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Authors: Lin, Ching-Long, and Ho, Ju-shey

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**Three species of *Pseudotaeniacanthus* Yamaguti & Yamasu, 1959
(Copepoda, Taeniacanthidae) parasitic on laced moray
(*Gymnothorax favagineus*) in Taiwan**

Ching-Long Lin* and Ju-shey Ho

(CLL) Department of Aquatic Sciences, National Chiayi University, Chiayi 60083, Taiwan,
e-mail: cllin@mail.ncyu.edu.tw;

(JSH) Department of Biological Sciences, California State University, Long Beach,
California 90840-3702, U.S.A., e-mail: jsho@csulb.edu

Abstract.—Three new species of *Pseudotaeniacanthus* Yamaguti & Yamasu, 1959 were discovered infesting gill filaments of the laced moray, *Gymnothorax favagineus* Bloch & Schneider, caught off southern Taiwan. Two of these species, *P. dentiferus*, new species and *P. similis*, new species, are distinguished from their congeners by the presence of a tooth-like projection on the ventral side of the proximal segment of their antennule. *Pseudotaeniacanthus similis* differs from *P. dentiferus* in having a plumose seta (instead of a spine) on the outer margin of the terminal, endopodal segments of legs 2–4. The third species, *P. conspicuus*, new species, is distinguished by the presence of a rostral bar partially visible in dorsal view and a small protuberance on the posterolateral margin of the cephalothorax. A key to the 11 species of *Pseudotaeniacanthus* is provided.

Taeniacanthids (Taeniacanthidae) of *Pseudotaeniacanthus* Yamaguti & Yamasu, 1959 are so far known only from the gill filaments of anguilliforms (Anguilliformes) (Dojiri & Cressey 1987). Our recent examination of the moray eels of Taiwan yielded five new species of taeniacanthids from the laced moray, *Gymnothorax favagineus* Bloch & Schneider, 1801. Two of the five species, attributable to a new genus of taeniacanthids, have been reported elsewhere by Ho & Lin (2006). This report deals with the remaining three species, which are new to *Pseudotaeniacanthus*.

With the addition of these three new species, 11 species altogether are currently known in the genus. Thus, a key to the species of *Pseudotaeniacanthus* is provided

at the end of this report to facilitate identification of these taeniacanthids.

This is the first report of three congeneric species of parasitic copepods from the same microhabitat on a single species of fish host. An example of such a multiple infestation has been reported only once for the symbiotic copepods from a species of sea anemone, *Heteractis crispa* (Ehrenberg, 1834). According to Humes (1982), four congeneric species of *Critomolgus* (reported as *Doridicola*) were obtained from the washing of a single specimen of *H. crispa* collected in New Caledonia.

Materials and Methods

Moray eels caught and landed at fishing ports in southern Taiwan were purchased and transferred in an icebox to National Chiayi University. In the laboratory, the gill cavity of the eels was fully

* Corresponding author.

exposed by cutting and folding back the operculum. Copepod parasites removed from the gill filaments were preserved in 70% ethanol. Five of them were later selected and cleared in 85% lactic acid for 1 to 2 hr before dissection in a drop of lactic acid on a wooden slide (Humes & Gooding 1964). Copepod body parts and appendages were examined under the compound microscope at a series of magnifications up to 1500 \times . Drawings were made with the aid of a camera lucida, and measurements were taken of selected specimens after soaking them in lactic acid.

Systematic Account

Order Poecilostomatoida Thorell, 1859

Family Taeniacanthidae Wilson, 1911

Genus *Pseudotaeniacanthus* Yamaguti & Yamasu, 1959

Pseudotaeniacanthus dentiferus,

new species

Figs. 1–3

Material examined.—52 parasites collected from gill filaments of laced morays, *G. favagineus*: 12 ♀♀ on 4 hosts landed at Dong-Gang Fishing Port on 27 Dec 2003; 27 ♀♀, 4 ♂♂ and 2 ♀ juveniles on 1 host landed at Tai-Dong Fishing Port on 27 Jan 2005 (types selected from this collection); and 7 ♀♀ on 1 host landed at Dong-Gang Fishing Port on 21 October 2005. Holotype ♀ (USNM 1082975), allotype ♂ (USNM 1082976) and 16 paratypes (15 ♀♀ USNM 1082977; 1 ♂ USNM 1082978) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.

Female.—Body (Fig. 1A) 2.24 (1.80–2.60) mm long, excluding setae on caudal rami. Cephalothorax wider than long, 0.41 (0.36–0.44) \times 0.70 (0.66–0.76) mm, with protruded posterolateral corners. Urosome long, one-half length of body, 1.12 (1.10–1.30) mm. Genital somite wider than long, 0.19 (0.18–0.22) \times 0.31 (0.30–0.32) mm, with area of egg sac

attachment (Fig. 1K) not visible when viewed dorsally. Abdomen (Fig. 1B) 4-segmented; posterior margin of first three somites fringed with hyaline membrane on ventral side; anal somite with anterior and posterior row of spinules on ventral surface. Caudal ramus (Fig. 1B) longer than wide, 66 (65–69) \times 41 (41–45) μ m, and armed with 5 short and 2 long setae. Egg sac (Fig. 1A) longer than body, 2.76 mm in length.

Rostral area slightly protruded anteriorly (Fig. 1A), Y-shaped rostral bar armed with rows of hooklets on arms (Fig. 1C). Antennule (Fig. 1D) 7-segmented; armature formula: 5 + 1 spine, 14, 4, 3, 4, 2 + 1 aesthetasc, and 7 + 1 aesthetasc; first segment with tooth on ventral surface. Antenna (Fig. 1E) 4-segmented; proximal segment (coxobasis) bearing single distal seta; first endopodal segment bearing long outer seta; second endopodal segment with 2 pectinate, distal processes and 1 curved, terminal claw (longer process with tiny distal seta and shorter process with tiny medial seta); third endopodal segment tipped with 4 unequal, curved claws and 3 unequal setae (Fig. 1F). Mandible (Fig. 1G) tipped with 2 unequal blades bearing marginal serrations along posterior margin and distal portion of anterior margin. Maxillule (Fig. 1H) represented by lobe tipped with 3 short and 2 long setae. Maxilla (Fig. 1I) 2-segmented; proximal segment large, unarmed; distal segment small, tipped with 3 setae and 1 short, unipinnate seta. Maxilliped (Fig. 1J) 3-segmented; proximal segment (syncoxa) triangular, bearing long subterminal seta; middle segment (basis or corpus) largest, greatly protruded outward in basal region, and equipped with tiny seta on medial margin; terminal (endopodal) segment indistinct, tipped with 2 extremely unequal setae.

