

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/235927844>

Clavellotis new genus (Copepoda:lernaepodidae) and redescription of Clavellotis dilatata (Kroyer,1863)

Article in *Journal of Crustacean Biology* · November 1984

DOI: 10.2307/1548082

CITATIONS

18

READS

111

2 authors, including:



Raul Castro

University of Antofagasta Anteriormente

59 PUBLICATIONS 405 CITATIONS

SEE PROFILE

Some of the authors of this publication are also working on these related projects:



Integrative Taxonomy and Ecology of Isopods Parasitic on Neotropical and Antarctic Fishes [View project](#)



Lernaepodidae species on deep sea fishes (elasmobranchs) [View project](#)

CLAVELLOTIS, NEW GENUS (COPEPODA:
LERNAEOPODIDAE), AND REDESCRIPTION
OF *CLAVELLOTIS DILATATA*
(KRØYER, 1863)

Raúl Castro, R. and H. Baeza, K.

A B S T R A C T

A new genus, *Clavellotis* (Copepoda: Lernaepodidae), is proposed to accommodate specimens originally described as *Anchorella dilatata* by Krøyer (1863), parasitic on *Cheilodactylus* sp. *Clavellotis dilatata* (Krøyer, 1863), the type and only species of the genus, is redescribed from a series of specimens recovered from an inshore fish, *Cheilodactylus variegatus* Valenciennes, taken near Antofagasta, Chile. The morphology of the female *Clavellotis* places it in the *Clavella*-branch of the family. The genus is characterized by aliform processes at the base on both sides of the cephalothorax. Other characters are the conspicuous genital process and the presence of secondary teeth on the dentiferous margin of the mandible. The most characteristic feature of *Clavellotis* is, however, the unique morphology of its male.

The newly described *Clavellopsis nodula* Do and Ho, 1983, is identical with *Clavellotis dilatata*. Its relegation to synonymy with this species is recommended.

Parasitic copepods of the family Lernaepodidae occur on both elasmobranch and teleost fishes. Most of the latter are grouped in two branches of the family, the *Brachiella*- and *Clavella*-branches (Kabata, 1979, 1981). The *Clavella*-branch currently includes 11 genera, the females of which have a long, subcylindrical cephalothorax and short, reduced second maxillae. With the exception of *Clavellopsis* Wilson, 1915, and *Advena* Kabata, 1979, they are devoid of posterior processes. The most characteristic feature of the branch, however, is its uniquely abbreviated males. The branch can be divided into two groups, distinguishable from each other by the type of their mandibular dentition (primitive in one, advanced in the other; cf. Kabata, 1979).

In their study of the parasitic copepods of the inshore fish *Cheilodactylus variegatus* Valenciennes, near Antofagasta, Chile, the authors found a lernaepodid conspecific with that which was originally described by Krøyer (1863) as *Anchorella dilatata*. Wilson (1915) placed it provisionally in the genus *Clavella* Oken, 1816, although he acknowledged that it differed from that genus considerably. We believe that these differences (i.e., the aliform process at the base of the cephalothorax and the conspicuous genital process) are significant enough to preclude placing *Anchorella dilatata* in the genus *Clavella*. Being unable to accommodate it in other genera of the *Clavella*-branch, where it undoubtedly belongs, the authors propose to establish for this species a new genus, *Clavellotis*.

This paper is intended to redescribe the species, to describe its male, and to discuss the reasons for the erection of the new genus.

MATERIALS AND METHODS

The specimens examined were fixed in 70% alcohol. For the study of the appendages some specimens were cleared in lactic acid. Dissections were carried out under a Zeiss stereomicroscope. Phase contrast illumination was used for close examination. Drawings were made with the aid of a camera lucida.

