 18, Third segment of endopod of leg 3, anterior (E); 19, Leg 4 and intercoxal plate, anterior (E); 20, Leg 5, ventral (D).

FIGS. 21-22. *Anthessius discipedatus* new species, male: 21, Dorsal (A); 22, Urosome, ventral (B).



Goenoeng Api, Banda Islands, Moluccas, 4°32'05"S, 129°52'30"E, 26 April 1975; 2 ♀♀, 3 ♂♂, 4 copepodids from one host, length 12 cm, in 10 m, southwestern shore of Goenoeng Api, Banda Islands, 4°31'24"S, 129°51'55"E, 28 April 1975; 6 ♀♀, 4 ♂♂, 2 copepodids from one host, length 11 cm, in 3 m, Gomumu Island, south of Obi, Moluccas, 1°50'00"S, 127°30'54"E, 30 May 1975.

LICHOMOLGIDAE Kossmann, 1877

Lichomolgus hippopi, new species

Figures 25–51

Type material: 11 ♀♀, 11 ♂♂ from one bivalve, *Hippopus hippopus* (Linnaeus), length 26 cm, in 3 m, Gomumu Island, south of Obi, Moluccas, 1°50'00"S, 127°30'54"E, 30 May 1975. Holotype ♀, allotype, 17 paratypes (8 ♀♀, 9 ♂♂) deposited in the National Museum of Natural History (USNM), Washington; the remaining paratypes (dissected) in the collection of the author.

Female: Body (Fig. 25) with the prosome moderately expanded. Length (excluding the setae on the caudal rami) 1.29 mm (1.22–1.35 mm) and the greatest width 0.60 mm (0.56–0.64 mm), based on 10 specimens in lactic acid. Segment of leg 1 incompletely separated from the head in dorsal view. Ratio of the length to the width of the prosome 1.52:1. Ratio of the length of the prosome to that of the urosome 2.24:1.

Segment of leg 5 (Fig. 26) $70 \times 169 \mu\text{m}$. Between this segment and the genital segment no ventral sclerite. Genital segment $146 \times 166 \mu\text{m}$, a little wider than long, in dorsal view broadest in the midregion. Genital areas located at the widest part of the segment. Each area (Fig. 27) bearing 2 naked setae 33 and 22 μm and a small dentiform process. Three postgenital segments from anterior to posterior 52×75 , 44×66 , $42 \times 60 \mu\text{m}$. Anal segment with a smooth posteroventral margin.

Caudal ramus (Fig. 28) $66 \times 27 \mu\text{m}$, about 2.44 times longer than wide. Outer lateral seta 73 μm , the dorsal seta 47 μm , the outermost terminal seta 86 μm , the innermost terminal seta 112 μm , and the 2 long median terminal setae 208 μm (outer) and 355 μm (inner), both inserted dorsally to a small ventral flange with a smooth margin. All setae naked except the innermost terminal seta which has a few proximal inner hairs.

