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THE COMPLETE DISINFECTION OF THE STATE FISH HATCHERY

AT WATERSMEET, MICHIGAN, SEPTEMBER 9-10, 1943

by

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Introduction

During the latter part of March and the month of April, 1943, a heavy loss among brook, brown and rainbow trout fry was sustained at the State Fish Hatchery at Watersmeet, Michigan. The cause of this loss was determined as bacterial gill disease (Memorandum No. 156). Members of the hatchery crew stated that a mortality occurred every year when the fry reached a certain age, i.e. shortly after they had begun to feed well, and that it appeared to be caused by gill trouble. Treatments with various and sundry chemicals were never successful.

According to Dr. H. S. Davis there are two types of gill disease, the Eastern type and the Western type. The former responds to treatment with copper sulphate but the latter does not respond to any treatment. Since the present case did not respond to treatment with copper sulphate, it was identified as Western type gill disease.

The supply pond at Watersmeet contained a number of adult trout which could have been carriers of the disease, thus accounting for the persistent annual outbreaks of the disease. Because the disease was of bacterial

origin, the disinfection of the entire hatchery was recommended to eliminate fish from the supply pond and to destroy any bacteria that might be present.

Chemicals

A solution containing 200 p.p.m. available chlorine was used as the disinfectant. The same concentration was used in the disinfection of Oden Hatchery where 15X Klensade, a liquid containing 15 per cent available chlorine, was the source of chlorine. However, handling of the great number of one-gallon jugs necessary for the treatment proved to be a considerable undertaking. To eliminate this, a chemical powder, H.T.H. (calcium hypochlorite) was used as a source of chlorine. The powder proved to be much more easily handled and applied than the liquid. One pound of HTH will make 400 gallons of 200 p.p.m. chlorine solution. The amount of HTH required to completely disinfect Watersmeet Hatchery was 700 pounds. The supply pond, all out-door ponds, the troughs in the building and all rooms on the first floor of the building were treated. All equipment concerned with rearing trout was also treated.

All the water from the hatchery flows directly into a private lake containing trout. For this reason it was considered necessary to neutralize the chlorine with sodium thiosulphate before it reached the lake. Since 1/5 ounce of sodium thiosulphate will neutralize one gallon of 200 p.p.m. chlorine solution, it would require 3,500 pounds to neutralize the 200 p.p.m. solution of chlorine made by 700 pounds of HTH. Due partly to auto-neutralization and partly to the escape during the night of some incompletely neutralized solution, only 2,975 pounds of sodium thiosulphate was actually used.

Procedure

Prior to the treatment a fish-proof wire screen was placed across hatchery creek at the lake to prevent the migration of trout back into the waters of the hatchery.

The display pond and the raceways were disinfected first, after a seine was placed across the waste ditch just above the bridge to prevent fish from escaping the treatment and from entering the treated areas after neutralization.

In the treatment of the raceways and spring supplying them, two methods were used. HTH was introduced directly into the spring and the small stream connecting it with the raceways. In treating the raceways, the stocking unit was used. The tanks were filled with water, HTH added and well mixed. The solution was pumped out through two one-inch hoses. The sides of the raceways also were thoroughly washed down.

The supply pond was drawn down to approximately one-quarter of its capacity and the HTH introduced from a row boat. After the chemical was spread into the pond, an outboard motor on the boat was used to thoroughly mix the water. A pumping unit with two hoses attached drew treated water from the pond and thoroughly soaked the sides of the pond. After treatment the pond was allowed to fill. The overflow was neutralized at the screened entrance to the private lake.

In the building, drains were plugged and the troughs filled with water from the treated supply pond which contained about 50 p.p.m. chlorine at that time. The floor was completely covered by the water. Approximately three ounces of HTH was placed in each trough and mixed. Approximately 20 pounds of HTH was mixed in the water covering the floor during the treatment. The same pumping unit as was used in the supply ponds was brought into the building and water from the floor was pumped onto the walls of the supply room, meat room, furnace room, and the large trough room. The undersides of all troughs were thoroughly soaked. All pieces of equipment used in the handling of fish were also thoroughly treated. Egg trays and other equipment from the attic were brought downstairs and immersed or

sprayed. One hour after the treatment the drains were opened and the chlorine solution neutralized as it emptied into the waste ditch near the lake.

