First report on the record of parasitic infection in the Moray eel (*Thyrsoidea macrura*) along the Parangipettai coastal waters (Southeast coast of India)

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Abstract An isopod belongs to the family Cirolanidae namely *Anopsilana* sp. was recorded from Parangipettai coastal waters during February and March, 2011. This is the first report and first record of occurrence of parasite in the Moray eel from this region. In the present study, totally 110 specimens of Moray eel (*Thyrsoidea macrura*) were examined for parasites and discussed about parasitic infection.

Keywords Moray eel · Parasitic diseases · Isopods · *Thyrsoidea macrura* · *Anopsilana* sp.

Introduction

Parasitic diseases currently constitute one of the most important problems in the fisheries. Several parasitic isopods inflict large wounds often stunt the growth and occasionally kill the host fish (Trilles 1994). Fish which form minor and major links in food webs of the aquatic ecosystems. The parasite and diseases of fishes constitute one of the most important problems to the fishery biologists and modern fish culturist and also to the public health. Parasites play an important role in the biology of fishes and can affect their behavior, feeding, health and distribution (Rohde 1993). Parasitic organism causing mass mortality in fish either directly or indirectly (Lerssutthichawal 1999).

Parasites have been used widely as biological tags to provide information for fishery managers on the movements and population structure of their hosts such as monogeneans, digeneans, acanthocephalans and nematodes (Brickle and MacKenzie 2007; Timi 2007).

Isopods associate with many species of commercially important fishes around the world and cause significant economic losses to fisheries by killing, stunting or damaging these fishes. Isopods are primarily found in warm waters, they infect fish but also other crustaceans. Isopods commonly seen on teleosts in tropical and subtropical water attached to the body surface in the mouth or on the gills (Brusca 1981). The pathogenic microbes and parasite presence could damage the physiological and reproductive activities of the host fish (Kabata 1985). Their body form varies from an easily recognizable isopod to a relatively amorphous sac. Though free on host blood or host hemolymph. Their mouthparts form a cone with maxillipeds that tear at the flesh and tiny pointed mandibles that pierce into the tissue to penetrate blood vessels or blood sinuses. They also enter into the gut, particularly the hind gut is quickly filled often swelling the body, and then the contents are slowly transferred to the midgut glands for digestion.

The largest known eel, *Thyrsoidea macrura*, which grows to 400 cm, belongs to this family Muraenidae. Morays inhabit shallow waters of tropical seas. They are scavengers and predators which become active at night in reef flats and feed on small reef animals, particularly crustaceans. Moray eels are rich source of Moisture, Ash, Carbohydrate, Protein and Lipid, Minerals like calcium and phosphorous in the tissue and bone. It is also a rich source of omega 3 fatty acid like EPA and DHA (Peninal 2011). Moray eel being a nutritious fish it is also infected by some types of parasite, so the present study was carried out to study the parasitic infection in the Moray eel.

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Materials and methods

Eels were collected from Parangipettai coastal waters (Annan kovil and Mudasalodai landing centre) (Fig. 1) during the month of March and February. Totally 110 specimens of Moray eel were examined for parasitological study. Total length, sex, maturity stage and weight of the fish were recorded in fresh condition. Collections of the parasites were done separately. Then were preserved in 70 % Alcohol or in 5 to 10 % formalin for further identification. Taxonomically important body parts such as pereopods, uropods, antennae, maxillae, mandibles were carefully dissected and studied under light microscope for the study.

Results

In the present study, the Moray eel (*Thyrsoidea macrura*) was infected by isopods which belong to the family

Cirolanidae and identified as *Anopsilana* sp. More than 30 isopods were found to attach on each specimen and cause severe effect on that fish. Out of 110 specimens examined 80 specimens were affected by the parasites. Most of the parasites found on the body surface, in the branchial chamber and inside the buccal cavity (Fig. 1). *Anopsilana* sp. mainly found in the gill region and damaged the gill rakers (Fig. 2) Gill lamellae also heavily destroyed and gill arches were found eroded due to the presence of isopod. The isopod also caused a severe wound on the external body of the host and often moves about as they fed. The isopod also causes some hemorrhages and lesions in the fish which mainly found beneath the external skin (Fig. 3). The parasite was attached in such a way that its broader posterior part was lodged in the wider portion of the floor of the buccal cavity and its narrow anterior part either located towards the mouth or protruding from the mouth. Some small open sores in the buccal mucosa suggested that

Fig. 1 Study area Annan kovil and Mudasalodai landing centre

the dactyli of the pereopods of the parasite penetrated deeply into the host tissue. The isopod penetrate the skin with their pereopods and mouth parts and the tissue inhabiting forms maintain a small opening to the outside which leads to little secondary infection occurred on the body surface. Different size groups of isopods (*Anopsilana* sp.) in different stages were found to attach in the Moray eel (*Thyrsoidea macrura*) (Fig. 4). Based on the key characteristics, isopod was identified as *Anopsilana* sp. (Fig. 5) and discussed about its infection in the Moray eel (Fig. 6).

Discussion

Fish parasites are an integral part of water ecosystems and they are common in natural and cultured populations of fish. In natural conditions, most parasites do not tend to severely injure their hosts and cause mortalities which affect the population size at detectable levels. It is very difficult to estimate the actual harm to fish caused by the presence of parasites. An available report indicates that infestation causes serious problem to host animals either directly or indirectly affecting the physiological function of host. Polyanski (1961) reported that the main factors determining the fish parasite fauna as well as intensity and prevalence of infestation in marine environments can be summarized as being: the diet of the host, lifespan of the host, the mobility of the host throughout its life including the variety of habitats it encounters, its population density (gregariousness) and the size attained, with large hosts providing more habitats suitable for parasites than small

Fig. 2 Parasitic erosion on external body surface

Fig. 3 Attachment of *Anopsilana* sp. in the gill region

Fig. 4 Presence of hemorrhages in the infected eels

Fig. 5 Different size groups of isopods (*Anopsilana* sp.)

Fig. 6 Dorsal and ventral draw diagram of *Anopsilana* sp.

ones (Bashirullah 1973) stated differently that the smaller fish contained fewer parasites, while the larger fish contained greater number. Behavioral changes in feeding could explain the decrease in prevalence and intensity with increase in fish size (Zaman and Leong 2006). Loss of weight in host fishes of gobiid fishes due to parasitism (Ravi and Rajkumar 2007). Moray eel being a large fish, it may be the one of the reason for the attachment of parasite in enormous number. Khanum et al. 1994 reported that isopods were directly related with the size of the host fish i.e., the rate of infestation increased with the increase in length of the fish. Rameshkumar and Ravichandra (2010) studied the occurrence of double parasitizing in the body surface and buccal cavity in fresh water fish *T. mossambica*. In present study occurrence of parasite in the Moray eel and observed the excessive mucus secretion in the infected specimen. This type of parasitic infection may leads to economic losses in commercial species of fish. Heavy infection of *Anopsilana* sp. in the Moray eel cause mass mortality. The results obtained from this study

suggested that the parasites of each fish species might be possibly specific to their host. However, under some environmental condition eel or any other fish were their intermediate host.

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