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Poecilostome copepods associated with antipatharian coelenterates in the Moluccas

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ABSTRACT

From the Moluccas *Vahinius verbericolus* n. sp. (Vahiniidae) is described from *Cirripathes anguina* and *Paramolgus insectus* (Humes, 1969) (Lichomolgidae) is recorded from *Antipathes abies*. These are the first records of copepods from Antipatharia outside of Madagascar, where four copepods are known from six host corals.

INTRODUCTION

Four poecilostome copepods are associated with six species of Antipatharia in Madagascar as follows:

Paramolgus constrictus (Humes, 1969) from *Antipathes ericoides* Pallas, *Paramolgus insectus* (Humes, 1969) from *Antipathes abies* (Linnaeus), *Antipathes myriophylla* Pallas, and *Antipathes* cf. *spinescens* Gray, *Thamnomolgus robustus* Humes, 1969, from *A. abies, A. ericoides, A. myriophylla*, and *A.* cf. *spinescens, Vahinius petax* Humes, 1967, from *Stichopathes echinulata* Brook, and from *Antipathes longibrachiata* (van Pesch) (Humes, 1969).

Until now no poecilostome copepods have been reported from antipatharians in the Pacific Ocean.

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: MD = mandible, MX_1 = first maxilla, MX_2 = second maxilla, MXPD = maxilliped, and P_{3-5} = legs 3—5.

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Vahiniidae Humes, 1967
Vahinius Humes, 1967
Vahinius verbericolus n. sp.
Figs. 1—18

Type material. — 48 ♀♀, 24 ♂♂ from two *Cirripathes anguina* Dana, in 24 m, southwestern side of Goenoeng Api, Banda Islands, Moluccas, 4°31′45″S, 129°51′ 55″E, 25 May 1975. Holotype ♀ (ZMA 102.639), allotype (ZMA 102.640), and 40 paratypes (30 ♀♀, 10 ♂♂) (ZMA 102.641) deposited in the Zoölogisch Museum, Amsterdam; 18 paratypes (10 ♀♀, 8 ♂♂) in the National Museum of Natural History, Smithsonian Institution, Washington; and the remaining paratypes in the collection of the author.

Female. — Body (figs. 1, 2, 3) elongate, with external segmentation weak or absent. Length (without setae on caudal rami) 0.84 mm (0.80—0.88 mm), greatest width 0.20 mm (0.19—0.21 mm), and greatest dorsoventral thickness in prosome 0.20 mm (0.19—0.21 mm), based on 10 specimens in lactic acid. Prosome somewhat sausage-shaped, stouter than tapered urosome. No external division between cephalosome and segment of leg 1 or between segment of leg 1 and that of leg 2. Segment of leg 3 and remaining segments weakly separated from each other by very indistinct sutures or delicate sclerites as in figures. Ratio of length to width of prosome 2.8:1. Ratio of length of prosome to that of urosome 1.7—2.0:1. (These ratios approximate.)

Genital segment with a dorsal sclerotized band (fig. 1) in anterior half enclosing two genital areas. Two setae which in other cyclopoids are situated on genital area here removed posteriorly and laterally from the area (fig. 4).

Caudal ramus (fig. 5) minute, 21 × 11 μm, bearing six naked setae, longest 52 μm.

