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Hemicyclops ctenidis, a New Poecilostomatoid Copepod (Clausidiidae) Associated with a Polychaete in Korea

Ju-Shey Ho and Il-Hoi Kim*

Department of Biology, California State University, Long Beach, California 90840, USA and
Department of Biology*, Kangreung National University, Kangreung 210-702, Republic of Korea.

***Hemicyclops ctenidis* sp. n. is described based on the specimens washed from *Neanthes japonica* collected from Kangreung, South Korea. The new species can be distinguished from its 24 congeners by a combination of features in the segmentation of the first antenna, the structure of the inner seta of the first endopod segment in legs 1-4, and the armature of the second endopod segment in leg 4.**

KEY WORDS: Korean Copepoda, Clausidiidae, Hemicyclops, New speices.

Copepods of the genus *Hemicyclops* are known chiefly from the intertidal and shallow coastal waters. Twenty-four speices are currently known in this genus, with most of them occurring in association with various marine invertebrates or in burrows occupied by tubicolous hosts (Humes, 1984). So far only two species, *H. arenicola* Gooding, 1960 and *H. Adhaerens* Gooding, 1963, are known to be associated with polychaetes. This report deals with the third species found in association with a polychaete, *Neanthes japonica*, living in the brackish water section of a small river flowing through Kangreung, South Korea.

The new species to be described below is the second species of *Hemicyclops* from the Far East, the other speices is: *H. dilatatus* Shen and Bai, 1956 from Chefoo, China. This paper also reports the first species of copepods symbiotic with Korean invertebrates. The specimens were dissected and measured in lactic acid. All figures were drawn with the aid of a camera lucida. In the following, a complete description is given to the female and for the male only those sexually dimorphic characters are mentioned.

Description

Hemicyclops ctenidis, n. sp. (Figs. 1-5) Type material. 210♀♀, 110♂♂ from washings of more than one hundred polychaetes, *Neanthes japonica*, collected by I. H. Kim on June 18, 1988 at Namdaechon River (brackish, highly polluted with sewage) in Kangreung, about three hundred meters away from seashore (approximately 37°46' N, 129° 57'E). Holotype ♀, allotype and paratypes (195♀♀, 83♂♂) deposited in the U.S. National Museum of Natural History, Smithsonian Institution, Washington, D. C.; other paratypes in junior author's collection.

Female.

Body(Fig. 1A) with widely separated tergal plates in prosome. Length(excluding setae on caudal rami) 1.01 mm (0.94-1.07 mm) and greatest width of prosome 0.39 mm (0.36-0.43 mm) based on 10 specimens. Ratio of length to width of prosome 1.71:1. Ratio of length of prosome to that of urosome 1.85:1. Segment bearing leg 5 133×78 μm. Anterior part of this segment usually concealed by segment in front in dorsal view.