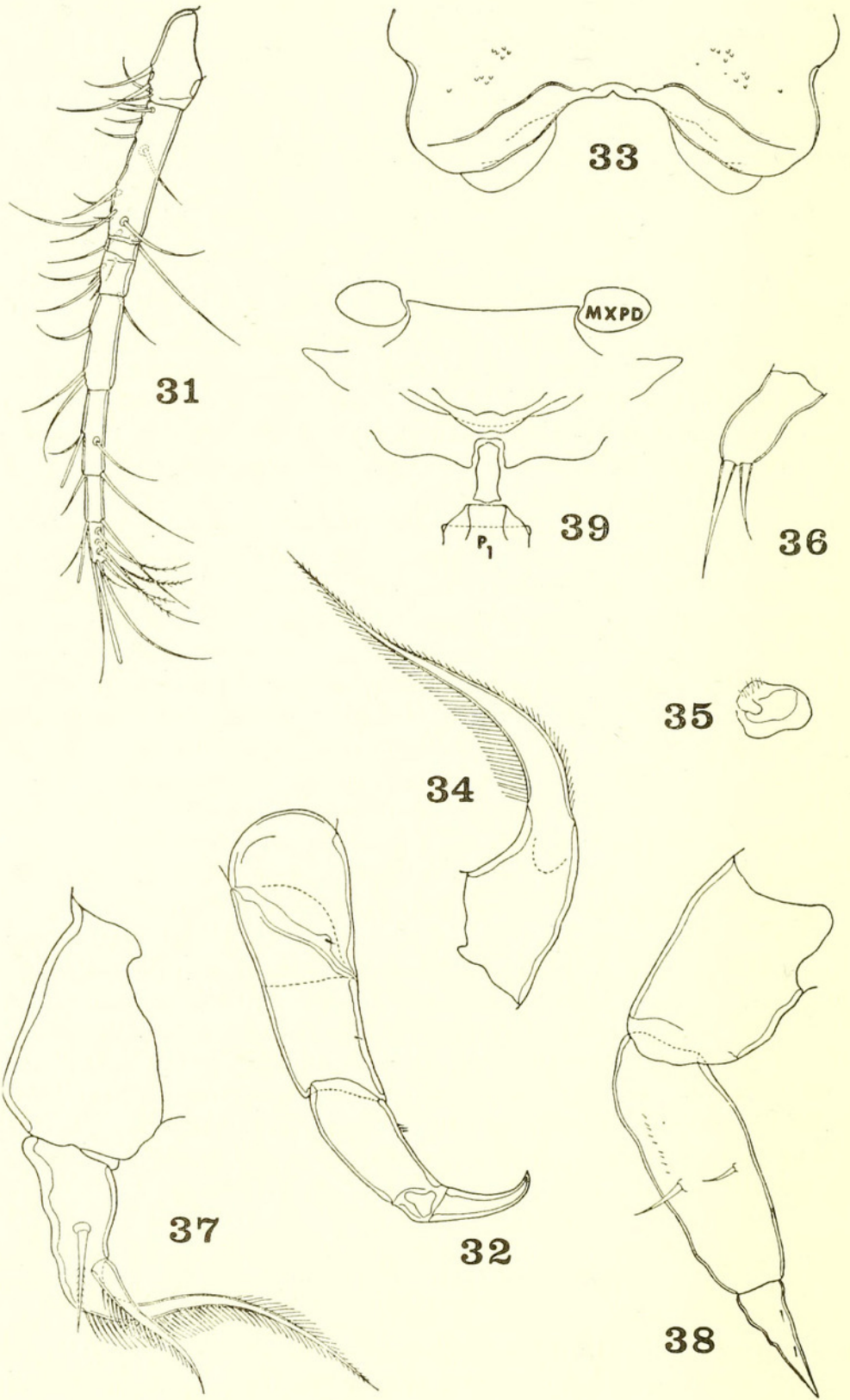
Body surface with a very few hairs (sensilla) as in Figure 25.

Egg sacs fragmentary in all ovigerous specimens. Each egg approximately 104 μm in diameter and slightly irregular in shape.

←

FIGS. 23–24. *Anthessius discipedatus* new species, male: 23, maxilliped, postero-inner (D); 24, Claw of maxilliped, antero-outer (D).

FIGS. 25–30. *Lichomolgus hippopi* new species, female: 25, Dorsal (H); 26, Urosome, dorsal (G); 27, Genital area, dorsal (C); 28, Caudal ramus, dorsal (C); 29, Rostrum, ventral (B); 30, Rostrum, ventral (B).



Rostrum (Fig. 29) well-developed, reaching to a level between the bases of the second antennae. Posteroventral tip of the rostrum truncated rather than pointed and variously thickened (Fig. 30).

First antenna (Fig. 31) 396 μm long. Lengths of the 7 segments (measured along their posterior margins): 26 (65 μm along the anterior edge), 99, 39, 64, 60, 34, and 29 μm respectively. Formula for the armature: 4, 13, 6, 3, 4 + 1 aesthete, 2 + 1 aesthete, and 7 + 1 aesthete. All setae naked except 4 on the seventh segment which are weakly haired.

Second antenna (Fig. 32) 234 μm long. First and second segments with a very small inner seta. Third segment (combined third and fourth segments) with 3 minute inner setae. No subterminal armature. Claw 54 μm along its axis.