Clavellotis, new genus

Female.—Lernaepodidae, *Clavella*-branch. Cephalothorax subcylindrical, long, with aliform lateral processes at base; trunk without posterior processes, but

Table 1. Dimensions in mm of 33 fully mature female *Clavellotis dilatata*.

| | Range | Mean \pm SD |
|-----------------------|-----------|-----------------|
| Cephalothorax length | 2.43–1.33 | 1.82 \pm 0.19 |
| Cephalothorax width | 0.67–0.38 | 0.51 \pm 0.08 |
| Second maxilla length | 0.65–0.38 | 0.60 \pm 0.12 |
| Second maxilla width | 0.76–0.32 | 0.53 \pm 0.13 |
| Trunk length | 1.33–0.79 | 1.06 \pm 0.14 |
| Trunk width | 1.52–0.85 | 1.28 \pm 0.17 |
| Egg sac length | 1.70–0.85 | 1.23 \pm 0.27 |

conspicuous genital process. Second antenna with reduced endopod. Second maxilla short, fused. Dental formula of mandible with three secondary teeth P1S1, P1S1, and P1S1 B3.

Male.—Trunk abbreviated, much smaller than, and not clearly delimited from, arching cephalothorax. Genital process prominent.

Type-species.—*Clavellotis dilatata* (Krøyer, 1863).

Etymology.—The generic name is derived from *Clavella* by the addition of *-otis* (from Greek *otion* = a little ear).

Clavellotis dilatata (Krøyer, 1863), new combination

Anchorella dilatata Krøyer, 1863, pp. 376–377, pl. XV, fig. 2, a–f.—Wilson, 1915, p. 669.

Clavellopsis nodula Do and Ho, 1983, pp. 31–35, figs. 1–29.

Specimens Examined.—17 ovigerous ♀♀ and 2 ♂♂ (29/9/81), 2 ♀♀ (10/10/81), 9 ovigerous ♀♀ (8/10/81), 5 ovigerous ♀♀ (7/21/81) deposited in the author's collection. One syntype specimen from the Zoologisk Museum, Denmark (host *Cheilodactylus* sp.; locality, Cape of Good Hope).

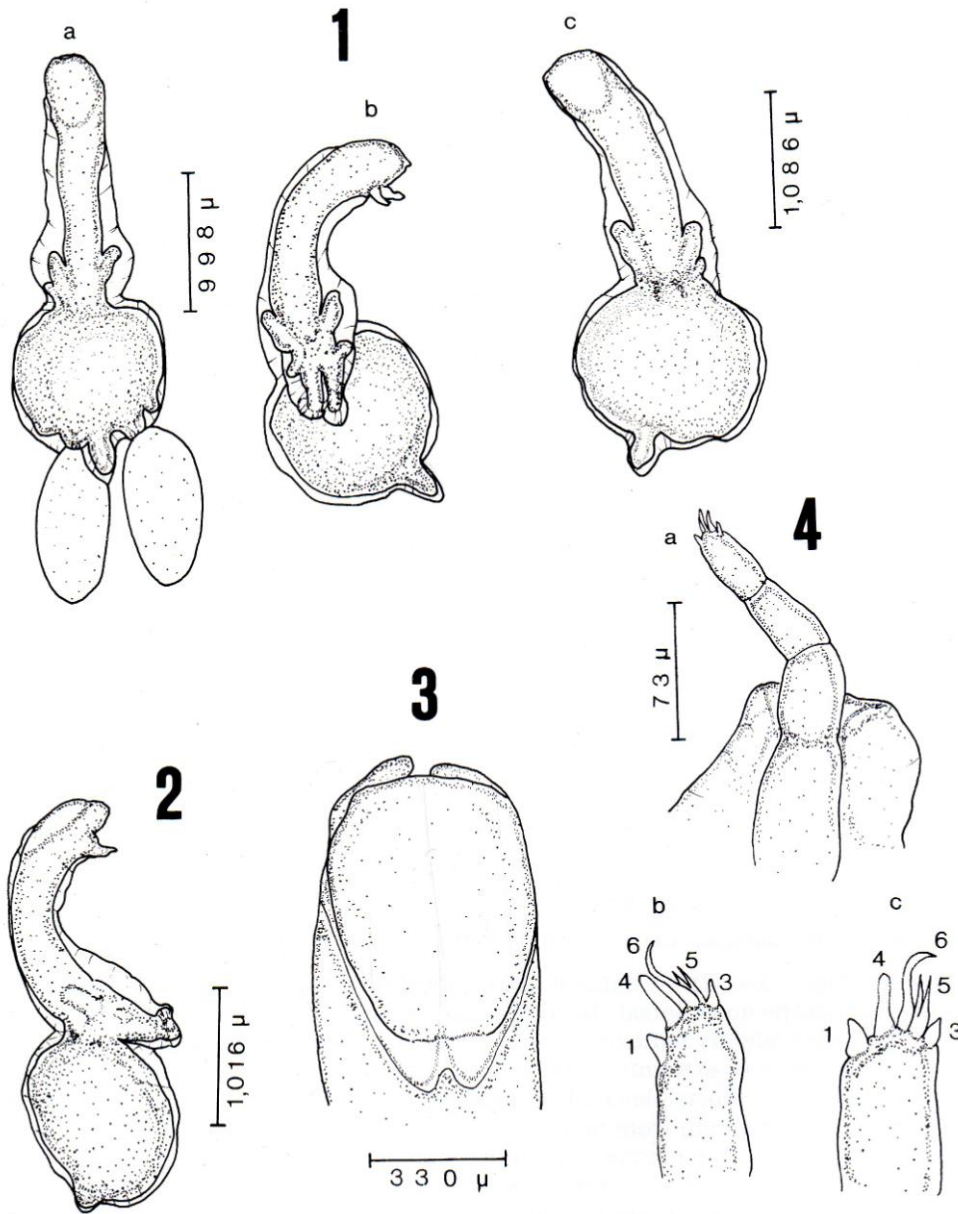
Host.—*Cheilodactylus variegatus* Valenciennes.

