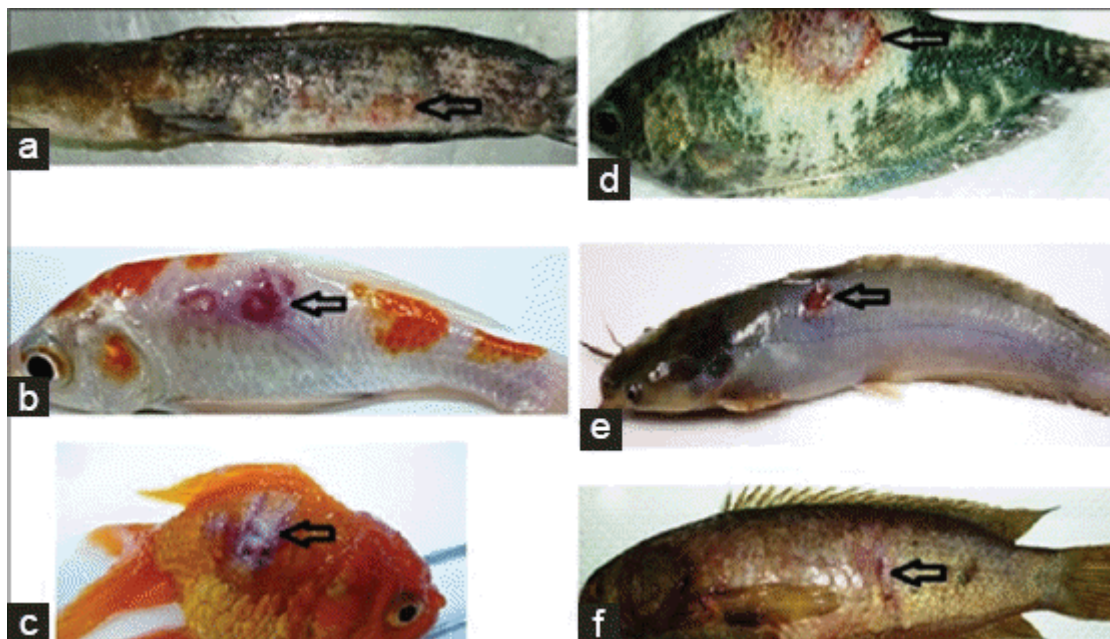


## Epizootic Ulcerative Syndrome

### General characteristics

EUS causes ugly lesions in affected fish. Lesions can range from small pinpoint red spots, haemorrhagic spots, localized swelling, localized raised areas on the body surface, protruding scales, scale loss, skin erosion, reddened areas of the skin under the scales, exposure of underlying musculature, and ulceration. Ulcers can be found over a broad area with the center of the lesions being necrotic. Lesions are observed most often in the lateral surface but can also occur on any part of the body. Infection in fish occurs when motile spores of the fungi *Aphanomyces invadans* in the water or other carriers/ vectors are attracted to the skin of the fish. The spores penetrate the skin and germinate, forming fungal filaments or hyphae. The hyphae invade widely into the surrounding skin and deeply into the underlying muscle tissues, resulting in extensive ulceration and destruction of tissues. The sporangia are narrow, with diameters similar to that of the hyphae.



### Diagnostics

Histopathology of EUS-infected dashtail barb (Botswana) showing typical mycotic granulomas surrounding the invasive fungal hyphae (stained black, black arrows) in the skin layer (Grocott's silver stain) Typical severe mycotic granulomas (black arrows) from muscle section of EUS fish (barb from Namibia) (H&E) More than 50 species of both farmed and wild fish, freshwater and estuarine, are susceptible to EUS.

### These include, for example:

barbs (Africa), bream (Africa), catfishes (Africa), cichlids (Africa), churchill (Africa), eels (Asia), • gobies (Asia), gouramies (Asia), Indian carps (catia, mrigal, rohu) (Asia), ayu (Japan), • menhaden (United States of America), mullets (Asia), perches (Asia, Africa), seabass (Asia), seabream (Asia), snakehead (Asia) and tilapias (Africa).

## Prevention

- EUS infected fish should not be thrown back to the open waters and should be disposed of properly by burying them into the ground or through incineration.
- Additional practical aquaculture biosecurity measures include: – good farm hygiene (e.g. handwashing between tanks, separation of nets/tanks/stocks, regular and correct disinfection procedures, etc.) – good husbandry practices – good water quality management – proper handling of fish – regular monitoring of fish health – good record keeping (gross and environmental observations and stocking records including movement records of fish in and out of aquaculture facility, etc.)
- Early reporting or notification to concerned authorities of a disease outbreak or suspicion of any abnormal appearance, behavior or other observations in fish stocks.

## Treatment

A number of simple biosecurity measures can minimize or prevent the spread of EUS. These include:

- All possible carriers or vectors such as freshly dead fish, birds or terrestrial animals as well as contaminated fishing gears/net and fish transport containers should be prevented from getting into water bodies or fish ponds.
- In outbreaks occurring in small, closed water bodies, liming of water and improvement of water quality, together with removal of infected fish, are often effective in reducing mortality.
- Increasing salinity in holding waters may also prevent outbreaks of EUS in aquaculture ponds.
- During dry and cold seasons, close observation of wild fish should be made to determine the presence of EUS-diseased fish in neighbouring tanks or canals, in which case, exchange of water should be avoided.