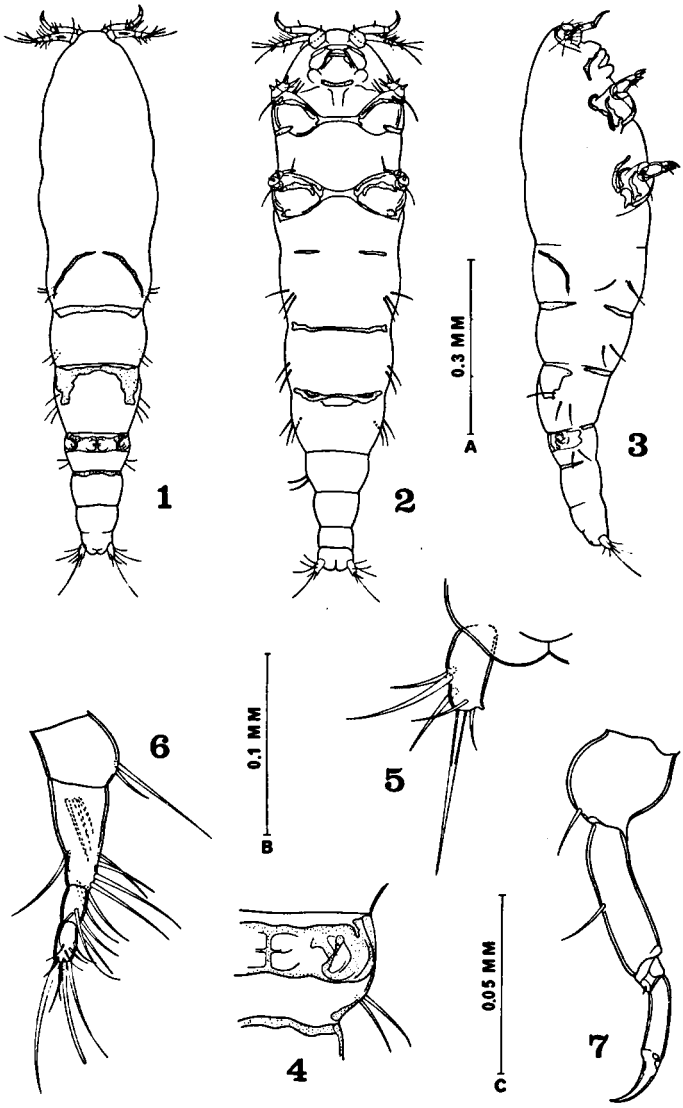
Egg sac not seen.

Rostral area not developed.

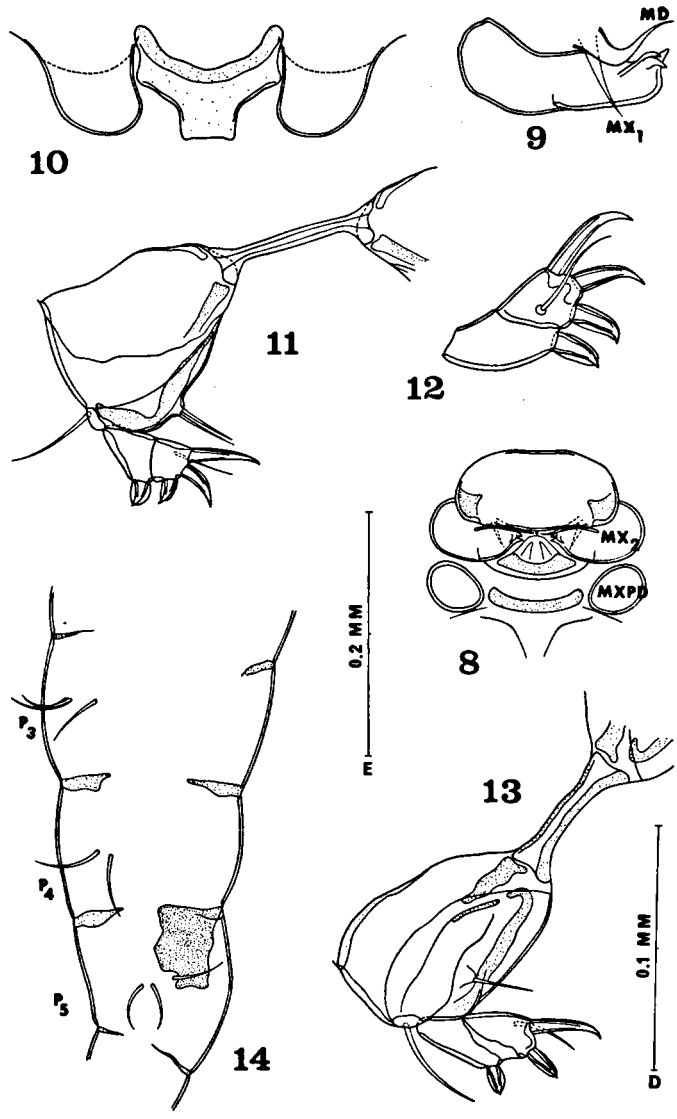
First antenna (fig. 6) 4-segmented and 67 μm long. Lengths of segments approximately 15, 29, 10, and 13 μm respectively. Formula for armature: 2, 10, 4, and 9 + 1 aesthete. Longest terminal seta 39 μm. All setae naked.

