MISSOURI DEPARTMENT OF CONSERVATION

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June 14, 2005

Steve Probst
100 Cognac Ct.
Lake St. Louis, MO 63367

Dear Mr. Probst:

On May 25, 2005, the Missouri Department of Conservation completed an electrofishing survey of the 550 acre impoundment, Lake St. Louis, in St. Charles County. The purpose of the survey was to assess the status of fish populations and overall lake conditions. I have enclosed the results of the survey as well as management recommendations. Thank you for your interest in fisheries management.

Sincerely,

Sarah Oakes

Sarah Oakes
Fisheries Management Biologist
Missouri Department of Conservation

LAKE SURVEY RESULTS AND RECOMMENDATIONS

Missouri Department of Conservation

Lake Conditions and Fish Population Characteristics: Lake St. Louis

1) A low number of largemouth bass (34/hour) was taken during the survey. Bass ranged in size from 4.6 to 19.4 inches, with a good number of fish larger than 15 inches. All bass appeared robust and healthy with the exception of a few that had open sores on their bodies.

2) A moderate number of bluegill (217/hour) was taken during the survey, ranging in size from 3.0 to 6.3 inches.

3) A low number of white crappie (39/hour) was collected, ranging in size from 4.7 to 12.6 inches. Most of the crappie were below 7.0 inches, suggesting that the population possesses high numbers of stunted individuals.

4) Six channel catfish were taken in the survey, ranging in size from 16.5 to 23.2 inches. Our electrofishing gear is generally not effective for sampling catfish.

6) A high number of gizzard shad was taken during our sampling as well as several common carp, green sunfish, yellow bullhead, and golden redhorse.

7) The water had a visibility of 2 feet and a surface temperature of 70 degrees F.

Management Recommendations

Largemouth Bass

Bass population looks good. The bass PSD (percentage of stock size fish which are greater than 12 inches) has continued to rise since previous samples. In 1997 PSD was 70%, in 2000 it was 86%, and this year it was 94%. RSDs (percentage of stock size fish which are greater than 15 or 18 inches) have risen slightly since 1997. RSD(15) has gone from 45% to 50% and RSD(18) has gone from 10% to 12%. These are great numbers. We didn't capture any bass over 20 inches, but I am sure they are around. I think your habitat efforts are paying off. Keep up the good work and enjoy the good bass fishing.

Regarding the sores on the bass, it is not an uncommon occurrence, especially in the spring time. Spawning stress and warming water temperatures make fish susceptible to disease, parasites and fungal infections. Most fish will recover from such infections under natural conditions. It is not likely that any mortality that does occur will have an effect on the overall population of largemouth bass. Regardless, there is nothing that can be done to treat such diseases in an impoundment as large as Lake St. Louis.

I took one specimen to examine in the lab. I found a few *Ergasilus*, a parasitic crustacean, on the gills of the fish. I took some scrapings from one of the ulcers on the fish and found a light infestation of *Trichodina*, a ciliate protozoan. I believe the *Trichodina* is probably a secondary infection, with the original sores being caused by another agent. The sores most closely resemble the effects of "Red Sore Disease," which is caused by the bacterium *Aeromonas hydrophila* coupled with *Heteropolaria*, a protozoan. All of these are common and do not warrant alarm. See the attachments for more information on these organisms. The fish that were observed dead the day following our sample were probably fish that we collected. It is not uncommon for one or two fish to die as a result of electrofishing. Any more than that, and I would have to speculate that the fish were already under some stress from the disease and the electrofishing put them over the top.

Bluegill

Lakes with a high concentration of gizzard shad seldom have a good bluegill fishery. Adding more vegetative and brushy habitat may help improve the bluegill population somewhat. Harvest bluegill as you like, up to the statewide limit of 50 sunfish per day in aggregate.

Crappie

Crappie populations have not improved. The 2000 sample is almost identical to this year's sample. About 50 white crappie were caught and 95% of those were less than 7 inches. I recommend harvesting all crappie caught, up to the statewide limit of 30 fish per day, in order to lower crappie numbers.

