6-20-80

2M

L-1210

FACT SHEET

ICH DISEASE OF FISHES

S. K. Johnson*

The Parasite

Ichthyopthirius multifilis, the cause of Ich or whitespot disease, is a common protozoan parasite in most parts of the world. In the southern U.S., it is found throughout natural waters and is especially a nuisance in cultured fishes.

Ich, along with some other protozoans, needs a fish host to complete the life cycle. Consequently, these parasites are passed from fish to fish and do not exist as part of a natural body of water that has no fish. In contrast, many other fish diseases are caused by organisms that are present naturally, but affect fish only when they become weakened.

Ich is considered contagious where fish are cultured. A contagious parasite not only causes disease, but spreads readily from one fish to another. While many protozoans merely split to produce a new generation, a single Ich divides into hundreds at each change in generation. This ability to produce increased numbers aids the parasite in the successful completion of the life cycle by increasing the chance to find a host fish.

The parasite reproduces while separated from the host fish. Newly produced parasites must find a fish before further development can take place. The general cycle of Ich is presented in figure 1.

The amount of reproduction that occurs in the parasite population is geared to populations of fishes in wild waters. Man's influence in fish culture presents a crowded situation. As a result, infestation exceeds the natural rate, thereby enhancing the contagious potential of the parasite.

The parasites appear as whitish to brownish spots on the surface of the fish. The parasites are lodged just beneath the surface of the skin and the spots that are seen are often a combination of the parasite beneath the skin and excess mucus secreted at that place, figure 2. The parasite observed at these spots is the large

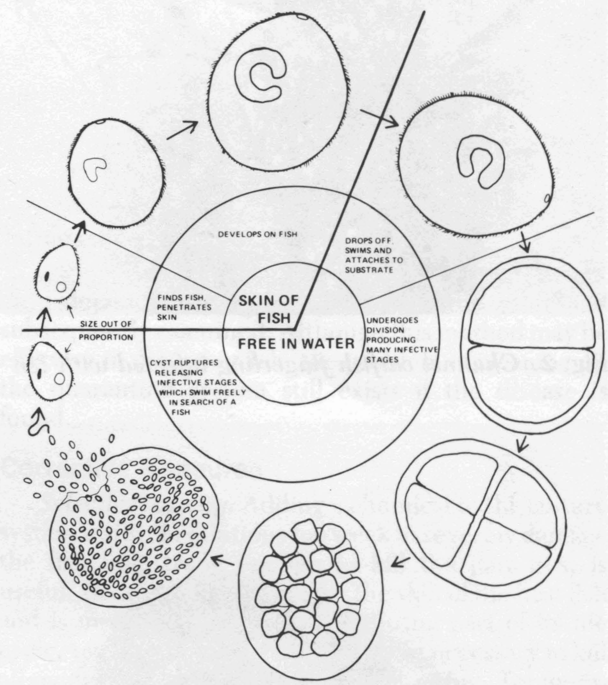

Fig. 1. Life history of Ich

stage, figure 3. A rolling motion and horseshoe shaped nucleus are visible through a microscope. In the smaller infective stage, the parasite will move about the skin surface as well, but this stage cannot be seen by the unaided eye. More parasites of both types also will be found on the gills of infected fish.

The length of time that Ich spends as a parasite on a fish varies with temperature of the water. At optimum temperature (75-80 degrees F.) the period is as low as 2 days. (Other temperatures: 70-75 degrees F., 4 days; 60 degrees F., 14 days; 50 degrees F. and less, 35 days or more; 80-85 degrees F., development time extends until 85-90 degrees F., reproduction ceases). After a parasite leaves the fish, the time lapse for infective stages may last as long as 5 days in cooler temperatures. After hatching at optimum temperatures, some

*Extension fish disease specialist, The Texas A&M University System.

Texas Agricultural Extension Service • The Texas A&M University System • Daniel C. Pfannstiel, Director • College Station, Texas