Labrum (Fig. 33) with 2 widely divergent, broad, posteroventral lobes. Mandible (Fig. 34), paragnath (Fig. 35), first maxilla (Fig. 36), second maxilla (Fig. 37), and maxilliped (Fig. 38) similar in most respects to those of *Lichomolgus tridacnae* Humes, 1972. Third segment of the maxilliped with 2 minute setae.

Ventral area between the maxillipeds and the first pair of legs (Fig. 39) not protuberant.

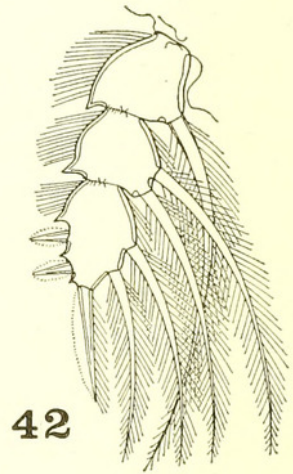
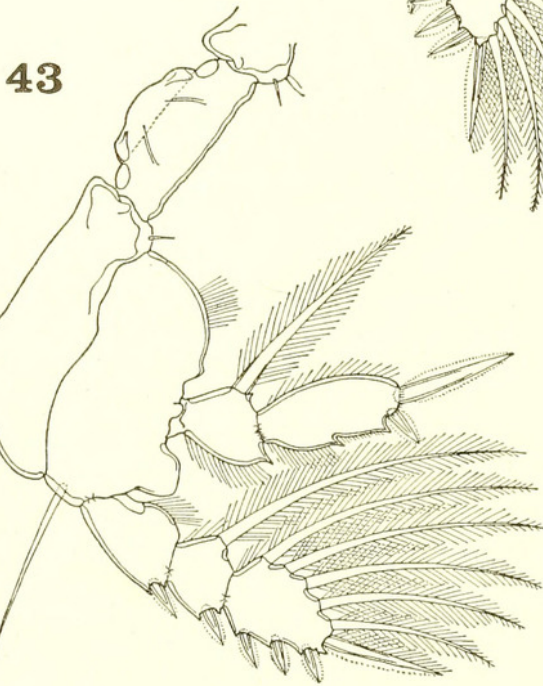
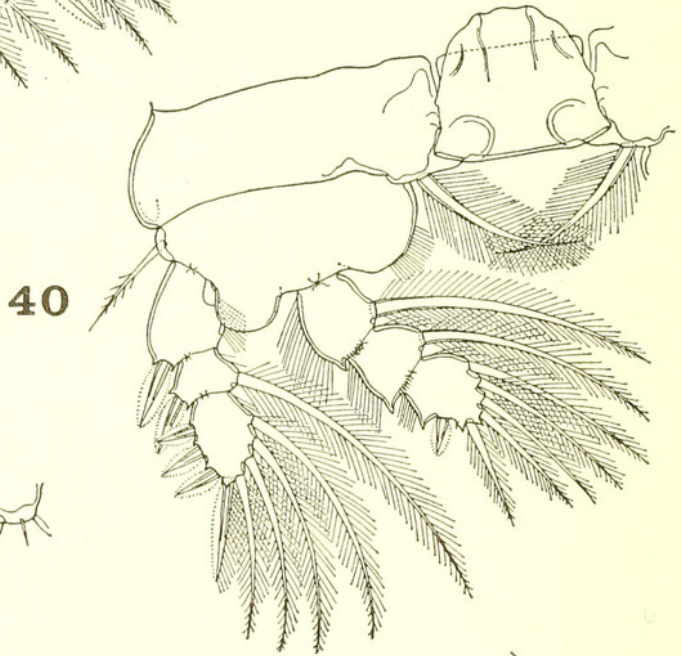
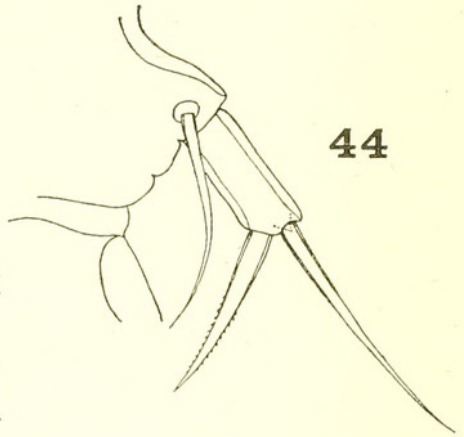
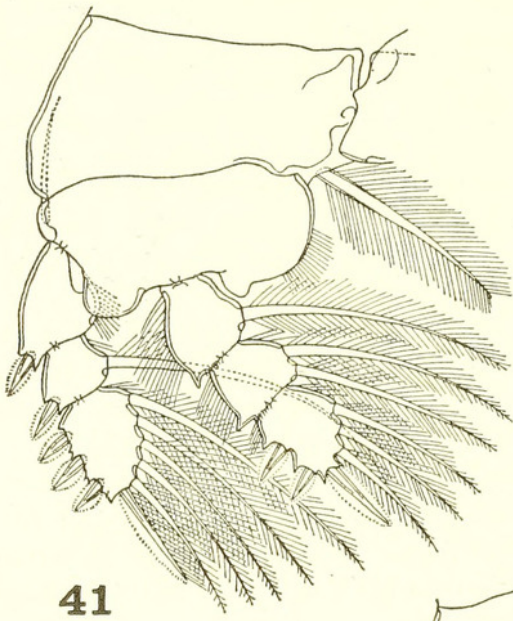
Legs 1-4 (Figs. 40, 41, 42, 43) with 3-segmented rami except for the endopod of leg 4 which is 2-segmented. Formula for the armature as follows (Roman numerals representing spine, Arabic numerals indicating setae):