Catfish

Harvest channel catfish as you like up to four fish in the aggregate (channel, blue, and flathead catfish combined) per day. Restock channel catfish periodically on a put-and-take basis to replace those harvested plus 10% for natural mortality. Stock 8 inch or larger fish to avoid predation by largemouth bass.

Other species

Remove all green sunfish, carp and bullhead as caught up to the statewide daily limit.

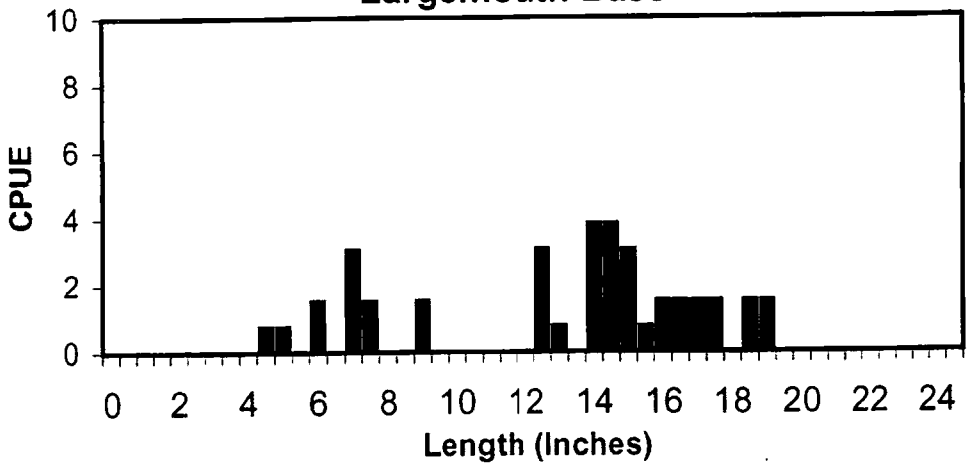
Fish Cover

Keep up the habitat work. More brushy cover is needed. Brush piles placed in 4 to 8 feet of water depth will get the most use by fish.

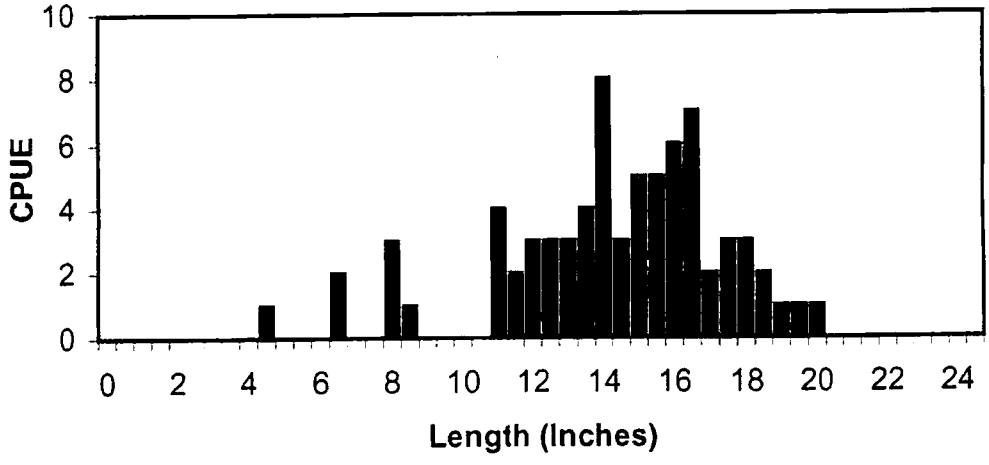
Aquatic plants are important for providing habitat for fish-food organisms such as insects and cover for small bluegill and largemouth bass. We recommend 15-20% of a lake's area contain aquatic plants for optimum fish production. I know the angler's

group spent some time on this in the past with out much success. Changing water levels make establishing vegetation difficult, and public attitude toward aquatic vegetation isn't always positive. I'm just guessing that these are two of the problems you are facing. Do what you can, and if I can offer guidance please let me know.

