CIR921

Introduction to Fish Health Management [1]

Ruth Francis-Floyd[2]

What Is Fish Health Management?

Fish health management is a term used in aquaculture to describe management practices which are designed to prevent fish disease. Once fish get sick it can be difficult to salvage them.

Successful fish health management begins with prevention of disease rather than treatment. Prevention of fish disease is accomplished through good water quality management, nutrition, and sanitation. Without this foundation it is impossible to prevent outbreaks of opportunistic diseases. The fish is constantly bathed in potential pathogens, including bacteria, fungi, and parasites. Even use of sterilization technology (i.e., ultraviolet sterilizers, ozonation) does not eliminate all potential pathogens from the environment. Suboptimal water quality, poor nutrition, or immune system suppression generally associated with stressful conditions allow these potential pathogens to cause disease. Medications used to treat these diseases provide a means of buying time for fish and enabling them to overcome opportunistic infections, but are no substitute for proper animal husbandry.

Daily observation of fish behavior and feeding activity allows early detection of problems when they do occur so that a diagnosis can be made before the majority of the population becomes sick. If treatment is indicated, it will be most successful if it is implemented early in the course of the disease while the fish are still in good shape.

The Significance of Fish Disease to Aquaculture

Fish disease is a substantial source of monetary loss to aquaculturists. Production costs are increased by fish disease outbreaks because of the investment lost in dead fish, cost of treatment, and decreased growth during convalescence. In nature we are less aware of fish disease problems because sick animals are quickly removed from the population by predators. In addition, fish are much less crowded in natural systems than in captivity. Parasites and bacteria may be of minimal significance under natural conditions, but can cause substantial problems when animals are crowded and stressed under culture conditions.

Disease is rarely a simple association between a pathogen and a host fish. Usually other

1. This document is CIR921, one of a series of the Fisheries and Aquatic Sciences Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Original publication date February, 1990. Reviewed July, 2003. Minor revision July, 2005. Visit the EDIS Web Site at http://edis.ifas.ufl.edu.

2. Ruth Francis-Floyd, Professor, Department of Large Animal Clinical Sciences (College of Veterinary Medicine) and Department of Fisheries and Aquatic Sciences, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, 32611.

circumstances must be present for active disease to develop in a population. These circumstances are generally grouped under the umbrella term "Stress" (Figure 1). Stress is discussed in greater detail in the UF/IFAS Extension Circular 919 *Stress - Its Role in Fish Disease*. Management practices directed at limiting stress are likely to be most effective in preventing disease outbreaks.

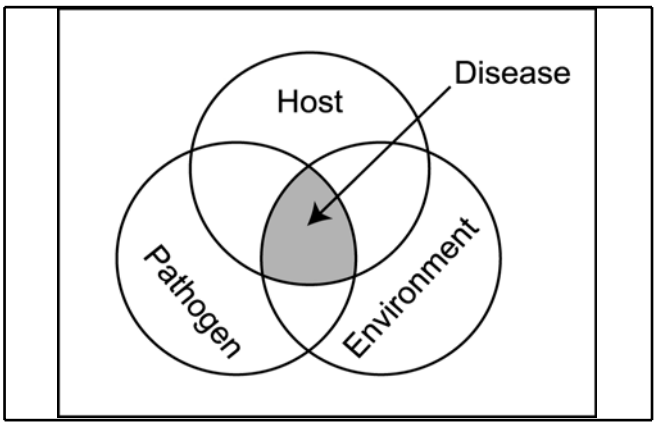

Figure 1. Disease rarely results from simple contact between the fish and a potential pathogen. Environmental problems, such as poor water quality, or other stressors often contribute to the outbreak of disease.

Determining if Your Fish are Sick

The most obvious sign of sick fish is the presence of dead or dying animals. However, the careful observer can usually tell that fish are sick before they start dying because sick fish often stop feeding and may appear lethargic. Healthy fish should eat aggressively if fed at regularly scheduled times. Pond fish should not be visible except at feeding time. Fish that are observed hanging listlessly in shallow water, gasping at the surface, or rubbing against objects indicate something may be wrong. These behavioral abnormalities indicate that the fish are not feeling well or that something is irritating them.

