

[SHORT COMMUNICATION]

**Occurrence of Juvenile Forms of a Pycnogonid,
Ammothella biunguiculata (Pycnogonida, Ammotheidae)
in an Actinian, *Entacmaea actinostoloides*
(Anthozoa, Stichodactylidae)**

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There are just a few records of association of pycnogonids on the surface of or even within the bodies of marine invertebrates (King, 1973; Arnaud and Bamber, 1987). Most of them are, however, found to feed on their prey, and the case of parasitism, especially the endoparasitism, is rather rare.

Uchida (1947) mentioned briefly the occurrence of juvenile forms of a pycnogonid on the stomodaeum of an actinian, *Entacmaea actinostoloides* (Wassilieff), but the pycnogonids were unidentified, with no further biological information such as their morphology and ecology. This internal association was reconfirmed in 1996 by the pycnogonid specimens found from the inside of *E. actinostoloides* taken in Shimoda located near the top of the Izu Peninsula, Pacific side of Central Japan, kindly transferred to the author. Since then, the author has collected the actinians from tide pools at the tip of Noroshi-Zaki near the Shimoda Marine Research Center (SMRC), University of Tsukuba six times; January and March of 1997, and every months from April to August of 2001 except for June.

The collected actinians were dissected and measured their wet weight in a laboratory. The associated pycnogonids were kept in 70% ethanol or Kryofix (Merck). Some pycnogonids were dissected to investigate their gut-contents, and some others were processed into preparations for scanning electron microscopy (SEM) through conventional procedures.

Among 84 dissected specimens of *E. actinostoloides*, 72 (85.7%) contained pycnogonids inside. They were juvenile forms, because no genital pores were present and the head appendages were apparently immature. All pycnogonid specimens could be identified as *Ammothella biunguiculata* (Dohrn) mainly due to their much reduced main claws with a pair of well-developed accessory claws (Fig. 1). This identification was confirmed by previous descriptions and figures of juvenile forms of the species (Ohshima, 1927; Utinomi, 1965; Hong and Kim, 1987).

Most pycnogonids were found to be embedded in a mass of mesenterial filaments in the gastrovascular cavity of actinians, and some others on the stomodaeum. The embedded pycnogonids were totally covered by transparent mucous presumably secreted by the actinians. Although no damages of actinian bodies caused by the stocked pycnogonids could be detected, capsule-like structures resembling the nematocysts of *E. actinostoloides* in shape and size were found in the gut-contents of the pycnogonids that demonstrated their use of the actinians as a food. Thus the present internal association would be a case of endoparasitism. There were one to 14 parasites in one host with one exception, where one individual contained 67 pycnogonids. No correlation was found between the number of parasites and the wet weight of the hosts. The parasitic pycnogonids seem to be divided into at least five ontogenetic stages based on their size and morphology of appendages. The definite distinction of the stages, however, has not been done yet.

Other than Uchida (1947), there have been a few records on the internal association of pycnogonids with actinians: Ohshima (1935) reported four specimens of *Pycnogonum benokianum* in the gastrovascular cavity of an unidentified actinian. This report originally written in Japanese was partly translated into English in Hedgpeth (1949). Arnaud and

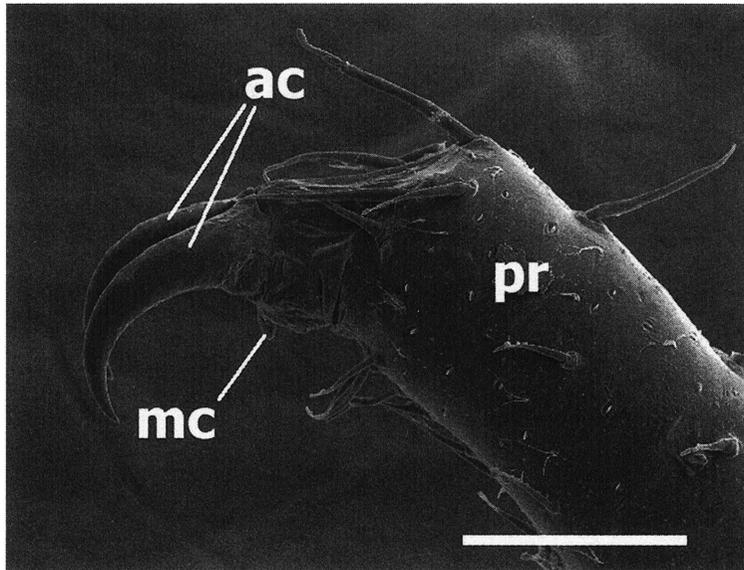


Fig. 1 Tip of propodus with claws of a parasitic *Ammothella biunguiculata*. SEM. ac: accessory claws, mc: main claw, pr: propodus. Scale=100 μ m.

Bamber (1987) mentioned “young” *Pycnogonum litorale* taken inside the “enteron” of *Actinia* sp. More interestingly, Hong and Kim (1987) found seven juvenile *A. biunguiculata* in the gastrovascular cavity of an actinian, but they did not identify the host. These previous records were very fragmentary and contained little information on the biology of association. The present study gives a little progress: both the pycnogonids and the actinians are identified, and the type of association is confirmed to be a case of endoparasitism. Moreover, the author plans to continue the monthly collection from April 2001 at least for one year, and the transition of the composition of definite ontogenic stages throughout a year will shed light on the life history of the parasitic *A. biunguiculata*.

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