Second antenna (fig. 7) 94 μm long including claw, with first segment large but remaining segments slender, their lengths along outer margins 22, 33, 5, and 22 μm respectively. Formula: 1, 1, 1, and one claw. Terminal claw 12 μm along its axis.

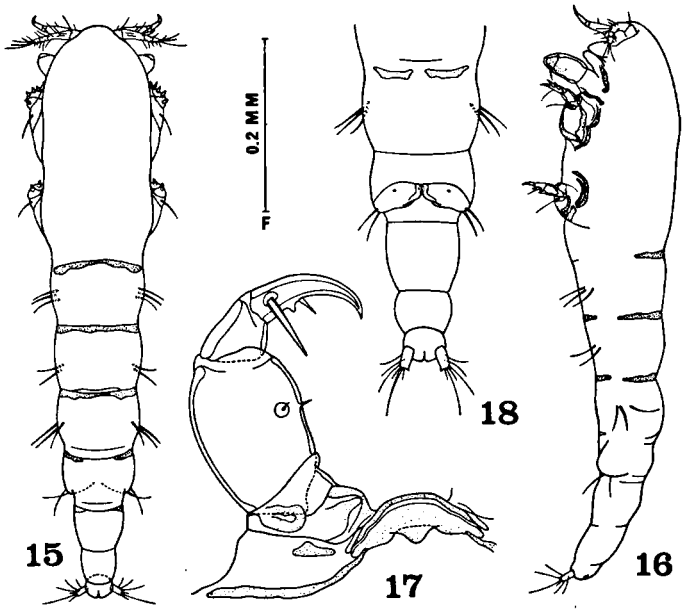
Labrum (fig. 8) broad, its posteroventral edge nearly straight, with two



Figs. 1—7. *Vahinius verbericolus* n. sp., female. 1, dorsal (A): 2, ventral (A); 3, lateral (A); 4, genital area, dorsal (B); 5, caudal ramus, dorsal (C); 6, first antenna, posterodorsal (C); 7, second antenna, postero-inner (C).



Figs. 8—14. *Vahinius verbericolus* n. sp., female. 8, oral area, ventral (D); 9, mandible, first. maxilla, and second maxilla, anteroventral (C); 10, maxillipeds and intermaxillipedal sclerite, posteroventral (C); 11, leg 1 and intercoxal plate, anterior (D); 12, exopod of leg 1, posterior (C); 13, leg 2 and intercoxal plate, anterior (D); 14, segments of legs 3—5, lateral (E).



Figs. 15—18. *Vahinius verbericolus* n. sp., male. 15, dorsal (A); 16, lateral (A); 17, maxilliped and intermaxillipedal sclerite, posterior (D); 18, urosome, ventral (F).

small patches of minute spinules laterally. Mandible (fig. 9) and first maxilla (fig. 9) styliform. Paragnath a small hyaline pointed process. Second maxilla (figs. 8, 9) elongate with a tripartite tip. Labium largely filling space between second maxillae (fig. 8). Maxilliped (figs. 8, 10) a small round knob. A distinct transverse sclerite between bases of maxillipeds.

Leg 1 (fig. 11) and leg 2 (fig. 13) prominent, with protopodal sclerites. Legs 3 and 4 vestigial (fig. 14) and represented only by three and two setae respectively. Spine and setal formula for legs 1—4 as follows (Roman numerals indicating spines, Arabic numerals representing setae):

P_1 coxa 0—0 basis 1—0 exp I—0; I, II, 1
enp 2
P_2 coxa 0—0 basis 1—0 exp I—0; I, I, 1
enp 1
P_3 3
P_4 2

Leg 1 (fig. 11) with intercoxal plate. Coxa and basis indistinctly separated. Exopod 2-segmented (fig. 12). First segment with outer spine having lateral lamellae. Second segment with a lamellate spine, two longer spines, and a seta arising on posterior surface. Endopod represented by two naked setae. Leg 2 (fig. 13) resembling leg 1 but only two spines on second segment of exopod and endopod represented by only one seta. Leg 3 (fig. 14) consisting of three setae and leg 4 (fig. 14) represented by two setae, all these setae about 40 μm long.