Armature on rami of legs 1–4 as follows (Roman numerals indicating spines and Arabic numerals, setae):

	Coxa	Basis	Exopod	Endopod
Leg 1	0-1	1-0	1-0; I-1; 8	0-1; 0-1; 5
Leg 2	0-1	1-0	I-0; I-1; II, I, 5	0-1; 0-2; I, 4
Leg 3	0-1	1-0	I-0; I-1; II, I, 5	0-1; 0-2; I, I, I, 2
Leg 4	0-1	1-0	I-0; I-1; II, I, 5	0-1; 0-1; III

Leg 1 (Fig. 2A) fringed with row of setules on posterior margin of intercoxal plate and a narrow hyaline membrane on outer margin of protopod. Legs 2 (Fig. 2B), 3 (Fig. 2C), and 4 (Fig. 2D) with row of long spinules on ventrolateral margin of coxa, ventral margin near base of endopod, and outer margin of all segments on both rami. All outer spines on these 3 pairs of legs long and pinnate. Leg 5 (Fig. 2E) 2-segmented; proximal segment short, armed with small, outer seta; distal segment about as long as wide, ornamented with 2 rows of spinules on postero-distal margin, and armed with 3 pinnate spiniform setae and 1 naked seta. Leg 6 represented by 3 long setae on genital operculum, located in pit for attachment of egg sac (Fig. 1K).

Male.—Body (Fig. 3A) 1.04 (1.00–1.10) mm long, excluding setae on caudal rami. Cephalothorax wider than long, 250 (240–260) × 379 (365–405) μm. First pediger completely fused to cephalosome, remaining pedigers on prosome distinctly separated from each other and becoming narrower posteriorly. Urosome 387 (373–413) μm long, shorter than prosome and occupying 37% of body length. Genital somite wider than long, 118 (113–122) × 134 (130–138) μm, with row of spinules on genital ridge (Fig. 3B) carrying leg 6. Abdomen 4-segmented (Fig. 3C); fringed with hyaline membrane on posteroventral margin on first 3 somites; anal somite with row of spinules on ventral side across anterior and posterior margins. Caudal ramus (Fig. 3C) longer than wide, 32 × 24 μm, armed as in female.

Maxilliped (Fig. 3D) 4-segmented; proximal segment (syncoxa) armed with long, medial seta; second segment (basis or corpus) largest, armed with small, blunt, short process and large split-tip myxal process bearing 2 setae and fringed with blunt spines along distal margin; third segment (first endopodal segment) smallest and unarmed; terminal endopodal segment a long, curved claw with row of teeth on medial margin, 2 basal setae and a robust basal knob tipped with 3 teeth.

Armature on rami of legs 1–4 as in female, but segments of leg 2 (Fig. 3E), leg 3 (Fig. 3F), and leg 4 (Fig. 3G) ornamented differently, bearing more robust spinules instead of long, fine spinules. Leg 5 (Fig. 3H) 2-segmented; proximal segment larger than distal segment, armed with naked, outer seta; distal segment armed with 2 rows of spinules, 3 pinnate spines and long, spiniform seta. Leg 6 (Fig. 3B) represented by seta on genital ridge.

Etymology.—The species name *dentiferus* means “bearing tooth” in Latin, alluding to the tooth-like projection on the ventral surface of the first segment of the antennule (Fig. 1D).

Remarks.—*Pseudotaeniacanthus dentiferus* resembles the following five congeners: *P. congeri* Yamaguti & Yamasu, 1959; *P. margolisi* Johnson & Kabata, 1995; *P. muraenesocis* Devi & Shyamasundari, 1980; *P. puhi* Lewis, 1967; and *P. septemsetigerus* Johnson & Kabata, 1995, in their structure of leg 4, viz. having an armature formula of II, I, 5 on the terminal exopodal segment and 3 elements on the terminal endopodal segment. However, it differs from *P. congeri* and *P. muraenesocis* in the absence of posterior tines on the rostral bar in both sexes and bearing in the female a tooth-like projection on the ventral surface of the first segment of the antennule. *Pseudotaeniacanthus dentiferus* can be distinguished from *P. margolisi* and *P. puhi* by

