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# A Histopathological Study on Diseased Larvae and Juveniles of Sparid Fishes

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A histopathological study was made on diseased larvae and juveniles of red sea bream, *Pagrus major* and black sea bream, *Acanthopagrus schlegeli* found during the larval rearing in Kochi Prefectural Fisheries Experimental Station in 1983. On histopathological examinations, the diseased fish showed 1) *Ichtyobodo necator* infestation on the skin, 2) intestinal and rectal expansion with bacterial multiplication in food particles, and 3) mouth and tail rot with *Flexibacter* sp. infection and necrosis of the infected lesions.

Key words: sea bream, development, diseases

With the development of larval production of red sea bream, *Pagrus major* and black sea bream, *Acanthopagrus schlegeli*, bacterial and parasitic diseases have often occurred accompanying mortalities among young fishes (MASUMURA *et al.* 1977; IWATA *et al.* 1978; YAMASHITA 1981; OHNISHI *et al.* 1982; MUROGA *et al.* 1982). In this study, microscopical examinations were made to investigate causative agents on sickened or moribund larvae and juveniles of red and black sea bream. This paper describes the histopathological findings of the diseased fish.

## Materials and Methods

Eighteen larval red sea bream (17−31 days old), fifteen larval black sea bream (17−31 days old) and one juvenile red sea bream (52 days old) were obtained from fish-rearing ponds in Kochi Perfectural Fisheries Experimental Station from May to June of 1983. They were fixed in 10% formalin solution, processed routinely, embedded in paraffin wax, and 3−5 $\mu$m sections were stained with Mayer's hematoxylin and eosin (H−E), PAS, Goodpasture and Giemsa.

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## Results

1. Gross signs. Diseased larval fish showed unusual swimming behaviour, loss of appetite and segregational tendencies. Most of them also showed swollen addomens. One juvenile red sea bream exhibited an eroded mouth and tails.

2. Microscopic findings. Among the fish observed, 4 larval red sea bream and 4 larval black sea bream showed skin infestation of *Ichtyobodo necator*. The affected epithelium of the skin was atrophic or erosious in the superficial layer (Plte I −1). Some of them also showed invasions of short rod-shaped bacteria and necrosis in the skin with the *I. necator* (Plate I −2). In stamped specimens of *I. necator*, they showed pyriform or triangular shapes with the cytostome strectching from the midmost body to the tip of the process (Plate I −3). The infested fish showed atrophied hepatocytes.

Among the fish observed, 14 larval red sea bream and 10 larval black sea bream showed markedly expanded intestines and recta. Both intestines and recta were packed with rotifers, *Brachionus plicatilis* or copepods, *Tigriopus japonicus* as food particles; inside of them many Gram negative, short rod-shaped bacteria were present (Plate II −1). Some of the affected digestive tracts also showed partial desquamative catarrh and congestion of the villi (Plate II −2). In these fish, hepatic cells were atrophied and the spleen was engorged with blood; no sign indicating systemic bacterial infection was observed. Some of the fish also exhibited infestation of *I. necator* on the skin.

One juvenile red sea bream showed extensive invasions of long rod-shaped bacteria in the caudal and dorsal fins, as well as in the dermis of the tail and mouthe (Plate II −3). The infected tissue was necrotized. The underlying lateral musculature was invaded by short rod-shaped bacteria resulting in extensive necrosis and hemorrhage (Plate II −4). Hepatic cells were markedly atrophied and the spleen was congestive.

## Disscussion

Mortalities have often occurred among the larvae and juveniles of sparid fishes reared in ponds. Epitheliocystis and gliding bacteria (PAPERNA *et al.* 1977), *Flexibacter* sp. (MASUMURA *et al.* 1977), *Vibrio Alginolyticus* (IWATA *et al.* 1978), *V. anguillarum* (MUROGA *at al.* 1982), *Pasteurella piscicida* (OHNISHI *et al.* 1982) and copepodid larvae of the Caligoida (YAMASHITA 1981) have been reported as causative organisms of the diseases. In the present study, *Ichtyobodo necator* was also found to be a pathogenic organism hostle to the larvae. IWATA *et al.* (1978) and MUROGA *et al.* (1982) reported bacteria belonging to genus Vibrio as possible causative organisms of enteric diseases accompanying the high incidence. In our study, bacteria were found to multiply in food particles inside the digestive tracts, although bacterial identification was not made. This finding indicates that feed which was contaminated with bacteria evoked an enteric problem among larvae. Because the larval stomachs are usually not fully developed for approximately 30 days (HOTOS 1984),

their gastric activities were too weak to kill contaminated bacteria in feed. Bacteria contaminated feed must be avoided at all costs. A diseased fish with mouth and tail rot due to long rod-shaped bacteria showed a resemblance to that described previously by MASUMURA *et al.* (1977).

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## Explanation of Plate I

Fig. 1 Skin lesion with *Ichtyobodo necator* in larva of black sea bream (31 days old). Giemsa, X160.

