

ON THE NATURE OF ATTACHMENT OF *LERNAEENICUS*  
*HEMIRHAMPHI* KIRTISINGHE TO THE HOST FISH  
*HEMIRHAMPHUS XANTHOPTERUS* C & V

Observations on parasitic copepods have hitherto been chiefly taxonomical. WILSON (1917), KIRTISINGHE (1932), and NIGRELLI and FIRTH (1939) have made certain observations with regard to host-parasite relationships in *Nannobrachium leucopsarum* and *Cardiodectes medusaeus*, *Hemirhamphus xanthopterus* and *Lernaeenicus hemirhamphi*, and *Sebastes marinus* and *Sphyrion lumpi*. Nevertheless, details regarding the nature of parasitism, the exact relationship between parasite and host and other ecological factors are still incompletely known. While studying the nature of host-parasite relationship among representative copepod parasites an interesting observation has been recorded. The host was *Hemirhamphus xanthopterus* and the parasite *Lernaeenicus hemirhamphi*. Of the 58 specimens of *Hemirhamphus* examined during the course of two months (17. February 1969 to 23. April 1969) thirty were found to be infested by the parasite. The sites of penetration of the parasite into the host fish were chiefly the fins as well as the dorsal and ventral sides of the body. On closer examination of the host it was found that the parasites had penetrated deep into the skin and muscles, and the head part of the parasite was found to have its attachment in the various organs of the viscera, and in one case even on the vertebral column of the host. While studying this species KIRTISINGHE (1932) observed that these parasites "were attached to the host in such a way that practically the entire neck was within the flesh of the host with the head projecting into its body cavity". In the present case, however, none of the specimens observed was found with the head projecting into the body cavity of the host. On the other hand, the head was always found attached to some part of the body of the fish such as the muscle, stomach-wall, air-bladder, kidney, testis, pharynx, or closely applied to the vertebral column (Fig. 1). In one case the opercular bone was found to be perforated and the parasite passing through the branchial chamber eventually getting attached to the floor of the pharynx. In another case the cycloid scale of the host fish was perforated by the parasite to facilitate penetration into the body wall (Figure 2). How exactly the penetration has been effected, whether by mechanical and/or chemical means is still not clear. The nature of the attachment of the parasite to the host is an intimate and firm one, the entire head with the mandibular horns and neck being buried in the tissue of the different organs of the host. The head bears the three horns, one median and two lateral, attached to the concerned organs, while the long tubular neck passes through the body cavity and the muscles of the body-wall, the rest of the body consisting of the genital segment, abdomen and egg sacs remains exposed to the outside. The head and a major portion of the neck of the parasite were found to be encapsulated in a cystlike formation.

WILSON (1917) reports that members of the family Lernaeidae have horns and peculiar processes which help the parasite to burrow into the host and get anchorage; so much so they can only be separated by making an incision into the flesh of the host. He also refers to a tough membrane around the horns