Leg 5 (fig. 14) situated laterally and consisting of three naked setae about 40 μm long. Near dorsal seta a weak sclerite covered with very small spinules.

Leg 6 represented by two setae near genital area (fig. 4).

Color in life in transmitted light opaque, prosome slightly orange-tan, eye red.

Male. — Body (figs. 15, 16) resembling that of female.In dorsal view of preserved specimens legs 1 and 2 more visible than in female. Length (excluding setae on caudal rami) 0.85 mm (0.70—0.92 mm), greatest width 0.18 mm (0.15—0.20 mm), and greatest dorsoventral thickness in prosome 0.18 mm (0.14—0.20 mm), based on 10 specimens in lactic acid. Ratio of length to width of prosome 3.2:1. Ratio of length of prosome to that of urosome 1.8:1.

Urosome segmented as in female. Caudal ramus, rostral area, first antenna, second antenna, labrum, mandible, paragnath, first maxilla, and second maxilla like those of female. Maxilliped (fig. 17) 4-segmented (assuming that proximal part of claw represents a fourth segment). First segment short with several sclerotized areas. Second segment large with two small naked setae. Third segment short and unarmed. Claw 44 μm along its axis and bearing proximally two very unequal setae with a small knob on concave edge between them. Well-formed sclerite between bases of maxillipeds.

Legs 1—5 as in female.

Leg 6 (fig. 18) consisting of a posteroventral flap on genital segment bearing two naked setae.

Spermatophore not seen.

Color in life as in female.

Table 1. Distinguishing features of two species of *Vahinius*.

	V. petax	*V. verbericolus*
extremity of caudal ramus	without inner terminal knob	with small inner terminal knob
number of distinct segments in first antenna	3	4
second segment of second antenna	moderately stout	elongate, slender
armature of second exopod segment of leg 1	I, 1*	I, II, 1
armature of second exopod segment of leg 2	I, 1	I, I, 1
number of setae in leg 4	1	2

*The second exposed segment of leg 1 in *V. petax* bears two small spinelike processes in addition to the seta and terminal spine. If these two processes are interpreted as rudimentary spines, the formula is comparable to that of *V. verbericolus*.

Etymology. — The specific name *verbericolus* is formed from the Latin words *verber* meaning whip and *colere*, to inhabit, alluding to the presence of the copepod in whip corals.

Comparison with *Vahinius petax*. — The genus *Vahinius* until now has contained only a single species, *Vahinius petax* Humes, 1967, a parasite of *Stichopathes echinulata* Brook and *Antipathes longibrachiata* (van Pesch) in Madagascar (Humes, 1967, 1969). The salient differences between this species and *V. verbericolus* are shown in Table 1.

Remarks. — During routine examination of antipatharians for copepod parasites, internal forms such as *Vahinius* may easily be overlooked. In addition to soaking the hosts for several hours in sea water with 2—5 per cent ethyl alcohol, it is useful to fold the antipatharians and wring them as one would a piece of wet laundry. This seems to force the copepods out of the polyps.

Lichomolgidae Kossmann, 1877
Paramolgus Humes & Stock, 1972
Paramolgus insectus (Humes, 1969)

Specimens collected. — 24 ♀♀, 16 ♂♂ from one *Antipathes abies* Linnaeus), in 17 m, southwestern side of Goenoeng Api, Banda Islands, 4°31′45″S, 129°51′55″E, 30 April 1975.

Remarks. — These copepods conform in all observed details with paratypes from Madagascar. The species was placed originally in the genus *Lichomolgus* Thorell, 1859, but has been recently removed to *Paramolgus* by Humes & Stock (1973).

Paramolgus insectus is usually recovered in considerable numbers after the first rinsing of the host in the sea water-ethyl alcohol solution and apparently lives on the outer surface of the antipatharian. Its relatively unmodified body suggests that it is less of a parasite than *Vahinius verbericolus*.

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