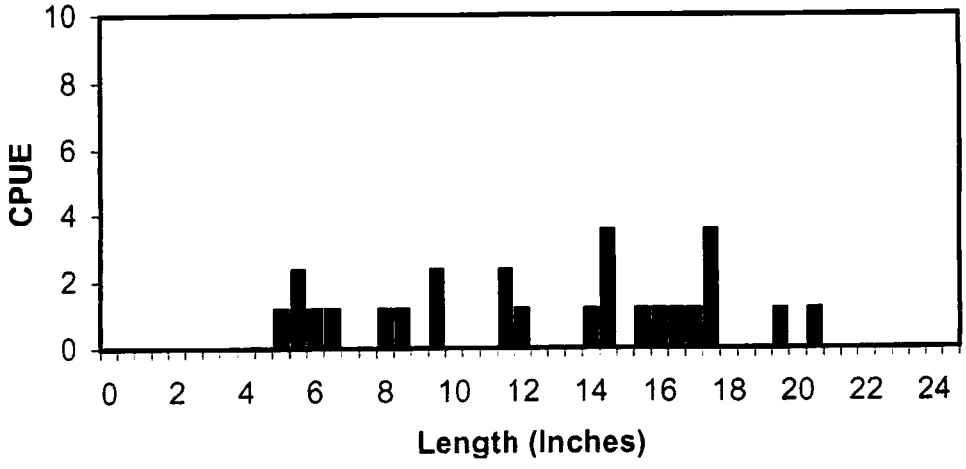
Lake St. Louis 2005
Largemouth Bass

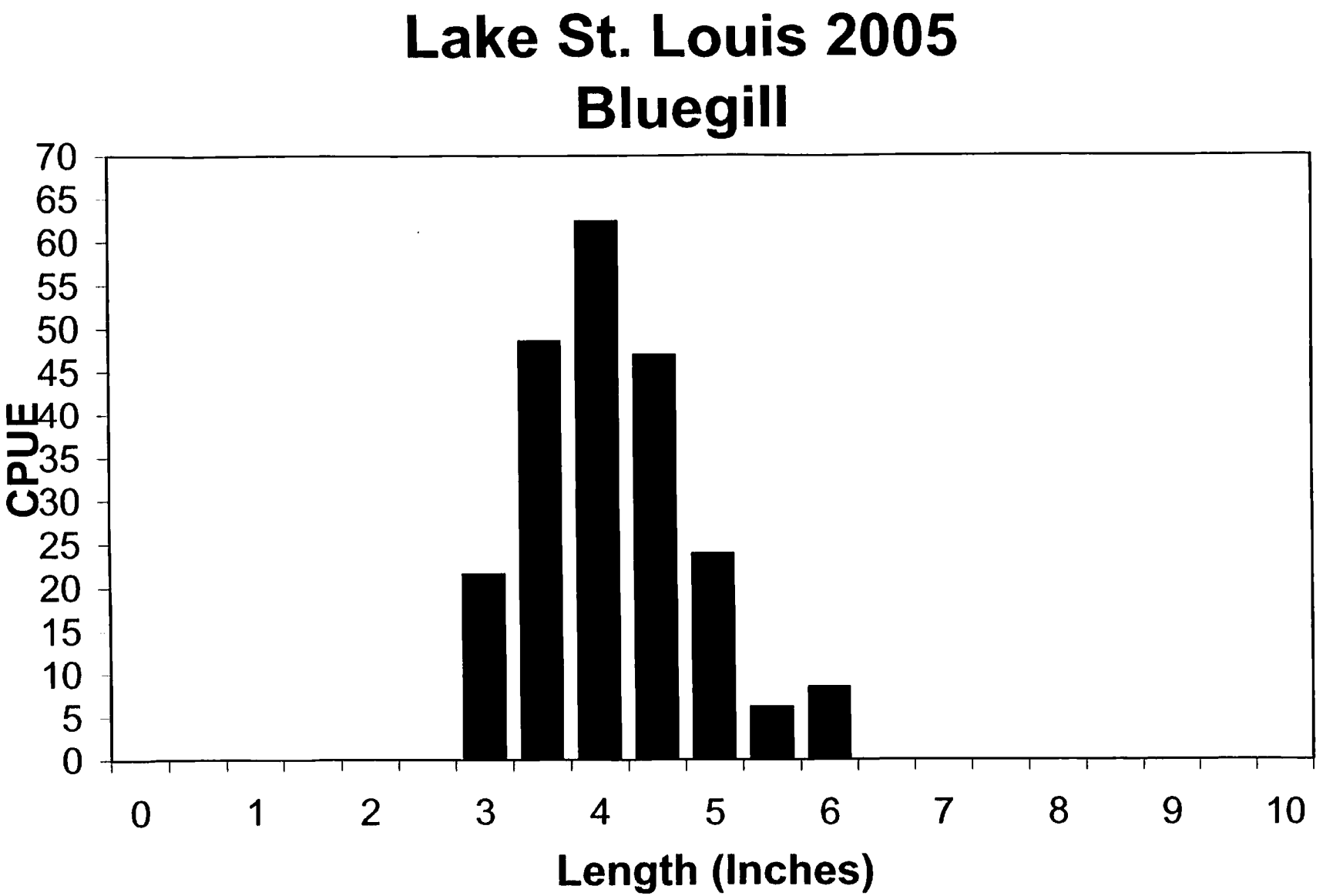


Lake St. Louis 2000
Largemouth Bass



Lake St. Louis 1997
Largemouth Bass




Lake St. Louis 2005
Bluegill
CPUE
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
0
1
2
3
4
5
6
7
8
9
10
Length (Inches)

