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AEROMONAS HYDROPHILA SEPTICAEMIA OF INDIAN MAJOR CARPS IN SOME COMMERCIAL FISH FARMS OF WEST GODAVARI DISTRICT, ANDHRA PRADESH

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AEROMONAS HYDROPHILA is an important pathogen of warm water fishes[1]. Gopalakrishnan[2] reported many instances of entire populations of Indian major carps being wiped out by epidemics of *A. hydrophila* infection in stocking tanks in West Bengal, India. Snieszko and Axelrod[3] classified disease symptoms caused by *A. hydrophila* under four categories, viz. acute, rapidly fatal septicaemia, with a few gross symptoms; an acute form with dropsy, blisters, abscesses and scale protrusion; chronic ulcerous form with furuncles and abscesses; and latent form with no symptoms. An ulcerative form of *A. hydrophila* infection in *Catla catla*[4] has been reported earlier. An acute septicaemia due to *A. hydrophila* in some commercial fish farms of West Godavari District of Andhra Pradesh is discussed here.

Following complaints from some fish farmers in Eluru, West Godavari District, Andhra Pradesh, of mortality of fish in their farms during April 1988, infected fish were collected.

Farm A: Water spread area of 7 acres, stocking three Indian major carps, Catla, Rohu and Mrigal, in a ratio of 1:2:0.8. At the time of sampling, average weights were Catla 0.8 kg, Rohu 1 kg, Mrigal 0.5 kg. Mortality was noticed in Catla and Rohu at the rate of 6–7/day and 1–2/day respectively.

Farm B: Water spread area of 20 acres, stocking Catla, Rohu, Mrigal and grass carp in the ratio 1:3:0.5:0.125. Average weights of fish at the time of sampling were Catla 0.75 kg, Rohu 1.25 kg, Mrigal 1 kg and grass carp 2.0 kg. Mortality was noticed only in Rohu at the rate of 10–15/day.

Fish from both farms showed dark patches on the body. Live fish were transported to the laboratory for collection from surface lesions for culturing. Fish were anaesthetized by keeping cotton dipped in 70% alcohol under the operculum. The fish was then cut open using sterile instruments. Blood was drawn from the heart, and pieces of liver, kidney and spleen were removed, taking care to avoid contamination from the alimentary canal. All samples were plated on trypticase soy agar and incubated at ambient temperature. Isolates were purified and initial identification of the isolates was made using the diagnostic scheme suggested by Plumb and Bowser[5]. Identification of *A. hydrophila* was by a series of biochemical tests described earlier[4].

Surface swabs from infected fish yielded predominantly *A. hydrophila*. This organism was isolated in pure culture from blood, liver and kidneys of infected fish. This indicated that there was acute septicaemia due to *A. hydrophila*. The organism's presence in blood, liver and kidney is a clear indication of it causative role. In both farms, the species that was in larger number was affected.

Factors contributing to virulence of *A. hydrophila* have been investigated earlier[6]. Allan and Stevenson[7] demonstrated that crude extracellular preparations of *A. hydrophila* containing haemolytic and proteolytic activities could produce pathological symptoms in trout. Thune *et al.*[8] also demonstrated that crude extracellular preparations from *A. hydrophila* containing haemolysin and heat-stable

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Table 1 *Virulence of A. hydrophila isolates from diseased carp*

Fish from which isolated	Site from which isolated	LD_{50}	Haemolytic activity	Protease production	MHD*
Farm A					
Rohu	Blood	1.3×10^6	+	+	10^8
	Liver	2.4×10^6	+	+	10^8
	Surface	3.1×10^6	+	+	10^8
Catla	Blood	3.6×10^5	+	+	10^7
	Liver	4.2×10^5	+	+	10^7
Farm B					
Rohu	Blood	1.4×10^5	+	+	10^7
	Surface	1.2×10^6	+	+	10^8

*Minimum number of bacterial cells required to bring about agglutination of catfish erythrocytes.

and heat-labile proteases could produce gross clinical signs similar to those produced by the whole organism. The isolates obtained in this study showed haemolytic and proteolytic activity (table 1), indicating their virulence. The LD_{50} of the isolates to catfish fingerlings ranged from 10^5 to 10^6 (table 1). De Figueiredo and Plumb[9] examined the virulence of *A. hydrophila* strains isolated from diseased fish to channel catfish fingerlings, and obtained LD_{50}s in the range 10^4–10^5. The LD_{50}s of our isolates to *Clarias batrachus* fingerlings were only marginally higher.

Haemagglutinating activity is closely related to the adhesive property of the organisms and is believed to play an important role in the infectivity of pathogens. Therefore we tested the isolates for haemagglutinins for catfish erythrocytes by the method of Toranzo *et al.*[10] As shown in table 1, all the isolates had haemagglutinins and the mean haemagglutination dose (MHD) ranged from 10^7 to 10^8 cells.

The present results show that mortality of Indian major carps noted during April 1988 in some fish farms is due to *A. hydrophila* septicaemia. Isolation of this organism from blood and internal organs of infected fish and the characterization of the isolates with respect to virulence factors like haemolysin, protease and haemagglutinins strongly support the conclusion regarding their causative role. The isolates were sensitive to tetracycline, cotrimaxazole and furazolidone.

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