Features of the first known association between Syllidae (Annelida, Polychaeta) and crustaceans

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Abstract

In this paper, we report the finding of a specimen of *Haplosyllis* (Polychaeta: Syllidae) living attached to the pleopod of a female of the pontonin shrimp *Platycaris latirostris* Holthuis 1952, which, in turn, lives symbiotically with the scleractinian coral *Galaxea astreata* (Lamarck 1816) in the Vietnamese coasts of the South China Sea. This association is considered as ectoparasitic, being thus the single known between polychaetes and shrimps, but also between syllids and crustaceans in general. This mode of life strongly differs from that of the single currently accepted species of the genus, *Haplosyllides floridana* from Florida and Cuba (a strict sponge endosymbiont), thus casting some doubts on its synonymy with *Syllis* (*Haplosyllis*) *aberrans* (described from Vietnam).

Keywords: *Haplosyllides*; Syllidae; symbiotic association; ectoparasite.

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Parasitism is a rare phenomenon among polychaetous annelids. About 80 species parasitize different marine and freshwater invertebrates and fishes, 40 of them being borers of mollusc shells (Martin & Britayev, 1998). This is a very low number, compared to the 8000 – 13000 known polychaete species (Hutchings & Fauchald, 2000) or even to the 292 commensals (Martin & Britayev, 1998). Their habitually low infestation rates, together with their peculiar mode of life, came up as the most reliable explanations for this scarcity. Many species are known from their original descriptions (often based on a single or very few specimens) and have rarely (or even never) been found again (Martin & Britayev, 1998).

In October 2003, a survey on the fauna associated with the scleractinian coral *Galaxea astreata* (Lamarck 1816) at Mung Island (Nhatrang Bay, Vietnam, South china Sea) was funded by the Russian Foundation for Basic Research (projects no. 05-04-48350 and 07-04-90009) and INTAS (project YSF 06-1000014-6229). During the survey, a small specimen of *Haplosyllides* Augener, 1924 was found attached to the base of the pleopod of the pontonin shrimp *Platycaris latirostris* Holthuis 1952, a well-known obligatory associate of the coral. The specimen was collected at 2 - 3 m depth in the coral reef, fixed in a 10% formaldehyde-seawater mixture and preserved in 70% alcohol. In the laboratory, it was photographed with a ProgRes C10 plus digital camera (Jenoptics, Jena) attached to a Zeiss Stemi 2000-C compound microscope. The specimen was the prepared for scanning electron microscopy (SEM) following the standard procedure and additional digital images were captured with the help of the Windows PRINTERFACE system using a HITACHI S-3500N microscope at the SEM Service of the ICMB (CSIC).

The specimen of *Haplosyllides* was characterized by having two (occasionally three) thick hooked simple chaetae on each parapodium, usually one thicker than the others, all them with tridentate curved tips (Fig. 1D). A single worm was found among the 87 *Platycaris latirostris* examined (36 of them females). The infestation prevalence was thus very low: 1.15% for the whole host population, and 2.78% for the host females. The worm was found inside the ventral brood pouch of the shrimp, which contained eggs (Fig. 1A, 1B). It was firmly attached by the pharynx to the base of the exopod of the second right pleopod of the host (Figs. 1B, 1C). Host tissues were visible inside the pharynx of the worm (Fig. 1B). In turn, the exopod was substantially reduced in comparison to the other exopods of the right pleopod, as well as to the corresponding one from the left pleopod (Figs. 1B, 1C), likely due to the sucking activity of the parasite.

Haplosyllides is a monotypic genus (Uebelacker, 1982). The single currently accepted species, *H. floridana* Augener, 1924, was described from Florida and later re-described from Cuba, as a strict endosymbiont of the sponge *Xetospongia muta* (De Laubenfels, 1930) by San Martín et al. (1997). Among the synonymies, however, there are some specimens originally described as *Syllis (Haplosyllis) aberrans* Fauvel 1939, which were collected from coral reefs in the same Vietnamese coasts as the specimen here reported. These specimens were swimming non-ripened adults, captured with the help of a light trap (Fauvel, 1939). This supports the ability of non-epitokous adult worms to swim, which, in turn, this appears to be an obligatory requirement in connexion with the association to *Platycaris latirostris*. To enter inside the ventral brood pouch of the shrimp and reach the host's pleopod, the syllid must first pass through a field of the nematocyst-armed crowns of tentacles of *Galaxea astreata* (the shrimp's host). This supports that the association may not be accidental, while the presence hooked chaetae, which structure is comparable to that of other known symbiotic polychaetes, syllids particularly (Martin & Britayev, 1998), also points on a specialized symbiotic mode of

life. Finally, the attachment to a host's exopod that was reduced in size and the presence of host tissues inside the worm strongly suggests an ectoparasitic relationship.

The most common hosts for parasitic polychaetes are sponges and other polychaetes. The former are mainly parasitized by Syllidae, the latter by Oeonidae, Calamizidae, Iphitimidae, Spionidae and Syllidae. The only known polychaetes parasitizing decapods are *Dipolydora commensalis* and *Polydora robi*, borers of hermit crab shells, which occasionally feed on their eggs (Williams, 2001). There are no previous reports on polychaetes parasitizing shrimps (Martin & Britayev 1998). Thus, the association here reported would be the first and single known between a polychaete and shrimps, but also between syllids and crustaceans in general.

The fact that the Vietnamese specimens appeared to be facultative ectoparasites of shrimps seems to be in contradiction with the obligatory sponge endosymbiotic relationship of the Cuban specimens of *Haplosyllides floridana*. This cast some doubts on the synonymy between the *Syllis (Haplosyllis) aberrans* from Fauvel (1939) and *Haplosyllides floridana* sensu Uebelacker (1982) and San Martín et al. (1997), which validity should be further reassessed.

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Figure legend

Figure 1. Whole view of *Platycaris longirostris* with the *Haplosyllides* inside the ventral brood pouch (white arrow). B. Detail of the attachment to the exopod; black arrow: reduced exopod; white arrow: host tissues inside the worm pharynx. C. Same view under SEM; white arrow: reduced exopod. D. Hooked simple chaetae of the worm.