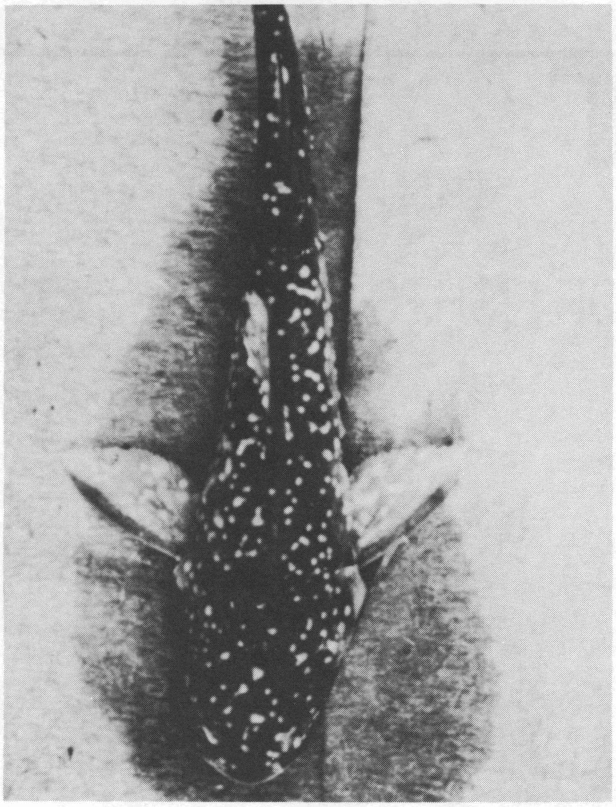

Fig. 2. Channel catfish fingerling infected with Ich

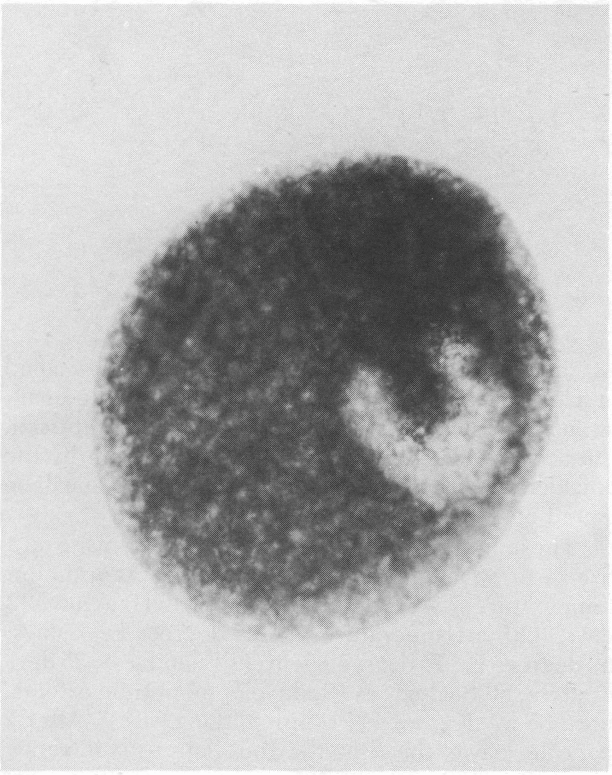

Fig. 3. Large or feeding stage of Ich

infective stages remain alive and free-swimming for 4 days.

Since Ich does not reproduce well at high temperatures, occurrence is seasonal. August and September are months when Ich is normally absent from fish culture systems in southern states.

Although strains of Ich may exist with varying degrees of virulence, those examined so far have proved quite strong.

The Infected Host

Ich seems to be able to infest most kinds of freshwater fishes. The natural resistance or suitability of a certain kind of fish as a host influences the development of the disease. However, the changing defense mechanisms of a fish often allow for wrong ideas about the weakness of a particular fish species to the disease.

Immunity is one defense mechanism that results from Ich infestation. Fishes exposed to the disease and then relieved of the infestation have temporary immunity. However, the immunity usually is not complete and the fishes act as undiseased carriers of the parasite. The consequence of release of such fishes into another fish population usually results in a serious problem for the established stock.

The actions of stressors influence immunity. Various stressors, such as oxygen shortages and rapid environmental changes, lessen the ability of fishes to produce an effective immunity. Carriers, for example, will become diseased if the influence of stressors lessens their immunity.

Soon after an infestation begins to spread through the culture system, fishes begin to show signs of appetite loss. This usually occurs before they begin to die. If a sample of fish is obtained, an early diagnosis of the problem may be made. Other causes of loss of appetite are weather changes, feed changes and other fish diseases. This behavior, therefore, is not only a symptom of Ich.

Infected fish secrete unusual amounts of mucus and the cells that comprise their outer skin become swollen. Sloughing of skin is common, and areas where the skin is lost feel rough to the touch.

DISEASE MANAGEMENT

Avoidance of Introduction

Assuming that a fish system is free of the parasite, the only concern is to avoid parasite introduction. Possible sources for introduction are diagrammed in figure 4.

Transport of Ich by wind and land animals into a culture system is a constant threat. For most fish farm situations, however, the threat is considered minor.

