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TYCHIDION GUYANENSE N. GEN., N. SP. (COPEPODA, CYCLOPOIDA) ASSOCIATED WITH AN ANNELID OFF GUYANA

by

ARTHUR G. HUMES

Boston University Marine Program and Systematics-Ecology Program, Marine Biological Laboratory, Woods Hole, Massachusetts, U.S.A. [1])

With 19 text-figures

In his original description of the worm *Lamellibrachia barhami*, found in a depth of 1125 m in the northeastern Pacific, Webb (1969: 31) mentioned "as yet unidentified copepods which live in quite large numbers in interlamellar pockets in the tentacular crown". Webb regarded the worm host as a pogonophoran (Order Vestimentifera), but Dr. J. van der Land of the Rijksmuseum van Natuurlijke Historie, Leiden, believes that the genus *Lamellibrachia* should be referred to the Annelida, Vestimentifera (in a letter to the author, 13 December 1971). Copepods are not known to be associated with Pogonophora, but many live on polychaete annelids.

Through the kindness of Dr. W. Vervoort, Rijksmuseum van Natuurlijke Historie, Leiden, I have had the opportunity to study a small number of cyclopoid copepods found with an annelid worm (Vestimentifera) taken off Guyana during the Guyana Shelf Expedition "CICAR 15" (Cooperative Investigation of the Caribbean and Adjacent Regions, Cruise No. 15). The host is a second and new species of the genus *Lamellibrachia*, according to Dr. van der Land who is currently studying it. Unidentified copepods were seen in serial sections of the tentacles of this host specimen.

The study of the copepods has been aided by a grant (GB-8381X) from the National Science Foundation of the United States.

I am indebted to Dr. Jan H. Stock, Zoölogisch Museum, Amsterdam, for examining the drawings and offering valuable suggestions.

1) Systematics-Ecology Program, Contr. No. 257.

CLAUSIDIIDAE Embleton, 1901

Tychidion n. gen.

Diagnosis. — Male: Body cyclopoid. Urosome 5-segmented, though the apparent genital segment may represent a fusion of the genital segment and first postgenital segment. First antenna 7-segmented. Second antenna 3-segmented, though the third segment shows weak indication of division. Mandible a flexed blade with 5 elements (3 setae and 2 spines). First maxilla a lobe with 3 setae. Second maxilla 2-segmented, the first segment unarmed. Maxilliped 4-segmented, the fourth segment forming part of the terminal claw.

Legs 1-4 with trimerous rami. Leg 5 2-segmented, the second segment with 3 spines and 1 seta. Leg 6 with 1 seta and a spinous process.

Other features as in the species described below.

Female unknown.

Associated with Annelida, Vestimentifera.

Gender neuter.

Type-species. — *Tychidion guyanense* n. sp.

