

# Bacterial diseases of fish

## Vibriosis

Vibriosis is one of the oldest recognised diseases of fish. The causative agent was named *Vibrio anguillarum*. This bacteria is commonly found in marine and estuarine environments with wide range of salinities and readily isolated from marine invertebrates. *Vibrio anguillarum* Gram negative, motile, curved or straight rods (0.5×1.5-2.5 µm).

Most marine vibrios have absolute requirements for sodium ions on media containing sea water salts and on most general purpose media containing 1-2% sodium chloride. Thiosulphate citrate bile salt sucrose (TCBS) is a selective medium. Smooth, convex, white colonies develop within 48 hr at 20 °C on non-selective media. *Vibrio anguillarum* forms yellow colonies on TCBS.

### *Epizootiology*

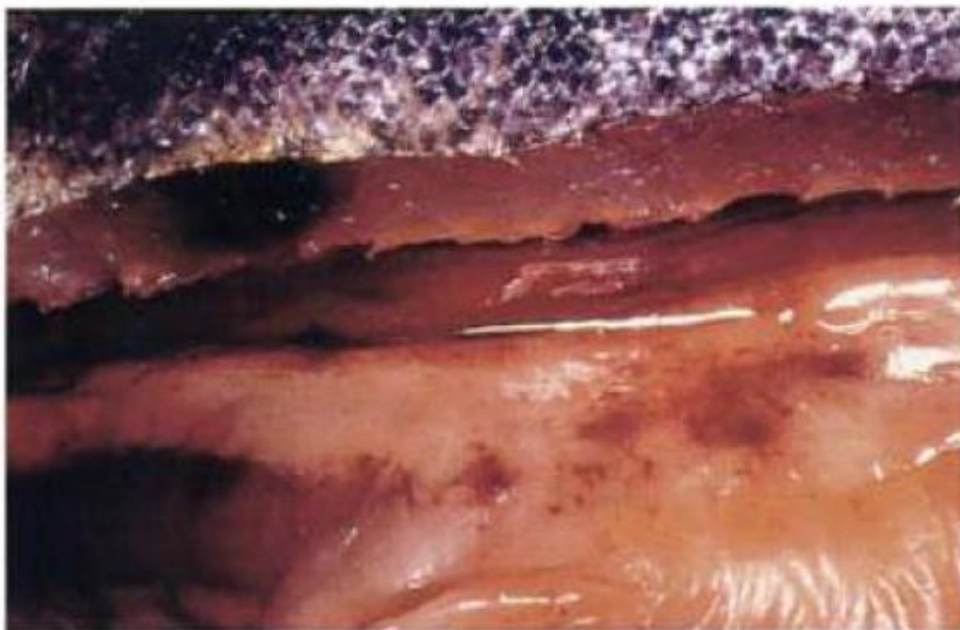
Vibriosis is the most significant disease of cultured and wild marine fish in salt or brackish water. It was first described in eels, where it was called red pest. But now the disease recorded in a wide range of fish. Outbreaks have also been recorded in fresh-water species, usually associated with the feeding of marine fish offals. In the wild the diseases normally occur in fish in shallow waters in late summer when temperatures are high. In farmed fish the disease occurs at most times of year

## **Clinical pathology**

First signs of losses, affecting most susceptible fish are often anorexia, darkening and sudden death in young fish these may be the only signs, although periorbital and/or abdominal dropsy may also develop( Fig 8 -16). In older fish, the subsequent development of the disease goes through an acute or chronic phase. Acutely affected fish show swollen, dark, skin lesions which ulcerate to release blood coloured exudate. The ulcers may be very deep and necrotic.( Fig 8-17). Internally the main feature is enlargement and liquefaction of the spleen but there is also liquefaction of the kidney and petechiation of visceral and parietal peritoneum, focal haemorrhages may also be seen on the surface of the heart and the gills are usually paler, there are also deep necrotic haemorrhages within myotomes in larger fish.



**Fig. 8.16.** Young turbot with peracute vibriosis resulting in circulatory failure and gross abdominal distension, due to oedema.



