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Case Study

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Case Study: Occurrence of Virulent *Aeromonas hydrophila* Infection in Carp Fish at Ri-Bhoi District, Meghalya, India

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A B S T R A C T

The case study reported upon a virulent *Aeromonas hydrophila* isolation for the first time from infected *Labeo gonius*, *L. bata*, *L. calbasu* and *Puntius javanicus* under mid-hill condition exhibiting various clinical signs like surface ulcer, fin rot, opacity of eye, and hemorrhagic septicemia. Isolation was done from eye, surface ulcer and kidney of infected fish and pond waters using *Aeromonas* selective agar media. A total of 21 representative isolates were identified as *A. hydrophila* by biochemical test. The histo-pathological study of liver, kidney, heart, gill shows infiltration of lymphocytes and gradually cell distortion. The present study emphasizes on the isolation, proper detection of virulent, opportunistic pathogen like *A. hydrophila* for health management in aquaculture to save the famers from huge crop failure.

Introduction

Aeromonas hydrophila is a facultative anaerobic, oxidase-positive, gram-negative bacterium which inhabits aquatic environments naturally (Ahmed, 2009). *A hydrophila* are motile bacteria and exists in wide environment ranges of conductivity, turbidity, pH, salinity and temperature Aeromonads reported as pathogens in fish, amphibians and reptiles (Hazen *et al.*, 1978). Infection with *Aeromonas* spp. causes hemorrhagic and ulcerative disease, furunculosis and septicemia in animals (Harikrishnan and Balasundaram, 2005). In natural situations, an infection with *A. hydrophila*, fish probably shows a minor problem but under stress conditions huge mortality may occur (Janda and Abbott, 2010). Under poor environments like high levels of total ammonical nitrogen (TAN), low levels of dissolved oxygen, or high levels of carbon dioxide (CO_2), algal bloom, temperature fluctuation due to rainfall are more vulnerable to infection by *Aeromonas hydrophila* (Kautsky *et al.*, 2000).

The case study was reporting on virulent *A. hydrophila* infection which causes 30% mortality in carp farms at Ri-Bhoi district, Meghalaya during June- August 2015 (Fig:1).

The ponds were located at 950 m above the MSL between 21° 50′ - 29°.50′ N latitude and

85° 5′ -97° 5′ E longitude, inside and nearby the campus of ICAR Research Complex, Meghalaya (Fig 1). The climatic condition of the region is cold to warm pre-humid with annual rainfall of above 2,000 mm. The air and water temperature varies between 11 - 26ºC and 09 - 28ºC, respectively.

Materials and Methods

Collection of samples

Moribund fish (Fig 2) with visible lesions viz. surface ulcer, dropsy, fin rots, opaque eyes etc. were collected from three fish farms where disease outbreak occurred and brought to the laboratory with sterile plastic pouches. The pond waters of these three farms were also collected with 1 litre capacity sterile plastic containers and brought to the laboratory. All the samples were kept at 4^{o}C until further use. The *A. hydrophila* was isolated in selective *Aeromonas agar* media (Fig 3) and confirmed as *A. hydrophila* by serial biochemical test.

Histopathology

Tissue samples from liver, kidney, heart, gill, were taken for histopathological examination. The samples were fixed in Bouin's solution for 6 hours and then embedded in parafin following routine tissue processing. Tissue sections in 5-6 µm width were stained with haematoxylin-eosin and evaluated under light microscope.

