LAMELLIFORM STRUCTURES ON THE PROBOSCIS
OF *PENICULUS AND METAPENICULUS*
(COPEPODA: PENnellIDAE)

Raul Castro Romero and Hernan Baeza K.

Abstract. — Two pairs of laminae, at the proboscis base ventral surface were
discovered in adult and chalimus IV female stage of *Peniculus* specimens. One
pair of these structures is present at the proboscis base of the premetamorph-
phosing female of *Metapeniculus*.

The laminae of *Peniculus* are narrow, those of *Metapeniculus* wide. These
laminae are described and illustrated; their importance for the copepod and
its taxonomy are discussed.

The taxonomy of the Pennellidae Burmeister, 1835 (Copepoda: Siphonostoma-
toida), which includes parasites on teleosts
and some on Balaenoptera (e.g., *Pennella*
Oken, 1816) has some problems at both the
generic and specific levels. The problems are
due to the lack of good discriminant char-
acters, and to the fact that we do not possess
accurate and detailed description of the appen-
dages for the majority of pennellid species. The characters used at present (e.g.,
buccal appendages, leg armament) are more
or less uniform throughout the family, and
have little, if any discriminant value. The
morphology of the anterior part of the body,
one of the most commonly used taxonomic
characters, shows great intraspecific vari-
ability according to the specific attachment
site, as has been shown by Hogans (1986)
for *Pennella instructa* Wilson, 1917 and by
Bellwood (1981) for *Cardiocetes spiralis*
Bellwood, 1981.

The taxonomy of *Peniculus* von Nord-
mann, 1832 is not clear, and is made more
difficult by the lack of external characters
that facilitate differentiation of the species
and that indicate their relationships with
other genera of the family, especially with
*Metapeniculus* Castro & Baeza, 1985, which
is very close morphologically. Kabata &
Wilkes (1977) suggest that *P. fissipes* Wil-
son, 1917 is probably a synonym of *P. fistula*
von Nordmann, 1832, this being only one
example of the taxonomic problems within
this genus.

We searched for new features that could
be useful in clarifying the interspecific and
intergeneric differences among the pennel-
lids, as well as in establishing intergeneric
relationships. We studied some specimens
of *Peniculus* von Nordmann, 1832 and
*Metapeniculus antofagastensis* Castro &
Baeza, 1985, and discovered lamelliform
structures on the ventral surface of the buc-
cal cone of *Peniculus* and *M. antofagasten-
sis*, which are illustrated, described, and their
importance for the copepods and their tax-
onomy discussed.

Methods. — *Peniculus* specimens were
taken from different host species; adult fe-
males from *Hemilutjanus macrophthalmus*
(Tschudi, 1845), *Mugiloides chilensis* (Mol.),
and *Sciaena fasciata* (De Buen); chalimus
IV from *Eleginops maclovinus* (Val.). The
premetamorphosing female of *M. antofa-
gastensis* was collected from the type host
*Anisotremus scapularis* (Tschudi).

The material was fixed and preserved in
formalin (5%) and/or alcohol (70%). Some
specimens, fixed as described above, were
dehydrated by critical point drying, coated
with gold, and examined under SEM Auto-
Figs. 1–5. *Peniculus* sp.: 1, Adult ♀ buccal area, lateral view, ×400; 2, Adult ♂ cephalothorax, ventrofrontal view, ×200; 3, Adult ♀ detail of laminae, ×800; 4, Chalimus 4 ♂, ventral view, showing position of laminae on proboscis ventral surface, ×98; 5, *Metapeniculus antofagastensis*, premetamorphosing ♂, ventral view, ×400. Abbreviations: bt—buccal tube; fm—first maxilla; is—intrabuccal stylet; sm—second maxilla. Laminae indicated by arrows and asterisks.
Results. — *Peniculus* sp. (Figs. 1–4): The female specimens examined, regardless of their stage of development (adult and chaetum IV), and the identity of their hosts, bear on the ventral surface, near the base of the buccal cone, two pairs of smooth, narrow laminae with rounded margins. The two pairs are separated from each other by a short gap, and the two members of each pair are slightly separated from each other.

*Metapeniculus antofagastensis* (Fig. 5): Free living, not metamorphosed, females examined bear on the ventral surface, near the base of the buccal cone, a single pair of laminae, smooth, wide, and with entire margins. The two members of the pair are separated from each other near the midventral line.

Discussion. — The existence of armament on the ventral surface of the pennellid buccal cone is not widely known. Kabata (1963) reported the presence of “serrated lamellae” on the buccal cone of *Lernaeenicus sprattae*, and later Kabata (1979) modified this description to “denticles”. These findings were corroborated by Schram (1979). Similar denticles were found by Kabata (1965), in *Lernaeocera centropristi*. In the same paper, Kabata mentioned the presence of transverse “wrinkles” on the buccal cone of *Lernaeocera branchialis* (possibly long laminae). Thomsen (1949) found small “denticles” (“finisimos dientecitos”) in *Tri-fur tortuosus*, and Castro & Baeza (1985) confirmed his finding of “small squamiform sclerites”. We add to those records two pairs of long laminae in *Peniculus* and one such pair in *Metapeniculus*.