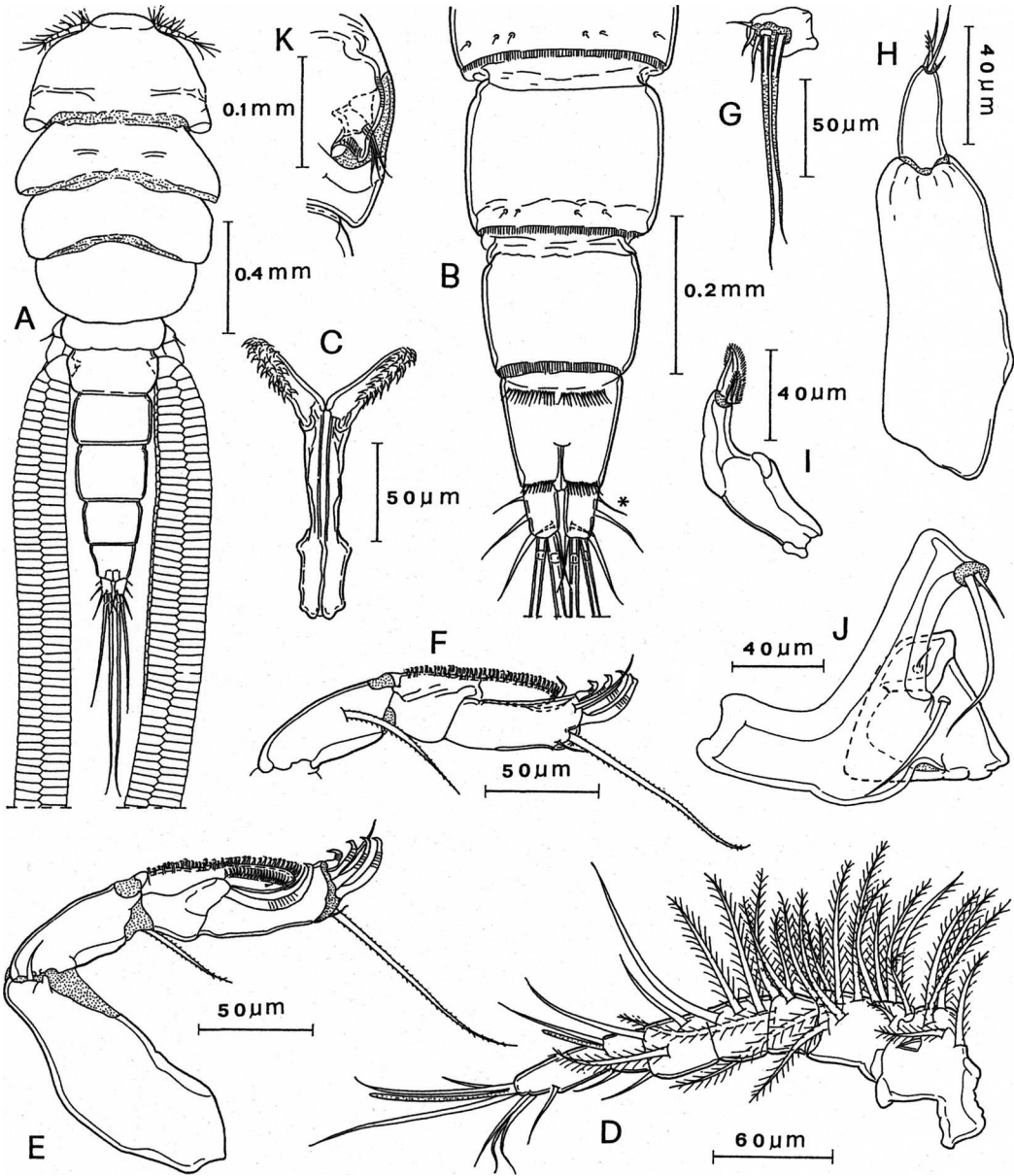


Fig. 1. *Pseudotaeniocanthus dentiferus*, female paratype. A, habitus, dorsal; B, abdomen, ventral (* indicates seta I); C, rostral bar, ventral; D, antennule, ventral; E, antenna, posteroventral; F, endopod of antenna, anterodorsal; G, maxillule; H, maxilla; I, mandible; J, maxilliped; K, left side of genital segment, ventral.

the structure and armature of the caudal ramus in addition to the presence of a tooth-like projection on the ventral surface of the first segment of the antennule. *Pseudotaeniocanthus dentiferus* differs further from *P. puhi* in bearing a large myxal processes on the male maxilliped.

Pseudotaeniocanthus dentiferus is unusual for being armed with 7 elements on the caudal ramus. This is an ancestral character state retained in the extant species of copepods (Huys & Boxshall 1991). This ancestral character state [the seta on Figs. 1B, 3C indicated with an

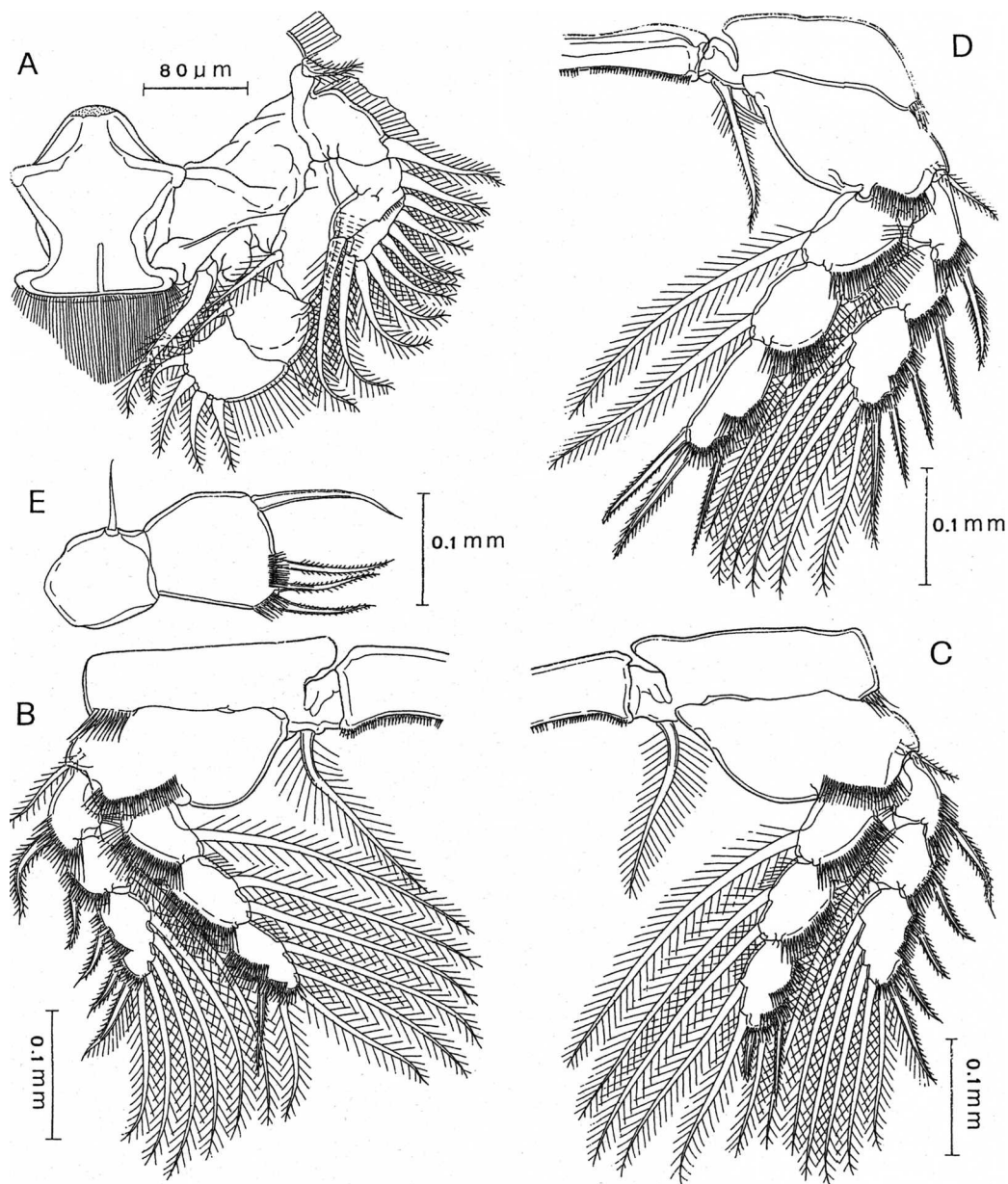


Fig. 2. *Pseudotaeniocanthus dentiferus*, female paratype. A, leg 1, anterior; B, leg 2, anterior; C, leg 3, anterior; D, leg 4, anterior; E, leg 5, anterior.

asterisk (*)] is exhibited also by *P. septemsetigerus*. Nevertheless, as indicated in the species name, *P. dentiferus* is distinguished from *P. septemsetigerus* by the presence of a tooth-like projection on the ventral surface of the first segment of the antennule (see Fig. 1D).