Habitat.—Gill rakers, palate, and throat.

Locality.—Near Antofagasta, Chile (23°29'S, 70°25'W).

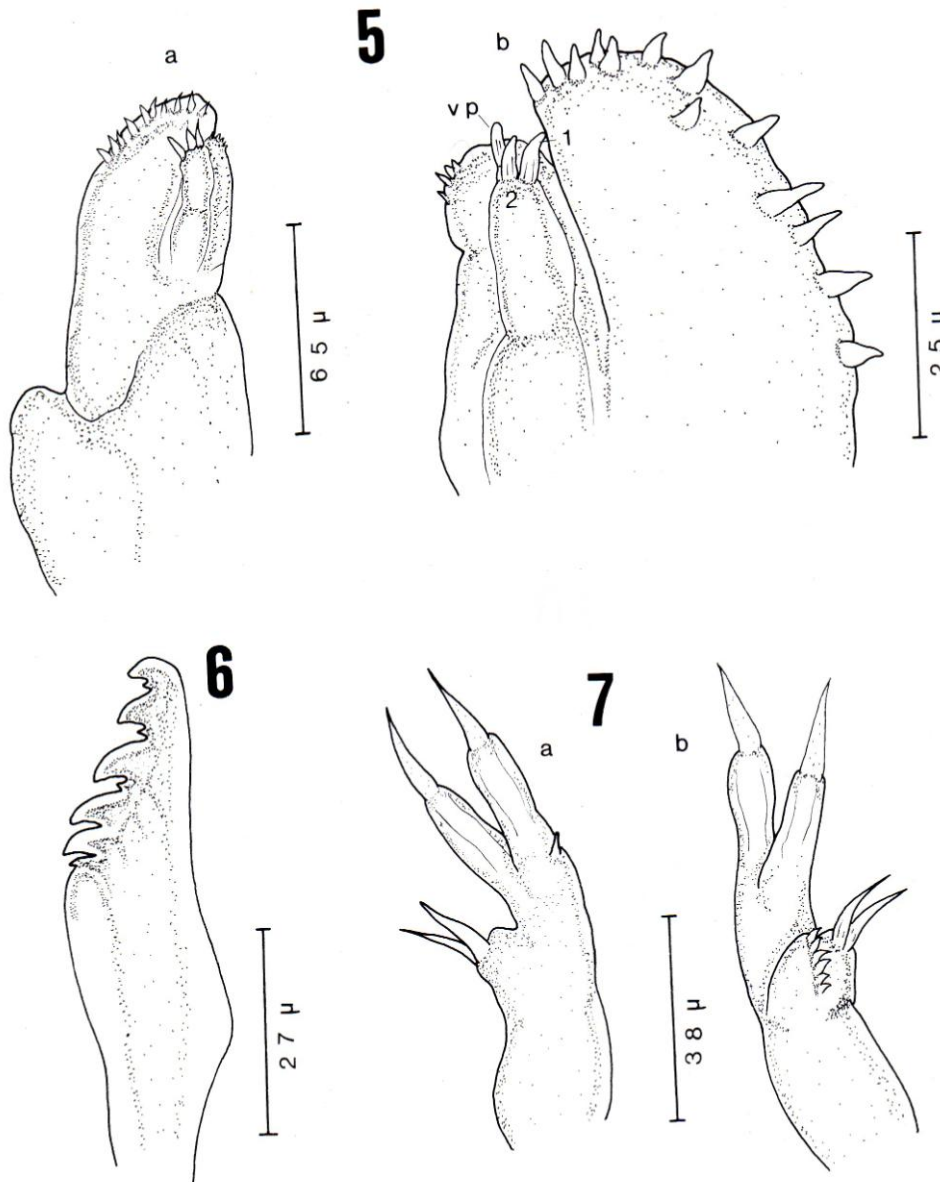
Female (Figs. 1a–c, 2).—Cephalothorax subcylindrical, gently curving ventrally and with conspicuous dorsal shield (Fig. 3); prominent aliform lateral processes at base. Trunk slightly flattened dorsoventrally, subcircular and somewhat longer than wide; posterior extremity with conspicuous subconical central genital process and orifices of oviducts elevated on papilliform swellings on both sides of that process (swelling absent from nonovigerous females); mature female occasionally with uneven posterior margin simulating blunt outgrowths, but never with true posterior processes. Egg sacs oblong, variable in size, depending on reproductive state. The dimensions of mature females are shown in Table 1. Dimensions of the syntype specimen are: cephalothorax length 2.36, cephalothorax width 0.56, trunk length 1.94, trunk width 2.06, second maxilla length 0.70, second maxilla width 0.42 (in mm).

First antenna (Fig. 4a–c) uniramous, 4-segmented; second segment with long distomedial seta (whip) (not shown in Fig. 4), apical armature of distal segment (Fig. 4a–c) comprising 2 tubercles (1 and 3), digitiform seta (4), bifid seta (5), and slender seta (6). Second antenna (Fig. 5a, b) with sympod-exopod along axis; sympod apparently 1-segmented, heavily sclerotized and subrectangular; endopod bulbous, indistinctly 2-segmented; apical armature comprising hook (1), spiniform



