Epizootic Ulcerative Syndrome in genetically improved farmed tilapia- A case report

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Epizootic Ulcerative Syndrome (EUS) is an epizootic infection caused by *Aphanomyces invadans* or *A. piscicida*. *Aphanomyces invadans* and *A. piscicida* are oomycetes which affects wild, farmed, fresh water and brackish water fish (OIE, 2022). EUS causes lesions due to the localization of the pathogens under the scales of fish, causing haemorrhagic spots and protruding scales with bloody areas underneath the scales. The spores initially damage the skin and germinate to produce hyphal filaments. The skin invaded by infiltrating hyphae finally enters the underlying muscular tissues, causing severe ulceration and tissue loss (Kamilya and Baruah, 2014). More than 50 fish species are affected by EUS, however, important varieties such as tilapia, milkfish, and carp have been shown to be resistant. EUS was first recorded as an outbreak in Japan in the 1970s (Egusa and Masuda, 1971). EUS was first documented in India in 1989 (Mohan and Shankar,1994).

In this report, two cases of EUS infection were reported in Kerala. Both the infection occurred in Genetically Improved Farmed Tilapia (GIFT) (Fig.1), one during the month of Dec 2019 from an aquaculture farm in Kothamangalam, Ernakulam and another during the month of November 2020 in an aquaculture farm in Alappuzha. In both cases, the water quality parameters viz., pH, dissolved oxygen, salinity, nitrite and nitrate were determined. In farm 1, fishes had haemorrhagic lesions on the surface of the body. Examination of internal organs revealed cotton wool appearance over the kidney region. In farm 2, the external body surface was observed with bloody mucilage, rotten fins and gill necrosis. Nitrate and nitrite levels were 40 mg/l and 1 mg/l respectively for farm 1. The nitrate and nitrite levels of the other farm were within the limits.

Samples such as haemorrhagic lesions on the skin surface, gills, kidney and liver were collected from the infected fish. DNA and RNA were extracted from the tissues and analysed by PCR/RT-PCR for the economically important pathogens as described by OIE. In both farms, EUS was confirmed based on the amplification of a specific amplicon (550 bp) by PCR. In farm 2, additionally *Aeromonas* sp. were also isolated from the skin lesions. None of the other pathogens screened could be detected. Although complete elimination of EUS causing *A. invadans* in finfish aquaculture is very difficult, the infections can be controlled effectively by increasing the salinity of farm water to 2 ppt in the water and treating the water with disinfectants before the release of seeds in farms affected with EUS.

Fig.1 *Haemorrhagic lesions on body of GIFT Tilapia*

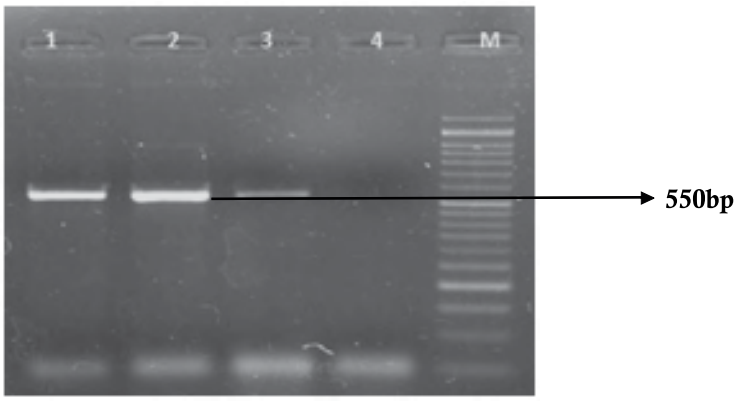

Fig.2 *PCR amplification for detection of A.invadans*
(Lane1 and 2: *Test sample 1 and 2;*
Lane 3: *Positive control plasmid;*
Lane 4: *Negative Control; M: Molecular Weight marker)*

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