Pseudotaeniocanthus similis, new species Figs. 4–6

Material examined.—Eight parasites from gill filaments of *G. favagineus* landed at Dong-Gang Fishing Port: 3 ♀♀ and 2 ♂♂ collected from 1 host on 27 Dec

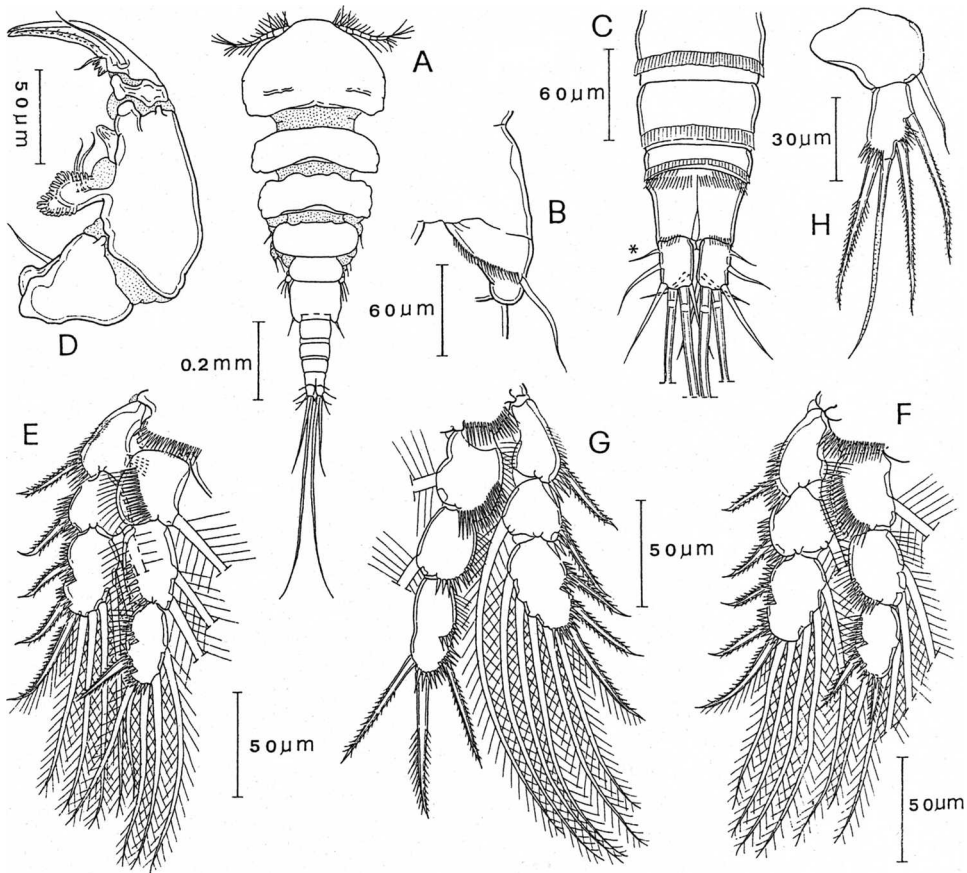


Fig. 3. *Pseudotaeniacanthus dentiferus*, male paratype. A, habitus, dorsal; B, left side of genital segment, ventral; C, abdomen, ventral (* indicates seta I); D, maxilliped; E, rami of leg 2, anterior; F, rami of leg 3, anterior; G, rami of leg 4, anterior; H, leg 5, anterior.

2003 and 3 ♀♀ collected from 1 host on 21 Oct 2005. Holotype ♀ (USNM 1082983 from 2003 collection) and 2 ♀ paratypes (USNM 1082984 from 2005 collection) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.

Female.—Body (Fig. 4A) 1.41 (1.32–1.48) mm long, excluding setae on caudal rami. Cephalothorax wider than long, 0.30 (0.30–0.30) × 0.54 (0.51–0.56) mm, appearing as an inverted bowl. Urosome shorter than one-half of total body length, 0.60 (0.58–0.61) mm. Genital somite wider than long, 119 (113–122) × 216 (203–227) μm, with area of egg sac attachment not visible in dorsal view (Fig. 4A) and concealed in ventral view

(Fig. 4K). Abdomen (Fig. 4B) 4-segmented; with U-shaped sclerite on ventral surface of first 3 somites; anal somite ornamented with 3 transverse rows of spinules (one anterior and two posterior) on ventral surface. Caudal ramus (Fig. 4B) longer than wide, 43 (41–49) × 24 (24–24) μm, and armed with usual 4 short and 2 long setae. Egg sac (Fig. 4A) longer than body, 1.64 mm in length.

Rostrum, Y-shaped rostral bar (Fig. 4C), antennule (Fig. 4D), mandible (Fig. 4I), and maxillule (Fig. 4G) similar to those in *P. dentiferus*. Antenna (Fig. 4E, F) also similar to that of *P. dentiferus*, except for not having unusually long seta on dorsal side of terminal claws. Maxilla (Fig. 4H) 2-segmented; proximal segment

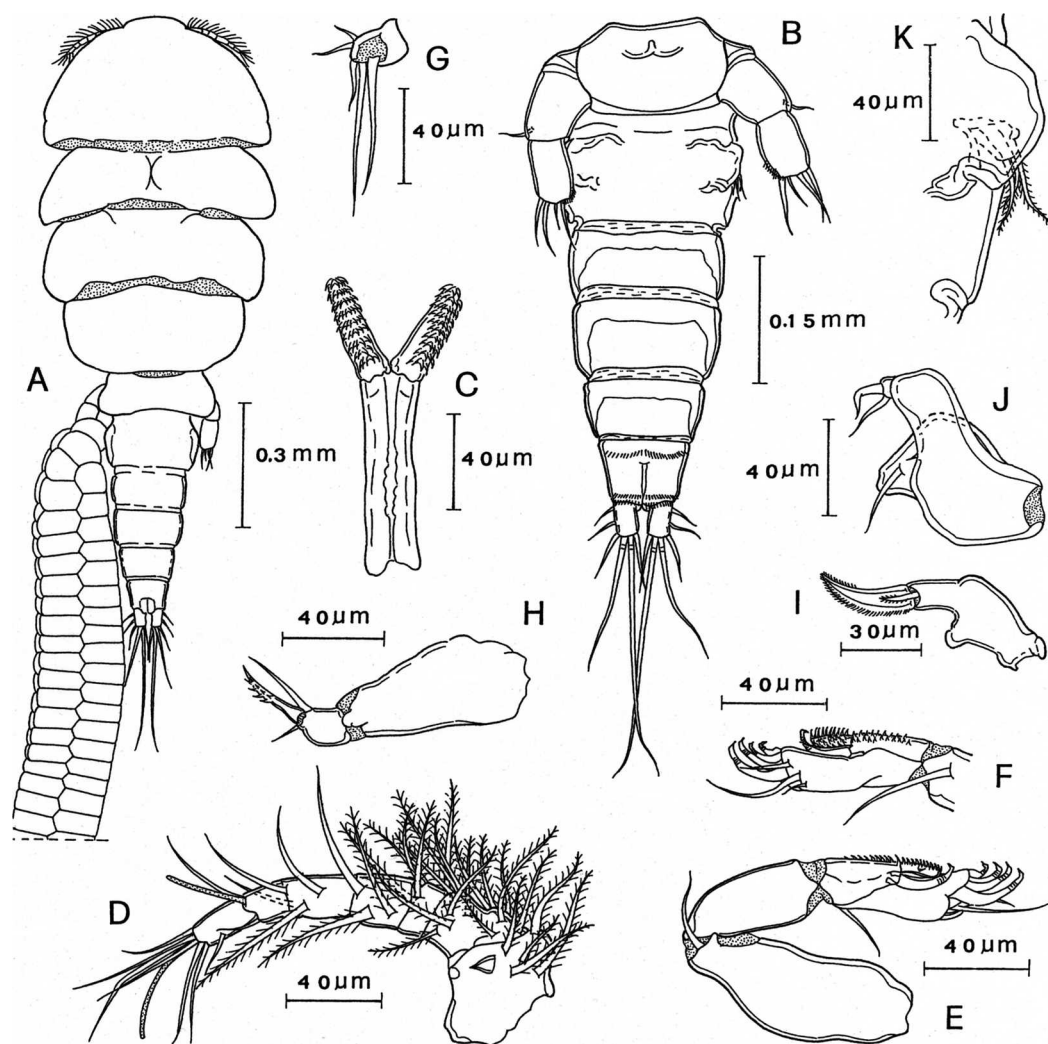


Fig. 4. *Pseudotaeniacanthus similis*, female paratype. A, habitus, dorsal; B, urosome, ventral; C, rostral bar, ventral; D, antennule, ventral; E, antenna, posteroventral; F, tip of antenna, anterodorsal; G, maxillule; H, maxilla; I, mandible; J, maxilliped; K, left side of genital segment, ventral.