In addition to behavioral changes, there are physical signs that should alert producers to potential disease problems in their fish. These include the presence of sores (ulcers or hemorrhages), ragged fins, or abnormal body confirmation (i.e., a distended abdomen or "dropsy" and exopthalmia or "popeye"). When these abnormalities are observed, the fish should be evaluated for parasitic or bacterial infections.

What to Do if Your Fish are Sick

If you suspect that fish are getting sick, the first thing to do is check the water quality. If you do not have a water quality test kit, contact your county extension office; some counties have been issued these kits, and your extension agent may be able to help you. If your county is not equipped with a water quality test kit, call the aquaculture extension specialist nearest to you (see the list at the end of this publication). Anyone contemplating commercial production of fish should invest in a water quality test kit and learn how to use it. An entry level kit for freshwater aquaculture can be purchased for about $200, and can save thousands of dollars worth of fish with its first use.

Low oxygen is a frequent cause of fish mortality in ponds, especially in the summer. High levels of ammonia are also commonly associated with disease outbreaks when fish are crowded in vats or tanks. Separate extension fact sheets are available that explain oxygen cycles, ammonia cycles, and management of these water quality problems. In general, check dissolved oxygen, ammonia, nitrite, and pH, during a minimum water quality screen associated with a fish disease outbreak. The parameters of significance include total alkalinity, total hardness, nitrate (saltwater systems) and chlorine (if using city water).

Ideally, daily records should be available for immediate reference when a fish disease outbreak occurs. These should include the dates fish were stocked, size of fish at stocking, source of fish, feeding rate, growth rate, daily mortality and water quality. This information is needed by the aquaculture specialist working with you to solve your fish disease problem. Good records, a description of behavioral and physical signs exhibited by sick fish, and results of water quality tests provide a complete case history for the diagnostician working on your case.

Professional assistance is available to Florida residents through the Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences (IFAS) at the University of Florida; the Department of Agriculture and Consumer Services, Division of

Animal Industries and Division of Aquaculture, as well as several private laboratories and veterinary practices. A list of public resources is included at the end of this publication.

If you decide to submit fish to a diagnostic laboratory you should collect live, sick fish, place them in a freezer bag (without water), and ship them on ice to the nearest facility. Small fish can be shipped alive by placing them in plastic bags which are partially filled (30%) with water. Oxygen gas can be injected into the bag prior to sealing it. An insulated container is recommended for shipping live, bagged fish as temperature fluctuations during transit are minimized. In addition to fish samples, a water sample collected in a clean jar should also be submitted. Detailed information on submitting samples is available in UF/IFAS Fact Sheet FA-55, *Submission of Fish for Diagnostic Evaluation*.

Types of Fish Diseases

There are two broad categories of disease that affect fish, infectious and non-infectious diseases. Infectious diseases are caused by pathogenic organisms present in the environment or carried by other fish. They are contagious diseases, and some type of treatment may be necessary to control the disease outbreak. In contrast, non-infectious diseases are caused by environmental problems, nutritional deficiencies, or genetic anomalies; they are not contagious and usually cannot be cured by medications.

Infectious diseases. Infectious diseases are broadly categorized as parasitic, bacterial, viral, or fungal diseases.

Parasitic diseases of fish are most frequently caused by small microscopic organisms called protozoa which live in the aquatic environment. There are a variety of protozoans which infest the gills and skin of fish causing irritation, weight loss, and eventually death. Most protozoan infections are relatively easy to control using standard fishery chemicals such as copper sulfate, formalin, or potassium permanganate. Information on specific diseases and proper use of fishery chemicals is available from your aquaculture extension specialist.

Bacterial diseases are often internal infections and require treatment with medicated feeds containing antibiotics which are approved for use in fish by the Food and Drug Administration. Typically fish infected with a bacterial disease will have hemorrhagic spots or ulcers along the body wall and around the eyes and mouth. They may also have an enlarged, fluid-filled abdomen, and protruding eyes. Bacterial diseases can also be external, resulting in erosion of skin and ulceration. Columnaris is an example of an external bacterial infection which may be caused by rough handling.

Viral diseases are impossible to distinguish from bacterial diseases without special laboratory tests. They are difficult to diagnose and there are no specific medications available to cure viral infections of fish. The most important viral infection which affects fish production in the southeastern United States is Channel Catfish Virus Disease, caused by a herpes virus. Consultation with an aquaculture or fish health specialist is recommended if you suspect a bacterial or viral disease is killing your fish.

