Columnaris disease (Saddleback disease)

The disease is brought in many cases by fish that have been badly handled, and often have been subjected to stress. Among predisposing factors often noted, is a sudden rise in temperature. And the disease most frequently appears, when water temperature is above 64^0F. There are some interesting relationships between the quality of the water, and the virulence of the disease. In waters with a total hardness of 33 ppm as $CaCO_3$. The pathogen was found to be at its most virulent, while in distilled water with zero minerals it was determined to be non-pathogenic. This would indicate some need for certain minerals in order for the bacteria to reproduce and further re-infect fish.

A typical characteristic of the disease is a rotting of the tail and very often the fins, which if unchecked will lead quickly to death of the infected fishes. This is a virulent pathogen, which can infect the vast majority of fishes, and has been found to occur in almost all parts of the world.

Aquarists often refer to *F. columnaris* disease as ‘fin rot’ or ‘cotton wool disease’, the latter name reflecting its physical resemblance to fine strands of cotton wool, which may lead inexperienced aquarists to misdiagnose the disease as a fungal infection.

Description of the organism

The causative organism is a bacteria usually called today ***Cytophaga*** but previously was called ***Flexibacter*** and also

Myxobacteria. ***Flexibacter columnaris*** and ***F. psychrophila*** are the most frequently isolated species of this genus in cyprinids and are commonly referred to as gliding bacteria.

The bacteria are thin rods, (0.5- 1.0 microns in diameter, and some 4-10 microns long). Their most noticeable feature is an unusual "gliding" motion, which is not observed in other species. In wet mounted specimens they can be seen piled up into large columns which have given one of the common names to this infection. Culture of the organism is best done and there is a culture media available called Cytophaga media, which is used for this purpose.

Clinical Pathology

Skin. There will be necrotic lesions on the skin, which often are white/gray colored with an edging of red. These will quickly transform (in a day or two) into ulcers with have an orange/yellow color, caused by the bacteria decaying the underlying tissue.

Gills. Similar effects very typically occur on the gills. The progression of these ulcers, causes the fish to have great trouble with its respiration, and thus can quickly lead to fatalities. If the gills are examined, excessive amounts of mucous are to be expected.

Fins. Large milky patches can be seen quite easily on the fins of the fish, and this is usually an indication that the disease has progressed to a degree that treatment will become much more difficult. One typical sign is the appearance of a "saddle" shaped lesion usually around the area of the dorsal fin, and this occurs so often, that the name "saddle back disease" is often used in

aquaculture to describe this infection.

Behavior. The fish will become very listless and lethargic, often hanging at the surface, trying to breathe there, although on occasion, the fish will rest on the bottom of the tank. Disinclination to feed is very typical and the fish will become anorexic. Respiration is often rapid, as the fish fights to overcome the damage done by the infection to its gills.

Fig. 8.6. Columnaris lesion on dorsum of rainbow trout. (By courtesy of Prof H.W. Ferguson.)

Transmission of infection

The infection can be expected to spread most rapidly if water conditions are less than ideal, and factors that have been observed to enhance the pathogenicity are low oxygen values, hard alkaline waters, excessive nitrite levels, and even the presence of certain trace elements such as arsenic.

Treatment

As noted previously, water quality plays a vital role in the prevention and cure of this disease. Prior to initial dosing of any medication to the aquarium, one should perform a large water

change (30-50%) with a thorough gravel cleaning in order to remove excess detritus and waste from the substrate.

The exact causative agent needs to be identified and a suitable antibiotic identified. Some water-borne chemicals such as benzalkonium chloride (BKC) are effective. In the case of highly prized fish, e.g. some ornamentals, antibiotics may be effective, and the early stages of the infection can sometimes be treated with an antibacterial bath, e.g. copper sulphate.

Mycobacteriosis (Tuberculosis) (TB)

Mycobacteriosis is a widespread, but rarely reported problem in wild and farmed cyprinids. Although fairly common in small tropical aquarium species, the disease is not so common in larger temperate cyprinids particularly those destined for the ornamental trade, e.g. goldfish and common carp.

Two species occur in fish –*Mycobacterium marinum* and *M. psicium*.

Aquarists often refer to the disease as fish tuberculosis (TB), because the bacteria belong to the same genus as the one causing human tuberculosis (*M. tuberculosis*). Note that this disease is of zoonotic importance. Transmission from infected fish to humans is rare but “fish handler’s disease” or “fish tank granuloma” is a condition that can occur in humans as a result of the skin infection from these bacteria. Gloves should be worn when handling suspect or infected fish or when cleaning contaminated surfaces.

In carp, the disease apparently takes on the cutaneous form, rather than the visceral form usually associated with warm water

aquarium fish. Infected fish appear emaciated, stunted and show loss of appetite. Areas of light grey discoloration are present on the body surface and can vary from focal areas of scale loss to open ulcers.

High water temperature would appear to be necessary for infection. It is thought that fish acquire infection mostly via the oral route, by consuming detritus that contains bacteria shed from the ulcers of infected fish, or by foraging on infected corpses.

Description:

Tuberculosis is an infectious disease caused by *Mycobacterium pisicum*. This is a gram-positive non-motile thick rod, between 2 and 12 micrometers in length. The optimum temperature for the bacterium growth on the nutritional media is 25C (77F). It affects fish's internal organs. The pathogen gets into the aquarium from a fish-pond with feed, plants and gravel if the latter has not been boiled or tempered as well as with fish, plants, water and equipment from a contaminated tank.