large but unarmed; distal segment small, tipped with 2 setae and 1 pinnate spiniform process. Maxilliped (Fig. 4J) 3-segmented; proximal segment (syncoxa) triangular, bearing long subterminal seta; middle segment (basis or corpus) largest, armed with tiny seta on medial margin; terminal (endopodal) segment indistinct, tipped with 2 subequal setae.

Armature on rami of leg 1 (Fig. 5A) as in *P. dentiferus*. That on leg 2 (Fig. 5B), leg 3 (Fig. 5C), and leg 4 (Fig. 5D) essentially as in *P. dentiferus*, except

outermost element on third endopodal segment of each leg a plumose seta. Leg 5 (Fig. 5E) different from that of *P. dentiferus* in ornamentation and relative length of 4 terminal elements, particularly the second innermost element, on distal segment. Leg 6 represented by 3 long setae on genital operculum, located in a pit for attachment of egg sac (Fig. 4K).

Male.—Body (Fig. 6A) 911 (899–923) μm long, excluding setae on caudal rami. Cephalothorax wider than long, 194

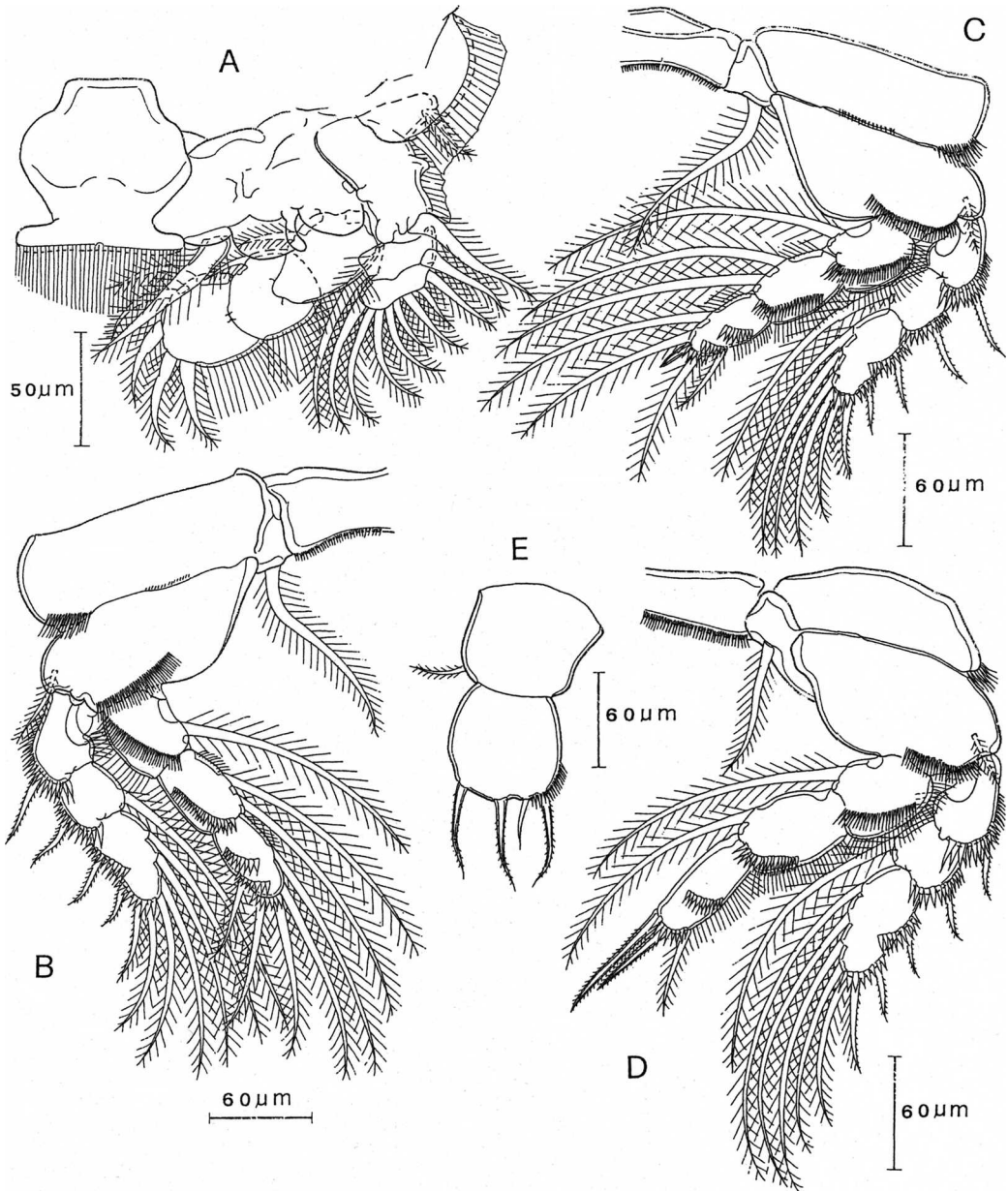


Fig. 5. *Pseudotaeniacanthus similis*, female paratype. A, leg 1, anterior; B, leg 2, anterior; C, leg 3, anterior; D, leg 4, anterior; E, leg 5, anterior.

