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HEMORRHAGIC SEPTICEMIA IN SOME MARINE FISHES OF INDIA

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ABSTRACT

Hemorrhagic septicemia in four marine fishes *Epinephelus pantherinus, Lutianus johni, Platax teira* and *Trachinotus ovatus* were documented for the first time from this country. The morphological, cultural, physiological and fermentative characteristics of the isolated bacteria were studied and the aetiological agent was identified as *Pseudomonas alcaligenes*.

INTRODUCTION

ONE method of increasing proteinaceous food supplies is the adoption of aquaculture of finfish and shellfish. But, for the successful management of aquaculture practices a thorough knowledge of atleast the common diseases that can affect these animals is essential, as well as methods of treatment, control and prophylaxis.

Extensive work has been done in advanced countries in the field of finfish and shellfish diseases and there is a vast literature avaliable. In India, however very little work has been carried out in these aspects (Almeida, 1962; Mahadevan *et al.*, 1978; Pillai, 1978, 1982). Hence, the significance of the need for immediate attention to be given to finfish and shellfish and shellfish disease surveys is quite imaginable and an attempt has been made here.

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MATERIAL AND METHODS

In the present study, the diseased marine fishes *Epinephelus pantherinus, Lutianus johni, Platax teira* and *Trachinotus ovatus* were obtained from the collections made from the inshore waters off Bombay during the post-monsoon period in 1976.

The moribund specimens were collected in suitable sized sterile containers and transported to the laboratory. In the laboratory, under aseptic conditions, skin scrappings, blood and kindney were removed in sterile containers by dissecting the fish, microscopically examined and the samples were then inoculated in fish infusion agar according to the methods described by Pillai (1978).

The inoculated Petri dishes were incubated at $28 + 2°C$ for 24 – 72 hours and the selected colonies were subcultured for further studies.

The isolated colonies were checked for their purity and the characteritics of the bacteria were studied as per standard procedures.

The bacteria were identified according to the system of classification of Buchanan and Gibbons (1974).

The Koch's postulates were tested according to the methods of Pillai (1978).

Results and Discussion

Pathogens were isolated from skin scrappings (+), blood (+) and kidney (+). The characteristics of the bacteria were: Gram negative rods (0.5 – 1.0 x 1.4 – 3.5 μ) with rounded ends, occurring singly. Colony: circular, 3 mm diameter, entire margin convex, opaque, butyrous and light orange.

The physiological and fermentative characteristics of the pathogen are presented in Table 1 and 2 respectively.

Based on the above characteristics, the organism was identified as *Pseudomonas alcaligenes*.

Tests performed to satisfy the Koch's postulates revealed that the organism is a pathogen as the experimental fishes died by 15 th hour after injection of the suspected pathogen. The fish exhibited signs such as restlessness, anorexia skin lesion with blood, erratic swimming, scale protrusion and sluggish movements. The controls were healthy.

Table 1. *Physiological characteristics of the pathogen*

Organism	Characteristics																				
	Indole	Methyl red	Voges Proskauer	Citrate utilization	Nitrate reduction	Ammonia from peptone	H_2S production	Gelatin liquecaction	Starch hydrolysis	Catalase	Oxidase	Urease	Reaction in Hugh and Leifson's medium	Litmus milk	Haemolysis in blood agar	Casein hydrolysis	Lipolytic activity	Sensitivity to: Penicillin (2.5 i.u)	O/129	Luminescence
Bacterial pathogen	–	–	–	+	+	–	+	+	–	+	+	+	A	(–)	(*)	+	–	–	–	–

A = Alkaline, – = Acid and peptonisation, * = Alpha and O / 129 + = A vibriostatic compound (2, 4 Diamio 6, 7 di isopropyl pteridine)

Table 2. *Fermentative characteristics of the pathogen*

Organism	Characteristics								
	Arabinose	Galactose	Glucose	Glycerol	Lactose	Maltose	Mannitol	Sucrose	Xylose
Bacterial pathogen	–	–	–	–	–	–	–	–	–

– = No acid. Identity of the pathogen = *Pseudomonas alcaligenes*.

This disease is caused by two species of bacteria of the genera *Aeromonas* and *Pseudomonas* singly or collectively. *Aeromonas* is pathogenic for many species of wild and propagated species of finfishes (Bullock and McLaughlin, 1970). There is also a view that even though *Aeromonas* is a pathogen, low levels of oxygen initiate the epizootics of hemorrhagic septicemia (Haley *et al.*, 1967). *Pseudomonas* also behaves like *Aeromonas* in causing the disease (Pillai, 1978).

Outbreaks of this disease were recorded by Schaperclaus (1954); Bullock (1965); Bullock

and McLaughlin (1970); Bullock *et al.* (1971); Shotts *et al.* (1972); Conroy and Vasquez (1979) and Roberts (1978).

In India, this disease has been recorded by Mahadevan *et al.* (1978) in *Penaeus indicus* and *Metapenaeus monoceros* due to *Pseudomonas fluorescens*. This disease caused by *Pseudomonas aeruginosa* in *Etroplus suratensis, Mugil cephalus* and *Chanos chanos* was reproted by Pillai (1982).

In the present investigation, hemorrhagic septicemia due to *Pseudomonas alcaligenes*, in *Epinephelus pantherinus, Lutjanus johni, Platax teira* and *Trachinotus ovatus*, is the first record in our country and the results are almost similar to those of Bullock (1965); Bullock and McLaughlin (1970); Bullock *et al.* (1971) Shotts *et al.* (1972); Conroy and Vasquez (1979) and Roberts (1978).

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