Comments

In addition to disinfecting the hatchery, the treatment removed all fish in the water supply system. The removal of fish from the supply water of a hatchery is important in the control of fish disease. Examination of brook trout removed from the supply water at Watersmeet hatchery revealed the presence of two parasites. Dr. A. S. Hazzard found both adult tapeworms and the gill louse, Salmincola edwardsii, in a high percentage of brook trout that he collected from the spring supply pond prior to the disinfection. The gill louse was also found on many brook trout removed from the pond during the treatment.

The prevention of recontamination of a hatchery after it has been completely disinfected is of utmost importance.

The screen in the waste ditch where it enters the pond should be carefully maintained to prevent disease-bearing fish from reaching the hatchery waters. Under present conditions of ownership it is impossible to prevent water from the pond backing up into the hatchery during heavy floods on the Ontonagon River which are said to over-top the dam for brief periods. This may bring contaminated water into the hatchery but the screen should block the fish. However it is possible that the flow of water from the hatchery may keep out water from the pond. If the pond were State-owned, the pond could be drained, the stream through it sterilized and a fish-tight screen installed at the site of the present dam. As the river raised during flood, boards could be put in to hold back the flow from the hatchery and to prevent entrance of river water. Since these flood periods are of short duration it is believed that the pond capacity would be sufficient to impound the flow from the hatchery without flooding the building, and if the water did back up into the building, it would be uncontaminated. An engineering study of this problem of flooding and possible ways to avoid it should be undertaken at an early date. (A.S.H.)

All foreign eggs should be disinfected with 0.05 per cent neutral acriflavine solution for one-half hour. Cases of shipped eggs, water, packing and the hands of those who handle those eggs should be kept from

contaminating the hatchery. All equipment that is shipped in should be disinfected before use or destroyed if not intended for use. No live trout should be brought into the hatchery, unless it is proven that trout cannot be successfully hatched and reared beyond the fry stage at this hatchery. If it is found necessary to transfer trout fry to Watersmeet hatchery for rearing, they should be transferred only from Thompson hatchery. If the latter plan is adopted, all eggs received at the Thompson hatchery should be treated for one-half hour with 0.05 per cent acriflavine, and the fry transported in a completely disinfected planting unit. Such transfers of fry should not be made until Unit No. 2 of the Thompson hatchery has been completely sterilized.

All foreign trucks coming into the hatchery to haul fish should be disinfected with a 200 p.p.m. chlorine solution before reaching the hatchery. The units could most easily be disinfected before they leave their home station, provided they carry no fish or water before they reach the disinfected hatchery. The planting units should be filled with water, the disinfectant added to the water and allowed to stand for at least one hour. The surface of the units should also be washed down with the solution. A solution of 200 p.p.m. chlorine can be made from some commercial washing and bleaching solutions. The following amounts are to be used for each ten gallons of water used:

Roman Cleanser: (Per cent given on label of bottle)

3% available chlorine -- 9 ounces liquid measure

4% available chlorine -- 7 ounces liquid measure

5% available chlorine -- $5\frac{1}{2}$ ounces liquid measure

Klenzade:

15% available chlorine -- $2\frac{1}{2}$ ounces liquid measure

HTH Powder:

Use 0.53 ounces (15 grams) per 10 gallons of water.

Other bleaching agents containing chlorine can also be used. The per cent of available chlorine is marked on the label. The amount to use may be determined from the above table.

In case the unit must be disinfected on the road, for example when fish are to be transported along the route before the unit reached Watersmeet hatchery to conserve gasoline, etc., a sufficient quantity of the disinfectant can be carried along.

Acknowledgments

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INSTITUTE FOR FISHERIES RESEARCH

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WATERSMEET HATCHERY



Spring supply pond. Hatchery and display pond in background. 4-10-43



Raceways. Hatchery and lake in background. 4-10-43