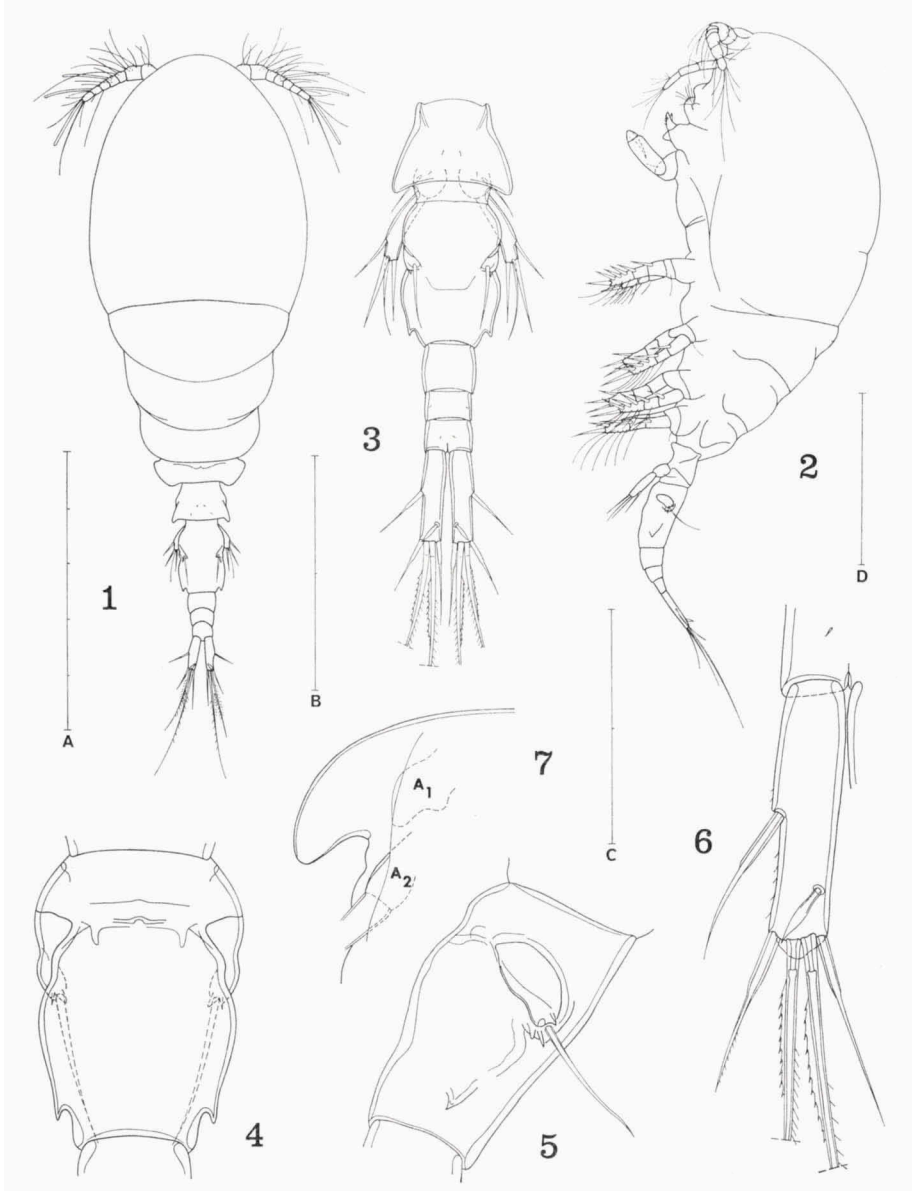
Etymology. — The generic name is a combination of τύχη = good fortune, alluding to the fortunate discovery of these copepods, and the diminutive - ίδιον.

Tychidion guyanense n. gen., n. sp. (figs. 1-19)

Type material. — 2 adult males and 3 copepodids from a jar containing a single specimen of an annelid, *Lamellibrachia* sp., taken at a depth of 500 m on the continental slope off Guyana, 8°1'N 57°24'W, collected at Station 101 on 4 September 1970 by H.Nl.M.S. "Luymes" during the Guyana Shelf Expedition (CICAR 15). Holotype, one paratype (dissected), and 3 copepodids deposited in the Rijksmuseum van Natuurlijke Historie, Leiden (Crust. F 795 and F 796, respectively).

Male. — The body (figs. 1, 2) has a slender prosome which is a little thickened dorsoventrally. In the holotype the length of the body (excluding the setae on the caudal rami) is 1.02 mm and the greatest width 0.36 mm. The ratio of the length of the prosome to that of the urosome is 2.27 : 1. The ratio of the length to the width of the prosome is 1.92 : 1. The segment of leg 1 is separated from the head by a dorsal furrow. The epimera of legs 1 to 4 are weakly defined.

The segment of leg 5 (fig. 3) is 81 × 101 μ, with the fifth pair of legs originating ventrolaterally. The genital segment (fig. 4) is 120 × 84 μ, in dorsal view separated by lateral notches into approximately equal anterior and posterior halves, the posterior half (first postgenital segment?) with



Figs. 1-7. *Tychidion guyanense* n. gen. n. sp., male. 1, dorsal (A); 2, lateral (A); 3, urosome, dorsal (B); 4, genital segment, ventral (C); 5, genital segment, lateral (C); 6, caudal ramus, dorsal (D); 7, rostrum, lateral (C). Scale A = 0.5 mm, B = 0.2 mm, C = 0.1 mm, and D = 0.05 mm. A_1 = first antenna, A_2 = second antenna.

posterolateral spiniform processes; in lateral view (fig. 5) the dorsal and ventral margins entire. (The posterior half of the genital segment, only

vaguely delimited dorsally and ventrally from the anterior half, may actually represent the first postgenital segment. If so, the tagmosis of the urosome would then correspond with other clausidiid genera where there are six urosomal segments, except *Clausidium* Kossmann, 1874, which has five such segments in the male). The three postgenital segments are 39 × 47 μ, 26 × 39 μ, and 29 × 39 μ from anterior to posterior. The posteroventral border of the anal segment is smooth.

