

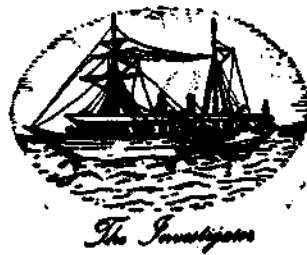
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**SOME OBSERVATIONS ON THE DISEASE OF THE SHORT FINNED
EEL *ANGUILLA BICOLOR BICOLOR* McCLELLAND**

K. DORAIRAJ

Central Marine Fisheries Research Institute,
Cochin-582 018.

ABSTRACT

During the course of the experimental culture of the short-finned eel *Anguilla bicolor bicolor* McClelland in running water at Mandapam Camp, seven kinds of diseases namely Fungus disease, Tail fin rot disease, Gas disease, Red pest and blotches disease, Swollen intestine disease, Gill disease and Cripple body disease were identified. The fungus disease was observed in elvers on their body surface as an outgrowth of whitish or greyish mass, spreading from the affected region. The tail-fin rot disease was noticed both in elvers and in growing eels and the affected portion gradually spreads due to the activity of the causative bacteria resulting in putrefaction. Mostly the glass eels were affected by the gas disease, when the O₂ or N level in the water was too high. The Red pest and blotches disease caused by bacteria was observed in elver as well as in grown up eels, the visible symptoms of this disease being rash-like reddening of the body musculature, particularly near the abdominal and anal regions. The swollen intestine disease has been found to attack both the elvers and the growing eels whereas the gill-disease and cripple body disease were observed only in grown up eels. Diagnosis and some of the preliminary preventive measures for the above seven eel diseases are briefly discussed in this paper.

INTRODUCTION

It is a well known fact that 'as the intensity of fish culture operation increases there is a greater chance of problems from fish diseases'. In eel culture which is being carried out in an intensive scale in Japan, diseases are not uncommon. About twenty kinds of eel diseases are reported from Japan, of which nine are considered very serious as they had caused considerable economic losses to eel culture (Usui, 1974; Forrest, 1976; Tesch, 1971; Egusa, 1979; Nishio, 1979). However, no information is available on the disease of Indian species of eels. During the course of the experimental culture of the short finned eel *Anguilla bicolor bicolor* seven kinds of eel diseases were observed. In the present paper the preliminary observation made on eel diseases are briefly presented.

I express my sincere thanks to Dr. E. G. Silas, Director and Shri S. Mahadevan, for their guidance and scrutiny of this paper.

MATERIAL AND METHODS

The glass eels and elvers of *Anguilla bicolor bicolor* collected at various centres in Tamil Nadu during 1976-78 were reared in running water tanks at the Regional Centre of CMFRI at Mandapam Camp. The live as well as the dead specimens obtained during the culture operation formed the basis of this study. Wherever possible, the diseased specimens were kept separately, treatments were given and observations were made.

RESULTS

Seven kinds of eel diseases namely, Fungus disease, Tail fin rot disease, Gas disease, Red pest and botches disease, Swollen intestine disease, Gill disease and Cripple body disease were observed during the experimental culture of *A. bicolor bicolor* in running water.

Fungus diseases

This disease was observed only in elvers during January-March months. The diagnosis of this disease is the presence of whitish or greyish threads on the body surface especially near the margins of dorsal and ventral fins and also on the tail region, in the form of tuft of cotton wool. This disease was also observed in specimens already affected by tail fin rot disease. Usually the infection spreads from an injured area of the animal, hence it may be considered as a secondary infection. The causative parasitic aquatic fungi was not identified. However, in Japan, the fungus disease in eel is stated to be caused due to the fungi *Saprolegnia parasitica* (Usui, 1974). The elvers affected by this disease become very inactive and lethargic and die in about a week's time.

Tail fin rot disease

This disease has been found to attack both the elvers and growing eels. Partial or complete damage to the skin and musculature of the tail region are the visible symptoms of this disease. This disease gradually spreads on the same animal from the affected part to the other portions of the tail region due to the activity of the bacteria, resulting in peeling of the skin, exposure of the musculature, severe haemorrhage and putrefaction. In a medium sized specimen of 172 mm in length, affected by this disease it was found that the entire skin and flesh on the tail region was peeled off exposing the vertebral bones. The affected specimens were very much inactive and refused to take food. Usually the

specimens affected by tail fin rot disease could not fully use their tail region for locomotion. They may either settle down at the bottom of the tank or swim very slowly and hang on near the surface of the water at one corner of the tank. This disease was observed to be more common during March-August period. This disease is stated to be caused due to a pathogenic bacteria *Aeromonas liquefaciens* (Forrest, 1976).

Gas disease

This disease was observed only once during December 1978 in a consignment of about 1200 glass eels kept in two numbers of 3' dia polycraft pools with aerators. In one pool by about 10 AM on 12-12-78, in a few glass eel's head two air bubbles were formed one on either side. Within fifteen minutes such air bubbles on the head were formed in almost all the glass eels in the pool. Similarly the glass eels kept in another 3' dia polycraft pools were also affected by this disease. The glass eels became inactive and were lazily swimming near the surface of the water as they could not go down through the water due to the presence of air bubbles on their head. This disease occurs when oxygen or nitrogen level in the water was too high. Immediately treatment for this disease was given. The aerators were cut off and in each tank about $\frac{1}{2}$ kg of crushed ice was added in order to bring down the oxygen level and the temperature of the water. In about half an hour's time, the bubbles formed on the head of the glass eels had vanished, the glass eels become normal and thus all the glass eels were saved.

