

## Occurrence of heavy copepod infestation on *Hemiramphus lutkei* and double parasitisms on *Hemiramphus far* with copepod (*Lernaeenicus hemiramphi*) and isopod (*Mothocya plagulophora*)

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**Abstract** In the present study about, 66 copepod parasites of *Lernaeenicus hemiramphi* of two *Hemiramphus* sp., *H. far* (17 copepod) and *H. lutkei* (49 copepod), and an isopod (*Mothocya plagulophora*) on the gill chamber were observed. *H. lutkei* was added as a new host for *L. hemiramphi*. The copepod infestation was almost on the ventral side of the hosts.

**Keywords** Copepod · Isopod · Double parasitism · Infestation

### Introduction

Pennellids are unique among the parasitic copepods; all the species typically utilize two hosts in their life-cycles (Kabata 1979). *Lernaeenicus hemiramphi* is the parasite on *Hemiramphus* sp, which was first described by Kirtisinghe (1933) in *Hemiramphus xanthopterus* collected from Ceylon waters, and Gnanamuthu (1953) redescribed the same species on *Hemiramphus far* caught at the Madras coast. Natarajan and Nair (1972) studied the impact of *L. hemiramphi* on *H. xanthopterus*. Jhon and Nair (1973) described the mouth part of *L. hemiramphi*. Radhakrishnan and Nair (1983) reported on *H. xanthopterus* and *H. far*. Recently, a study on *L. hemiramphi* from the Parangipettai coastal water was reported by Gopalakrishnan et al. (2010). In the present study heavy infestation of *L. hemiramphi*

was observed on *H. lutkei* and *H. far* and isopod infestation also occurs in the gill chamber of *H. far* were also collected from the Cuddalore landing center, southeast coast of India.

### Material and methods

Two *Hemiramphus* spp., namely *H. far* and *H. lutkei* were heavy infested by *L. hemiramphi* collected from the Cuddalore landing center, southeast coast of India. The fish length and weight were measured and examined for a number of parasitic attachments of copepod and isopod parasites infestation. The fishes were identified based on description by Fischer and Whitehead (1974) and from Froese and Pauly (2008), and the parasitic copepod and isopod were identified using the morphological description by Gnanamuthu (1953) and Kirtisinghe (1933), respectively.

### Result and discussion

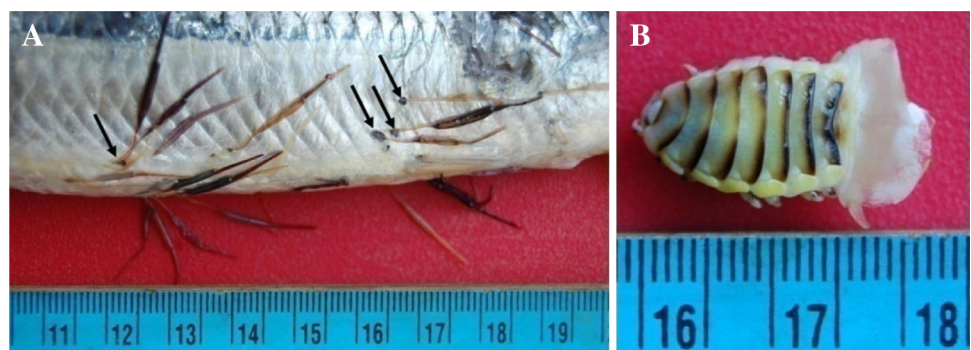
*Hemiramphus far* (292 mm and 170 g) and *H. lutkei* (315 mm and 180 g) were infested with 17 and 49 nos. of copepod (*L. hemiramphi*) shown in Fig. 1A, 1B respectively. The attachment of the copepod parasites were scattered over the host body of the two species, but the majority were at the lateral side, some of them on the dorsal and also in the operculum of the host. A similar observation was reported (Radhakrishnan and Nair 1983) on the lateral side of the *H. xanthopterus* and *H. far*, which were infested by *L. hemiramphi*. The external character of the copepod parasite *L. hemiramphi* was redescribed by Gnanamuthu (1953): the head is one or one and half times longer than the broad with backward extension of the

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**Fig. 1** (A) Heavy infection of *L. hemiramphi* on *H. lutkei* (B), double parasite in *H. far*