The caudal ramus (fig. 6) is elongated, 80 × 20 μ in greatest dimensions, with a ratio of 4 : 1. The outer lateral seta, thicker proximally than distally, is 47 μ long and naked. The outermost distal seta, thickened proximally, is 49 μ with a few minute barbules distally. The innermost terminal seta, thickened proximally, is 55 μ and naked. The two long median terminal setae, each with an outer proximal lamella bordered with spinules and an inner row of hairs, are 132 μ (outer) and 208 μ (inner). The dorsal seta is short (26 μ), hyaline, and gladiolate. The outer margin of the ramus bears a few small spinules. The terminal ventral flap is smooth.

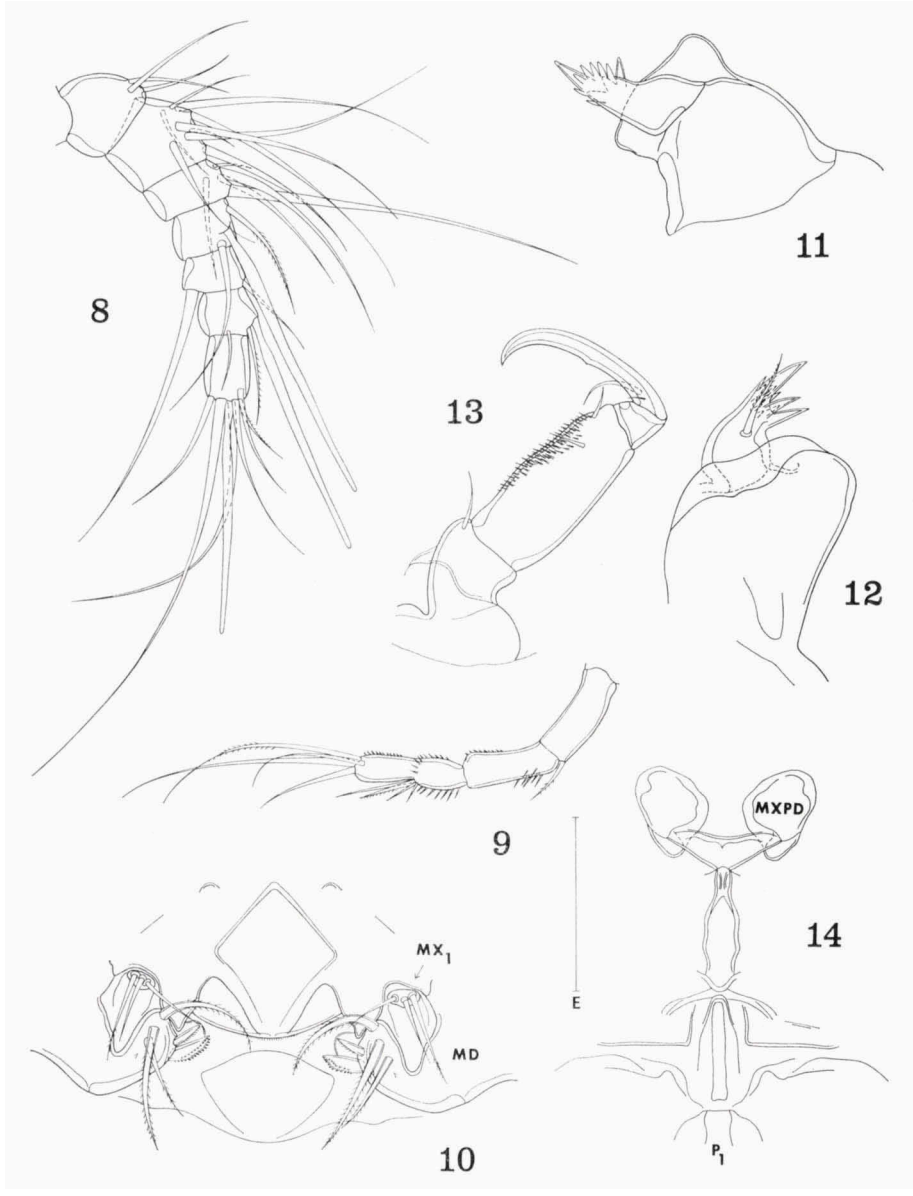
The rostrum is broadly rounded and projects ventrally in lateral view (fig. 7).

