

Sea lice, *Caligus rotundigenitalis* infestations and its management in pond cultured pearlspot, *Etroplus suratensis* in Gujarat: a case study

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Abstract Highly popular and delicious fish of Kerala (India), pearlspot, *Etroplus suratensis* is known for its ability to tolerate wide range of salinity, omnivorous feeding behavior. Present report documents the occurrence and management of *Caligus rotundigenitalis* in brackish-water pond meant for culture demonstration of pearlspot in Gujarat, (India). A brackishwater aquaculture pond (1,500 sq m) was stocked with pearlspot fry (2.60 ± 0.83 g; 4.31 ± 0.82 cm) @ 25,000 ha⁻¹. On the 46th day of culture couple of dead fish were observed which gradually increased to 120 per day by 52nd day. Following the close observation parasitic infestation was noticed on gills cavities ranging from 15 to 20 numbers per fish. These characteristic features confirmed the parasite as *C. rotundigenitalis*. As a therapeutic measure the infested pond was successfully treated with Butox[®] @ 300 ml/ha (Deltamethrin 12.5 mg) and repeat dose was administered 2 weeks later. The results of the study suggest the possible therapeutic value of Deltamethrin in treatment of caligid infestation in pond cultured pearlspot.

Keywords Sea lice · *Caligus rotundigenitalis* · Pearlspot · *Etroplus suratensis*

Introduction

The pearlspot, *Etroplus suratensis* commonly called as ‘Karimeen’ is a highly popular and delicious fish of Kerala. The ability to tolerate wide range of salinity, omnivorous feeding behavior and high market demand makes pearlspot a potential species for viable culture in India. Efforts are being made to popularize the pond culture technology for economical culturing of pearlspot in different parts of India. As the culture get the popularity it is essential to know the concurrent occurrence of diseases and parasitic infestation so that the effective control measures are developed. Parasitic infestation is one of the major burdens in marine finfish cultures worldwide including India (Ho 2000; Jithendran et al. 2008). Parasitic copepods, caligids are known to cause mild skin damage to stress-induced mortality in fish (Costello 2006). Though caligid copepods are known to infest wide variety of fish species cultured in brackishwater and marine waters, information on occurrence of this parasite is limited from India. Recently, occurrence of caligid copepods was reported in Snappers from Visakhapatnam coast (Pillai et al. 2012). There is only one report of *Caligus* infestation in pearlspot raised under controlled experimental condition (Rattan and Parulekar 1998) and no information is available on the infestation under pond culture conditions. Since, caligid infestation is economically important parasite and *Caligus rotundigenitalis* is the most dangerous species, monitoring their occurrence in marine finfish cultures is important so as to develop effective prevention and control measures. The present report documents the occurrence and

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management of *C. rotundigenitalis* in brackishwater pond meant for culture demonstration of pearlspot in Gujarat.

Materials and methods

A brackishwater aquaculture pond (1,500 sq m) was stocked with pearlspot fry (2.60 ± 0.83 g; 4.31 ± 0.82 cm) @ $25,000 \text{ ha}^{-1}$. The fry were reared and shifted from Fish Hatchery of Fish Culture Division, CIBA, Chennai. The fish were fed with formulated feed (crude protein 30 %) @ 10 % of the body weight initially and gradually reduced to 3 % at the end of culture period. Standard pond management procedures were followed with water depth of 1.2 m and early morning aeration throughout the culture period.

On the 46th day of culture couple of dead fish were observed which gradually increased to 120 per day by 52nd day. Following the close observation parasitic infestation was noticed on gills cavities ranging from 15 to 20 numbers per fish. Site of infection revealed both male and females parasites with excess mucus secretion. Microscopic examination showed the features as: length 5.6 mm and width 2.6 mm, long excluding setae on caudal rami, suborbicular cephalothoracic shield (1.55×1.29 mm), slightly ovate and bulging genital complex (0.85×0.94 mm), no distinct abdomen with 2 segments, long caudal ramus with 3 each long and short setae and egg sac with 13–20 eggs per string. These characteristic features confirmed the parasite as *C. rotundigenitalis* (Fig. 1).