Genital segment (Fig. 2A) quadrate, 101×102

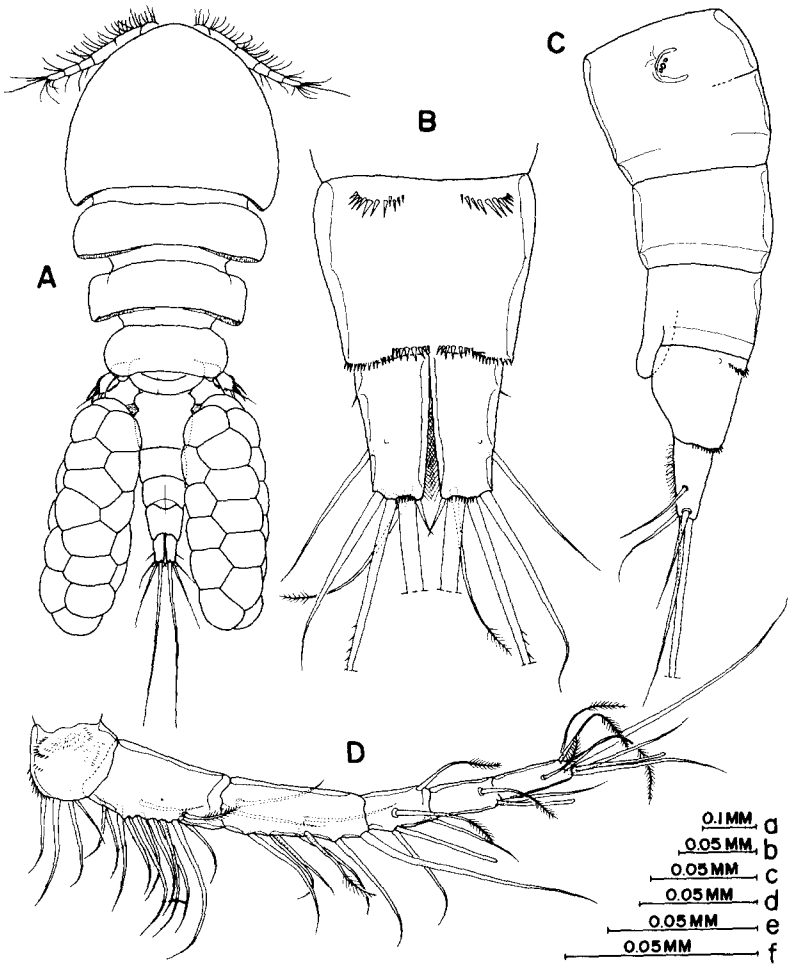

Fig. 1. *Hemicyclops ctenidis*, sp. n. Female. A, dorsal; B, anal segment and caudal rami, ventral; C, abdomen, lateral; D, first antenna. Scales: A=a, B=e, C=b, D=c.

μm when measured at midpoint; anteriorly with small, pointed lateral swellings (width 116 μm across this area). Ventrally this segment divided by incomplete transverse suture at anterior two-fifths (Fig. 1C). Genital opening situated antero-laterally. Three postgenital segments 63×88, 53×79, and 60×69 μm, respectively from anterior to posterior. Anal segment distally with inner row of spinules and outer row of smaller spinules on each side (Fig. 1B).

Caudal ramus(Fig. 1B) gradually narrower distally, 51×25 μm; with numerous hairs on dorsal surface. Outer margin at proximal fourth with a minute spinule. All six setae originate somewhat dorsally. Lateral seta(57 μm long) plumose distally. Innermost seta (14 μm long) shortest. Inner long terminal seta (327 μm long) with short spinules on outer margin in distal half. Outer long terminal seta (150 μm long) with similar spinules on outer margin in distal three-fourths. Distal end of ramus with row of minute spinules near bases of long terminal setae.

Egg sac, 457×157 μm (320-491×140-161 μm), reaching beyond caudal ramus.

Rostrum triangular and weakly pointed ventrally. First antenna (Fig. 1D) about 260 μm long, 6-segmented, each segment measuring 36, 56, 62, 38, 31 and 37 μm from basal to distal when