(170–219) \times 326 (324–328) μm . First pediger completely fused to cephalosome; remaining pedigers on prosome distinctly separate from each other and becoming narrower posteriorly. Urosome 397 (373–421) μm long, shorter than prosome and occupying 44% of body length. Genital

somite slightly wider than long, 116 (105–126) \times 128 (122–134) μm , with row of spinules on genital ridge (Fig. 6E). Abdomen 4-segmented (Fig. 6A); fringed with 2 anterior and 2 posterior transverse rows of spinules on ventral surface of anal somite (Fig. 6D). Caudal ramus (Fig. 6D)

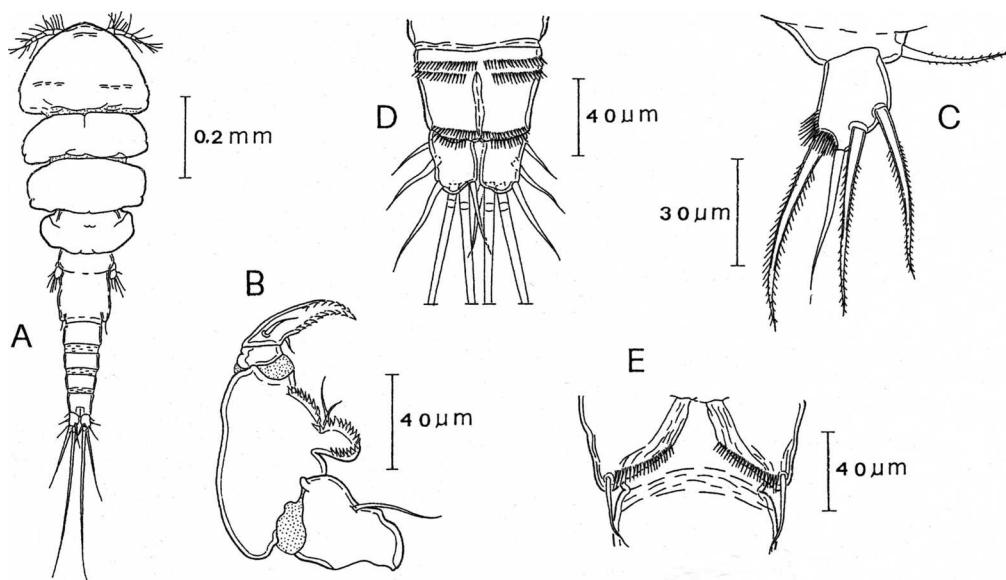


Fig. 6. *Pseudotaeniacanthus similis*, male paratype. A, habitus, dorsal; B, maxilliped; C, leg 5, anterior; D, anal somite and caudal rami, ventral; E, posterior part of genital segment, ventral.

longer than wide, 31 (30–32) \times 21 (20–22) μ m, and armed as in female.

Maxilliped (Fig. 6B) 4-segmented; proximal segment (syncoxa) armed with long seta; second segment (basis or corpus) largest, fringed with spines along medial margin and armed with large myxal process bearing 2 setae; third segment (first endopodal segment) smallest and unarmed; terminal endopodal segment a short claw with 1 row of teeth on each medial margin and 2 setae in basal region.

Armature on rami of legs 1–4 as in female. Leg 5 (Fig. 6C) 2-segmented; proximal segment wide and short, armed with pinnate outer seta; distal segment armed with 3 pinnate spines and naked seta; short row of setules on distal medial margin and base of innermost element. Leg 6 (Fig. 6E) represented by naked seta on genital ridge.

Etymology.—The species name *similis* means “resembling” in Latin, alluding to the similarity with the previous new species, *P. dentiferus*.

Remarks.—*Pseudotaeniacanthus similis* resembles *P. dentiferus* not only in the presence of a tooth-like process on the first segment of the antennule but also in most cephalic and thoracic appendages. However, it is distinctly smaller than *P. dentiferus* and carries in both sexes a maxilla and maxilliped with different terminal structure. The tip of the maxilla of *P. dentiferus* is armed with 3 setae and 1 short unipinnate seta, but in *P. similis*, the same area is tipped with 2 setae and 1 pinnate spiniform process. The 2 elements at the tip of the maxilliped are extremely unequal in length in *P. dentiferus*, whereas in *P. similis*, the 2 elements are subequal. The presence of an outer plumose seta on the terminal endopodal segment of legs 2–4 in *P. similis* is also distinctive.

***Pseudotaeniacanthus conspicuus*,**
new species
Figs. 7–9

Material examined.—Seventeen parasites from gill filaments of laced moray, *G. favagineus*: 3 ♀♀ on 1 host collected at

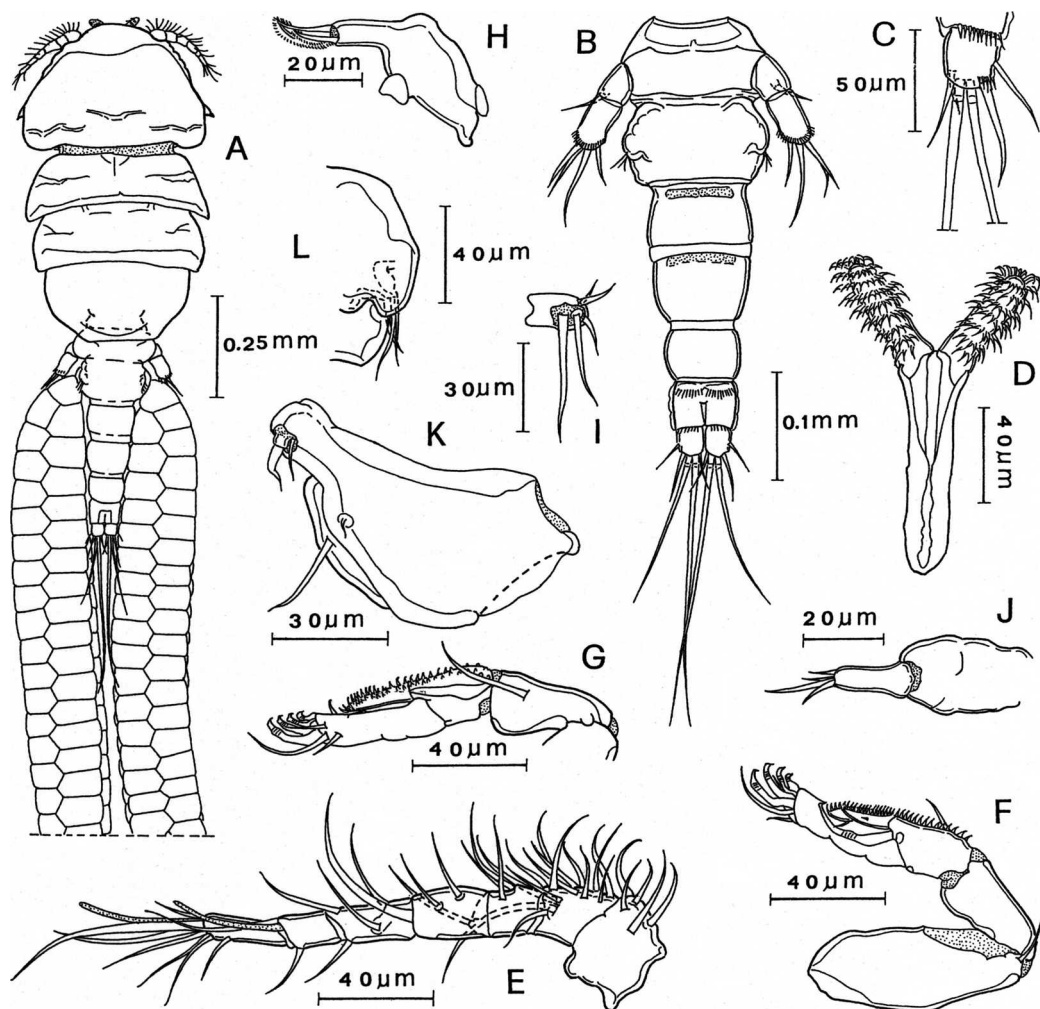


Fig. 7. *Pseudotaeniacanthus conspicuus*, female paratype. A, habitus, dorsal; B, urosome, ventral; C, caudal ramus, ventral; D, rostral bar, ventral; E, antennule, ventral; F, antenna, posteroventral; G, endopod of antenna, anterodorsal; H, mandible; I, maxillule; J, maxilla; K, maxilliped; L, left side of genital segment, ventral.

