

STUDIES ON FISH EPIDEMICS FROM ASSAM

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ABSTRACT

Investigations conducted since July, 1988 on ulcerative fish epidemics in Assam indicated that mainly four species of fishes belonging to the genera *Puntius*, *Channa*, *Macrognathus* and *Mystus* were widely affected by the disease. Results indicated that outbreak of the disease may not be due to organic pollution of water or radio-active and heavy-metallic contamination. Bacterial culture revealed colonies of *Escherichia coli* and *Pseudomonas aeruginosa* in the surface muscular lesions and gill tissues while preliminary electron microscopic studies indicated the presence of viruses in the muscles and gills of diseased fishes.

The hitherto unknown epidemic in fishes, which broke out during July, 1988 in Assam and elsewhere in Eastern India, had made people panic-stricken. The present communication is a scientific note of the epidemic in fishes based on a study conducted by the authors since the end of July, 1988.

The earliest report of the outbreak of this fish epidemic goes back to Australia in 1972, and gradually the epidemic swept through other South-East Asian countries (Mackenzie and Hall, 1976; FAO, 1986) until it had appeared in Bangladesh and India during July, 1988 (Kar and Dey, 1988 a & b). However, the epidemic seemed to be unknown to the living memory of the people of this locality. As such, the present investigation was directed to systematically analyse the possible major factors which could lead to the outbreak of fish disease.

Standard methods of APHA (1978) had been followed for analysing the physico-chemical parameters of water while Gamma-ray spectrometric studies were conducted after Kapoor and Ramamurthy (1986). Bacteriological studies were conducted as per Cruickshank (1972) and analysis of trace elements were done following methods given by Vogel (1978) and APHA (1978). Preliminary virological studies were

conducted according to FAO (1986).

Ichthyological surveys at the landing centres of the lentic water bodies of Silchar sub-division in Cachar district (lat. 24° 10' N and long. 93° 15' E) revealed that fishes belonging to only four species had been widely affected by the disease.

*Macrognathus aculeatus* showed ulcerated skin generally in the abdomen and occasionally in the caudal region. *Channa punctata*, which had ulcerated skin generally at the base of the caudal peduncle and sometimes showed reddish protruded eyes. *Mystus vittatus*, which depicted amber-coloured lesions at the base of the rayed dorsal fin and sometimes at the base of caudal fin. *Puntius conchoni*, which exhibited amber-coloured lesions at the base of the dorsal and caudal fins and sometimes on the abdominal surface.

Other species affected by the present epidemic, but not very widely, included *Clarias batrachus*, *Mastacembelus armatus*, *M. pancalus*, *Salmostoma bacaila*, *Gadusia chapra*, *Badis badis*, *Glossogobius giuris*, *Ailia coila*, *Lepidocephalus guntea*, *Cirrhina* sp. and *Chanda ranga*. Among the Indian major carps, *Catla catla*, *Cirrhina mrigala* and *Labeo gonius* were found to be affected while *L. rohita* and *L. calbasu* were not affected by

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the epidemic. Interestingly, *Amblypharyngodon mola*, *Ctenopharyngodon idella*, *Rasbora daniconius*, *Puntius ticto* and *Channa marulius* from some areas of the district alone were infected.

Field estimations were conducted at fortnightly intervals during December 1986 to October 1988 at the lentic water bodies of Silchar. The observed average water temperature (33.4°C), turbidity (61.9 TU), pH (6.9), dissolved oxygen (5.95 mg/l), free carbon di-oxide (7.25 mg/l) and total alkalinity (7.5 mg/l) suggested normal values. The recorded normal values during July-October for different parameters for a similar water body were 32-34°C, 50-70TU, 6.0-7.2, 3.0-6.0 mg/l, 6.00-10.0 mg/l and 35.0-45.0 mg/l respectively for temperature, turbidity, pH, DO FCO<sub>2</sub> and TA (Dey and Kar, 1987). The total alkalinity, however, depicted lower values during the period when disease occurred as compared to the usual values as referred to above. Aquatic macrophytes in these water bodies exhibited normal species composition and usual trend of biomass giving a mean biomass of 0.406 kg/m<sup>2</sup> which fell within the usual range of mean biomass : 0.2 -1.5 kg/m<sup>2</sup> reported by Dey and Kar (1987). Limnoplankton exhibited normal trend of species composition and a mean total count of 144 µ/l which well agreed with the normal range of 100-150 µ/l (Dey and Kar, 1987). These results indicated that the lentic water bodies of Silchar sub-division had been largely maintaining their organically unpolluted nature. Hence organic pollution of water could not be regarded as the possible reason for the outbreak of the present epidemic in fishes.

Studies conducted with Gamma-ray spectrometer indicated that the level of radioactive contamination recorded in the diseased fishes was very negligible to cause any harm in fish or in human beings who consume fish (radiation level : background 770, 791; with healthy fish 741, 716 and background 400, 460; with diseased fish 316, 306).

Qualitative chemical estimation of the

trace elements in the diseased fish muscles by atomic absorption spectrophotometry did not reveal levels of mercury, lead, arsenic and cadmium which could be of lethal proportion (average quantity in mg/kg of Hg, Pb, As and Cd (a) in diseased fish muscles - 0.99, 0.6, 0.0001, 0.0003, (b) in apparently healthy fish muscles - 0.63, 0.54, 0.00005, 0.00028 respectively).

Scanning and transmission electron microscopic studies revealed the occurrence of virus-like particles in the muscles and gills of diseased fishes. These are being identified.

Bacterial culture from the surface lesions and gills of each of the four most widely affected species of fishes showed colonies of mainly haemolytic *Escherichia coli*, *Pseudomonas aeruginosa* and *Klebsiella sp.* All these bacteria have been found to be sensitive to Gentamycine, Nalidaxic acid, Chloramphenicol, Tetracycline and Norfloxacin.

In relation to fish consumption by human beings, it can be said that the bacteria isolated from the diseased fish are generally known to cause diarrhoea in man. These bacteria normally do not enter the blood, but secrete certain toxins into the lumen of the intestine from where they are absorbed into the blood. This may lead to the expression of certain clinical symptoms in the human host.

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