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A TEST OF THE EFFICACY OF TWO ANTIBIOTICS (LINCOMYCIN HYDROCHLORIDE AND SPECTINOMYCIN SULFATE) IN AN EPIZOOTIC OF CORYNEBACTERIAL KIDNEY DISEASE AMONG YEARLING BROOK TROUT (SALVELINUS FONTINALIS)

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Abstract

Two antibiotics (Lincomycin Hydrochloride and Spectinomycin Sulfate) were tested from May 20 through July 19, 1969, for efficacy in the control of corynebacterial kidney disease among brook trout (Salvelinus fontinalis) at the Thompson State Fish Hatchery in Michigan. Lincomycin Hydrochloride alone or in combination with Spectinomycin Sulfate, did not effect a cure nor could any suppression of the disease be demonstrated.

Introduction

A test of the efficacy of two antibiotics, Lincomycin Hydrochloride and Spectinomycin Sulfate, was made during an epizootic of corynebacterial kidney disease (KD) at the Thompson State Fish Hatchery in Michigan. The Upjohn Company, Kalamazoo, Michigan, cooperated by supplying the antibiotics and recommending dosage levels.

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Procedures

Production brook trout experiencing a mortality due to KD were selected for the tests. A sample of 100 fish from the same lot showed 19% incidence of KD observable in gross lesions of the kidney. Microscopic examination of gram-stained kidney smear slides from the same fish indicated no other infections, nor additional cases of KD. Of these fish 150 pounds were selected as representative of the population and were taken from the outdoor raceways at 40-60° F. and set up indoors at a constant temperature of 45° F. Six tanks were used with a total weight of 25 pounds of fish per tank (approximately 411 fish at 16.44 fish per pound).

Fish in two tanks were treated daily for 21 days with Lincomycin Hydrochloride at a level of 50 milligrams per pound of fish. This was fed as 1.25 grams of drug per day per tank, mixed with 90 grams of the OMP (Oregon Moist Pellet) diet.

Fish in two tanks were treated daily for 21 days with Lincomycin Hydrochloride and Spectinomycin Sulfate mixed in a 1:2 ratio at a level of 50 milligrams per pound of fish. This was fed at the same rate and manner as mentioned in the paragraph above.

Fish in two tanks were kept as controls with no drug in their diet of OMP.

Mortalities were removed and records made daily. Beginning 8 days after the last drug was fed, and continuing on for 30 days, all dead fish were examined for gross kidney lesions and a daily record

kept. At 38 days post-treatment the experiment was terminated and 100 fish from each treatment and 100 control fish were examined for lesions of KD.

Results

The incidence of KD lesions dropped markedly in all lots of fish from the 19% level at the start of the study. The surviving fish sampled at the conclusion of the study showed 3% KD in both lots treated with the antibiotics, and 5% in the control group. Mortalities due to KD following therapy were less with the mixed drugs (36) compared to those with the Lincomycin Hydrochloride alone (58) or the controls (50). However, total losses due to all causes during the entire period of study were 163 with mixed drugs, 124 with Lincomycin Hydrochloride alone, and 131 for the controls.

Discussion

On a practical basis, the drugs tested above show little hope for the hatchery biologist in the therapy of KD. The difference at the conclusion of the study of 3% incidence in treated, versus 5% in the controls is hardly worth the effort of treating. And, though the losses due to KD in the fish treated with the mixture of drugs were less than in the controls, the disease was still active in 3% of the fish, so a cure was not effected.

The total mortality for the fish treated with mixed drugs was much higher than in either the fish treated with Lincomycin Hydrochloride

or in the control fish (See Table 1). It is possible that the higher total losses with the mixed drugs were due to a toxicity factor, yet a lower level of drug feeding would probably be of little value since the disease was not curtailed by the dosage used.

The reason for the drop of incidence of KD in the controls from 19% at the start to 5% at the conclusion of the study is not completely understood although a number of factors were involved. One factor was that some infected fish died. There was also less chance of reinfection since the experimental fish were kept in a controlled water source with no KD contamination. The experimental fish were also kept at a colder temperature (45° F. exp., vs. 40-60° F. prior) where the disease is less active. And the diet was changed from a dry pellet to the OMP.

This work brings to date a total of 36 compounds tested against KD, the most promising being erythromycin as reported by Wolf and Dunbar (1959), and Piper (1961).

Acknowledgment

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1961. Toxic effects of erythromycin thiocyanate on rainbow trout. Progressive Fish-Culturist, vol. 23, no. 3, p. 134-135.

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TABLE I

Total Losses During Testing Period. (Days 1-59)

Mixed Drugs	Lot A	85	Lot B	73	Combined	158
Lincomycin HCl	Lot A	55	Lot B	69	Combined	124
Control	Lot A	68	Lot B	63	Combined	131

Losses Due to KD (Days 29-59).

Mixed Drugs	Lot A	18	Lot B	18	Combined	36
Lincomycin HCl	Lot A	25	Lot B	33	Combined	58
Control	Lot A	27	Lot B	23	Combined	50

KD in Survivors (Based on a random sample of 50 fish per lot)

Mixed Drugs	Lot A	1	Lot B	2	Combined (%)	3
Lincomycin HCl	Lot A	3	Lot B	0	Combined (%)	3
Control	Lot A	3	Lot B	2	Combined (%)	5