Lake St. Louis 2005

White Crappie

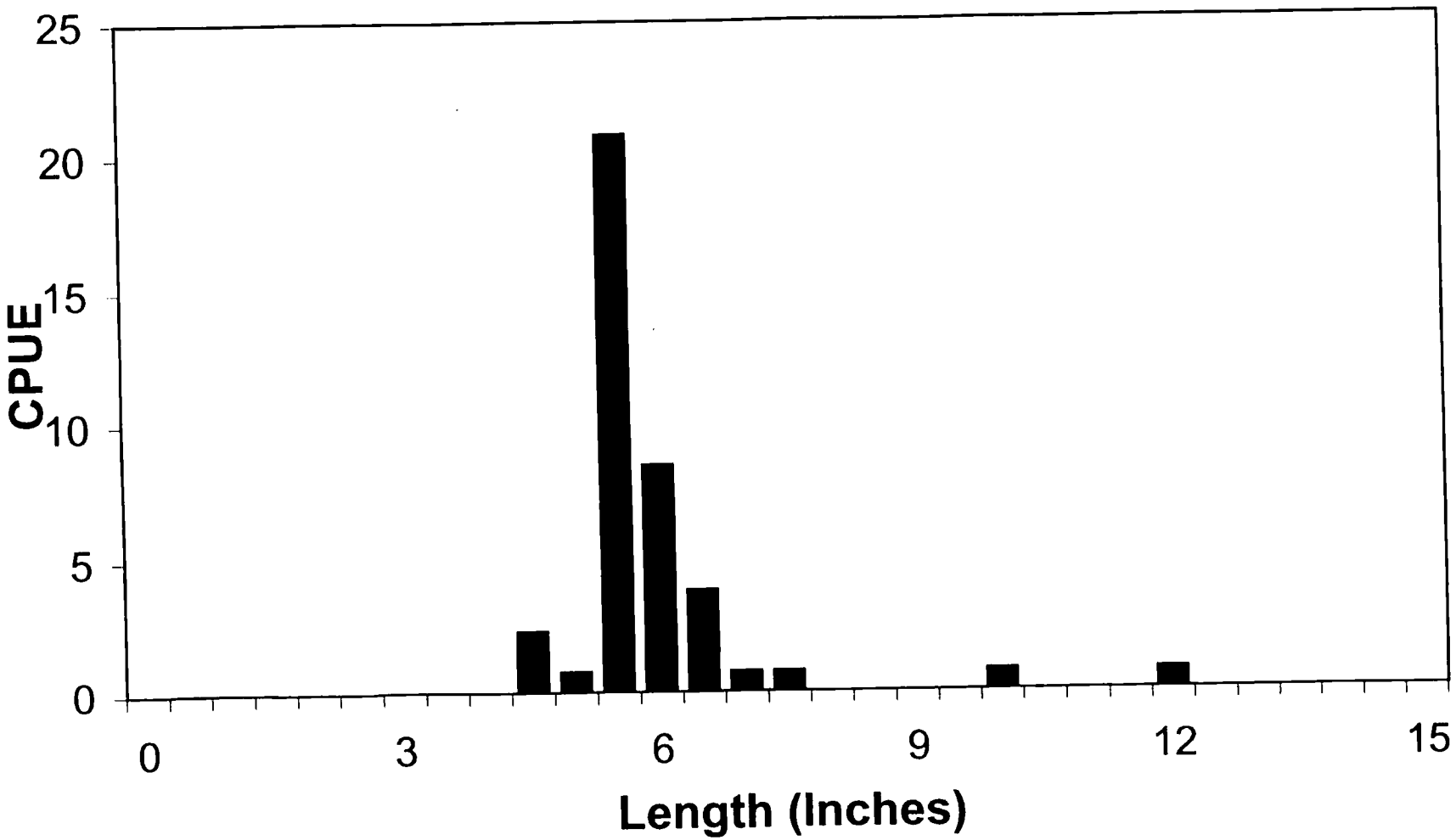


Figure 23 .

One of the most serious adult cestodes that affect fish is the Asian tapeworm, *Bothriocephalus acheilognathi* . It has been introduced to the United States with grass carp and has caused serious problems with bait minnow producers.

Praziquantel at 2 -- 10 mg/L for 1 to 3 hours in a bath is effective in treating adult cestode infections in ornamental fish. At this time, there is no treatment that can be used for food fish. Also, there is no successful treatment for plerocercoids. Ponds can be disinfected to eradicate the intermediate host, the copepod.

PARASITIC CRUSTACEA

Parasitic crustacea are increasingly serious problems in cultured fish and can impact wild populations. Most parasitic crustacea of freshwater fish can be seen with the naked eye as they attach to the gills, body and fins of the host. Three major genera are discussed below.

<italics><string>Ergasilus </string></italics>