Dong-Gang Fishing Port on 27 Dec 2003; 3 ♀♀ and 8 ♂♂ on 1 host landed at Tai-Dong Fishing Port on 27 Jan 2005; and 1 ♀ and 2 ♂♂ on 1 host collected on 21 Oct 2005. Holotype ♀ (USNM 1082979, from collection of January 2005), allotype ♂ (USNM 1082980, from collection of January 2005) and 5 paratypes (2 ♀♀ USNM 1082981, from 2003 collection; 3 ♂♂ USNM 1082982, from collection of January 2005) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.

Female.—Body (Fig. 7A) 1.07 (0.99–1.13) mm long, excluding setae on caudal rami. Cephalothorax wider than long, 267 (251–292) × 388 (332–421) μm, with small pointed protuberance on posterolateral margin (Fig. 7A). Urosome shorter than half of body length, 446 (421–470) μm. Genital somite wider than long, 99 (89–105) × 140 (134–146) μm, with area of egg sac attachment occurring on lateral side (Fig. 7B). Abdomen (Fig. 7B) 4-segmented; first 3 somites unornamented; anal somite ornamented with 1 anterior and 1

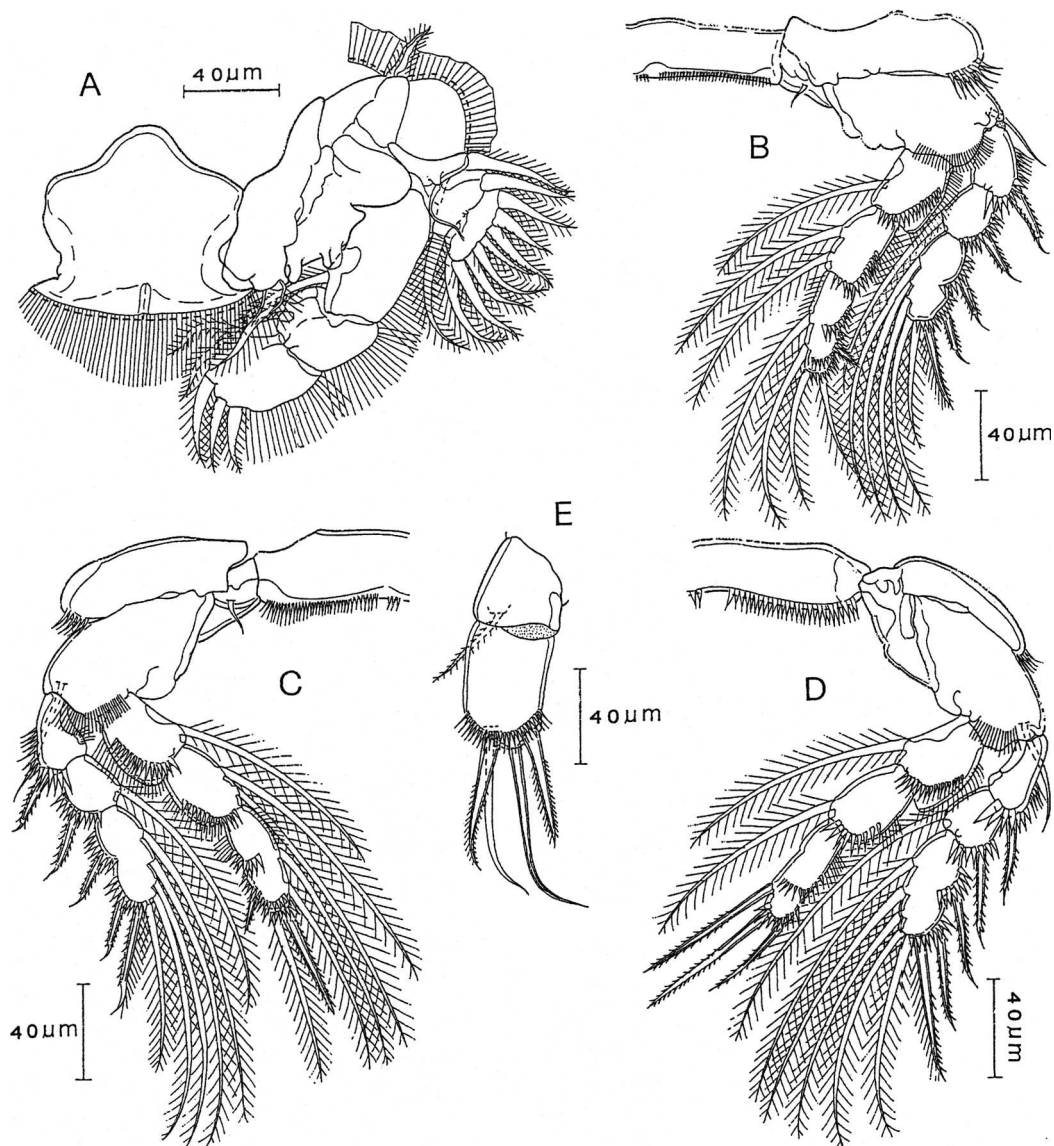


Fig. 8. *Pseudotaeniacanthus conspicuus*, female paratype. A, leg 1, anterior; B, leg 2, anterior; C, leg 3, anterior; D, leg 4, anterior; E, leg 5, anterior.

posterior transverse row of spinules on ventral surface. Caudal ramus (Fig. 7C) slightly longer than wide, $30\ (28\text{--}32) \times 25\ (24\text{--}28)\ \mu\text{m}$, and armed with usual 4 short and 2 long setae. Egg sac (Fig. 7A) longer than body, 1.22 mm long.

Teeth on Y-shaped rostral bar (Fig. 7D) coarser than those on *P. dentiferus* and *P. similis*. Formula of armature on antennule (Fig. 7E) as in

previous two species, except for lack of tooth-like process on proximal segment. Antenna (Fig. 7F, G), mandible (Fig. 7H), maxillule (Fig. 7I) and maxilliped (Fig. 7K) generally as in *P. similis*, while maxilla (Fig. 7J) resembling that of *P. dentiferus*.

Armature on rami of legs 1–4 (Fig. 8A–D) as in *P. dentiferus*, but ornamentation on these segments like that of *P. similis*.

