On the Fifth Copepodid Stage of a Harpacticoid Copepod of the Genus *Cletopsyllus* from Sagami Bay[1)]

By

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(*With 3 Text-figures*)

In a previous paper (Itô, 1971a) the author reported *Cletopsyllus sagamiensis* (Harpacticoida, Normanellidae) based on the five specimens found in a small sample from Sagami Bay. The sample also contained an another female specimen which is supposed to be the fifth copepodid stage of the species. In this paper the morphology of the copepodid stage is described and the resemblance of the genus *Cletopsyllus* to the genus *Pseudocletopsyllus* Vervoort (1964) is also discussed.

The specimen was collected on the KT 68–25 cruise of the R/V *Tansei-Maru* of the Ocean Research Institute, University of Tokyo, on the days of Dec. 3–10, 1968.

Before going further the author expresses his sincere thanks to Prof. Mayumi Yamada for his critical reading the manuscript.

Description

Length about 1.2 mm, rostrum included and furcal setae excluded. Rostrum (Fig. 1–5) well-developed, with a setula on both sides of bifid apex. Body (Figs. 1–1,2) elongate, subcylindrical in form, somewhat tapering posteriorly and consisting of nine-segments, each segment clearly defined. Cephalothorax gradually thickened posteriorly and ended with thickly chitinous ridge which is densely furnished with a number of minor granular projections; some distinct hairs scattered on surface and along posterior ridge; dorsal outline in lateral view rather straight. Succeeding four free-thoracic segments, each with several hairs along serrate posterior edge; dorsal surface more or less granulated. Abdomen four-segmented; epimeral plates moderate; first two segments clearly separated from each other dorsally as well as ventrally and never forming so called genital double-somite. First abdominal segment ornamented with some hairs and less number of spinous projections along posterior ridge dorsally and laterally, while both

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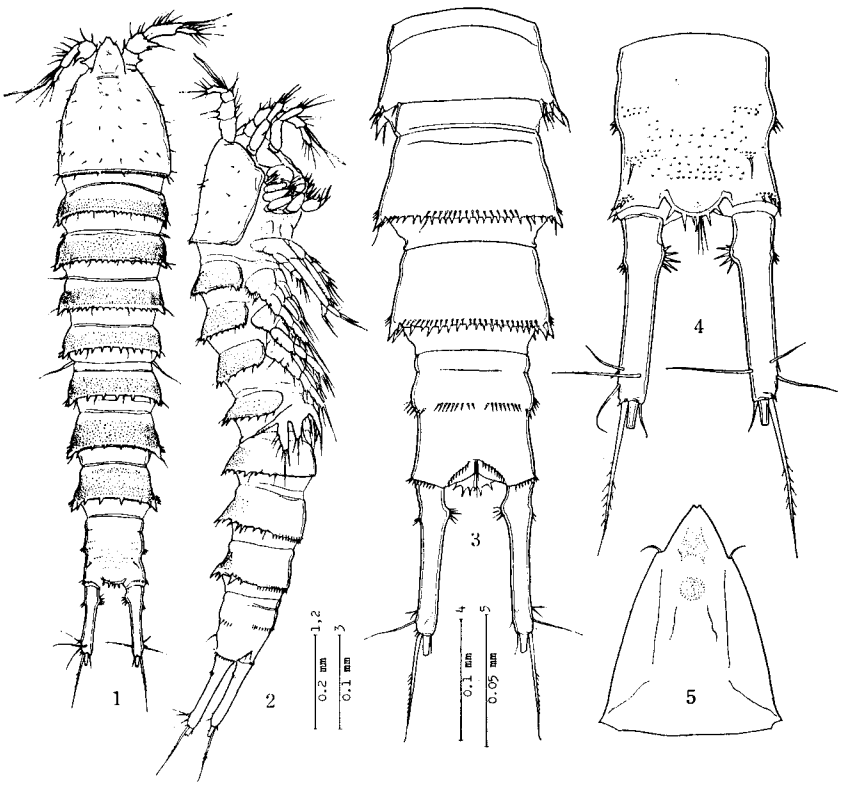

Fig. 1. The fifth copepodid female of *Cletopsyllus*. 1. dorsal; 2. ventro-lateral; 3. abdomen, ventral; 4. anal segment and furcal rami, dorsal; 5. rostrum.

ventral surface and ventro-posterior ridge (Fig. 1–3) entirely bare. Second and third abdominal segments ornamented as in preceding one in dorsal part; each ventro-posterior ridge distinctly serrate and furnished with a transverse spinular row near ridge; spinular projections of dorsal ridge of third one a little stronger than of second. Last abdominal segment about 1.5 times as long as preceding one, and subdivided in appearance into two parts with transverse spinular rows on ventral surface and on both lateral edges and further with an obscure constriction; a pair of sensory hairs arising from dorsal surface of posterior part; posterior end with many spinules laterally and ventrally. Anal operculum with thickly chitinous ridge and furnished with six spinous formations. Furcal ramus (Fig. 1–4) cylindrical in form, about as long as last abdominal segment; subproximal edge slightly swollen inwards and this part with several spinules, and further less number of spinules on opposite outer edge; setal ornamentation of apical part almost same as in the adult of *Cl. sagamiensis*.

Fig. 2. The fifth copepodid female of *Cletopsyllus*. 1. antennule; 2. antenna; 3. mandible; 4. maxillula; 5. maxilla; 6. maxillipede; 7. leg 5.