Red pest and botches disease

This disease was observed in elvers as well as in grown up eels, cultured in 12' dia polycraft pool in running water. In elvers, the visible symptom of this disease is rash-like redding of the body musculature, particularly near the abdominal and anal regions and on the

base of the dorsal and ventral fins. In advanced condition, the affected portion is very raw and exposed, with oozing of blood. In growing eels (measuring from 110-650 mm) the symptom for this disease is the appearance of tumor like out-growths, about the size of a pea, in red colour on the body and tail regions. The botches may burst and discharge the pus into the water. Thus this disease is contagious. Elvers affected by this disease invariably die within one week. In big eels, healing is possible, if they are kept in running water. It is stated that this disease is a serious bacterial disease caused by the bacterium *Aeromonas (Pseudomonas) punctata* (Tesch, 1977).

Swollen intestine disease

Small elvers of *Anguilla bicolor bicolor* were affected by this disease, particularly during the acclimatization period in the laboratory after their capture from the wild. As the name implies, the visible symptom for this disease is swelling of the intestine. When the elvers, were attacked by this disease their intestine bulge slightly, they become inactive, refuse to take food and become very thin and lean. They swim very lethargically near the surface of the water and finally die.

One instance of swollen intestine disease was observed on 7-11-1977 in a big cultured eel *A. bicolor bicolor* measuring 481 mm in length and 140 g in weight. The eel was separated and kept in a PVC square drum for observation and treatment. The intestine of the eel had swollen to a considerable extent and appeared like a balloon. The eel was actually floating in the water, as it could not go down in the water due to the bulging of the intestine. In addition to the bulging of the belly, the eel had a small cyst on the tail region. On two occasions the eel was treated with Methylene Blue and the belly was slightly reduced. The eel, however, died on 15-12-1977. The dead eel was cut open and the internal organs were examined. It was found that the entire intes-

tine was swollen and bulging. The kidney was very reddish in colour and was also slightly bulging. The intestine contained small quantity of a colourless liquid.

Gill disease

Only one instance of gill-disease was observed in *Anguilla bicolor bicolor*. One big eel, 632 mm in total length weighing 445 g in weight reared in 12' dia polycraft pool was found dead on 23-1-'77. Externally there were no indications of any disease or injury. The internal organs were in good condition, but the gills on both sides of the eel were found to be in a very damaged condition. The gill-filaments were very short and they were found broken in the middle or at the base. More than half of the total surface area of the gills were either damaged or missing. The damaged gill-filaments in fresh condition without staining were examined under the microscope, but the causative bacteria could not be detected. The above symptom of erosion of the gills strongly indicates that the eel had died due to the gill-disease. *Chondrococcus columnaris* is stated to be the causative bacteria for the gill disease in eels (Usui, 1974; Forrest, 1976).

Cripple body disease

This disease was observed in a cultured eel *A. bicolor bicolor* measuring 253 mm in length which died on 27-6-'78. The body of the eel was misshapen, particularly in the region between anus and tail. It is in the form of two short bends, in a zig zag manner. In all other respect the eel was normal. It is stated that this disease is caused due to the attack of the muscular system by the protozoan parasite of the genus *Plistophora* (Usui, 1974). In the present case the causative parasite could not be either located or identified. Only by observing the external distorted appearance of the eel, it was indirectly concluded that the eel was affected by cripple body disease. In another

specimen, the same disease was noticed in December '78.

REMARKS

During the course of the culture operation, mortality was met with in glass eels, elvers and in growing eels but in many cases the cause for the death could not be definitely ascertained. During January-June 1976, out of 1,648 elvers, 315 numbers (19%) had died in the laboratory. There were no external indication of any injury or disease in the dead elvers. However, the elvers were found inactive for one or two days before their deaths. It was observed that most of the elvers were prior to their death, violently shaking and twisting their bodies.

13 numbers of *A. bicolor bicolor* reared in the Aquarium in running water, died suddenly on 3-7-1978. The size of the dead eels ranged from 288 mm to 615 mm and the weight from 20 g to 475 g. Externally there were no indication of any diseases. All the internal organs of the dead eels were also in good condition. However, in the liver and in the bile fluid rod shaped live bacteria were found in very large numbers. The exact cause for the death of the eel was not known. Immediately one live eel in the same aquarium measuring 390 mm length and 120 g in weight was sacrificed and the internal organs were examined. The liver and the bile fluid were also examined. The rod shaped bacteria found in the dead eel were not present in the liver and bile fluid of the sacrificed eel. This suggests that the

probable cause for the death of the eel may be due to rod shaped bacteria found in large numbers in the liver and bile fluid.

The main objective of this study was to document the various eel diseases of the Indian species of eels in culture condition. In most of the cases, the disease were observed only in advanced condition. However, the fungus disease, tail fin rot disease and gas disease were detected well in advance. For the fungus and tail fin rot diseases salt water bath and Methylene Blue bath (about 2 ppm) were tried periodically but with very little success. For the gas disease, the temperature of the water was immediately reduced to about 22°C by adding ice cubes. This treatment had given 100% recovery from the disease.

In the experimental culture operation, instance of eye blindness, excessive secretion of mucus on the body, deformities of the body like absence of one pectoral fin, loss of some portion of the caudal region have also been observed. A few white patches were also seen on the surface of the body of big cultured eels. These white patches have gradually disappeared when more water was circulated in the tanks.

The incidence of eel diseases met with in the present experimental eel culture are isolated in nature and hence quantitative estimation was not possible. Further intensive research work is necessary in order to develop a suitable diagnosis and control measures for the Indian eels.

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