

***Anchistrotos kojimensis* sp. nov. (Copepoda: Taeniacanthidae)  
Parasitic on *Acanthogobius flavimanus* (Pisces: Teleostei)  
in Kojima Bay, Japan**

Tran The Do\* and Ju-shey Ho\*\*

\*Ocean Research Institute, University of Tokyo, Nakano-ku, Tokyo  
164, Japan

\*\*Department of Biology, California State University, Long Beach,  
California, 90840 U.S.A.

(Received April 11, 1983)

*Anchistrotos kojimensis* sp. nov. is described based on the adult females recovered in the branchial cavities of *Acanthogobius flavimanus* (TEMMINCK & SCHLEGEL) from Kojima Bay, Japan. It is the fourth species of parasitic copepods known from this host fish in Japan.

### Introduction

In his monumental work of reviewing the copepod parasites of British fishes, KABATA (1979) recognized 13 species of *Anchistrotos* BRIAN, 1906. However, since then, four more species have been added to this list, with two of them (*A. aluteri* and *A. trachuri*) by AVDEEV (1977) and another two (*A. parupenei* and *A. upenei*) by UMA DEVI & SHYAMA-SUNDARI (1980). Only two species of *Anchistrotos* are currently known from Japan, both of them (*A. callionymi* and *A. pleuro-nychthydis*) were described by YAMAGUTI (1939) as parasites of flounders (Pleuronectidae). In the following we shall report the third species of Japanese *Anchistrotos*, that was recovered from the yellow goby, *Acanthogobius flavimanus* (TEMMINCK & SCHLEGEL) in Kojima Bay, Okayama Prefecture.

### Material Examined

Nine adult females, collected from the branchial cavities of five *Acanthogobius flavimanus* on July 22, 1980 and March 24, 1981 were examined for making the following description. Holotype (USNM 184964) and paratype (USNM 184965) have been deposited in the United States National Museum of Natural History, Smithsonian Institution,

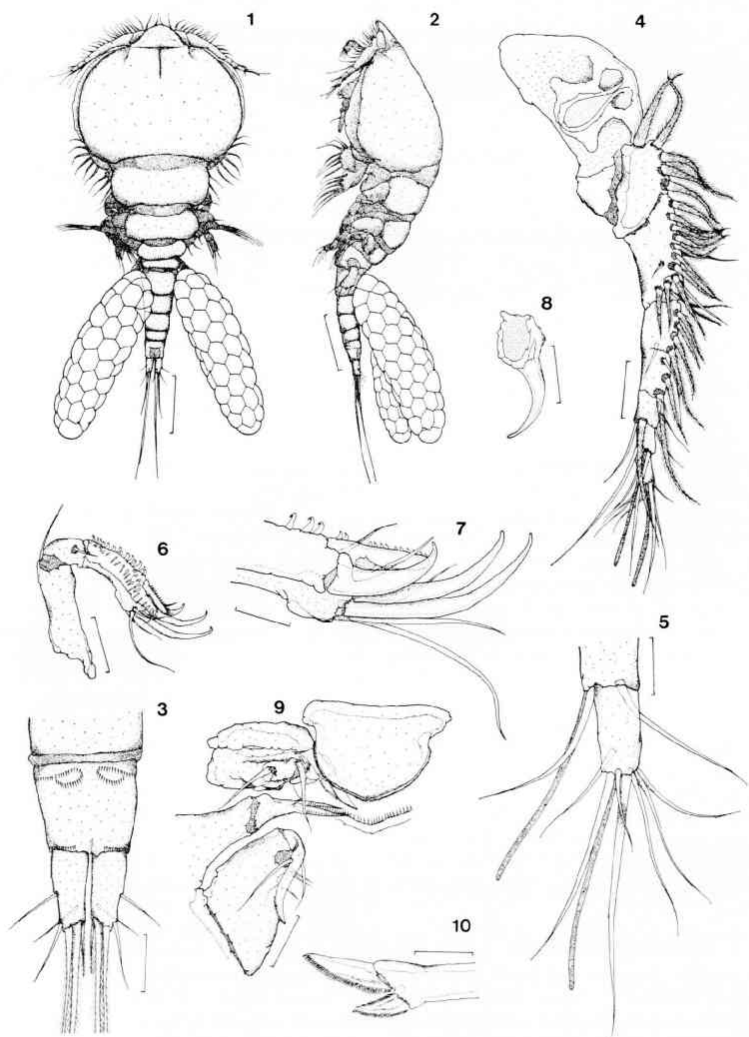
Washington, D.C., and the remaining specimens are kept in the authors' collection.