Fig. 2 Skin lesion with *I. necator* and bacteria in larva of black sea bream (31 days old). Giemsa, X320.

Fig. 3 Stamped seicimen of *I. necator*. Giemsa, X600.

Fig. 4 Intestine of normal larva of black sea bream (9 days old). H—E, X160.

## Explanation of Plate II

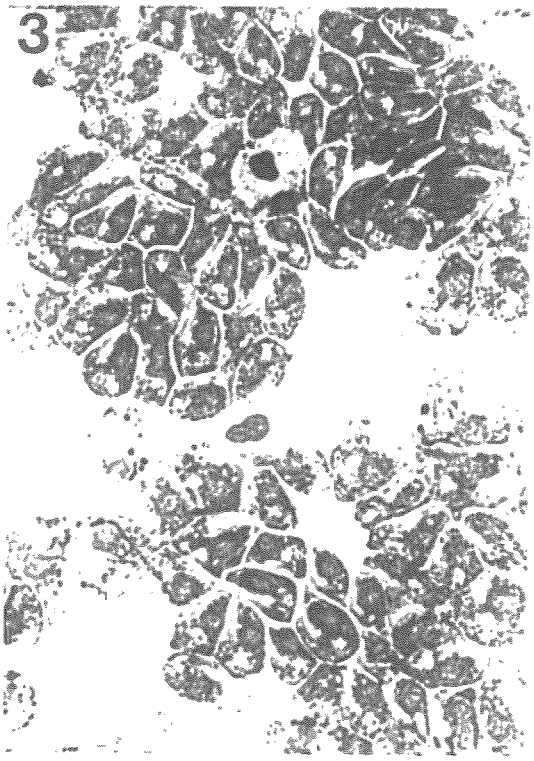
Fig. 1 Intestine of 17 days old black sea bream, expanded and packed with food particles containing multiplying bacteria. Giemsa, X100.

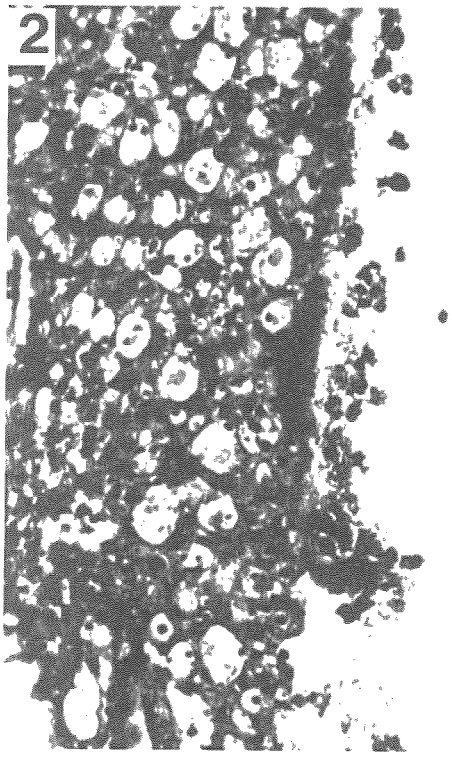
Fig. 2 Rectum of 28 days old red sea bream showing catarrh and bacterial multiplication in the lumen. Giemsa, X400.

Fig. 3 Tail lesion of 52 days old red sea bream, showing bacterial multiplication in the dermis. Giemsa, X320.

Fig. 4 Tail lesion of above fish showing invasions of short rod-shaped bacteria and necrosis of lateral musculature. Giemsa, X400.

# Plate I



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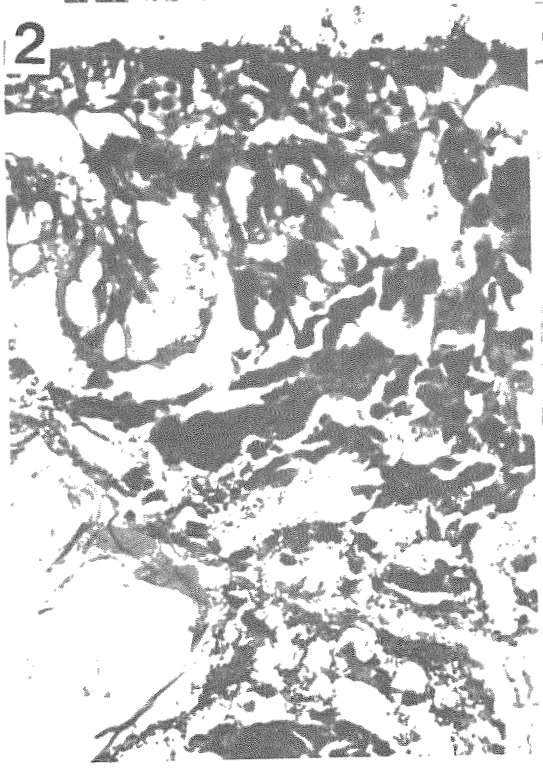
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