Fungal diseases are the fourth type of infectious disease. Fungal spores are common in the aquatic environment, but do not usually cause disease in healthy fish. When fish are infected with an external parasite, bacterial infection, or injured by handling, the fungi can colonize damaged tissue on the exterior of the fish. These areas appear to have a cottony growth or may appear as brown matted areas when the fish are removed from the water. Formalin or potassium permanganate are effective against most fungal infections. Since fungi are usually a secondary problem it is important to diagnose the original problem and correct it as well.

Non-infectious diseases. Non-infectious diseases can be broadly categorized as environmental, nutritional, or genetic.

Environmental diseases are the most important in commercial aquaculture. Environmental diseases include low dissolved oxygen, high ammonia, high nitrite or natural or man-made toxins in the aquatic environment. Proper techniques of managing water quality will enable producers to prevent most environmental diseases. There are separate IFAS

publications which address water quality management in greater detail.

Nutritional diseases can be very difficult to diagnose. A classic example of a nutritional disease of catfish is "broken back disease," caused by vitamin C deficiency. The lack of dietary vitamin C contributes to improper bone development, resulting in deformation of the spinal column. Another important nutritional disease of catfish is "no blood disease" which may be related to a folic acid deficiency. Affected fish become anemic and may die. The condition seems to disappear when the deficient feed is discarded and a new feed provided. Additional information on nutrition of fish is available through your aquaculture veterinary extension specialist.

Genetic abnormalities include conformational oddities such as lack of a tail or presence of an extra tail. Most of these are of minimal significance; however, it is important to bring in unrelated fish for use as broodstock every few years to minimize inbreeding.

Summary

There are many diseases of fish which can be troublesome to commercial producers as well as the recreational pond owner. Many disease outbreaks of captive fish stocks are associated with stressful conditions such as poor water quality, excessive crowding or inadequate nutrition.

There are two broad categories of disease which relate directly to selection of appropriate treatments:

1. Infectious diseases are contagious diseases caused by parasites, bacteria, viruses, or fungi. These often require some type of medication to help the fish recover.

2. Non-infectious diseases are broadly categorized as environmental, nutritional, or genetic. These problems are often corrected by changing management practices.

Fish disease outbreaks are often complex, involving both infectious and non-infectious processes. Appropriate therapy often involves medication and changes in husbandry practices. Assistance from UF/IFAS aquaculture extension specialists is available to help you manage disease outbreaks and develop management programs to prevent them. A list of public laboratories available to assist with diagnoses of fish disease is provided for your convenience at the end of this publication. There are many private veterinarians willing to see fish or aquaculture species in their practice. Your aquaculture veterinary extension specialist may be able to refer you to a veterinarian in your area.

State Specialists

University of Florida

IFAS Aquaculture Extension Specialists

Gainesville

Department of Fisheries and Aquatic Sciences and College of Veterinary Medicine

7922 NW 71 St.

Gainesville, Fl. 32653

(352) 392-9617, X 230 (Fisheries)

(352) 392-4700, X 5686 (VetMed)

Tampa

Tropical Aquaculture Laboratory (commercial aquaculture clients only)

1408 24th Street SE

Ruskin FL 33570

(813) 671-5230

Florida Department of Agriculture and Consumer Services, Division of Animal Industries

State Veterinary Diagnostic Laboratories

Kissimmee Veterinary Diagnostic Laboratory

P.O. Box 458006

Kissimmee, FL 34745-8006

(407) 846-9200

Live Oak Veterinary Diagnostic Laboratory

Drawer O

Live Oak, Fl. 32060

(904) 362-1216

State Specialists

University of Florida:

IFAS Aquaculture Extension Specialists:

Gainesville

Department of Fisheries and Aquatic Sciences and

College of Veterinary Medicine

7922 NW 71 St. Gainesville, Fl. 32606

(904) 392-9617Tampa

Hillsborough County Extension Office

5339 St. Rd. 579, Seffner, Fl. 33584

(813) 621-5605

Florida Department of Agriculture and Consumer Services:

State Veterinary Diagnostic Laboratories

Kissimmee

P.O. Box 420460, Kissimmee, Fl. 34742-0460

(407) 847-3185

Live Oak

Drawer O, Live Oak, Fl. 32060

(904) 362-1216