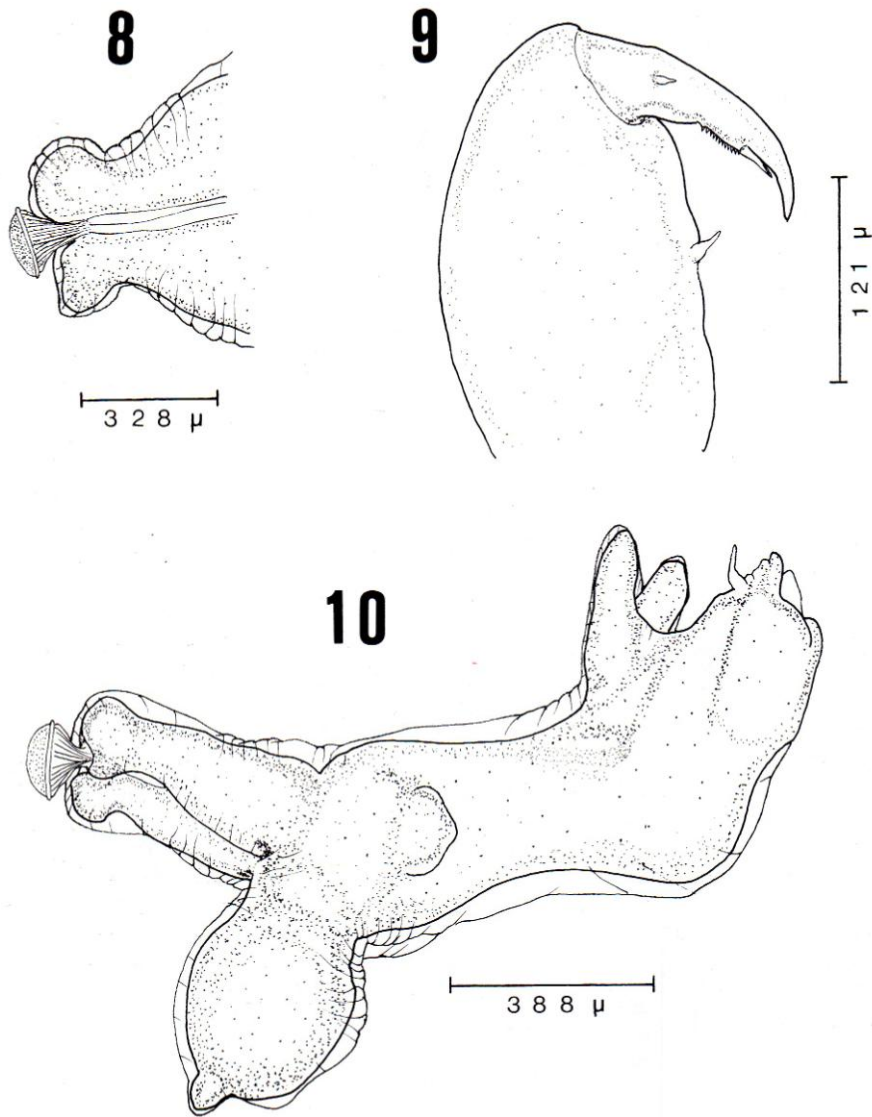
Figs. 1-4. *Clavellotis dilatata* (Krøyer, 1863), female. 1a, dorsal view; 1b, ventral view; 1c, dorsal view; 2, lateral view; 3, cephalothorax, dorsal shield; 4a, first antenna, entire; 4b, c, detail of apical armature (see text for explanation of numbers 1-6).

seta (2), and ventral process of uncertain homology; ventral surface of distal segment bearing small patch of spinules. Dental formula of mandible (Fig. 6) P1S1, P1S1, P1S1, B3; secondary teeth barely observable under highest magnification. First maxilla (Fig. 7a, b) with slender sympod, about as long as endopod;



Figs. 5-7. *Clavellotis dilatata* (Krøyer, 1863), female. 5a, second antenna, entire; 5b, detail of endopod of second antenna (vp = ventral process); 6, mandible; 7a, first maxilla, medial; 7b, first maxilla, ventrolateral.

latter with 2 long subequal setae and very small setule at base of dorsal papilla; exopod in ventral position, short and blunt, bearing distally 2 short setae and 6 clawlike denticles on lateral surface. Second maxilla (Fig. 8) short, completely fused to its opposite member, with short ventrolateral nipplelike papillae near base and moderately developed collar. Bulla (Fig. 8) small, with short manubrium