Fig.1 GPS location of farm where disease occur

Fig.2 Infected fish showing red spot and lesion

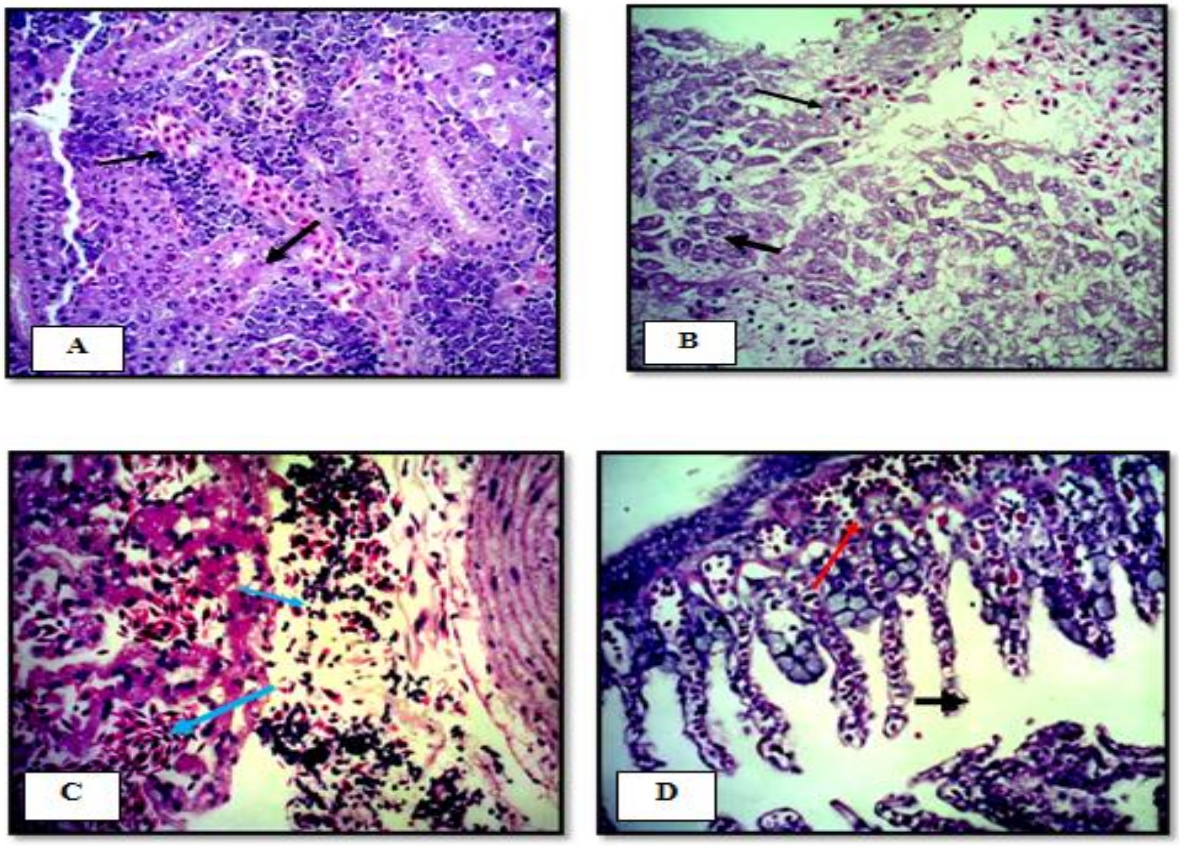
Fig.3 Typical *Aeromonas* colony

Fig.4 A: Degenerative changes in Kidney (thick arrow) and infiltration of lymphocytes cells (thin arrow) HE, 40x)

B: Focal degeneration of hepatic cells in liver (thick arrow) and infiltration of lymphocytes cells (thin arrow) HE, 40x).

C: Focal distortion of cardiac mussel (thick arrow) and infiltration of lymphocytes between cardiac muscle (thin arrow) HE, 40x).

D: Degeneration of secondary gill lamella (thick arrow) and infiltration of lymphocytes cells in between gill lamella (thin arrow) HE, 40x).



The histological slides of liver, kidney, heart, and gill (Fig 4a-d) showed degeneration of cells of all organ and infiltration of lymphocytes. The *A. hydrophila* destroyed cell therefore gradually fish die and farmers loss the crop.

Aeromonas hydrophila is an opportunistic bacterial pathogen which may cause serious losses to the farmers if the culture system is not manage properly. *A. hydrophila* infection causes huge losses farmers due to mortality as it become very virulent under adverse environmental condition. Therefore it is advice for adoption of best management practices with proper hygienes. Water quality mainly ammonical nitrogen, dissolved oxygen and organic load need to be maintained in optimum condition. Treatment with Terramycin @ 50mg/kg fish for 10 days in feed in recommended.

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