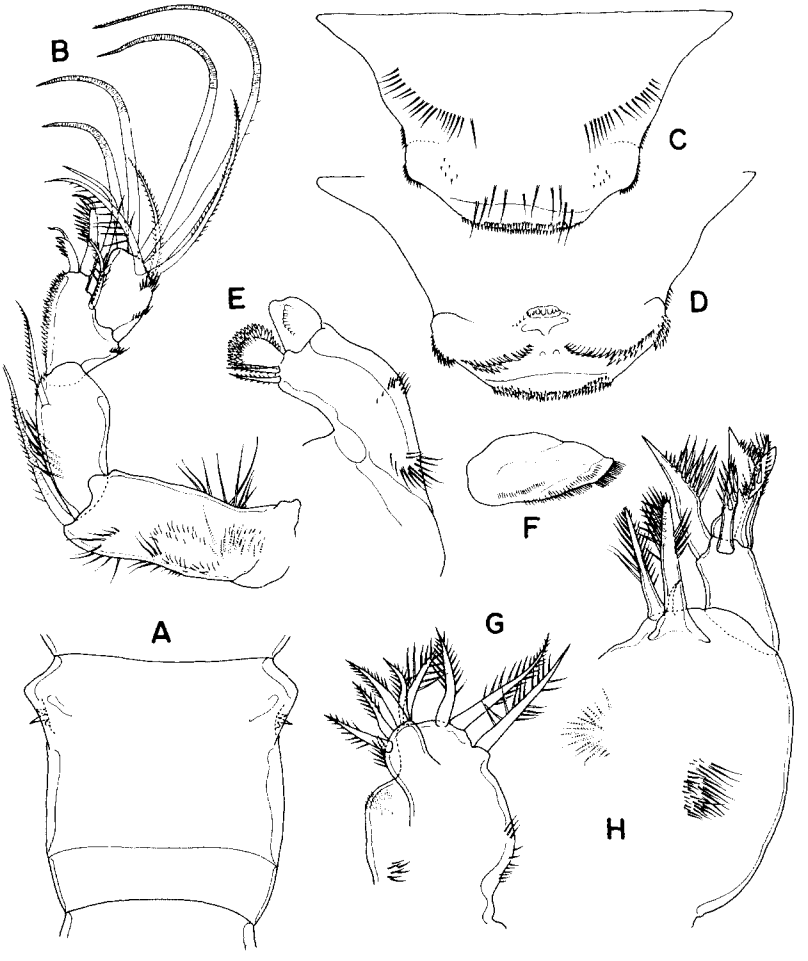

Fig. 2. *Hemicyclops ctenidis*, sp. n. Female. A, genital segment, dorsal; B, second antenna; C, labrum, ventral; D, labrum, dorsal; E, mandible; F, paragnath, ventral; G, first maxilla; H, second maxilla. Scales: A=d, B=e, C—F=f.

measured along axis. First segment with minute spinules on anterior margin and a number of setules on dorsal surface. Formula for armature: 4, 14, 9, 4+1 aesthete, 2+1 aesthete, and 7+1 aesthete. Plumose setae: 1 each on second and third, 2 on fourth, 1 on fifth and 4 on terminal segment.

Second antenna (Fig. 2B) 4-segmented. with armature 1, 1, 2+II, and 7. First segment longest and much hairy. Third segment spinulose on anterior margin; anterodistal corner protruded; two spines on this corner unequal in size, both with a low of spinules on anterior margin and a subterminal setule; seta next to these spines longest among 4 elements, naked and curved near distal one-third; fourth element spinulose. Distal segment 1.5 times as long as wide, with four long, annulated setae, one barbed seta, and two setae with spinules.

Labrum (Fig. 2C) ventrally with transverse row of hairs on either side and several subterminal hairs. Dorsal surface (Fig. 2D) with transverse row and a subsidiary row of denticles on each side. Posterior border armed with fine spinules arranged irregularly.

Mandible (Fig. 2E) with 2 stout elements (one heavily denticulate) and two, equal-sized, spinulose spines. Basal segment with two groups of