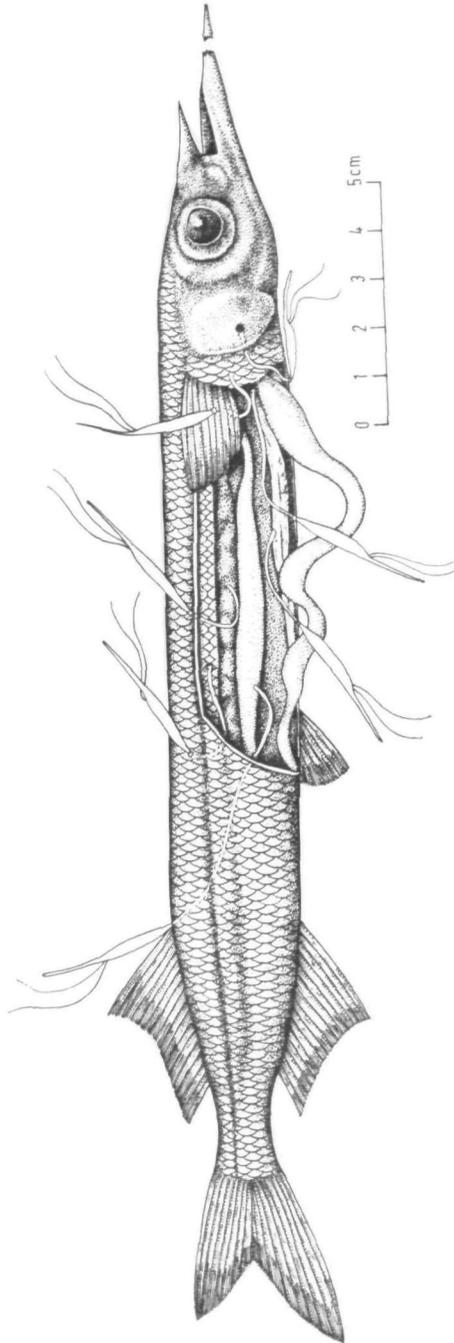


Figure 1. *Hemirhamphus xanthopterus* showing the infestation of the parasite. Note the attachment of the parasite to the different organs of the viscera.

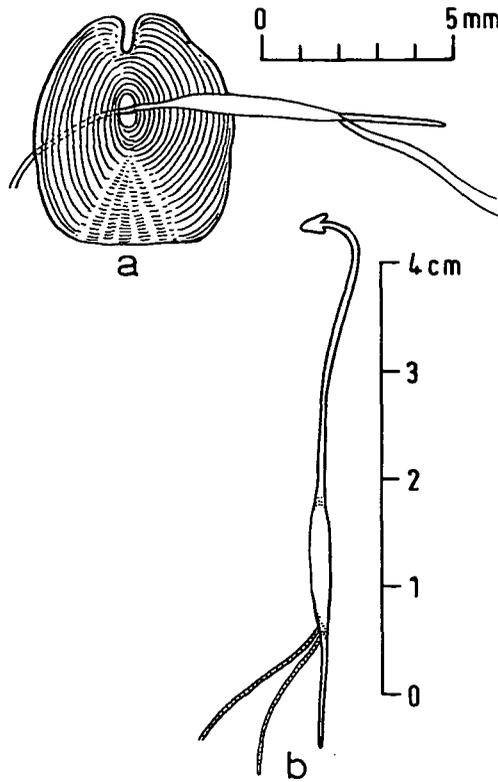


Figure 2. a. One cycloid scale of *Hemirhamphus xanthopterus* perforated by the parasite. b. *Lernaenicus hemirhamphi*, an entire specimen removed from the host.

which, according to him, considerably helps the prehension of the parasite to the host tissue.

BAUDOIN (1905) has reported that *Lernaenicus sardinae* clings with the cephalothorax to the vertebral column of the host "as a woodpecker clings to the trunk of a tree". BAUDOIN (1905), JUNGENSEN (1911) and WILSON (1917) have all come to the conclusion that lernaecids after penetrating into the host tissue ultimately reach some big blood vessel and the mouth is then closely applied to the blood vessel. In the present case it is seen that *Lernaenicus hemirhamphi* sometimes even penetrates deep into the mesonephros so much so the head region of the parasite is completely buried within the renal tissue. In this case the mouth is closely applied to the blood sinus. Stained sections of the renal tissue with the parasite reveal blood corpuscles in the oesophagus of the parasite. Even though previous reports indicate that the food of these parasites is the blood of the host fish, from the above it may be noted that the parasite can get nourishment not only from the main blood vessels, as indicated by the previous investigators but also by penetrating into the organs which are supplied with blood vessels. When a parasite has got itself fixed to the renal tissue, gonad, or even the swim-bladder of the host fish an apparent

degeneration of the surrounding tissue was evident on examining serial sections.

A cursory examination of the host fish will show the parasites protruding from the body through small openings which are visible to the naked eye in the skin of the host. Closer examination revealed that the fins were damaged as a result of the attack and the damage on the skin extends to an area of a few millimeters. Sometimes the epidermis was found eroded and the scales are lost in such infected regions of the host fish.

Detailed examination of this interesting relationship between the host and the parasite is in progress.

The measurements of a large specimen collected during the present study are as follows:

	Length mm	Width mm	With Cyst mm
Head .....	2.4	1.5	..
Neck .....	52.6	0.4	0.7
Genital segment .....	10.3	0.5	..
Abdomen .....	10.0	0.6	..
Egg strings .....	25.7	..	..

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