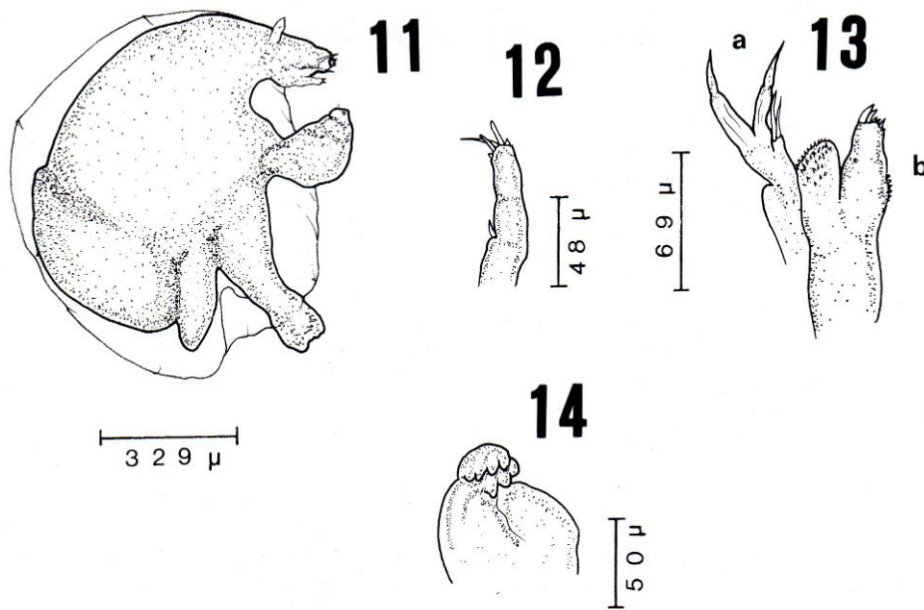


Figs. 8-10. *Clavellotis dilatata* (Krøyer, 1863), female. 8, second maxilla, distal part with bulla; 9, maxilliped; 10, young female, lateral view.

and subconical anchor, convex subanchoral surface and narrow flange in equatorial plane. Maxilliped (Fig. 9) with robust corpus, bearing single spine on myxal area; subchela with long shaft and short claw; barb and spinulation present on distal part of inner margin of shaft.

Juvenile female (Fig. 10) 1.52 mm long, with still underdeveloped trunk already equipped with genital process and developing aliform process present.

Male (Fig. 11).—Cephalothorax with anterior part narrower than posterior part, with slight constriction on its dorsal surface demarcating boundary with trunk.



Figs. 11–14. *Clavellotis dilatata* (Krøyer, 1863), male. 11, lateral view; 12, first antenna; 13a, second antenna; 13b, first maxilla; 14, second maxilla, detail of distal end, ventral view.

Body conspicuously arched, making this aspect completely different from other related males. Characterized also by presence of prominent genital process behind maxilliped. Length of 2 specimens examined 0.65 mm and 0.74 mm, respectively. Description of appendages based on observations in situ. First antenna (Fig. 12) very similar to that of female. Second antenna (Fig. 13a) with apparently unsegmented sympod; exopod rounded, spinulated, smaller than endopod; latter 2-segmented, basal segment longer, with spinulation on ventral surface, apex with fully developed armature. First maxilla (Fig. 13b) resembling female. Second maxilla (Fig. 14) short and squat, subchelate. Maxilliped longer and narrower than second maxilla, subrectangular, subchelate.

DISCUSSION

In order to determine the true identity of our specimens, we compared them with Krøyer's original material of *Anchorella dilatata*. After they had been cleared in lactic acid, the females in Krøyer's collection were found to have the characteristic auricular projections at the base of the cephalothorax. The genital process was also visible. No morphological differences were discovered between the two sets of specimens. In addition, both sets came from the same genus of host.

The question of the generic affiliation was more difficult to handle. The presence of three secondary teeth in the mandibular dentition will place this copepod in a well-defined subgroup of the *Clavella*-branch. This subgroup consists of four genera (Kabata, 1979): *Clavellisa* Wilson, 1915; *Euclavellisa* Heegaard, 1940; *Clavellodes* Wilson, 1915; and *Clavellopsis* Wilson, 1915 (the last-named genus has ill-defined boundaries and requires revision). *Clavellisa* and *Euclavellisa* are characterized by the position of the base of the cephalothorax in or near the center of the dorsal surface of the trunk; these two genera cannot accommodate the

author's specimens. From *Clavellodes* the Chilean specimens differ in the structure of both pairs of maxillae and by the developed genital process and from the type-species of *Clavellopsis* in the absence of posterior processes.