Results and discussion

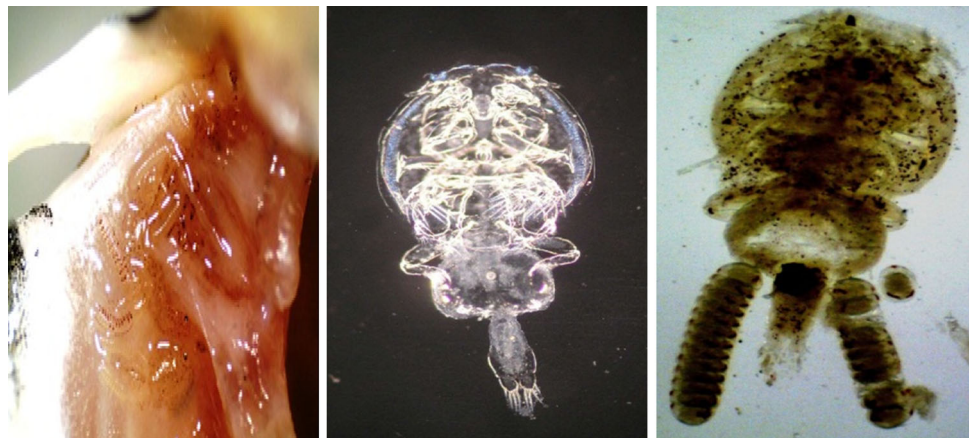
In the present study identification of parasite was done based on the key morphological features described previously (Maran et al. 2009). Similar parasites have been published from *L. erythropterus*, *E. bleekeri*, *E.*

fuscoguttatus and *G. speciosus* cultured in Malaysia (Maran et al. 2009).

As a therapeutic measure the infested pond was treated with Butox[®] @ 300 ml/ha (Deltamethrin 12.5 mg) and repeat dose was administered 2 weeks later. Ponds were aerated to ensure uniform mixing of the drug in the pond water. The dosage of drug was determined based on the previous recommendations for treating sea lice infestation in Ireland (Anonymous 2007). The methodology used in the present study was modified to suit the culture conditions. Reduction in mortality was observed 24 h following the first dose and no dead fish were detected after 4 days. Traditionally used anti-parasitic chemicals like, formalin and hydrogen peroxide are being discouraged due to recent reports on their toxicity, carcinogenicity, requirement of large dosage and variation in their effectiveness (Burka et al. 1997; Alderman and Michel 1992). Further, hydrogen peroxide is not very effective since it only removes the parasites and not kills them and hence the chance of re-infection. Recently, more effective drugs like, emamectin benzoate, cypermethrin, deltamethrin and dichlorovos are licensed to use in aquaculture to control sea lice infestation (Kvenseth 1997). Due to the recently reported emamectin benzoate resistance, search for alternate therapeutic agents has been suggested (Mont et al. 2008).

Generally the anti-parasitic drugs are applied in aquaculture through bathing and medicated feed. Since, it is practically not possible to go for bathing in commercial aquaculture pond and deltamethrins are not safe for oral feeding in the present case direct application into the pond was resorted. Deltamethrin is licensed for use in agriculture, public health, livestock applications including aquaculture in many countries in the world. The drug has been extensively studied for its effect on target and non-target hosts and found to be safe (Crane et al. 2011). The drug in the present dosage has been approved in European Union for application in salmon industry to control sea lice. Deltamethrin is a pyrethroid insecticide that kills parasites

Fig. 1 Gills of pearlspot showing infestation of parasite (a), ventral (b) and the dorsal view (c) of female parasite *Caligus rotundigenitalis*



by paralyzing their nervous system. The drug has been approved for use as bath treatment in aquaculture to control sea lice. The advantages of using deltamethrin compound are its strong adsorption on particles, insolubility in water and safety to fishes. Though reports on the safety of deltamethrin application in open sea is available similar studies need to be conducted under pond conditions. This is the first report on caligus infestation in pond reared pearlspot and its therapeutic management.

It is concluded from the present case study that as the marine finfish culture is picking up in India it is required to monitor the cultures for possible infectious and parasitic diseases. Based on the occurrence of diseases and the economic losses they cause suitable preventive and control measures need to be developed.

Conflict of interest Nil.

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