**Fig. 8.17.** Deep *Vibrio anguillarum* lesion in muscle of Atlantic salmon. (By courtesy of Prof T. Hastein.)

Chronically infected fish, skin lesions may organize and become granulomatous. Gills usually remain pale, and

organization of haemorrhages in the abdominal cavity which may result in fibrous adhesions between viscera. The mouth area (Fig 8-18) or the eyes are frequently affected in such fish. The first sign is corneal opacity, which may progress to ulceration.



**Fig. 8.18.** Oral ulceration in albino plaice with chronic dermal vibriosis. (By courtesy of Mr A. Finnie.)

## **Control**

Immunization and genetic selection have been shown to improve the resistance of fish to infection. Antibiotic therapy is still the main method of controlling clinical outbreaks. Oxytetracycline, potentiated sulphonamides or nitrofurans are the most commonly used drugs. Vaccination is now so effective unless there is immunosuppression present, that's should be used routinely in all production systems in the marine environment.

## **FURUNCULOSIS**

Furunculosis is a serious, septicemic, bacterial disease found principally in salmonid fishes. but it may also occur in goldfish and other cyprinids. The common name of the disease is derived from the presence of “blisters” or furuncles on the surface of chronically infected salmonids . However, this sign is not diagnostic of this disease in as much as it may be encountered in fish infected with other pathogens. It should be pointed out that, in acute cases of furunculosis, the furuncles may not be present. Furunculosis is found worldwide with few exceptions and causes disease in many species of coldwater and warmwater fishes.

The disease is caused by a Gram-negative bacterium, ***Aeromonas salmonicida***. This organism can also cause clinical disease in other fish species where it is named ulcer disease or carp erythrodermatitis.

### **Aetiology**

*Aeromonas salmonicida* is a Gram-negative, non-motile short rod and most strains produce a brown diffusible pigment on agar containing tryptone. Grows best at 22°C or less.

### **Clinical signs**

Clinically-infected fingerlings will usually exhibit hemorrhages at the base of fins and erosion of the pectoral fins. Bloody or hemorrhagic vents and petechial hemorrhages on the ventral surface are frequently observed. In chronically infected adults, typical “furuncles” or blisters on the skin containing an amorphous yellow substance and blood may be present. This is rarely seen in small or fingerling fish since an acute infection frequently causes massive bacteremia and death before gross lesions develop. Internal examinations frequently reveal a bloody fluid in the body cavity. Petechial hemorrhages are commonly observed in the body wall and viscera.

### **Diagnosis**

Gross and histological sign are helpful but confirmation requires isolation on general nutrient agar (24 - 48 hours at 22°C) such as TSA (tryptic soy agar) or BHI. Isolation vital for antibiotic sensitivity.

## **MODES OF TRANSMISSION**

Transmission generally occurs as a result of contact with diseased or carrier fish, but can occur through water passed from one pond or raceway to another. Contaminated clothing or equipment may also transfer the disease from one culture unit to another. The possibility also exists that fish-eating birds may transfer the disease either by contact or by dropping infected fish into an uninfected pond. If eggs from carrier broodstocks are not disinfected prior to incubation, the organisms may be transferred on the surface of the eggs.

### **control**

All lots of fish in a hatchery should be inspected at least once per year for the presence of disease. Transfers of suspect or known carrier fish from hatchery to hatchery should be avoided. All eggs from susceptible species should be routinely disinfected using organic iodine compounds at 100 ppm of active iodine for 10 min on water hardened eggs. The hatchery water supply should be kept free of fish. Barriers should be provided to prevent the introduction of potential wild carrier fish into the hatchery. Resistant strains of fish should be utilized as a disease management tool where appropriate.

### **Treatment**

Broad spectrum antibiotics effective in controlling an outbreak, but increasing antibiotic resistance is observed and sensitivity should be tested.

Epizootics of the disease may be treated through the addition of drugs to the fish feed. Terramycin (oxytetracycline) should be added to feed at the rate of 3.0 g/100 lb fish, administered daily for 10 d to affected fish. Sulfamerazine should be administered at the rate of 5-10 g/100 lb fish and fed for 10 or 15 consecutive days.



Figure 16. Salmon parr affected by atypical furunculosis presenting with small skin ulcers .



A dermal ulceration in the mirror carp (*Cyprinus carpio*) indicative of the pathology observed in Carp Erythrodermatitis, as caused by an atypical *Aeromonas salmonicida*. Photograph from NFHRL collection courtesy of R. Bootsma.