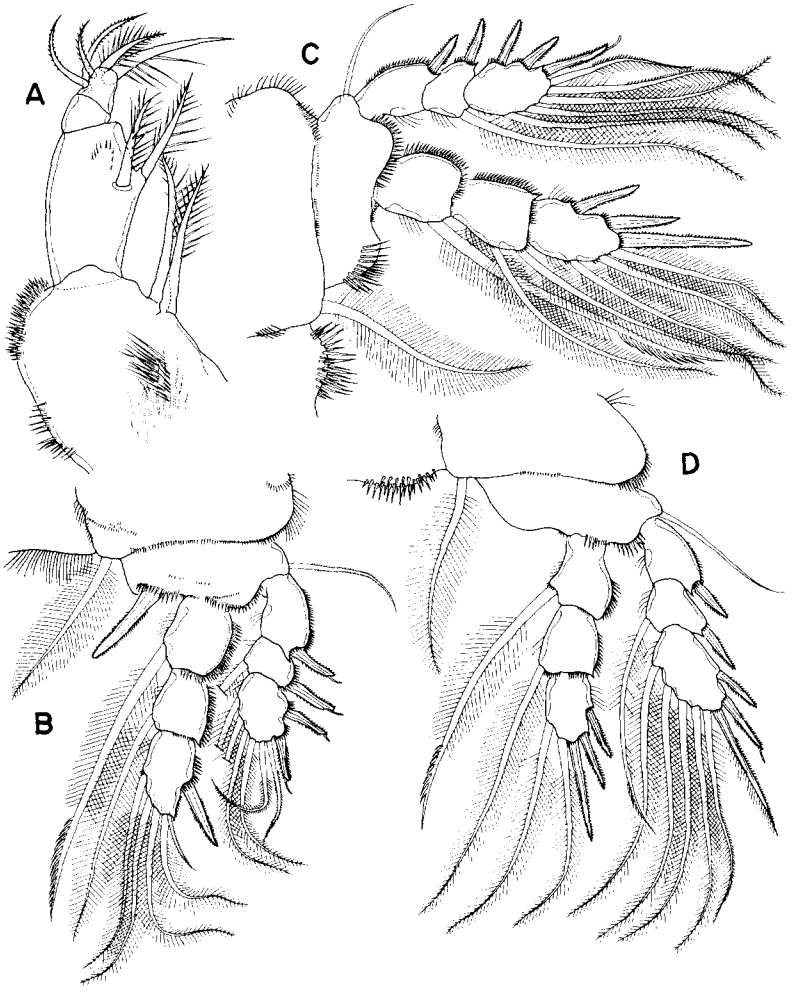

Fig. 3. *Hemicyclops ctenidis*, sp. n. Female. A, maxilliped; B, leg 1; C, leg 2; D, leg 4. Scales: A=f, B–D=c.

ventral hairs. Paragnath (Fig. 2F) elongate, with rows of hairs posteriorly and dense tuft of hairs apically. First maxilla (Fig. 2G) bilobate, with 3 spines on smaller lobe and 5 spines on larger lobe. Second maxilla (Fig. 2H) with 2 large, barbed spines and minute, naked spine on basal segment. Second segment with 4 elements, one element thick and bifurcate distally. Maxilliped (Fig. 3A) with armature 2,2,0,5. First segment with numerous spinules on outer distal corner and 3 groups of hairs on median surface.

Legs 1-4 with endopods longer than exopods. Armature as follows (Roman numerals representing spines, Arabic numerals indicating setae):

P1: coxa 0–1, basis 1-I, exopod I-0; I-1; II, 6 endopod 0-1; 0-1; I, 5

P2 & P3: coxa 0-1, basis 1-0, exopod I-0; I-1; III, 6 endopod 0-1; 0-2; III, 3

P4: coxa 0-1, basis 1-0, exopod I-0; I-1; II, 6 endopod 0-1; 0-1; III, 2

Spines of first endopod segment of legs 1-4 typically with pectinate terminal part. Leg 1 (Fig. 3B) with blunt, barbed spine (43 μm long) on inner surface of basis. This area of basis bearing row of