In view of these findings it is reasonable to assume that structures of this kind may be present in other genera of Pennellidae. The differences among them, in number, shape etc. might be adaptations to their respective microhabitats and to the function they have evolved to fulfil. The two pairs of laminae in *Peniculus* might assist in food intake by collecting solid particles and liquid and facilitating their ingestion. They might also be of some assistance in the process of penetration of the host tissues by the buccal complex.

The same is true of *Metapeniculus*, a genus with microhabitat similar to that of *Peniculus*.

The reduction in number of laminae, and the increase in their size, could be indicative of a functional improvement of those structures in *Metapeniculus*, according to their similar microhabitat shared with *Peniculus*.

The lamelliform structures show a clear difference between *Metapeniculus* (with one pair of laminae) and *Peniculus* (with two pairs of laminae). This adds to the differences between these genera in their thoracopod number (four pairs in *Peniculus* and three in *Metapeniculus*).

Without any doubt the discovery of lamellae in these two genera will be of great help in separating specimens of *Peniculus* and *Metapeniculus* which are very close in external gross morphology, and will help in determining generic relationships within the family. The presence or absence of this structure and their possible variability must be studied for all the species assigned to *Peniculus*, which can give us a clue for species differentiation, and the validity of some *Peniculus* species whose taxonomic status is not clear.

Literature Cited

Bellwood, R. 1981. Two new species of *Cardiodes*.


Kabata, Z. 1963. The free swimming stage of *Ler*...
Acontiophorus excavatus, a new species (Copepoda: Siphonostomoida) associated with the soft coral Dendronephthya (Alcyonacea) in the Indo-Pacific

Arthur G. Humes

Abstract. —A new species of siphonostomatoid asterocherid copepod, Acontiophorus excavatus, is described from Madagascar, the Philippines, and the Moluccas, where it is associated with the alcyonaceans Dendronephthya mucronata and D. koellikeri. The new copepod, though closely related to Acontiophorus bracatus from the Mediterranean, may be distinguished by the excavated outer margin of the first exopod segment of leg 1 and by the presence of only two small dentiform projections between the terminal setae on the free segment of leg 5.

Materials and Methods

The host alcyonaceans were isolated in plastic bags immediately after collection. Later they were soaked for 1-2 hours in sea water with 5% ethanol, rinsed thoroughly, and the sea water passed through a fine net (about 120 holes per 2.5 cm). The copepods were then recovered from the sediment retained in the net.

The copepods were studied using the wooden slide/lactic acid technique described by Humes & Gooding (1974). Measurements were made on specimens in lactic acid. All figures were drawn with the aid of a camera lucida. The letter after the explanation of each figure refers to the scale at which it was drawn. The abbreviations used are: Ax = first antenna, A2 = second antenna, and Pt = leg 1.

Order Siphonostomatoida Thorell, 1859
Family Asterocheridae Giesbrecht, 1899
Genus Acontiophorus Brady, 1880

Acontiophorus excavatus, new species
Figs. 1-23

Type material—43 22, 70 66 from Dendronephthya mucronata (Putter), in 25 m, N of Ankazoberavina, near Nosy Be, NW Madagascar, 13°27.6'S, 47°58.2'E, 24 Aug 1967. Holotype female, allotype, and 103 paratypes (38 22, 65 66) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.

Other specimens. — 1 8 22, 43 66 from Dendronephthya koellikeri Kiikenthal, in 25 m, southern shore of Goenoeng Api, Banda Islands, Moluccas, 04°32'05"S, 129°52'30"E, 26 Apr 1975; 3 22, 2 66 from same host, locality, and date; 5 22, 9 66, and 9 copepodids from Dendronephthya koellikeri, in 10 m, Poelau Gomumu, S of Obi, Moluccas.

Universidad de Antofagasta, Instituto de Investigaciones Oceanológicas, Casilla 170, Antofagasta, Chile.

naenicus (Copepoda parasitica).—Crustacea 5:181–187
Schram, T. A. 1979. The life history of the eye-mag-

**View This Item Online:** [https://www.biodiversitylibrary.org/item/107493](https://www.biodiversitylibrary.org/item/107493)

**Permalink:** [https://www.biodiversitylibrary.org/partpdf/43672](https://www.biodiversitylibrary.org/partpdf/43672)

**Holding Institution**
Smithsonian Libraries

**Sponsored by**
Biodiversity Heritage Library

**Copyright & Reuse**
Copyright Status: In copyright. Digitized with the permission of the rights holder.
Rights Holder: Biological Society of Washington
License: [http://creativecommons.org/licenses/by-nc-sa/3.0/](http://creativecommons.org/licenses/by-nc-sa/3.0/)
Rights: [https://biodiversitylibrary.org/permissions](https://biodiversitylibrary.org/permissions)

This document was created from content at the Biodiversity Heritage Library, the world’s largest open access digital library for biodiversity literature and archives. Visit BHL at [https://www.biodiversitylibrary.org](https://www.biodiversitylibrary.org).