P ₁	0-1	1-0	exp	I-0;	I-1;	III, I, 4
			enp	0-1;	0-1;	I, 5
P ₂	0-1	1-0	exp	I-0;	I-1;	III, I, 5
			enp	0-1;	0-2;	I, II, 3
P ₃	0-1	1-0	exp	I-0;	I-1;	III, I, 5
			enp	0-1;	0-2;	I, II, 2
P ₄	0-1	1-0	exp	I-0;	I-1;	III, I, 5
			enp	0-1;	II	

Inner coxal seta on legs 1-3 long and plumose, but on leg 4 this seta short (10 μm) and naked. Inner margin of the basis in all 4 legs with a row of hairs. Exopod of leg 4 114 μm long. First segment of the endopod 36 \times 31 μm with hairs along the outer margin. Second segment

←

FIGS. 31-39. *Lichomolgus hippopi* new species, female: 31, First antenna, dorsal (G); 32, Second antenna, anterior (E); 33, Labrum, ventral (D); 34, Mandible, anterior (C); 35, Paragnath, ventral (C); 36, First maxilla, anterior (C); 37, Second maxilla, posterior (C); 38, Maxilliped, inner (C); 39, Area between maxillipeds and first pair of legs, ventral (G).



$57 \times 29 \mu\text{m}$ (width taken at the spine), the 2 terminal delicately fringed spines $15.5 \mu\text{m}$ (outer) and $55 \mu\text{m}$ (inner). Outer margin of this segment with a small thornlike process and provided proximally with long hairs and distally with short barbules; inner margin of the segment with delicate hairs.

Leg 5 (Fig. 44) with a small unornamented free segment $42 \times 16 \mu\text{m}$, bearing 2 unequal terminal setae, one naked and $80 \mu\text{m}$, the other a stouter very finely barbed seta $55 \mu\text{m}$. Adjacent seta on the body $65 \mu\text{m}$ and naked.

Leg 6 represented by the 2 setae on the genital area (Fig. 27).

Living specimens in transmitted light opaque, the eye red, and eggs dark gray.

Male: Body (Fig. 45) slender. Length (without the setae on the caudal rami) 0.89 mm ($0.88\text{--}0.90 \text{ mm}$) and the greatest width 0.26 mm ($0.24\text{--}0.29 \text{ mm}$), based on 10 specimens in lactic acid. Ratio of the length to the width of the prosome $2.02:1$. Ratio of the length of the prosome to that of the urosome $1.56:1$.