The first antenna (fig. 8) is 7-segmented and about 150 μ long. The lengths of the segments (measured along their posterior nonsetiferous margins) are: 17.5 (34 μ along the anterior margin), 23, 16.5, 16, 14, 17.5, and 25 μ from proximal to distal. The formula for the armature is: 3, 9, 5, 2 + 1 aesthete, 2, 2 + 1 aesthete, and 6 + 1 aesthete. All the setae are naked except one on the fourth, sixth, and seventh segments.

The second antenna (fig. 9), 112 μ long, is 3-segmented. Although the arrangement of the setae and spinules on the third segment suggests a division, no line of articulation is visible at the level of the group of setae. The first segment bears a single seta, the second lacks setae, and the third has 8 setae (4 + 4).

The labrum (fig. 10) has a slightly curved posteroventral edge finely serrated medially and bounded laterally by two mammillate lobes.

The mandible (fig. 10) is strongly flexed and bears distally 3 large barbed setae, a small spine unilaterally finely barbed, and a broadened spine with numerous small teeth along its posterior side. The paragnath is probably represented by a small lobe seen in fig. 10 dorsal to the tip of the mandible. The first maxilla (fig. 10) is a simple lobe bearing 3 setae. The second maxilla (figs. 11, 12) is 2-segmented, the first segment large and unarmed, the second small with a seta on its medial surface and a terminal spine around whose base there is a cluster of smaller spines. The maxilliped (fig. 13) is 4-segmented, the first segment with a single seta, the second with 2 setae



Figs. 8-14. *Tychidion guyanense* n. gen. n. sp., male. 8, first antenna, anteroposterior (C); 9, second antenna, anterodorsal (C); 10, oral area showing labrum, mandibles, paragnaths (?), and first maxillae, ventral (D); 11, second maxilla, lateral (D); 12, second maxilla, medial (D); 13, maxilliped, anterior (C); 14, area between maxillipeds and first pair of legs, ventral (E). Scale E = 0.1 mm. MX_1 = first maxilla, MD = mandible, MXPD = maxilliped, P_1 = leg 1.

and numerous inner spinules, the third unarmed, and the fourth forming the proximal part of the relatively short claw (72 μ along its axis) and bearing 2 unequal setae.

The area between the maxillipeds and the first pair of legs (fig. 14) is only slightly protuberant.

Legs 1 to 4 (figs. 15, 16, 17, 18) have trimerous rami. The armature is as follows (the Roman numerals indicating spines, the Arabic numerals setae):

P_1	coxa	0-1	basis	1-I	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, I, 2
P_4	coxa	0-1	basis	1-0	exp	I-0;	I-1; II, I, 5
					enp	0-1;	0-2; I, II, I, 1

The inner margin of the basis in leg 1 bears a large barbed spine and a row of small spines; in legs 2 to 4 this margin is smooth. The innermost spine on the third endopod segment of legs 3 and 4 has a few bilateral hairs proximally but is fringed distally. (The coxa, basis, and exopod of leg 3, not figured, are similar to those in leg 4).

Leg 5 (fig. 19) is 2-segmented. The first segment is 29 × 32 μ, with the haired dorsal seta 33 μ. The second segment is elongated, 60 × 18 μ, with 4 elements: a subterminal spine 46 μ, a dorsal terminal spine 65 μ, and a ventral terminal spine 48 μ, all three spines with minute spinules along the dorsal margin and narrow spinulose fringes along the ventral margin, and a slender seta 68 μ with a few distal hairs. The ventral margin of the segment bears a row of short very slender spinules.

