Infectious Diseases:

1- Bacterial diseases

Bacterial infections are often internal infections and require treatment with antibiotics by adding them to food or offering as drug to fish. Bacteria are very common in the aquatic environment; most bacterial disease agents are part of the normal flora of the water. They cause disease only when the fish are stressed due to poor environmental conditions, inadequate diet, nutritional deficient and overstocking.

Some of the most common bacterial diseases listed below:

VIBRIOSIS

This disease is also known as ***Vibrio* hemorrhagic septicemia**. The causative agents are *Vibrio parahaemolyticus, V. alginolyticus, V. vulnificus and V. carchariae*, these bacteria may affect all stages ages of fish (fry, fingerlings, juveniles, adults).

The transmission of the disease has been correlated with high salinity (30-35 ppt), these bacteria enter the fish through damaged areas, or may be transmitted through the water.

The first **clinical signs** of the disease are anorexia (loss of appetite) with darkening of the fish coloration, the fish may be lethargic, swimming near the water surface. Affected fish may lose equilibrium and exhibit abnormal swimming behavior, one of the important signs of the disease is body ulcer that may be hemorrhagic fin rot, which usually starts with erosion of the tip of the fin and gradually becomes necrotic, Exophthalmia. Internally, bloody discharges may be observed in the abdominal cavity due to internal organ hemorrhage.

To Prevent the disease, must avoid rough handling of the fish during stocking and grading, changing of nets, good water quality must be maintained. Affected fish can be **treated** with oxalinic acid mixed with feed at 20 mg/kg of fish or Terramycin added to feed at 7.5 g/kg for 5 days.

PSEUDOMONAS INFECTION (PSEUDOMONADIASIS)

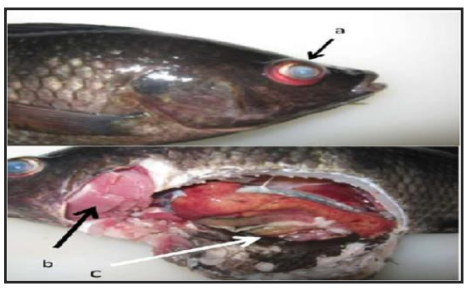
The disease is also known as **pseudomonad hemorrhagic septicemia**. The causative agents are among the *Pseudomonas* species (*P. chlororaphis*, *P. anguilliseptica*, *P. fluorescens*, *P. putida*, *P. plecoglossicida*), These bacteria may affect all stages of the fish. The *Pseudomonas anguilliseptica* is considered the most significant pathogen for cultured fish. This disease occurs at low temperatures (below 16°C) during the winter months. *Pseudomonas* spp. are ubiquitous in the aquatic environment; therefore, **transmission** of Pseudomonas infections is occurred when it is subjected to environmental stressors such as extreme water temperature changes, overcrowding, poor water quality and sub-optimal nutrition.

The main **clinical signs** of the fish are abdominal distension and hemorrhagic petechia in internal organs, have extensive hemorrhagic erosions of the body, exophthalmia and corneal opacity, Ulcerations on the skin, fins and tails may also be observed.
To Prevent this infection, avoid the predisposing factors such as extreme water temperature changes, overcrowding, poor water quality, sub-optimal nutrition and transferring affected fish into another tank with clean water may control the infection. Terramycin can be used to treat disease in aqua cultural, the dosage regimen is 2.5 to 3.75 g/100 lb/day for ten days.

Rainbow trout / infected by *Pseudomonas* sp. with oedema and petechial hemorrhages in the skin of the vent.

STREPTOCOCCAL INFECTION (STREPTOCOCCOSIS)

The disease is also known as **red boil disease** because the infected fish have red boils in the skin. It is often associated with **vibriosis***.* Streptococcal infection of fish could infect all cultured fish and all stages ages, the causative agent of This disease has shown that at least 5 different defined species:
Lactococcus garviea, *Streptococcus iniae*, *Streptococcus agalactiae*, *Streptococcus parauberis* and *Vagococcus salmoninarum*. Therefore, streptococcosis of fish should be regarded as a complex of similar diseases caused by different genera and species.
Streptococcus iniae is the main aetiological agent of streptococcosis.
The bacterium is **transmitted** ubiquitous in the environment, in the water and in carrier fish, spread of the disease is associated with the presence of parasites, handling stress and sub-optimal water quality.
the clinical signs of affected fish are weak and display disoriented whirling motion, Exophthalmia, hemorrhages on the cornea, operculum, around the mouth and the anus could also be observed.
Preventive of this disease by avoid the predisposing factors such as the presence of parasites, handling stress and sub-optimal water quality to prevent disease occurrence. Affected fish could be **treated** with oxalinic acid mixed with feed at 20 mg/kg of fish, and perfuran bath for 1 hour at 2 ppm.



Nile tilapia / showing gross clinical signs of streptococcosis. (a) exophthalmos, opaque, and hemorrhagic eye, (b) pale gill, and (c) ascites in abdominal cavity.

BACTERIAL GILL DISEASE (BGD)

It is a common external infection, all cultured species are probably susceptible, this disease has been reported from a broad range of cultured cold water and warmwater fishes, it is caused by *Cytophaga* sp., *Flexibacter* sp. or *Flavobacterium* sp., these bacteria usually attack fingerlings. The disease starts (**Transmission**) when the water quality deteriorates after a heavy rain. Silt and suspended organic particles from run-off could irritate the gills and increase susceptibility to the disease. Low dissolved oxygen and high ammonia levels are often observed during disease outbreak, stress makes fish susceptible to bacterial infection.

Affected fish (**clinical signs**) become anorexic, lethargic and dark in color, fish tend to remain near the surface and may be flaring their operculum, the gills produce excessive amounts of mucus and the gill filaments may stick together, the gills of affected fish become yellowish in color indicating gill rot.

to prevent the disease must maintain good water quality and minimize stress by avoiding overcrowding, low dissolved oxygen and high ammonia levels, transferring affected fish into another tank with clean water may control the infection.

Affected fish may be treated (**Control**) with oxalinic acid mixed with feed at 20 mg/kg of fish and oxytetracycline at 75 mg/kg for 10 days. Dipping the fish in the acriflavine bath at 100 ppm for 1 minute, potassium permanganate can also be used at 2-4 ppm could also be used to treat diseased fish.

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