Ergasilus (Figure 24) are often incidental findings on wild or pond-raised fish and probably cause few problems in small numbers. However, their feeding activity causes severe focal damage and heavy infestations can be debilitating. Most affect the gills of freshwater fish, commonly seen in warm weather. A 3% salt dip, followed by 0.2 %- prolonged bath for three weeks, may be effective in eliminating this parasite.

Figure 24 .

<italics><string>Lernaea </string></italics>

Lernaea , also known as anchor worm (Figure 25), is a common parasite of goldfish and koi, especially during the summer months. The copepod attaches to the fish, mates, and the male dies. The female then penetrates under the skin of the fish and differentiates into an adult. Heavy infections lead to debilitation and secondary bacterial or fungal infections.

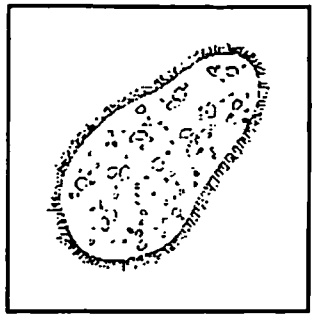


Figure 4 .

Identification of *Tetrahymena* internally is a significant but untreatable problem. A common site of internal infection is the eye. Affected fish will have one or both eyes markedly enlarged (exophthalmia). Squash preparations made from fresh material reveal large numbers (=> 10 per low power field) of *Tetrahymena* associated with fluids in the eye. Fish infected with *Tetrahymena* internally should be removed from the collection and destroyed.