Segment of leg 5 (Fig. 46) $31 \times 75 \mu\text{m}$. Genital segment elongated, $125 \times 102 \mu\text{m}$. Four postgenital segments from anterior to posterior 43×56 , 42×49 , 36×44 , and $32 \times 47 \mu\text{m}$.

Caudal ramus (Fig. 46) resembling that of the female, but smaller, $52 \times 21 \mu\text{m}$, ratio $2.48:1$.

Body surface very lightly ornamented as in the female.

Rostrum, first antenna, second antenna, labrum, mandible, paragnath, first maxilla, and second maxilla like those of the female. Maxilliped (Fig. 47) slender and 4-segmented (assuming that the proximal half of the claw represents a fourth segment). First and third segments unarmed. Second segment with 2 setae, one of them broad with a lateral setiform projection (Fig. 48), and with 2 rows of small spinules. Claw $121 \mu\text{m}$ along its axis including the terminal lamella, partly divided about midway, and bearing proximally 2 very unequal smooth setae.

Ventral area between the maxillipeds and the first pair of legs resembling that of the female.

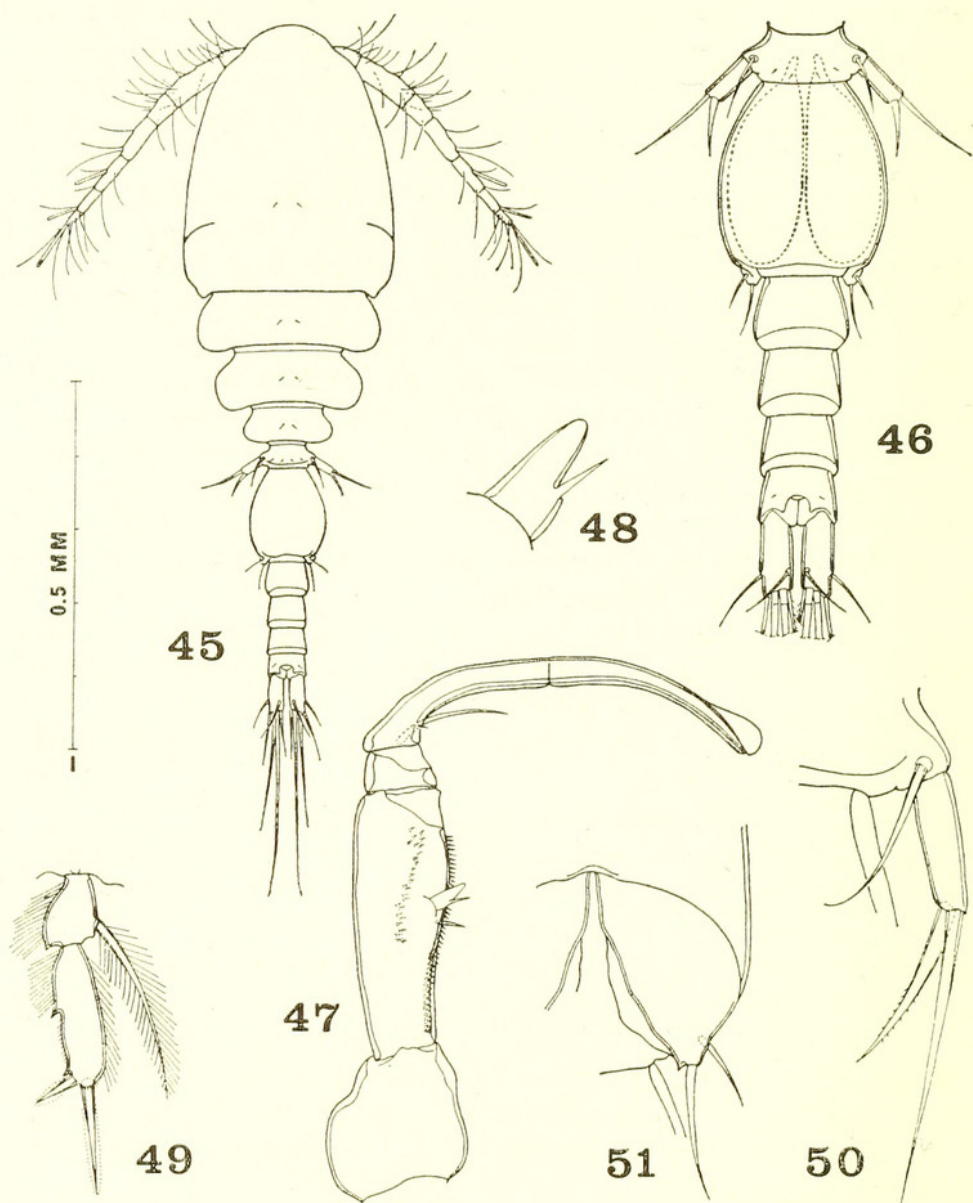
Legs 1–4 like those of the female except for the more slender second segment of the endopod of leg 4 (Fig. 49) which is $59 \times 19 \mu\text{m}$.