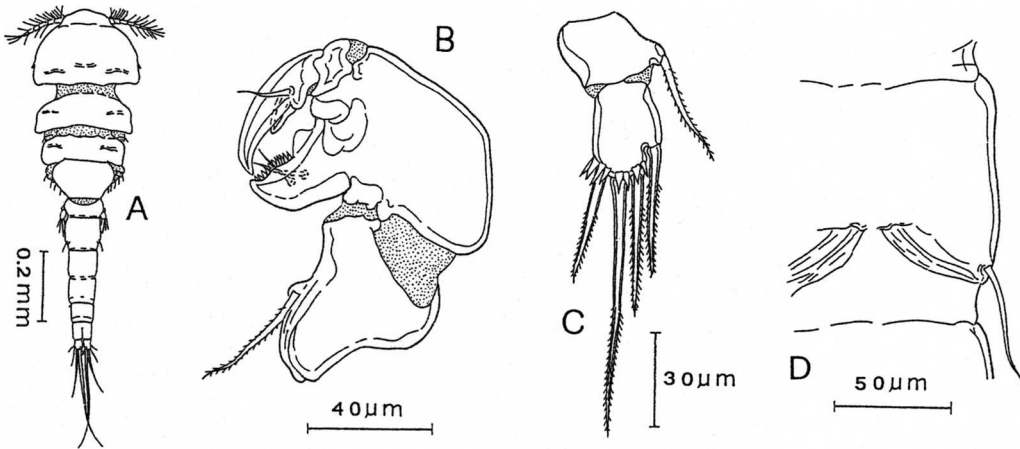


Fig. 9. *Pseudotaeniacanthus conspicuus*, male paratype. A, habitus, dorsal; B, maxilliped; C, leg 5, anterior; D, left side of genital segment, ventral.

Protopods of legs 2 and 3 (Fig. 8B–D) distinct from those of *P. dentiferus* and *P. similis* in bearing tiny, simple, inner coxal seta. Protopod of leg 4 (Fig. 8D) lacking this inner coxal seta. Leg 5 (Fig. 8E) tipped with 2 setae and 2 spines rather than 1 seta and 3 spines as in *P. dentiferus* and *P. similis*. Leg 6 represented by 3 long setae on genital operculum, located in a pit for attachment of egg sac (Fig. 7L).

Male.—Body (Fig. 9A) 930 (860–1080) μm long, excluding setae on caudal rami. Cephalothorax wider than long, 211 (203–243) \times 290 (275–340) μm , with tiny protuberance on posterolateral margin. First pediger completely fused to cephalosome, remaining pedigers on prosome distinctly separated from each other and becoming narrower posteriorly. Urosome 418 (381–502) μm long, shorter than prosome and occupying 45% of body length. Genital somite slightly wider than long, 95 (89–105) \times 103 (97–122) μm , without spinules on genital ridge (Fig. 9D). Abdomen 4-segmented (Fig. 9A). Caudal ramus (Fig. 9A) longer than wide, 26 (24–32) \times 21 (16–24) μm , and armed as in female.

Maxilliped (Fig. 9B) 4-segmented; proximal segment (syncoxa) armed with long, pinnate seta; second segment (basis

or corpus) largest, with robust myxal process fringed with teeth on distal half of medial margin and carrying 2 setae; third segment (first endopodal segment) smallest and unarmed; terminal endopodal segment a short claw equipped with 2 tooth-like processes and basal seta.

Armature on rami of legs 1–4 as in female. Leg 5 (Fig. 9C) 2-segmented; proximal segment squarish, armed with 1 outer, pinnate seta; distal segment armed with 4 pinnate spines and row of teeth on distal margin. Leg 6 (Fig. 9D) represented by a naked seta on genital ridge.

Etymology.—The species name *conspicuus* means “visible, standing out” in Latin, alluding to the appearance of the arms of the Y-shaped rostral bar in dorsal view (see Fig. 7A).

Remarks.—This is the smallest representative of *Pseudotaeniacanthus* found on the gill filaments of the laced moray. It is only half the size of *P. dentiferus*. It can be distinguished from *P. dentiferus* and *P. similis* by the presence of a small protuberance on the posterolateral margin of the cephalothorax, the lack of a tooth-like process on the proximal segment of the antennule, the arms of the Y-shaped rostral bar which protrude from the anterior margin of the cephalothorax in

dorsal view, and the fifth leg in female tipped with 2 setae and 2 spines.

Pseudotaeniakanthus conspicuus can be distinguished from six of the seven known congeners in having the armature of II,I,5 on the terminal exopodal segment of leg 4, 4 armature elements on the terminal endopodal segment of leg 3, and 3 armature elements on the terminal endopodal segment of leg 4. The species not distinguishable by these character states is *P. congeri*. However, the latter species is characteristic in bearing 2 basal tines on the rostral bar.

Key to the species of *Pseudotaeniakanthus*

In their revision of the Taeniakanthidae, Dojiri & Cressey (1987) provided a key to the six recognized species of *Pseudotaeniakanthus*, including an unnamed species called "*Pseudotaeniakanthus* species," which was reported by Lewis (1968) based on a single male obtained from Eniwetok Atoll. This unnamed species was not included in the key provided by Johnson & Kabata (1995).

1. Terminal exopod segment of leg 4 with armature of II,I,4
... *P. coniferus* Dojiri & Cressey, 1987
- Terminal exopod segment of leg 4 with armature of II,I,5 2
2. Terminal endopod segment of leg 4 with 4 armature elements 3
- Terminal endopod segment of leg 4 with 3 armature elements 4
3. Terminal exopod segment of leg 1 with 6 armature elements
... *P. longicauda* Pillai & Hameed, 1974
- Terminal exopod segment of leg 1 with 8 armature element
... *P. species* of Lewis 1968
4. Terminal endopod segment of leg 3 with 3 armature elements ... *P. muraenesocis* Devi & Shyamasundari, 1980
- Terminal endopod segment of leg 3 with 4 armature elements 5
- Terminal endopod segment of leg 3 with 5 armature elements 8
5. Y-shaped rostral sclerite with 2 posterior tines in basal region ...
... *P. congeri* Yamaguti & Yamasu, 1959

- Y-shaped rostral sclerite a simple bar in basal region 6
6. Proximal segment of antennule with out tooth on ventral surface ...
... *P. conspicuus*, new species
- Proximal segment of antennule with tooth on ventral surface 7
7. Terminal endopod segment of leg 4 with armature of III
... *P. dentiferus*, new species
- Terminal endopod segment of leg 4 with armature of I,II
... *P. similis*, new species
8. Caudal ramus bearing 5 setae 9
- Caudal ramus bearing 7 setae ..
... *P. septemsetigerus* Johnson & Kabata, 1995
9. Terminal exopod segment of leg 4 with 3 spines
... *P. margolisi* Johnson & Kabata, 1995
- Terminal exopod segment of leg 4 with 1 spine and 2 pinnate setae *P. puhi* Lewis, 1967

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