Wild fish act as carriers of the parasite, but they may be excluded by building spillways that prevent

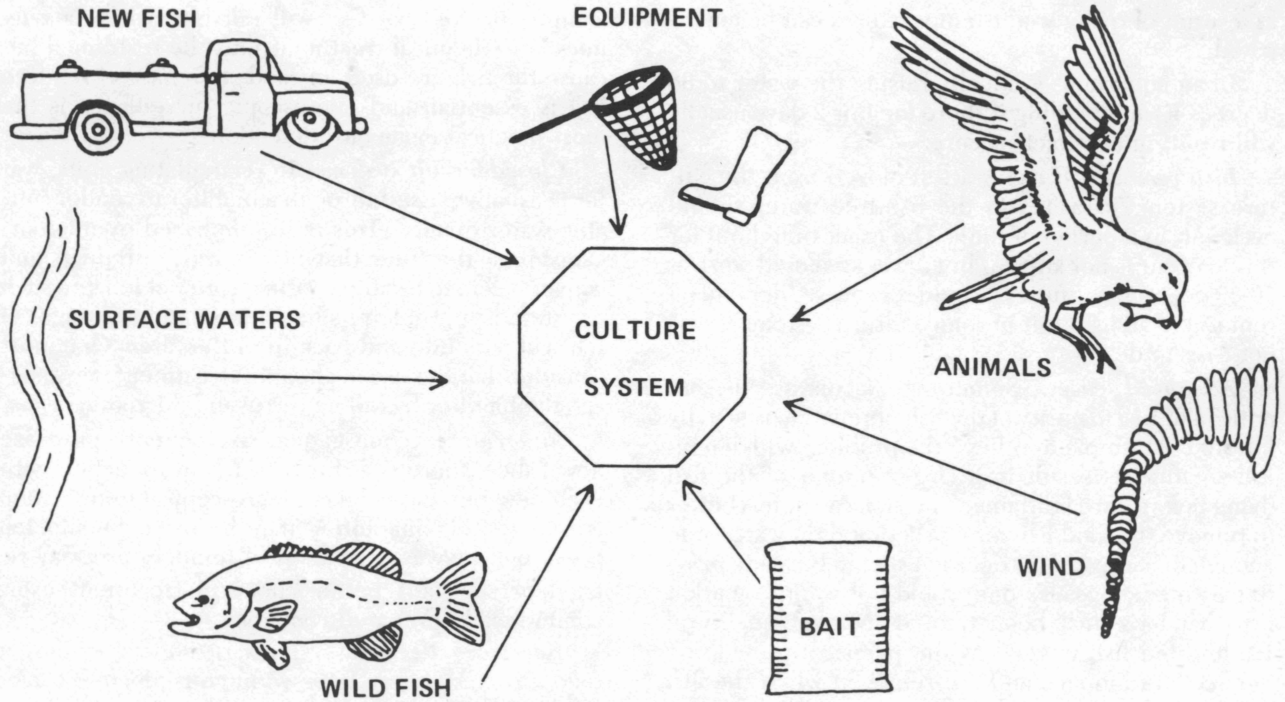

Fig. 4. Source of introduction

fish passage. Wild fish populations in the culture system prior to stocking should be eliminated.

Bait fish frequently carry Ich into fishing lakes. Operators who do not allow the use of fish as bait or require use only of their own Ich-free minnows will avoid this threat.

If streams or lakes are used for a water source for a fish pond, there is the threat of getting Ich from fish or the water itself. Filters will prevent passage of wild fish, but the free-swimming, infective stage of the parasite can pass through commonly used filters. The best preventative for this means of introduction of Ich is to change to ground water as the water source.

Equipment is a major threat for transfer of the parasite where multiple culture units are used. Dipping of equipment in disinfectants between uses will prevent spread of Ich from one unit to another.

The chance of purchase of infected fish should be of utmost concern to those who buy fish either as fingerlings or adults. "Eyeballing" the fish for spots will serve to detect Ich in advanced stages such as shown in figure 2, but a microscopic examination is needed for effective screening. Examination of gill filaments and scrapings from the skin of several fish will usually reveal the presence of Ich in a shipment.

Purchase of "treated" fish does not mean that the fish will be free of infestation. By being present beneath the skin of the fish, Ich is sheltered from the usual vat treatments that are administered prior to shipment.

Quarantine measures are usually helpful in detecting the presence of Ich. Fish may be held for several days (depending on the temperature of the water) and subsequently examined. Although this method may be effective in detecting Ich, the problem of cleaning up the quarantine system still exists if the disease is found.

Corrective Measures

Selective toxicity. Adding a chemical to the culture system water, in dilutions too weak to severely damage the fish but strong enough to kill the parasites, is useful. Because Ich lives under the skin of the host fish and is unexposed to the water during part of its life cycle, several chemical treatments are necessary to kill all parasites while they are free-swimming. Temperature determines the length of time that the parasite will feed within the skin of the fish. Treatment should be extended for a week at 70-80 degrees F., 1½ weeks at 60-70 degrees F. and longer for cooler temperatures.