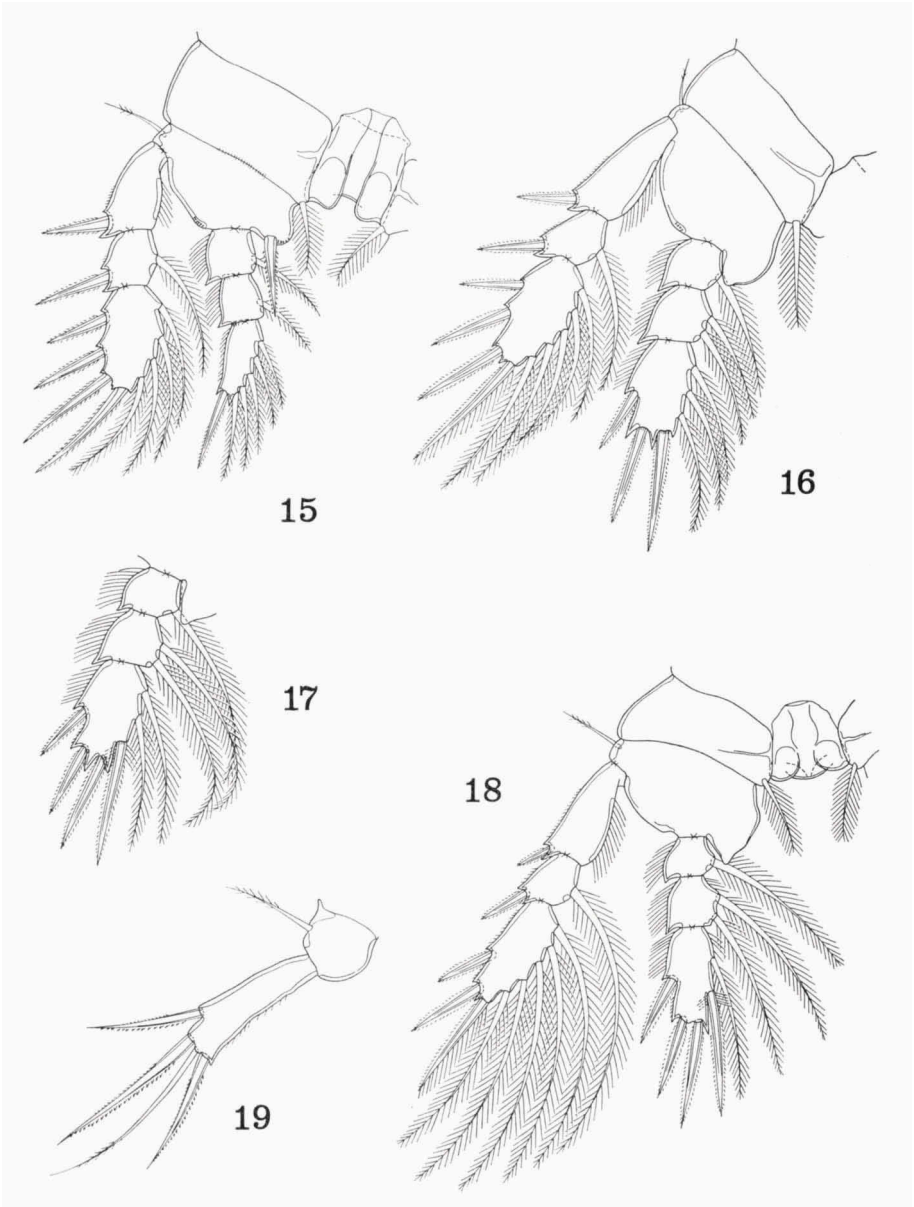
Leg 6 (figs. 3, 5) consists of a lateral flap on the anterior half of the genital segment, bearing a long naked seta 60 μ and a short spiniform process 5.5 μ.

The color in life is unknown.

Female unknown.

Etymology. — The specific name *guyanense* is formed from Guyana and the Latin suffix *-ensis* denoting locality.

Discussion. — *Tychidion* has several features characteristic of the Clausidiidae. Legs 1 to 5 are clausidiid both in segmentation and in armature. The appendages of the head are close to the clausidiid type, but the second antenna is apparently 3-segmented instead of 4-segmented as in other genera of the family, and the mandible has five elements, whereas there are only three or four in other genera. The 5-segmented male urosome, with three distinct post-genital segments, resembles *Clausidium*, rather than other genera of the



Figs. 15-19. *Tychidion guyanense* n. gen., n. sp., male. 15, leg 1 and intercoxal plate, anterior (E); 16, leg 2, anterior (E); 17, endopod of leg 3, anterior (E); 18, leg 4 and intercoxal plate, anterior (E); 19, leg 5, anterior (C).

family where there are six urosomal segments (four postgenital segments) in the male. The keys to clausidiid genera in Bocquet & Stock (1957), Good-

ing (1963), and Vervoort & Ramirez (1966) require modification to accommodate the new genus.

Obviously knowledge of the female will be necessary in order to understand more fully the affinities of *Tychidion* with the various known clausidiid genera.

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