Leg 5 (Fig. 50) similar to that of the female but smaller and slenderer, $32 \times 10 \mu\text{m}$, with the terminal setae 60 and $39 \mu\text{m}$.

Leg 6 (Fig. 51) a posteroventral flap on the genital segment bearing 2 naked setae $35 \mu\text{m}$ and $22 \mu\text{m}$.

←

FIGS. 40–44. *Lichomolgus hippopi* new species, female: 40, Leg 1 and intercoxal plate, anterior (E); 41, Leg 2, anterior (E); 42, Endopod of leg 3, anterior (E); 43, Leg 4 and intercoxal plate, anterior (E); 44, Leg 5, dorsal (D).



FIGS. 45-51. *Lichomolgus hippopi* new species, male: 45, Dorsal (I); 46, Urosome, dorsal (G); 47, Maxilliped, antero-inner (D); 48, Modified spine on second segment of maxilliped, antero-inner (F); 49, Endopod of leg 4, anterior (E); 50, Leg 5, dorsal (C); 51, Leg 6, ventral (D).

Living specimens in transmitted light colored as in the female.

Etymology: The specific name *hippopi* is the genitive form of the generic name of the host.

Comparison with related species: Among the 18 species of *Lichomolgus* listed by Humes and Stock, 1973, there are 6 which, like the new species, have only one claw on the second antenna. In 5 of these species the rostrum is broadly rounded posteroventrally and does not extend be-

tween the bases of the second antenna (*Lichomoligus arcanus* Humes and Cressey, 1958, *L. asaphidis* Humes, 1959, *L. inflatus* Tanaka, 1961, *L. spondyli* Yamaguti, 1936, and *L. tridacnae* Humes, 1972). In the sixth of these species, *L. chamarum* Humes, 1968, the rostrum is elongated and extends between the bases of the second antennae. The tip of the rostrum in this species, however, is pointed rather than truncated as in *Lichomoligus hippopi*.

The new species differs from all known *Lichomoligus* in having the formula III, I, 5 instead of II, I, 5 on the third segment of the exopod of leg 4. Since other features of *L. hippopi* are typically those of *Lichomoligus*, this variation in the number of outer exopod spines on leg 4 is best interpreted as intrageneric. Other lichomolgid genera show both formulas (II, I, 5 or III, I, 5),—for example, *Anisomoligus* Humes and Stock, 1972, *Macrochiron* Brady, 1872, *Monomoligus* Humes and Frost, 1964, and *Panjakus* Humes and Stock, 1972.

Lichomoligus tridacnae Humes, 1972

This species has been previously reported from *Tridacna gigas* (Linnaeus) and *Tridacna squamosa* Lamarck at Eniwetok Atoll, Marshall Islands (Humes, 1972).

Specimens collected: 1 ♀, 1 ♂ from the same specimen of *Hippopus hippopus* from which *Anthessius discipedatus* and *Lichomoligus hippopi* were recovered; in 3 m, Gomumu Island, south of Obi, Moluccas, 1°50'00"S, 127°30'54"E, 30 May 1975.

