AQUACULTURE EXTENSION
Illinois - Indiana Sea Grant Program

Sea Grant # IL-IN-SG-E90-2

Fact Sheet AS- 459

DISEASES

Diagnosis and Treatment of "Ich" or White Spot Disease in Fish

LaDon Swann
Illinois-Indiana Sea Grant Program
Purdue University

Scott Fitzgerald, D. V.M.
Animal Disease Diagnostic Laboratory
Purdue University

Description

Ich or white spot disease is the name commonly given to the external protozoan, Ichthyophthirius multifiliis. It is probably the most serious disease of channel catfish, and is commonly seen in other warmwater and coolwater species of farmed fish including hybrid striped bass. Ich is the only protozoan parasite that can be seen by the naked eye. Microscopic examination reveals a ciliated protozoan that has a horseshoe shaped micronucleus. Mature specimens range in size from 0.5- 1.5 mm in diameter.

Symptoms

Symptoms of Ich include gray-white spots that give the fish's skin and fins the appearance of being sprinkled with salt. These granular white spots have a "bumpy" feel to the touch. Infection of the gills occurs before the skin and fins, and in species such as the golden shiner, the gills are usually the only infected organ. In the earlier stages, the fish may swim horizontally and rapidly rub or "flash" against solid objects in an attempt to free themselves of the parasites. Fish also may appear sluggish and lie on the bottom of the pond or tank. In catfish ponds, fish frequently rest near the edge of the water. In advanced cases, bloody tins are common, with a thick mucous layer covering the body.

Life Cycle

The life cycle of Ich is complex. The mature parasite is found just under the skin of the fish and is visible as a white spot. Eventually, after spending 10-20 days (based on water temperature and resistance) under the skin of the fish, the adult leaves the fish and becomes a free-swimming form that settles to the bottom or fastens itself to the sides of the pond or tank. There it attaches to any suitable substrate, rocks, plants, tubing, etc. This cyst stage then undergoes a series of multiple divisions creating as many as 2,000 young protozoans called tomites. The length of time needed for these divisions is based on water temperature; at 77°F the development of tomites may require only 12 hours, while at 50°F it may take several months.

After development of the tomites is complete, they emerge from the cyst as free-swimming theronts and seek a host to penetrate. After penetrating the fish's skin, the theronts are referred to as trophozites and the life cycle begins again. If the free-swimming theronts do not find a suitable host within 24 hours they die.

The optimal water temperature for Ich is 68°-75°F. In warmwater fish cultures the disease is considered to be a fall-winter-and spring-occurring disease. Since the occurrence of the disease is most common in the spring, it is the opinion of some researchers that poor winter nutrition plays a role in the outbreak of the disease. This theory is in need of further research.

Treatment

Treatment of the disease is difficult because the fish-inhabiting and encysted forms are resistant to treatment, Only the free-swimming forms are vulnerable to treatment. The best treatment is prevention, Incoming water sources should always be kept free of wild fish which may carry the

protozoan and infect the farmed species. Infected ponds, tanks, or raceways will become Ich-free if left without any fish for a period of Seven days with a water temperature of at last 68°F. New fish should be quarantined for at least one week at 70°F for warmwater species and two weeks at 60ºF for coldwater species. Such a quarantine allows the disease to manifest itself prior to being introduced to healthy fish. Contaminated boats, buckets, and nets may be disinfected with calcium hypochlorite 70% chlorine to prevent contamination of other ponds or tanks, Even with these precautions, outbreaks of Ich may still occur. Therefore, two categories of treatments, chemical and mechanical, arc discussed.

Chemical

Treatment of Ich with chemicals can be costly and time-consuming. It is important to test the chosen chemical on a small "test" group prior to performing any chemical treatment on entire ponds or tanks of fish. Copper sulfate is used at whatever concentration is safe in the existing water chemistry. Copper ions arc extrmemely toxic to fish and the degree of toxicity depends on the water hardness. In water with a hardness of 40-50 m milligrams/liter(mg/1), use less than 0.25 mg/l of copper sulfate. For water with a hardness of 50-90 mg/l use 0.5 mg/l. For hard water with a hardness value of between 100-200 mg/l use 1 mg/l. Treat on alternate days, with two to four applications neccessary. Regardless of water hardness, treatments should be reduced by one-half during the third, and fourth treatment.

Using formalin in large ponds at a rate of 15-15 mg/l is effective in treating Ich but can be cost prohibitive, Two to four applications, made on alternate days, should be used, with [he higher dosage being the most effectivce Formalin removes oxygen from the water, so it is critical to monitor oxygen levels during treatment and be prepared to supply supplemental aeration if levels drop below 5 mg/l.

Potassium permanganate is sometimes used successfully to treat Ich. Treatment rates of 2 mg/l should be repeated on alternate days; two to four applications arc recommended. Success using Potassium permanganate is low.

Mechanical

Probably the easiest treatment in indoor systems for Warmwater species is to raise. the water temperature to 85°F for three weeks. Since Ich is a coolwatcr protozoan, raising the temperature will kill the free-swimming forms before they have a chance to reinfect the fish.

A second method to mechanically treat fish applies to raceway culture or pond culture, where infected fish can be removed and placed in a raceway. This treatment involves increasing the flow rates as high as possible while still permitting the fish maintain their position in the raceway. The increased flow flushes away the free-swimming forms before they have a chance to settle to the bottom and attach.

NA 89 AA-D-SG058 NEW1/91 (.5M)