<italics><string>Trichodina </string></italics>

Trichodina is one of the most common ciliates present on the skin and gills of pond-reared fish. Low numbers (less than five organisms per low power field) are not harmful, but when fish are crowded or stressed, and water quality deteriorates, the parasite multiplies rapidly and causes serious damage. Typically, heavily infested fish do not eat well and lose condition. Weakened fish become susceptible to opportunistic bacterial pathogens in the water. *Trichodina* can be observed on scrapings of skin mucus, fin, or on gill filaments. Its erratic darting movement and the presence of a circular, toothed disc within its body (Figure 5) easily identify it. *Trichodina* can be controlled with any of the treatments from Table 1. One application should be sufficient. Correction of environmental problems is necessary for complete control.

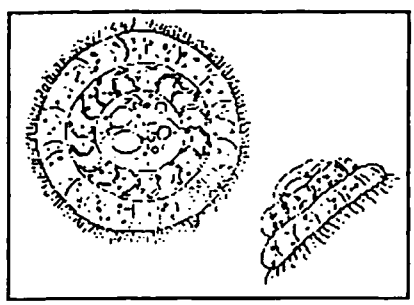


Figure 5 .

<italics><string>Ambiphyra </string></italics>

Ambiphyra , previously called *Scyphidia* , is a sedentary ciliate that is found on the skin, fins, or gills of host fish. Its cylindrical shape, row of oral cilia, and middle bank of cilia identify *Ambiphyra* (Figure 6). It is common on pond-reared fish, and when present in low numbers (less than five organisms per low power field), it is not a problem. High organic loads and deterioration of water quality are often associated with heavy, debilitating *Ambiphyra* infestations. This parasite can be controlled with one application of any of the treatments listed in Table 1.

UNIVERSITY OF FLORIDA
Cooperative Extension Service
Institute of Food and Agricultural Sciences

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"Red Sore Disease" in Game Fish [1]

Peggy Reed and Ruth Francis-Floyd[2]

One of the most common disease problems encountered in freshwater game fish is generically referred to as "red sore disease." This problem usually occurs in the spring and fall, and fishermen and pond owners are often concerned by the appearance of red ulcers and sores on their fish. Typically, "red sore disease" is caused by two organisms, *Aeromonas hydrophila* , a bacterium, and *Heteropolaria* sp. (formerly *Epistylis* sp.), a protozoan.

Both of these organisms are found in aquatic environments and are capable of causing disease. Red sore disease will often run its course, and fish may recover without treatment. The primary concern is often not mortality of fish, but rejection of the affected fish by anglers because of the diseased appearance. Occasionally red sore disease can reach epidemic proportions, contributing to significant mortality (more than 10 percent) of game fish. When this is the case, treatment is warranted.

Identification of Red Sore Disease

Red sore disease is a generic term that describes a physical condition of fish rather than referring to a specific disease agent. Fish most frequently affected are game fish, particularly bluegill (bream), largemouth bass, and striped bass and its hybrids. The condition is observed in fish from natural waters, recreational fishing ponds, and commercial aquaculture facilities. Sores caused by *Heteropolaria sp* . can be characterized by white-grey, cotton-like patches on the body surface or the fins. Due to the irritation, the fish will "flash," or rub, to rid itself of the parasite, causing scale loss and ulceration of the already damaged area. This allows the bacterium *Aeromonas hydrophila* to enter.

In its mildest form, the condition is seen as red, raised "sores," or lesions, on the tips of fins, particularly the dorsal fin of bluegill (Figure 1). As the disease progresses, fish may be afflicted with fin erosion, and ulcers on the side of their body (Figure 1). Because red sore disease is a general condition rather than a specific disease, affected fish must be sent to a fish disease diagnostic laboratory in order to correctly identify the pathogens contributing to each outbreak of disease.

done using Mueller-Hinton agar.