Clinical Pathology

Affected fish show loss of appetite, constantly lose weight, and hide in the corners of the aquarium. They will have a curved spine, hollow belly, and sunken eyes. Bones protrude through the skin and scales. Fish will die within a month. An autopsy will not reveal any abnormalities in the internal organs. Sometimes there will be small yellowish granules(round grains) on the liver and kidneys.

Diagnosis

Diagnosis is based on observation of clinical signs, histopathology and microbiological examinations.

Prevention and treatment

Prevention is through maintaining a healthy environment for your fish, providing them with a nutritionally balanced diet, avoiding overcrowding as well as maintaining high water quality. Quarantine new fish for three months before intoducing them into the main tank. During this period they should be closely observed.

There is no fully effective treatment therefore the best course is to cull and disinfect premises. 10,000ppm chlorine or 60 – 85% alcohol do kill mycobacteria.

It is possible to try to treat valuable fish in a separate tank by adding into the water one of the following medications: doxycycline or monocycline (30mg per 10L) oxytetracycline (150mg per 10L) tetracycline (0.2g per 10L).

Bacterial Haemorrhagic Septicemia (Infectious abdominal dropsy, motile aeromonad disease, Redmouth disease)

Many authors have identified fish species that are susceptible to all types and strains of motile aeromonads, but it is quite likely that most septicaemic forms of diseases in cyprinids are the result of aeromonad infection. For example in cyprinids, the familiar ulcerative disease in carp and goldfish may be caused by*. Aeromonas salmonicida* sub sp. *achromogenes*. In Europe, infection by this group of bacteria in cyprinids is widely known as 'summer ulcer disease'.

Clinical pathology and diagnosis

These organisms can be responsible for septicaemia disease in cyprinids, and the changes include haemorrhaging and surface ulcers of the skin, protruding scales, scale loss, exophthalmia, abdominal swelling and petechial haemorrhages on the gills. Internal examination may reveal varying amounts of pinkish-red fluid liberated from the abdomen when the fish is incised. Frequently there are haemorrhages and reddening of the gastro-intestinal tract, enlargement of the spleen and mottling of the liver.

In histological sections, the lesion site reveals a loss of the epidermal epithelium, with inflammation and necrosis extending through the dermis and in some cases into the musculature. When the muscle tissue is affected, it becomes haemorrhagic and liquefied and colonies of bacteria can usually be seen in histological sections.

Occurrence

Bacterial septicaemias in cyprinids is frequently associated with poor environmental conditions such as overcrowding, pollution, low oxygen

levels and raised water temperatures. In fact, any combination of the above can lead to septicaemic disease in temperate cyprinids. Handling stress, warm weather and raised water temperatures (above 12°C) are common predisposing factors in epizootics associated with many bacterial diseases in cyprinids.

Mortalities are generally low, perhaps up to 25%, but this figure depends on the population density and water conditions. Injuries, such as those caused by predators or angling, cause wounds that are ideal for aeromonad infections.

In terms of geographical distribution, diseases caused by motile *aeromonads* are found in both farmed and wild cyprinids, worldwide.

Prevention and treatment

Prevention of *aeromonad* diseases, like the majority of bacterial diseases in cyprinid populations, is made difficult because of the huge amount of movements of fish that take place for the ornamental industry and for sport fishing and aquaculture purposes.

Treatments can be administered either for prophylactic control or chemotherapeutic measure, however, antibiotic sensitivity tests must be performed before any antibiotics are administered.

Bacterial Gill Disease

This disease affects mainly young fish of all species, but it is not uncommon in growers and even broodstock. The disease can occur throughout the year, but outbreaks are more common in spring than in late summer and fall.

Aetiology

Flavobacterium branchiophila, is a Gram-negative, long, thin, filamentous rod.

Clinical signs of disease

Gill is the only target organ and clinical signs include lethargy, dyspnea, coughing and flared opercula. Strands of mucus may trail from the gills and gill themselves may exhibit pale and/or swollen areas. Large numbers of diseased fish gather near the screen or inlet of the pond. Acute epizootics may result in a 20 to 50% mortality in 24 h.

Diagnosis

Clinical signs, wet gill smears or histopathology. Isolation on Cytophaga Agar at 18°C.

Source

Carrier fish or contaminated water are considered to be sources of infection. However, epizootics are almost always associated with a deterioration of environmental conditions.

Prevention

Maintenance of a high quality environment is of utmost importance in the prevention of bacterial gill disease. Population level should be kept at lowest feasible levels to reduce the effects of crowding. The application of good sanitation practices is important. Clean ponds provided with an adequate flow of clean water coupled with prompt removal of dead or weak fish will reduce incidence of the disease.

Treatment

BGD usually responds well to antiseptic and surfactant baths such as Chloramine-T used in a single treatment at 10 ppm in a one-hour flush treatment but its effectiveness and toxicity are greatly affected by water quality and benzalkonium chlorides are used in concentrations of 1 - 2 ppm (calculated on the basis of the active ingredient) as a I-h bath or continuous flow treatment and Diquat it has been used at a concentration of 8.4 - 16.8 ppm of the formulated material, or 2 - 4 ppm on the basis of active ingredient (Diquat cation). Providing adequate oxygen is useful supportive therapy. **Most compounds require multiple applications for effective results.**

Salmon fry affected by bacterial gill disease and presenting with mottled and swollen gills.