The other genera of the *Clavella*-branch (*Alella* Leigh-Sharpe, 1925, and *Proclavellodes* Kabata, 1967) share with *C. dilatata* the presence of aliform expansions at the base of the cephalothorax, but differ from *C. dilatata* in the mandibular dentition (primary in both genera). Finally, none of these six genera have males that match those of the author's lernaepodid. The sac formed by the posterior part of the body of male *Clavellotis* is very small. Only the male of *Advena* Kabata, 1979, resembles it in this respect. These two males can be clearly distinguished from each other, however, by their appendages and by the fact that the male *Clavellotis* carries a prominent process posterior to the bases of the maxilliped. (There are two small conical processes in *Advena*.) In view of the high diagnostic value of male lernaepodid morphology, the authors believe that this species should be accorded the status of an independent genus.

Do and Ho (1983) described *Clavellopsis nodula* from Japan. Comparison between this species and the type of the genus *Clavellopsis*, *C. laciniata* (Krøyer, 1863), shows that these two species are not congeneric. On the other hand, differences between the females of *Clavellopsis nodula* and *Clavellotis dilatata* are minor (number of mandibular basal teeth and details of armature of maxillipeds). Their males are virtually identical. The authors suggest that the specimens described by Do and Ho (1983) and *Clavellotis dilatata* are conspecific. The relegation of *Clavellopsis nodula* to synonymy with *Clavellotis dilatata* is recommended.

ACKNOWLEDGEMENTS

We wish to thank Dr. Z. Kabata (Pacific Biological Station, Nanaimo, Canada) for his constructive criticism of the manuscript, and Dr. Jean Just (Zoologisk Museum, Denmark) for the loan of the syntype specimen of *A. dilatata*. We are grateful to our colleagues: R. Wilson, M. Avendaño, and others for their help in collecting host fishes. Thanks are also given to Pat Baglo for typing this paper.

LITERATURE CITED

- Do, Tran The, and J-S. Ho. 1983. *Clavellopsis nodula* sp. nov. (Copepoda: Lernaepodidae) parasitic on sea bream, *Mylio macrocephalus* (Basylewsky) (Pisces: Sparidae) in Japan.—*Fish Pathology* 18: 31–36.
- Heegaard, P. 1940. Some new parasitic copepods (Chondracanthidae and Lernaepodidae) from Western Australia.—*Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening i København* 104: 87–101.
- Kabata, Z. 1967. *Proclavellodes pillaii* gen. et sp. n. (Copepoda: Lernaepodidae) from South India.—*Journal of Parasitology* 53: 1298–1301.
- . 1979. Parasitic Copepoda of British fishes.—*The Ray Society, London*. 152: 1–469.
- . 1981. Copepoda (Crustacea) parasitic on fishes: problems and perspectives.—*Advances in Parasitology* 19: 1–71.
- Krøyer, H. 1863. Bidrag til Kundskab om Snyltekrebsene.—*Naturhistorisk Tidsskrift* (3)2: 75–320.
- Leigh-Sharpe, W. H. 1925. A revision of the British species of *Clavella* (Crustacea, Copepoda), with a diagnosis of new species: *C. devastatrix* and *C. invicta*.—*Parasitology* 17: 194–200.
- Oken, L. 1816. *Lehrbuch der Naturgeschichte*.—3 Theil: Zoologie, Abteilung 1, Fleischlöse Thiere. Leipzig and Jena. Pp. 1–842 + XVIII + XXVIII.
- Wilson, C. B. 1915. North American parasitic copepods belonging to the Lernaepodidae with a revision of the entire family.—*Proceedings of the United States National Museum* 53: 1–150.

RECEIVED: 26 September 1983.

ACCEPTED: 23 November 1983.

Address: Instituto Investigaciones Oceanológicas, Universidad de Antofagasta, Casilla 1240, Antofagasta, Chile.