### Results and Discussion

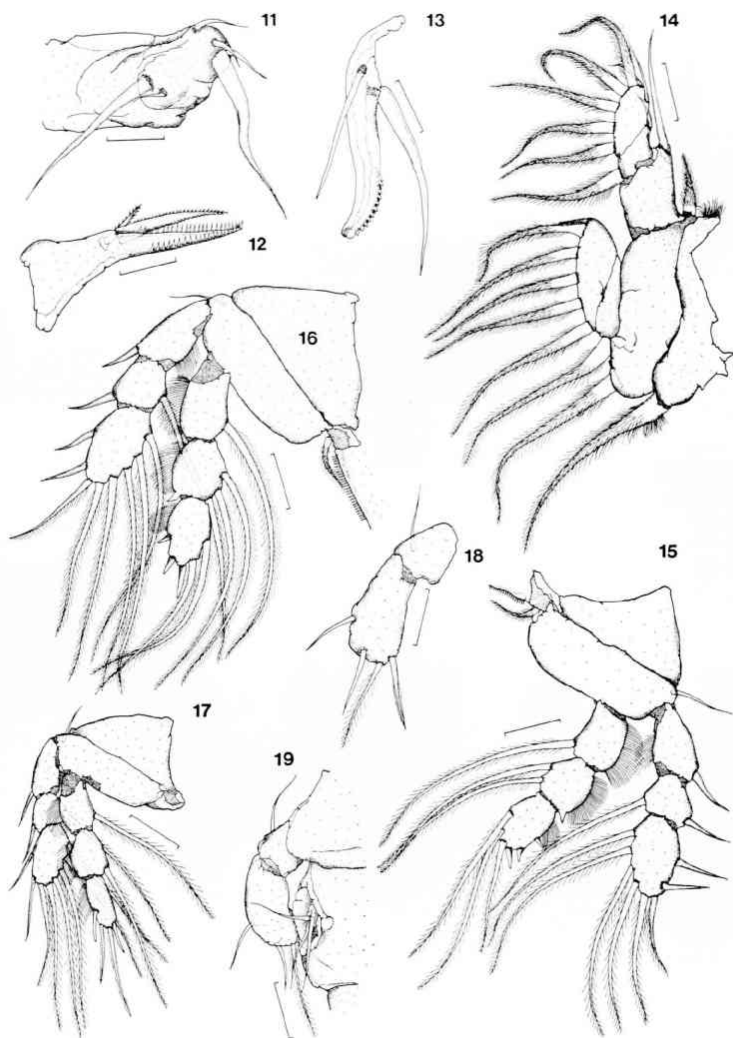
*Anchistrotos kojimensis* sp. nov.

*Female*: Body (Figs. 1, 2) with a large round cephalothorax bearing a prominent rostrum in mid-anterior margin and a strip of transparent membrane on each lateral margin. Free pedigerous somites becoming progressively smaller toward posterior. Genital complex barrel-shaped. Abdomen long, distinctly 4-segmented, and progressively narrowed posteriorly. Anal segment (Fig. 3) with spinules on ventral surface. Caudal ramus (Fig. 3) narrow, 2 times longer than wide and bearing 6 setae of usual form.

Rostral area (Fig. 4) with a pair of horizontally directed blunt process. First antenna (Fig. 4) 6-segmented, first 2 segments larger than others, armature on these segments being: 5 hairy setae, 12 hairy+3 naked setae, 6 hairy +2 naked setae, 1 hairy +3 naked setae, 2 naked setae +1 aesthete, and 7 naked setae +1 aesthete (see Fig. 5). Second antenna (Fig. 6) 3-segmented; first segment with 1 long seta near distal margin; second with 1 short seta; terminal segment with 2 or 3 rows of hooks and tipped with 3 hooklike spines and 5 slender setae (see Fig. 7). Postantennary process (Fig. 8) with



