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ERYTHROMYCIN TREATMENT OF KIDNEY DISEASE AMONG BROOK TROUT AT WATERSMEET HATCHERY

By Leonard N. Allison

Kidney disease among hatchery trout is one of several fish diseases that have appeared in recent years in Michigan. It is a bacterial disease and is important because mortality among affected groups of fish may be high; no effective agents for control have been found, and the mode of transmission is unknown.

Sulfamerazine has been useful in suppressing losses to some extent, but mortality has still remained above normal. Allison (1958) tested combinations of sulfa drugs for control of kidney disease but found them no more effective than sulfamerazine alone. Of 34 therapeutic agents tested on this disease by Wolf and Dunbar (1959), erythromycin was found to be most effective, although only about one half of the fish were cured.

At Watersmeet Hatchery, kidney disease appeared among yearling brook trout in several consecutive years. In May, 1961, the disease was found among fingerling brook trout and periodic courses of treatments with sulfamerazine, 12 grams per 100 pounds of fish, were given during the summer and fall. These treatments may have checked the disease, for no epidemic developed. However, mortality remained chronically above normal and the disease invaded the liver and other internal organs.

Since erythromycin was the most effective of the 34 therapeutic agents tested by Wolf and Dunbar (op. cit.), an experiment designed to compare the efficiency of sulfamerazine and erythromycin was initiated.

Methods

The experiment began on March 12, 1962 and terminated on June 30, 1962. The 8,400 brook trout used had been continuously infected by kidney disease since they were fingerlings in May, 1961. When the

tests were initiated the fish had reached legal length. The fish were divided randomly into 12 lots of 700 fish each and placed in cement tanks. Four lots were treated with sulfamerazine, 12 grams per 100 pounds of fish per day for 21 days; 4 lots were treated with erythromycin, 4.5 grams per 100 pounds of fish per day for 21 days; and 4 lots served as control and did not receive medication. All fish received a diet of beef liver. Records of mortality during treatment, and in the 3-month post-treatment period, provided information of the effectiveness of the medication. Differences between the four lots receiving a particular treatment were nonsignificant, so the data were combined for analysis.

Results

Mortality among the three groups (2, 800 fish in each) was:

Date	Sulfamerazine		Erythromycin		Control	
	Number	Percentage	Number	Percentage	Number	Percentage
3/12 to 4/2*	88	3.1	67	2.4	69	2.5
4/3 to 5/1	87	3.2	42	1.5	116	4.2
5/2 to 6/1	145	5.5	97	3.6	127	4.7
6/2 to 7/1	124	5.0	118	4.5	88	3.4
Total	444	15.9	324	11.6	400	14.3
Total, post-treatment	356	13.1	257	9.4	331	12.1

* Period of treatment.

Among the fish treated with erythromycin, mortality was virtually identical with the control group during therapy; for the next two months it was greater among the controls than among the treated fish; in the third month mortality of treated fish exceeded that of the control group. Autopsy at the conclusion of the tests revealed kidney disease. The slightly better survival (76 fish) in the erythromycin-treated lot over the control lot was not statistically significant; therefore there is no proof that the treatment did any good at all. Cost of erythromycin for the 21-day treatment was $167.00.

Among fish treated with sulfamerazine there was actually more mortality than among the controls, but the difference was not significant. Cost of the sulfamerazine treatment was $82.24.

Some of the fish used in these tests of kidney disease also had furunculosis; the particular furunculosis bacterium was determined to be resistant to sulfa therapy by Mr. Robert Piper, Hatchery Biologist,

U. S. Bureau of Sport Fisheries and Wildlife, LaCrosse, Wisconsin. According to studies by Snieszko and Bullock (1957), erythromycin is not effective in controlling furunculosis. As the furunculosis present among fish in this experiment was demonstrated to be sulfa-resistant and as erythromycin does not control this disease, furunculosis probably did not influence the results of the present tests on kidney disease.

Conclusions

One course of erythromycin therapy, at the rate of 4.5 grams per 100 pounds of fish for 21 consecutive days, failed to control a well established infection of kidney disease among yearling brook trout at the Watersmeet Hatchery. Among fish treated with sulfamerazine, losses were slightly greater than that among untreated fish.

The fine cooperation of Mr. Ted Monti and the Watersmeet Hatchery crew is gratefully acknowledged.

Literature cited

Allison, L. N. 1958. Multiple sulfa therapy of kidney disease among brook trout. Prog. Fish-Cult., 20(2): 66-68.

Snieszko, S. F., and G. L. Bullock. 1957. Treatment of sulfonamide-resistant furunculosis in trout and determination of drug sensitivity. U. S. Fish and Wildl. Serv., Fish Bull. 57(125): 555-564.

Wolf, Ken, and C. E. Dunbar. 1959. Test of 34 therapeutic agents for control of kidney disease in trout. Trans. Amer. Fish. Soc., 88(2): 117-124.

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