DEVELOPMENTS IN FISH CULTURE

Fin Splitting/Erosion in Rainbow Trout

Investigators

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INTRODUCTION

In February 1996 fin splitting in the Kamloops strain of rainbow trout was detected at the Ennis National Fish Hatchery (NFH). Since that time, a moderate to severe fin splitting/erosion condition developed in the other 5 strains of rainbow trout at Ennis NFH. Typically, this condition becomes obvious when the fish reach 4 to 5 inches in total length. Ennis NFH has been charged with raising 310,000 sub-catchable rainbow trout for the state of Montana to be stocked in the Spring of 2000. In addition, hundreds of retired brood fish are stocked annually in Colorado, North Dakota, and Montana. It is in the best interest of the hatchery program to provide a healthy and attractive fish for recreational anglers as well as for hatchery visitors.

It has been hypothesized that fin splitting/erosion may have either a nutritional or a pathogenic cause. In cooperation with the Bozeman Fish Technology Center (FTC) two different diet studies were conducted at Ennis NFH. Results from each test did not improve the fin splitting or erosion condition and currently this fin splitting/erosion condition still exists at the Ennis NFH.

This test proposed to determine whether treating fish with oxytetracycline (TM50), or Chloramine T, or formalin would prevent or reduce the fin splitting/erosion condition. One group received no treatments and served as the control group. Another group of fish was fed TM50 to protect the fish from systemic bacterium. Another group received weekly treatments of Chloramine T for control of external bacterium. Chloramine T is currently being experimented with by the Investigative New Animal Drugs (INAD) division of the U.S. Fish & Wildlife Service. Ennis NFH is currently authorized to use this new animal test drug. Lastly, the final group received weekly formalin treatments for the control of external parasites.

OBJECTIVES

To determine whether fin splitting or erosion is prevented or reduced by: 1) feeding TM50 medicated feed; 2) treating with Chloramine T; 3) treating with formalin for parasites.

METHODS AND MATERIALS

In this experiment 12 tanks in the main hatchery building were used. Eleven hundred and fifty (1150) eyed Erwin rainbow trout eggs were placed in each tank. The experiment consisted of 3 treatment methods, with 3 replicates for each treatment. All groups were fed according to the regular Ennis feeding program using the same contract feeds. Group 1 (3 tanks) was the

control group and received no treatments. Group 2 (3 tanks) was fed TM50 medicated diet for 14 consecutive days beginning with the # 1 granules and repeated after 30 days for the duration of the test. Group 3 (3 tanks) received one Chloramine T treatment each week for the duration of the experiment. The Chloramine T treatments were a one hour flow treatment (25 gpm) at 15 parts per million (ppm). Group 4 (3 tanks) received one formalin treatment each week. The formalin treatments were one hour stagnation treatments at 167 ppm . The treatments began approximately 20 days after swim up, and continued weekly for the duration of the test .

The initial examination of fin splitting/erosion was conducted three months after "swim up" and then at monthly intervals through February 24, 2000. The fin condition analysis consisted of a twenty fish sample for each one of the twelve tanks. Dorsal fin indexes (DFI) were calculated (dorsal fin length {mm}/total length {mm} on each fish as well as qualitative observations concerning the degree of erosion and fin splitting. A one-way Analysis of Variance (ANOVA) test and Least Significant Difference (LSD) test (95% and 90% C.I.) was used to determine significant statistical DFI differences among the four groups.

RESULTS & DISCUSSION

There was no significant statistical difference ($\propto$.05) among the four groups for the initial set of DFI's that were collected January 4, 2000. However, when the rejection level ($\propto$) was increased to .10 the TM50 group DFI's were statistically higher than the CHT group. On this date, mean DFI's for the four groups ranged from 6.8 to 9.9 (Table 1). Approximately one month later, February 1, 2000, DFI's for the TM-50 group were statistically higher than all 3 of the other groups at both .05 and .10 rejection levels (Table 1). During this time period (Jan. 4 - Feb.1) mean DFI's ranged from 5.7 to 8.9. The final set of DFI measurements were taken on February 24, 2000. These mean DFI's ranged from 4.3 to 6.9. At the .05 rejection level DFI's for the TM50 group were statistically higher than the control group DFI's, all others were statistically equal. At the .10 rejection level DFI's for the TM50 group were statistically higher than those of the CHT and control groups.

The results from this experiment clearly demonstrate a direct relationship with declining DFI's over a 3 month period of time. The statistics suggest that fin deterioration can be slowed by feeding TM50 medicated feed.

Table 1 : **20 Fish Average: DFI Measurements and Total Length (inches)**

Date	*DFI* ***Control***	*Total Length*	*DFI* ***TM50***	*Total Length*	*DFI* ***CHT***	*Total Length*	*DFI* ***Formalin***	*Total Length*
1/4/00	9.6	4.07	9.8	4.01	6.8	4.12	9.0	3.88
1/4/00	8.8	4.1	9.8	4.0	8.9	4.07	9.0	4.05
1/4/00	8.7	3.83	9.9	3.89	9.7	4.04	8.2	4.08
avg.	**9.0** $^{a}_{1\,2}$	**4.0**	**9.8**$^{a}_{1}$	**3.97**	**8.47**$^{a}_{2}$	**4.08**	**8.7**$^{a}_{12}$	**4.0**
2/1/00	6.5	5.0	8.9	5.0	5.7	5.0	6.9	4.8
2/1/00	6.5	5.0	8.0	4.93	7.3	5.0	6.7	5.0
2/1/00	5.8	4.7	7.9	4.81	7.1	5.0	6.2	5.0
avg.	**6.3**$^{b}_{3}$	**4.9**	**8.3**$^{c}_{4}$	**4.91**	**6.7**$^{b}_{3}$	**5.0**	**6.6**$^{b}_{3}$	**4.93**
2/24/00	5.39	5.7	6.94	5.78	4.32	5.6	6.12	5.6
2/24/00	5.03	5.78	5.79	5.74	6.1	5.75	5.85	5.75
2/24/00	5.28	5.5	6.44	5.6	5.73	5.78	5.55	5.77
avg.	**5.23**$^{e}_{6}$	**5.66**	**6.39**$^{d}_{5}$	**5.71**	**5.38**$^{de}_{6}$	**5.71**	**5.84**$^{de}_{56}$	**5.71**

Common alphabetical superscripts denote no significant statistical difference at the 05 rejection level
Common numerical subscripts denote no significant statistical difference at the .10 rejection level

CONCLUSION

There was a general decrease in overall fin condition throughout the test. Our observations revealed that this decrease was relatively slowed by feeding the medicated TM50 feed as the statistics indicated for all three sets of measurements. We observed moderate to severe fin splitting during the initial observations. Consequently, as the test continued fin splitting decreased as erosion intensified. Because of the variability in the results among the different treatments we suggest the possibility of a combination of the same treatments to determine if any positive or negative interactions may occur. In addition, it may be beneficial to initiate monthly TM50 feeding to produce higher quality fins. However further testing should be conducted to substantiate these findings before making significant changes to feeding programs to improve fin condition.