*Anchistrotos kojimensis* sp. nov., female: **Fig. 1.** Ovigerous female, dorsal (200  $\mu$ m). **Fig. 2.** Same, lateral (200  $\mu$ m). **Fig. 3.** Anal segment and caudal ramus, ventral (50  $\mu$ m). **Fig. 4.** Rostral area and first antenna, ventral (50  $\mu$ m). **Fig. 5.** Tip of first antenna, lateral (20  $\mu$ m). **Fig. 6.** Second antenna, posterior (50  $\mu$ m). **Fig. 7.** Tip of second antenna, anterior (20  $\mu$ m). **Fig. 8.** Postantennary process, ventral (50  $\mu$ m). **Fig. 9.** Labrum and oral appendages, ventral (50  $\mu$ m). **Fig. 10.** Mandible, dorsal (20  $\mu$ m).



*Anchistrotos kojimensis* sp. nov., female: **Fig. 11.** First maxilla, ventral ( $20\ \mu\text{m}$ ). **Fig. 12.** Second maxilla, ventral ( $20\ \mu\text{m}$ ). **Fig. 13.** Tip of maxilliped, anterior ( $20\ \mu\text{m}$ ). **Fig. 14.** Leg 1, posterior ( $50\ \mu\text{m}$ ). **Fig. 15.** Leg 2, posterior ( $50\ \mu\text{m}$ ). **Fig. 16.** Leg 3, posterior ( $50\ \mu\text{m}$ ). **Fig. 17.** Leg 4, posterior ( $50\ \mu\text{m}$ ). **Fig. 18.** Leg 5, ventral ( $50\ \mu\text{m}$ ). **Fig. 19.** Leg 5 and leg 6, dorsal ( $50\ \mu\text{m}$ ).

sturdy base and slender curving tine. Labrum (Fig. 9) fringed with spinules. Mandible (Fig. 10) bearing distally a large main blade and a small accessory blade, both with serrated concave edge. First maxilla (Fig. 11) papilli-form, with rounded apex bearing 4 short and 2 long setae. Second maxilla (Fig. 9) 2-segmented; distal segment tapering into a spinous process and armed with a spinulose seta and a long process with 2 rows of denticles (see Fig. 12). Maxilliped (Fig. 9) 3-segmented; first segment unarmed; second segment largest, bearing 3 setae on medial margin; third segment claw-like, unciform, with serrated terminal margin on concave side and 2 long basal setae (see Fig. 13).

Legs 1 to 4 (Figs. 14–17) with 2-segmented protopods. First endopod 2-segmented, all other rami 3-segmented. Armature formula as follows.

|       | Exopod             | Endopod            |
|-------|--------------------|--------------------|
| Leg 1 | I-0, I-1, II-5     | 0-1, 1, 5          |
| Leg 2 | I-0, I-1, II, I, 5 | 0-1, 0-2, II, I, 3 |
| Leg 3 | I-0, I-1, II, I, 5 | 0-1, 0-2, II, I, 2 |
| Leg 4 | I-0, I-1, II, I, 5 | 0-1, 0-1, I, II, I |

Leg 1 with rami enlarged and flattened, other legs normal. Cilia fringes on outer margins of endopods and inner margin of first exopod segment of legs 2 to 4. Leg 5 (Fig. 18) 2-segmented, basal segment with 1 slender dorsal seta; free segment with 4 setae: 2 naked, 1 plumose and 1 with finely haired edge. Leg 6 (Fig. 19) represented by 3 slender setae in area of egg sac attachment.

*Measurements (in  $\mu\text{m}$ ):* Total length 1660 (1381–1765)  $\times$  675 (595–725), cephalothorax 555 (490–660)  $\times$  675 (595–725), thoracic segments 577  $\times$  455 (380–488), genital complex 107 (91–120)  $\times$  176 (160–190), abdomen 312  $\times$  125 (110–135), and caudal ramus 72 (65–85)  $\times$  33 (29–35). *Male:* Unknown.