When chemicals are used in an aquarium, the temperature may be adjusted to 80 degrees F. and held during treatment. This promotes quick cycling of the parasites and, as a result, a better effect by the chemical treatment.

The legal use of treatment chemicals is regulated by state and federal agencies. For your protection and that of potential customers, check the current status of regulations pertaining to a particular treatment before using it.

Temperature change. Since Ich ceases development at high temperatures, culture systems used during hot summers do not have Ich infestations. This should be considered in late summer when "self cure" as a result of rising water temperatures can be anticipated.

In an aquarium, gradually raising the water to 88 degrees F. and holding it there for 1 or 2 days usually will result in an effective cure.

Fish removal. If fishes are removed from the culture system, parasites in the fish-free water should cycle out in a period of time. The exact time limit for this to occur is not known, but 2 weeks should work at 70-80 degrees F. Success would, of course, depend on removal of all fish, but in some culture systems this is not easy to do.

Advanced cases. Sometimes a disease is not noticed until a majority of the fish population is heavily infested. Attempts to relieve the problem with chemical treatments result in a large number of the fish dying before cure is attained. In such cases, it is better to remove the food fish for marketing if they are large enough to harvest. This decision should be made ***prior*** to treatment, because one would not want to market fish that have just been treated. Market quality of Ich-infested fish is good as the parasites provide no ill-effects to humans and are removed when the fish are dressed.

Management in Different Types of Cases

Grow-out ponds. The goal of this type of culture is to raise the fish in a static body of water from fingerlings to harvestable size. By following the suggestions for avoidance, Ich may pe prevented. Since use of the system is on a term basis, the pond may be dried between crops as an additional precaution.

Fingerling ponds. This system raises fish from eggs to stocking size. The commercial fingerling producer is not only concerned with Ich-free status of his fish from the survival standpoint, but also in establishing a reputation for producing healthy fingerlings. Frequent transfer of fish from pond to pond is common and, consequently, the disinfection of nets and equipment is an important precautionary measure. The keeping of records on the transfer of fish is also very important, because it allows rapid retracing of an outbreak of disease to its source.

Typically, the spread of Ich through fingerling ponds is rapid. The young fish usually have gained no immunity, and the smaller sizes are less able to produce an immune response.

Fish-out operations. Ich infestation is of paramount importance in fish-out systems. Since fish are constantly introduced, carriers of Ich may be mixed with unexposed stock, resulting in widespread disease. A further complication is that fish will not bite when heavily infested. Chemical treatment must be restrained because the fish are used for food. Purchase of Ich-free fish is essential, and microscopic surveillance is the most practical means for detection.

Closed circuit systems. In recirculating units, water is usually passed through a biofilter to render suitable water quality. This is accomplished by microorganisms in the filter that utilize waste products and convert them to harmless forms. Entry of Ich into such a system is a problem, since free-swimming stages of Ich will pass into and back from the filter. One must consider that the use of chemical treatment may damage the biofilter by killing the useful microorganisms.

Aquaria. Since most aquarists frequently purchase new fishes, there is a threat of Ich introduction with each new purchase. Since microscopical examination is impractical, quarantine may be used. Should Ich break out anyway, elevation of temperature may be tried or, perhaps better chemical treatment using commercially prepared remedies.

Raceways. Raceway systems use flowing water that tends to wash away free-swimming infective stages prior to their contact with fish. Raceways have great numbers of fish stocked per unit of water and this often offsets the disadvantage placed on the free-swimming Ich by water flow. This is especially true where long raceways are used or where water flow is sluggish.

Chemical treatment in raceways is difficult because Ich treatments must be maintained in contact with the fish for an extended period of time. Shutting off the water flow to hold the treatment chemical causes strain on the crowded fishes, whereas feeding the chemical into the flowing stream usually requires chemicals in amounts that make their use uneconomical.

Cages. By being stationary, cages are quite vulnerable to Ich infestation because both hosts and parasites are localized. Chemical treatment is best accomplished by treating the entire culture system as would be the case for a grow-out pond.

Minnow vats. The same problems are experienced in this system as in the fish-out operation. The disease is not as critical, in this case, since the minnows will be marketed in a short time and the value of the fish is much less. Retention of the disease over a long period of time will cause economic loss, however. Tank cleaning and separation of old fish, when new minnows are introduced, will eliminate the chance of spread from one to the other. Elevation of temperature is not suggested for minnows as a method of Ich removal.

Educational programs conducted by the Texas Agricultural Extension Service serve people of all ages regardless of socio-economic level, race, color, sex, religion or national origin.

Cooperative Extension Work in Agriculture and Home Economics, The Texas A&M University System and the United States Department of Agriculture cooperating. Distributed in furtherance of the Acts of Congress of May 8, 1914, as amended, and June 30, 1914.
2M—6-80, Revision FISH