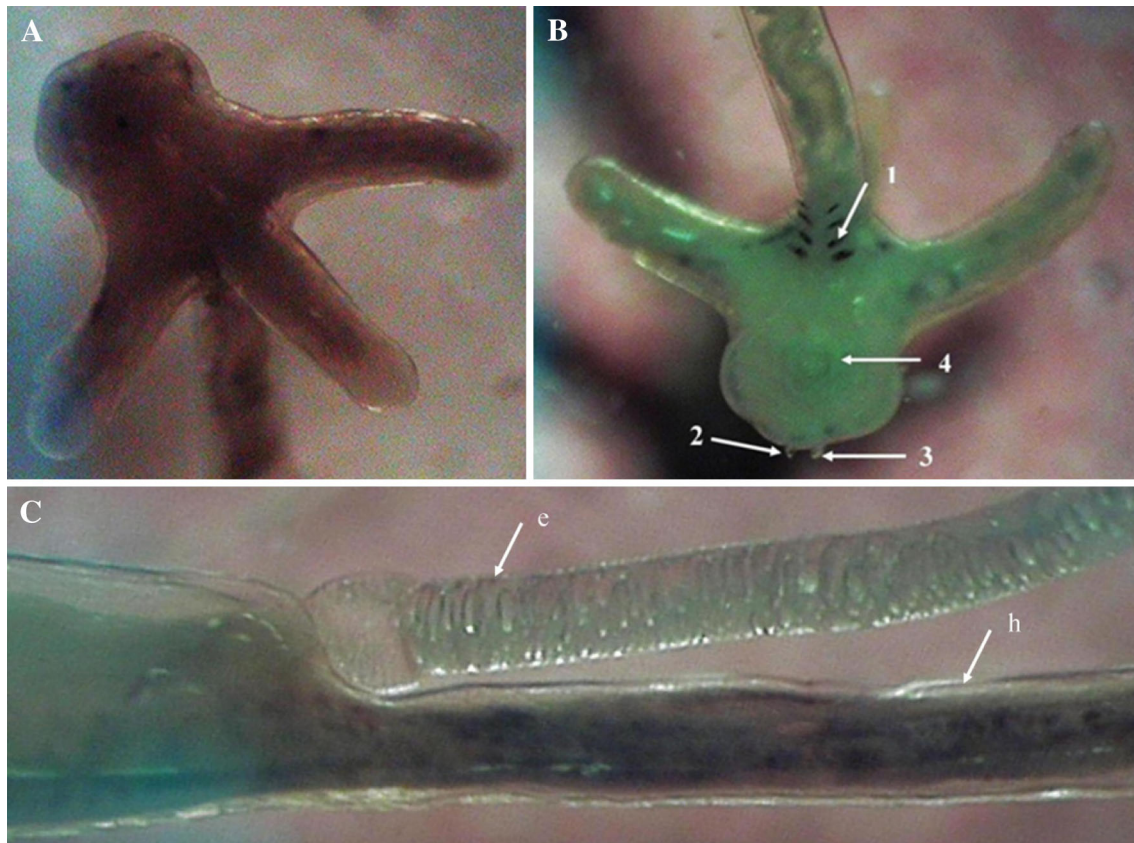
**Fig. 2** Wound due to parasitic infection (A), a isopod parasite *Mothocya plagulophora* from gill of *H. far* (B)



horns. The frontal end is smoothly rounded and marked by the antennae with horseshoe shaped cushion. The three horns behind are short, rounded and varied in size depending on the body location. The free thoracic segments are attached at right angle to the head in front of the horns. These taper down to the neck, which is the thinnest and longest part of the body. The neck is widened into the genital segment which is ventrally grooved and ended in the slender abdomen. The egg strings are connected to the end of the genital segment and thinner than the abdomen. The hind tip of the abdomen ends in two round prominences, each bearing two stumps of setae. These characters are also observed in the present study with the live copepod specimen shown in Fig. 2. The parasite has three horns on the dorsal side of the head, which helps to strongly embed on the host muscle. The point of anchoring of the cephalothorax is always anterior to the point of penetration on

the body wall. A part of the neck, genital segment, abdomen, and the egg strings of the parasite are out of the body surface. The organ of the attachment is a modified into cephalothorax, which is triangular in shape and provided with three identical horns (Radhakrishnan and Nair 1983). The copepod parasitic attachment induces the wound in the host skin (Fig. 3A) and causes the secondary infection. Similarly, the fishes infested with copepod parasite (*Lernaeenicus ramosus*) are not emaciated, but the skin exhibits redness on the site of attachment (Nagasawa et al. 2010).

*Hemiramphus far* is infested by double parasites, copepod (*L. hemiramphi*) and isopod (*Mothocya plagulophora*) (Fig. 3B), on the gill chamber. Isopods are blood-feeding ectoparasite and protandric hermaphrodites that live on marine, fresh and brackish water teleost fishes including many commercially important species. Similarly Gopalakrishnan et al. (2010) reported double parasitism on *H. far*,



**Fig. 3** Horse-shoe shape cephalothorax of the copepod *L. hemiramphi* with three dorsal horns (A), thoracic segment (1), first antennae (2), second antennae (3), proboscis (4) and neck (B) abdomen, egg string (e) hind end (h) (C)

as like that of the present study. The finding of the present study is that the occurrence of double parasitism on (*L. hemiramphi* and *H. lutkei*) on *H. far*, has been first reported in Indian waters.

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