Antennule (Fig. 2–1) four-segmented; chitinous ridge undeveloped and consisting of only very thin layer; first segment with an arched spinular row and one hairy seta; two cylindrical projections of second one rather moderate; posterior margin as well as anterior one rough. *Antenna* (Fig. 2–2). Coxa with several delicate spinules. First endopodite-segment nearly fused to basis. *Mandible* (Fig. 2–3). Praecoxa with an arched row of very delicate spinules on ventral surface. Each setal base of endopodite very indistinct. Middle inner

edge of exopodite furnished with one hairy short seta (the adult specimens of *Cl. sagamiensis* have also exactly such seta which was overlooked in the previous report). *Maxillula* (Fig. 2–4) and *maxilla* (Fig. 2–5) as shown in the figures. *Maxillipede* (Fig. 2–6). Outer part of first endopodite-segment remarkably swollen.

Leg 1 (Fig. 3–1). Setal and spinal ornamentation as well as segmentation nearly same as in the adult. Inner margin of first exopodite-segment entirely bare. First endopodite-segment about four times as long as greatest width, and with a spinular row along outer margin and outer distal corner; second segment about a third as long as first, with two setulae (not spinules) on inner edge. *Leg 2* (Fig. 3–2), *leg 3* (Fig. 3–3) and *leg 4* (Fig. 3–4). Chitinous rim remarkably thin, all rami and their spines and setae remarkably stumpy in appearance. Outer spine of second endopodite segment in each leg distinctly more or less hairy. *Leg 5* (Fig. 2–7). A pair of legs entirely confluent. Inner expansion with five hairy setae and two bare setulae arranged as shown in the figure, and without any spinules. Exopodite with no mark of separation from basal segment, about three times as long as basal width, with six setae in total; inner margin rather straight and without any spinules or hairs; four outer marginal setae accompanied with several spinules near each base.

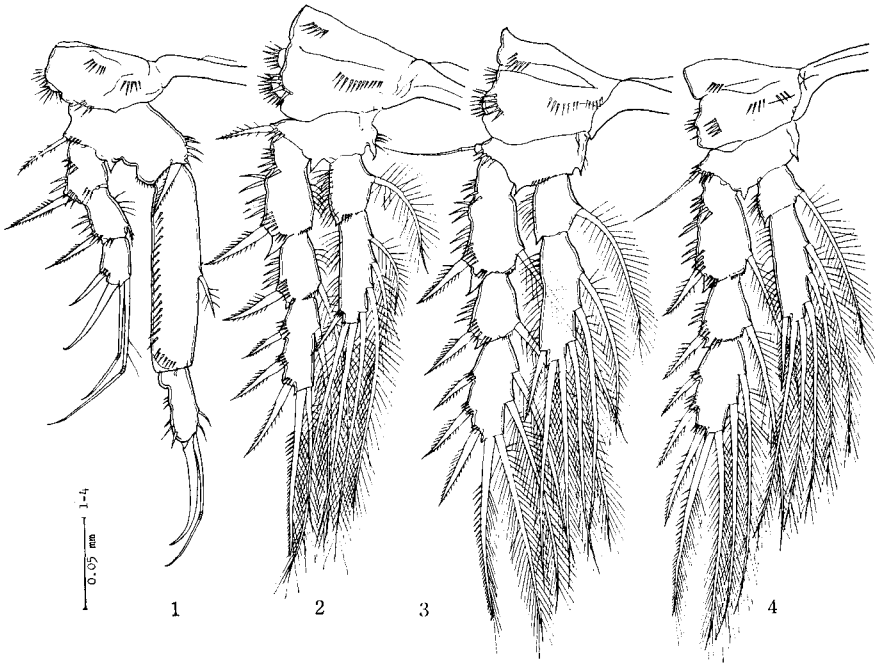

Fig. 3. The fifth copepodid female of *Cletopsyllus*. 1. leg 1; 2. leg 2; 3. leg 3; 4. leg 4.

Remarks

The present specimen seems to be the fifth copepodid (preadult) stage judging from the following characteristics: 1) undifferentiation of the genital double-somite, 2) the last body segment with an indication of next subdivision, and 3) the exopodite of leg 5 inseparable from the basal segment. It has been already clarified in several harpacticoid species that the three-segmented rami of thoracic legs are completed in the fifth copepodid stage (see Itô, 1970 and '71b). While the thoracic legs from the second to the fourth are three-segmented in the present specimen, the chitinous rims including those of all other appendages are very thin and further, the appendages show very stumpy appearance which also implies a characteristic in younger stage. In nearly all major structures the specimen coincides with those of *Cletopsyllus sagamiensis* Itô from Sagami Bay (Itô, 1971a), and it seems that the specimen is identified with this species. This identification, however, is rather tentative, because of lack of certain evidence to decide that the specimen is not the preadult stage of the other species, but the one of this species, and particularly of difficulty to distinguish between the larval structure and the adult one.

On the other hand, Vervoort (1964) described the genus *Pseudocletopsyllus* with the type species *Ps. spiniger* from Ifaluk Atoll. This species is very similar to the present fifth copepodid in several major structures, especially in the undifferentiated nature of the leg 5 and the stumpy appearance of the thoracic legs. If the separation between the last two abdominal segments in *Ps. spiniger* is incomplete, the abdominal segmentation almost coinsides with that of the present specimen which has apparent characteristics as those of the fifth copepodid stage. In addition, Vervoort did not refer to the ventral structure of the genital double-somite, while the genital area in the adult female has always certain noticeable structure. Concerning these morphological uncertainties, the author supposes that the specimen exmained by Vervoort might be the fifth copepodid stage of a certain species of the genus *Cletopsyllus*. If the Vervoort's material is exactly adult, the present specimen may be related to the genus *Pseudocletopsyllus* rather than to the genus *Cletopsyllus*.

References

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