LITERATURE CITED

- BRADY, G. S. 1872. Contribution to the study of the Entomostraca. VII. A list of the non-parasitic marine Copepoda of the north-east coast of England. Ann. Mag. Nat. Hist. ser. 4, 10:1-17.
- HUMES, A. G. 1959. Copépodes parasites de mollusques à Madagascar. Mém. Inst. Sci. Madagascar, 1958, sér. F, 2:285-342.
- . 1968. Two new copepods (Cyclopoida, Lichomolgidae) from marine pelecypods in Madagascar. Crustaceana, suppl. 1, Studies on Copepoda: 65-81.
- . 1972. Cyclopoid copepods associated with Tridacnidae (Mollusca, Bivalvia) at Eniwetok Atoll. Proc. Biol. Soc. Washington 84:345-358.
- . 1973. Cyclopoid copepods associated with marine bivalve mollusks in New Caledonia. Cah. O.R.S.T.O.M., sér. Océanogr. 11:3-25.
- , AND R. F. CRESSEY. 1958. Copepod parasites of mollusks in West Africa. Bull. Inst. Français Afrique Noire, sér. A, 20:921-942.
- , AND B. W. FROST. 1964. New lichomolgid copepods (Cyclopoida) associated with alcyonarians and madreporarians in

- Madagascar. Cah. O.R.S.T.O.M., sér. Océanogr. 1963, 6 (sér. Nosy Bé II): 131-212.
- , AND J.-H. HO. 1965. New species of the genus *Anthessius* (Copepoda, Cyclopoida) associated with mollusks in Madagascar. Cah. O.R.S.T.O.M., sér. Océanogr. 3:79-113.
- , AND J. H. STOCK. 1965. Three new species of *Anthessius* (Copepoda, Cyclopoida, Myicolidae) associated with *Tridacna* from the Red Sea and Madagascar. Bull. Sea Fish. Res. Sta. Haifa 40:49-74.
- , AND ———. 1972. Preliminary notes on a revision of the Lichomolgidae, cyclopoid copepods mainly associated with marine invertebrates. Bull. Zool. Mus., Univ. Amsterdam 2: 121-133.
- , AND ———. 1973. A revision of the family Lichomolgidae Kossmann, 1877, cyclopoid copepods mainly associated with marine invertebrates. Smithsonian Contrib. Zool. 127:i-v, 1-368.
- KOSSMANN, R. 1877. Entomostraca (1. Theil: Lichomolgidae). In Zool. Ergeb. Reise Küstengeb. Rothen Meeres, erste Hälfte, 4:1-24.
- REDDIAH, K. 1966. Copepods associated with Indian molluscs—(E) *Anthessius mytilicolus* n. sp. from *Mytilus viridis* at Ennore. Jour. Mar. Biol. Ass. India 8:290-294.
- STOCK, J. H. 1964. Sur deux espèces d'*Anthessius* (Copepoda) des Indes Orientales. Zool. Med. 39:111-124.
- , A. G. HUMES, AND R. U. GOODING. 1963. Copepoda associated with West Indian invertebrates. III. The genus *Anthessius* (Cyclopoida, Myicolidae). Stud. Fauna Curaçao and other Carib. Is. 17:1-37.
- TANAKA, O. 1961. On copepods associated with marine pelecypods in Kyushu. J. Fac. Agri., Kyushu Univ. 11:249-273.
- YAMAGUTI, D. 1936. Parasitic copepods from mollusks of Japan, I. Jap. Jour. Zool. 7:113-127.



Humes, A G. 1976. "Cyclopoid Copepods Associated With Tridacnidae Mollusca Bivalvia In The Moluccas Indonesia." *Proceedings of the Biological Society of Washington* 89, 491–508.

View This Item Online: <https://www.biodiversitylibrary.org/item/107501>

Permalink: <https://www.biodiversitylibrary.org/partpdf/43846>

Holding Institution

Smithsonian Libraries

Sponsored by

Biodiversity Heritage Library

Copyright & Reuse

Copyright Status: In copyright. Digitized with the permission of the rights holder.

Rights Holder: Biological Society of Washington

License: <http://creativecommons.org/licenses/by-nc-sa/3.0/>

Rights: <https://biodiversitylibrary.org/permissions>

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.