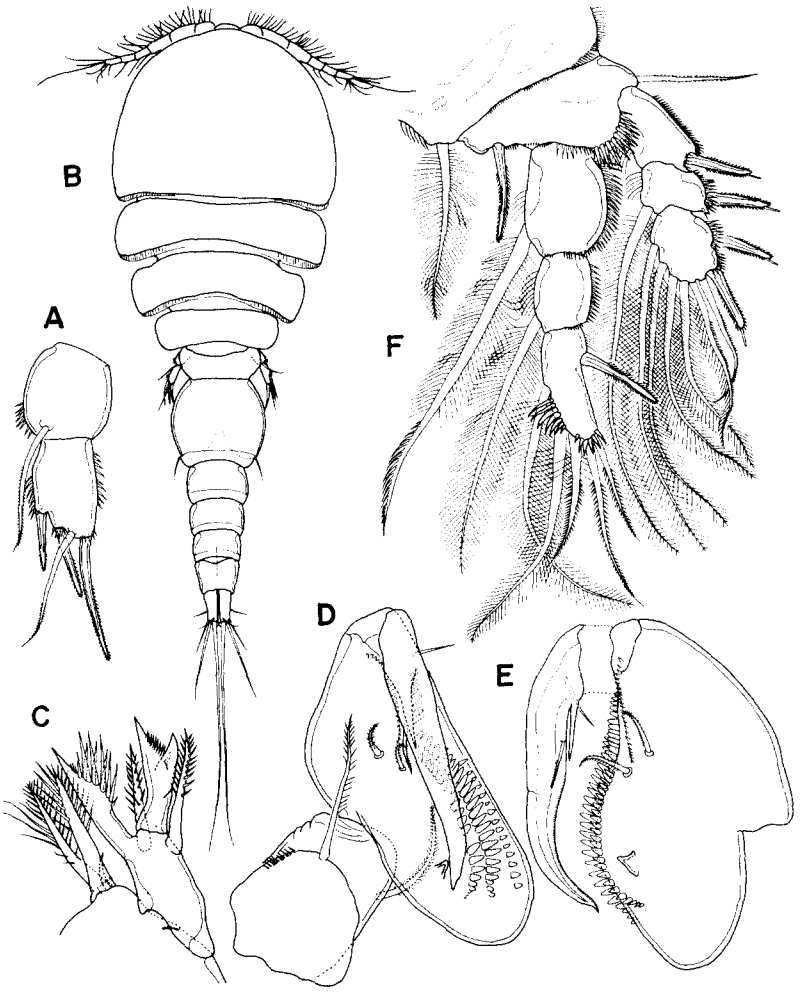

Fig. 4. *Hemicyclops ctenidis,* sp. n. Female. A, leg 5, dorsal. Male. B, dorsal; C, distal portion of second maxilla; D, E, maxillipeds; F, leg 1. Scales: A, D–F=c, B=a, C=f.

spinules in legs 2 and 3 (Fig. 3C) but naked in leg 4 (Fig. 3D). Ventral margin of intercoxal plate in leg 1 with hairs, but replaced with rows of spinules in legs 2-4. All outer spines on leg 1 exopod with subterminal setule, but in legs 2-4 such setule present only on distal spine of third segment. Leg 5 (Fig. 4A) 2-segmented. Segments about equal in length. First segment with seta (67 μm long) and spinules along outer distal corner. Second segment 1.5 times as long as wide, with spinules on both outer and inner margins; terminally bearing 3 spines (29, 36, and 62 μm long, respectively from outer to inner) and seta (63 μm long). Leg 6 (Fig. 2A) represented by three minute spinules in egg sac attachment area; of which middle one distinctly larger. Specimens, when alive, red in color.

Male

Body (Fig. 4B) larger than female. Length (excluding setae on caudal rami) 1.12 mm (1.05-1.23 mm) and greatest width 0.41 mm (0.39-0.43 mm), based on 10 specimens. Prosome flatter and broader than those of female. Ratio of length to