*Remarks:* Although 17 species of *Anchistrotos* are found in the literature, most of them are not adequately characterized by their authors and, furthermore, many of them have not been collected again since their original description. Therefore, it is virtually impossible to make a detailed comparison when a species is to be reported from a new

host. Nevertheless, the maxilliped of *Anchistrotos* seems to offer some reliable information for comparison, because it is a rather simplified structure that, in most cases, has been illustrated with considerable accuracy.

Four species of *Anchistrotos* (*A. callionymi* YAMAGUTI, *A. parupenei* UMA DEVI & SHYAMASUNDARI, *A. sauridi* PILLAI, and *A. upenei* UMA DEVI & SHYAMASUNDARI) can be immediately removed from comparing with the new species due to their lacking of a terminal claw in the maxilliped. *A. gobii* BRIAN and *A. pleuronichthydis* YAMAGUTI can also be removed due to their possession of an unusual terminal segment; it is a knob-like short process in the former and a sigmoid (*Bomolochus*-type) claw in the latter. Another six species (*A. aluteri* AVDEEV, *A. balistae* (CLAUS), *A. moa* LEWIS, *A. occidentalis* WILSON, *A. ostracionis* (RICHIARDI) and *A. trachuri* AVDEEV) can be eliminated due to their lack of long setae at the base of the terminal claw.

*A. hamatus* ROUNDS, *A. laqueus* LEIGH-SHARPE, *A. onosi* (T. SCOTT) and *A. zeugopteri* (T. SCOTT) are close to the new species in having a claw-like terminal segment in the maxilliped equipped with two long basal setae. However, *A. kojimensis* can be distinguished from these four species by the presence of three setae (instead of two) in the second segment and a comparatively short terminal claw. The maxilliped of *A. gracilis* (HELLER) reported from the gills of a hammer-head shark, *Sphyrna zygaena* (LINNAEUS), in Java shows no apparent difference from the present new species. However, comparison of their leg 5 indicates that *A. kojimensis* can not be conspecific with this only known species of *Anchistrotos* that parasitizes on an elasmobranch.

*A. kojimensis* is the fourth parasitic copepod known to occur on the yellow goby in Japan. The three other parasites are: *Acanthochondria yui* SHIINO, *Caligus punctatus* SHIINO, and *Ergasilus orientalis* YAMAGUTI.

#### Acknowledgements

We would like to thank Dr. Shin-ichi Uye

of the Faculty of Applied Biological Science, Hiroshima University for his assistance in collecting the host fishes, and Dr. Shogoro Kasahara of the same institution for the use of facilities in his laboratory for carrying out the preliminary work of this report.

### References

- AVDEEV, G. V. (1977): Two new and one known species of parasitic copepods of the *Anchistrotos BRIAN*, 1906 genus (Cyclopoida, Taeniacanthidae) from the Indian Ocean. *Izv. TINRO*, V. 101, 132-138.
- HELLER, C. (1865): Crustaceen. Reise der Oesterreichischen Fregatte Novara um die Erde in den Jahren 1857, 1858, 1859. *Zool. Theil*, 2 (3), 1-280.
- KABATA, Z. (1979): Parasitic Copepoda of British Fishes. *The Ray Society, London*, 667 pp.
- UMA DEVI, D. V. and K. SHYAMASUNDARI (1980): Studies on the copepod parasites of fishes of the Waltair coast: Taeniacanthidae. *Crustaceana*, 39 (2), 197-208.
- YAMAGUTI, S. (1939): Parasitic copepods from fishes of Japan. Part 4. Cyclopoida, II. *Vol. Jub. Prof. S. Yoshida*, 2, 391-441, 13 pls.

## 兎島湾産マハゼ (*Acanthogobius flavimanus*) に見いだされた 寄生性橈脚類の新種, *Anchistrotos kojimensis* (Copepoda: Taeniacanthidae) について

Tran The Do\* · Ju-shey Ho\*\*

(昭和 58 年 4 月 11 日受理)

岡山県兎島湾産マハゼ [*Acanthogobius flavimanus* (TEMMINCK & SCHLEGEL)] の鰓腔内に寄生する橈脚類の新種, *Anchistrotos kojimensis* (Copepoda: Taeniacanthidae) を記載した。本種の記載により、日本産マハゼを宿主とする寄生性橈脚類は 4 種となった。

\* 東京大学海洋研究所

\*\* カリフォルニア州立大学