Transmission

Heteropolaria is almost everywhere in fresh water and sediments. It has a direct life cycle, requiring only the fish host. It reproduces by binary fission (dividing), and the resulting young forms are free swimming. The mature stage attaches to fish or other structures in its environment, including spawning containers and submerged logs. *Heteropolaria* thrives if there are high levels of organic matter in the water to provide nutrients. Stress, caused by poor water quality, crowding, water temperature variations, reduction in body condition, or spawning can increase the susceptibility of fish to red sore disease.

Treatment of "Red Sore Disease"

In many instances fish afflicted with red sore disease will recover without treatment. If lesions on most fish are mild (restricted to the tips of dorsal fins), and if few mortalities are observed, it may be advisable to observe the fish daily and elect to treat the pond only if the situation seems to worsen rather than improve.

If treatment is warranted, potassium permanganate is often effective when administered one time as a bath at 2 mg/l (see IFAS Fact Sheet #FA-23) because of its broad spectrum activity against external protozoa, bacteria, and fungi. If fish do not improve following treatment with potassium permanganate, they should be submitted to a fish disease diagnostic laboratory (see IFAS Circular #921) for a complete diagnosis.

In some instances, the disease may be far enough along that fish are dying of systemic bacterial infection secondary to external damage. Antibiotic treatments should be provided in a medicated feed based on results of bacterial isolation and sensitivity testing (see IFAS Fact Sheet #VM-70). In the event medicated feed is warranted, this medication should be administered in addition to the potassium permanganate bath. Anytime fish do not respond to treatment as expected, they should be re-evaluated by a fish diagnostic laboratory.

If fish affected with red sore disease can be handled, a 3 percent salt dip is extremely effective in eliminating external *Heteropolaria* sp. infections. Salt treatments are discussed in IFAS Fact Sheet #VM-86.

Wholesomeness of Fish with Red Sore Disease

Fishermen often ask whether it is safe to eat game fish that have sores on them. In most cases the sores are external only, and when the fish is cleaned, the damaged area is easily removed from edible tissue. Thorough cooking will eliminate any pathogens that might remain in tissue, resulting in a safe and wholesome product. Although the appearance of a fish with sores on it may be unappetizing, there is no reason to discard the fillets as long as they are thoroughly cleaned and cooked.

Summary

Red sore disease in game fish is common in the spring and fall, and often due to the effects

of two opportunistic aquatic pathogens, *Heteropolaria* sp. and *Aeromonas hydrophila* . *Heteropolaria* sp. is a ciliated protozoan, found almost everywhere in fresh water. It causes problematic infestations on game fish. These protozoans flourish and attach to the skin, where they cause unsightly, bloody, ulcerated areas.

In lakes or rivers, treatment is not feasible. In recreational farm ponds or aquaculture facilities, *Heteropolaria* sp. may be controlled with potassium permanganate at 2 mg/l administered as a prolonged bath. A salt dip (3 percent) is also effective if it is feasible.

Aeromonas hydrophila is an aquatic bacterium capable of infecting skin or fins damaged by *Heteropolaria* sp. The bacterium adds to the damage caused by the protozoan, which results in formation of large red ulcers and occasionally systemic infection. If the bacterial infection becomes systemic, mortality rates will increase, and antibiotic therapy, administered in medicated feed, is warranted. Antibiotic therapy should be based on the results of sensitivity tests. Any time fish do not respond to treatment as expected, a sample should be submitted to a fish disease diagnostic laboratory for reevaluation.

Many game fish affected with red sore disease will recover without treatment. Fish heal very quickly, and sores will disappear rapidly once the recovery process has begun. Fish that have sores are still acceptable for human consumption as long as the damaged area is removed when the fish is cleaned and the meat is thoroughly cooked.

Footnotes

1. This document is Fact Sheet VM 85, one of a series of the College of Veterinary Medicine, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Printed December 1993. Please visit the FAIRS Web site at http://hammock.ifas.ufl.edu.

2. Peggy Reed, biological scientist; Ruth Francis-Floyd, DVM, associate professor; College of Veterinary Medicine; Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, 32611.

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