



Diagnosis and Treatment of "Aeromonas hydrophila" Infection of Fish

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Introduction

Aeromonas hydrophila causes disease in fish known as "Motile Aeromonas Septicemia" (MAS), "Hemorrhagic Septicemia," "Ulcer Disease," or "Red-Sore Disease." The many synonyms of this disease relate to the lesions caused by this bacterium which include septicemia where the bacteria or bacterial toxins are present within numerous organs of the fish, and ulcers of the fish's skin. *Aeromonas hydrophila* is a ubiquitous gram-negative rod-shaped bacterium which is commonly isolated from fresh water ponds and which is a normal inhabitant of the gastrointestinal tract. The disease caused by this bacterium primarily affects freshwater fish such as catfish, several species of bass, and many species of tropical or ornamental fish.

Reasons for Outbreaks

Many have considered *Aeromonas hydrophila* to be an opportunistic pathogen. This seems like a contradiction in terms, since most bacteria which are termed "opportunistic" usually do not cause disease unless other factors are involved, and those bacteria which are considered a "pathogen" can cause disease regardless of other factors. However, the term "opportunistic pathogen" conveys that *Aeromonas hydrophila* always is capable of producing disease if given the chance.

As previously stated, the organism is ubiquitous in nature and is even found in the intestinal tract of the fish. In natural situations, infections of fish with *Aeromonas hydrophila* are probably a minor problem. However, with intensive fish-farming systems, whether these systems are outdoor ponds or indoor aquaria or tanks, other factors must be considered. The common occurrence of this disease relates to stress conditions or factors of the fish. Fish experts agree that fish are easily stressed when mishandled, overcrowded, transported under poor conditions, are on a poor level of nutrition, have poor

water quality. Experimental demonstration shows that fish which are in poor environments due to unsatisfactory water quality such as high nitrite levels, low levels of dissolved oxygen (DO), or high levels of carbon dioxide (CO₂) are more susceptible to infection by *Aeromonas hydrophila*. Additionally, a seasonal incidence of a higher number of reared fish deaths in the spring is associated with decreased water temperatures.

Symptoms

Fish infected with *Aeromonas hydrophila* may have many different symptoms. These range from sudden death in otherwise healthy fish to lack of appetite, swimming abnormalities, pale gills, bloated appearance, and skin ulcerations. The skin ulcers may occur at any site on the fish and often are surrounded by a bright rim of red tissue. Other organs commonly affected with this disease include the gills, kidneys, liver, spleen, pancreas, and skeletal muscle. The symptoms vary since they are dependent upon a number of factors including the virulence of the organism, the resistance of the fish to infection, the presence or absence of bacteremia or septicemia, and stress factors associated with the fish. Because of the variability of these symptoms, the diagnosis of this disease based only upon symptoms is highly unreliable and may be economically disastrous to the fish producer.

Prevention and Treatment

Obviously the best prevention against *Aeromonas hydrophila* infection is to never have this disease. This may sound absurd, but by minimizing the stress factors of fish through proper handling, stocking levels, nutrition, transportation, and water quality, fish are much less susceptible to this disease. Excellent Sanitation and filtration procedures are an

absolute must in order to minimize the chances of this disease ever occurring. Once the diagnosis of *Aeromonas hydrophila* infection of fish has been established (which should be left to those trained in infectious fish diseases and supported by proper laboratory diagnostic tests), treatment should begin immediately.

Treatment is currently limited to two antibiotics, Terramycin®, an oxytetracycline, and Remet-30®, a potentiated sulfonamide. The current recommended treatment of these two drugs is given in Table 1 below.

Another method for antibiotic use is a dip or bath (see AS-458), although this is a rather controversial method and the efficiency or successfulness of this method is unknown. Problems associated with this method include the potential devastation to the biofilter of indoor tank systems and the possible lack of antibiotic entry into the fish.

Potential problems associated with any antibiotic therapy include inadequate dosage levels, overdosing, drug resistance by the bacteria and the chelating of calcium to hard water in the case of Terramycin® used in a dip or bath. Also remember that many of the fish which

are not actually having symptoms of this disease may be stressed and increased handling associated with therapy may be fatal to these fish.

Potential Concern to Human

Finally, the most important fact one should remember about *Aeromonas hydrophila* infection of fish is that this is a zoonotic disease, i.e., it is a disease which can be spread from animals to man and vice versa. Healthy individuals exposed to this bacteria are not very likely to get the disease. However, accidents do happen, and cutting yourself while butchering affected fish or impaling a sharp fin into your hand is a sure way to infect yourself. People who may be immunodeficient or immunoincompetent such as the very young, the elderly, or those with other disease problems are at the highest risk. Good personal hygiene and proper sanitation procedures should always be used to prevent human exposure to this disease. These practices include use of gloves when handling affected fish, proper medical attention to any cut or laceration (no matter how small), and bandaging of open wounds. While infection of *Aeromonas hydrophila* in people is usually a localized infection, it is wise to seek medical attention at the first indication of illness following exposure to or handling of fish affected with this disease.

Table 1. Registered therapeutants for aquatic or fishery use.*

Product	Sponsor	Dosage
Terramycin®	Pfizer, Inc.	2.5-3.75 g/100 lb of fish per day for 10 days in feed
Remet-30®	Hoffman-La Roche, Inc.	50 mg/kg of fish per day for 5 days

Note: Terramycin® has a 21 day pre-slaughter withdrawal time. Remet30® has a 3-day pre-slaughter withdrawal time, respectively for catfish and salmonids. Both have a 0.1 ppm tolerance level in salmonids and catfish.

* Taken from *A Guide to Approved Chemicals in Fish Production and Fishery Resource Management, 1989*, University of Arkansas Cooperative Extension Service.