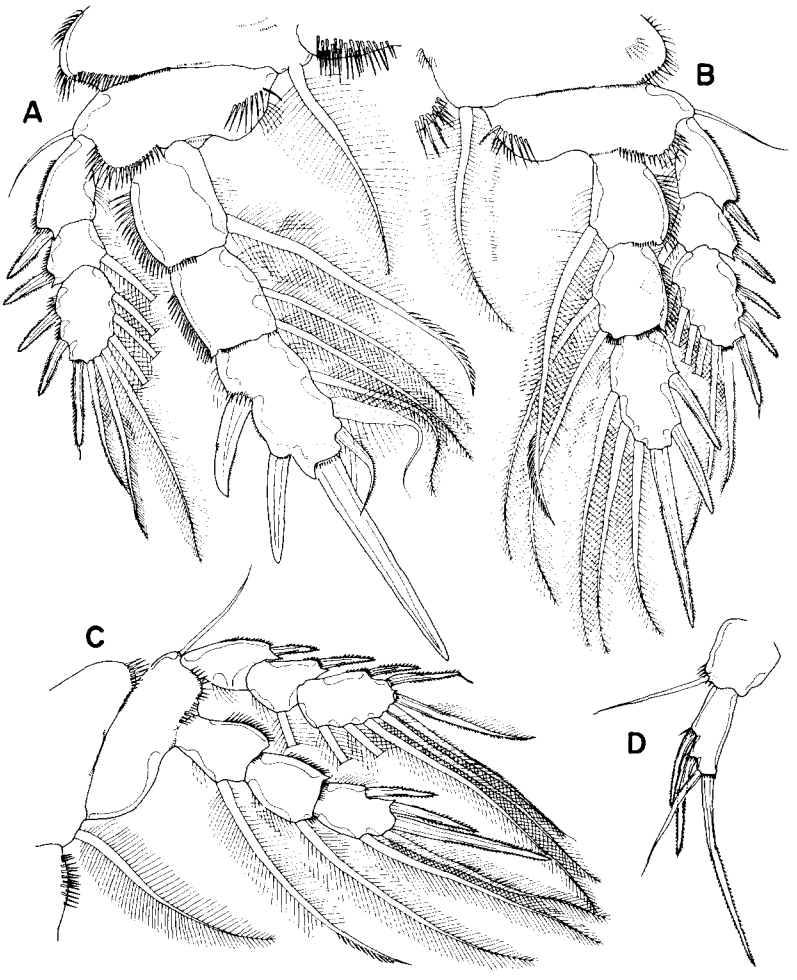

Fig. 5. *Hemicyclops ctenidis*, sp. n. Male. A, leg. 2; B, leg 3; C, leg 4; D, leg 5. Scale: A–D=c.

width in prosome 10:7 (10:6 in female).

Genital segment as long as wide, 172×175 μm. Four postgenital segments each wider than long, 72×114, 67×103, 56×89, and 63×81 μm from anterior to posterior.

Rostrum a little more conspicuous than in female. First antenna same as in female except for number of setae of second segment which bearing 15 instead of 14 as in female.

Second maxilla (Fig. 4C) much as in female. Maxilliped (Fig. 4D and E) with 2 long setae on first segment. Second segment with triangular process on inner dorsal area at proximal third, 3 rows of denticles on inner edge, one row of spinules on distal half, and 2 medial setae. Third segment very short. Claw 0.8 times as long as second segment, with 2 setae and spiniform process near base.

Formula for leg armature same as in female, but leg 1 and 2 show significant sexual dimorphism. Leg 1 (Fig. 4F) endopod third segment elongate, with 2 groups of spines: one group on distal border and another on inner border. Leg 2 (Fig. 5A) endopod strong and long, about 1.6 times as long as exopod; its third segment with 3 smooth, large spines, of which terminal one very long, distinctly longer than segment; of 3 setae on segment distal two somewhat transformed. Legs 3 (Fig. 5B) and 4 (Fig. 5C) nearly as those of female. Leg 5(Fig. 5D) slender. Second segment 2.6 times as long as wide, kwith naked lateral sides; elements on distal

end comparatively longer than those in female. Leg 6 represented by unarmed seta on ventrolateral corner of genital segment.

Color as in female.

Etymology

The specific name, *ctenidis* (Greek, comb), is named for the comb-like terminal portion of the seta on the first endopod segment in legs 1-4.

Comparison with other species

In their revisionary work, Vervoort and Ramirez (1966) recognized 22 species in *Hemicyclops*. Sicne then 2 more species have been described, these are *H. perinsignis* Humes, 1973 and *H. columnaris* Humes, 1984. Thus, 24 species are currently known in this genus.

The new species from Korea has three distinctive features: (1) 6-segmented first antenna, (2) a comb-like distal portion on the inner seta of the first endopod segment of legs 1-4, and (3) second endopod segment of leg 4 with only one seta. The last feature is shared with *H. carinifer* Humes, 1965, but the other two features are unique to this Korean species. Thus, *H. ctenidis* can be easily distinguished from the 24 species of *Hemicyclops* by the combination of these three features.

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(Accepred January 30, 1990)

갯이렁이와 공생하는 한국산 요각류(Clausidiidae) 1신종 *Hemicyclops ctenidis*

주세이호 · 김일회*(미국 캘리포니아 주립대학(롱 비치) 생물학과, 강릉대학 생물학과*)

강릉 남대천에서 채집된 갯지렁이 *Neanthes japonica*로 부터 분리해낸 요각류 신종 *Hemicyclops ctenidis*를 기재하였다. 이 신종은 제 1 촉각의 마디수, 첫째부터 네째 다리의 내지 첫마디에 있는 안쪽 강모의 구조, 네째다리 내지의 둘째마디의 강모수를 볼때 동일 속의 다른 24종과 구별되어진다.