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RESULTS OF WALLEYE EGG EXPERIMENTS
YELLOWSTONE RIVER - INTAKE - 1988

Phil Stewart - November 1988

ABSTRACT

Experiments were set up to determine the effect of LHRHa on ripening of mature female walleye. This material was highly effective in ripening walleye females held in live cars. For fish injected with this material, 88% ripened in one week or less while only 39% of uninjectd walleye ripened in one week.

Effect of LHRHa injections and of settled, filtered and unmodified river water for fertilization was also measured on egg eye-up percentage. Eye-up percentage averaged 31.8% and 24.6% for eggs from uninjected fish, respectively, but this difference was not significant. Eggs fertilized in untreated river water had a higher eye-up percentange than eggs fertilized in settled or filtered river water.

BACKGROUND

Eye-up percentages for eggs collected at Intake have not been high in the six years that eggs have been collected there. With the exception of 1983, when only 600,000 eggs were collected, the overall eye-up percentage has not exceeded 40%. Eye-up was 28% in 1987 and overall, 1988 eggs also yielded a 28% eye-up.

At Intake, few ripe walleye females are captured. Green females are retained in live cars until ripening for up to one week. Only approximately 30% of these females ripened. Beginning in 1987 carp pituitary (CP) and luteinizing hormone - releasing hormone analogue (LHRHa) were tested to improve ripening percentages of female walleye held in live cars. LHRHa appeared to greatly increase the ripening percentage of at least walleye females captured early in the run (Stewart 1988).

In 1988 experiments were designed to test the effect of LHRHa on eye-up percentages, although literature indicates there is no effect. Water clarity of fertilization was also tested on fish treated with LHRHa and not so treated.

Yellowstone River water is normally highly turbid in April. Most walleye eggs collected across the country come from fish living in much less turbid waters. I hypothesized that perhaps soil particles suspended in the Yellowstone River water were interferring with egg fertilization. Experiments were designed to test this hypothesis.

MATERIALS AND METHODS

Walleye females captured by electrofishing were held in nylon mesh live cars or in metal tanks drilled out with 1 inch diameter holes to allow water flow. LHRHa was obtained from Syndel Laboratories, Vancouver, British Columbia. Fish treated with

hormones received 0.02 mg/kg body weight of LHRHa the day of capture and the same dose 48 hours later if ripening had not already occurred. LHRHa was dissolved in 0.7 percent saline and injected into the peritoneal cavity with a 20 guage inch long needle.

All water used for fertilization was taken from the Yellowstone River. Untreated water was dipped directly from the river as each pan of eggs was fertilized. Water referred to as "settled water" was dipped into a steel tank in the river so that it's temperature would be the same as river water. This water was allowed to settle and clarify at least an hour before being used for fertilization. Water referred to as "filtered water" was obtained from the "settled water" tank and was pressure filtered through Millpore Corp. filter pads. These pads were type AP of pore size "prefilter." Both "settled" and "filtered" water were of obviously greater water clarity than untreated water. All eggs were fertilized at water temperatures in the range 47-54 F. This was within the optimal range found by Koenst and Smith (1976).

Eggs from different hormone and fertilization water treatments were kept separate in nylon mesh trays floated in the river. Eggs were bagged separately in the field for transportation to the hatchery and were cultured separately in jars at the Miles City Hatchery.

RESULTS

LHRHa was effective in ripening female walleye (Table 1). For LHRHa injected fish 88% ripened within a week following the first injection. Only 39% of uninjected fish ripened in one week. This difference was statisticaly significant at the 99% level of confidence, using the "students t" test.

Experiments were also done to determine the effect of injected LHRHa on egg eye-up percentage. General results of these experiments are shown in Table 2. Overall, eggs from uninjected fish eyed-up at a 31.8% rate; the corresponding figure for eggs from injected fish was 24.6 %. However this difference was not statistically significant. The calculated "students t" was 1.16, well below the value of 1.71 required for significance at the 90% level.

Both filtered and settled water for egg fertilization resulted in eye-up percentages lower than those for eggs fertilized in untreated river water. (Table 2) This was true for both LHRHa treated and untreated walleye females. Obviously, there was no advantage to settling or filtering river water for egg fertilization.

DISCUSSION

All green Intake female walleye should be routinely injected with LHRHa. Not injecting would have resulted in a large decrease in the number of walleye fry produced from Intake eggs, even considering the slightly lower eye-up for eggs from injected fish. Possibly, this lower eye-up percentage for eggs from injected fish could be caused by a longer period of time in live cars for injected fish. Approximately two thirds of the eggs from uninjected fish came from walleye that were captured in a ripe condition. These fish were always spawned during the first egg take following their capture. A better experiment would have resulted if eggs from live car held uninjected fish had been kept separate from eggs taken from females captured in a ripe condition.

Literature cited.

Koenst, W. M. and L. L. Smith, Jr. 1976. Thermal requirements of the early life history stages of walleye and sauger. J. Fish. Res. Board Can. 33:1130-1138.

Stewart, P.A. 1988. Southeast Montana warm water streams investigations. JOB PROG. REPT. F-46-R-1, JOB III-b. Montana Dept. Fish, Wildlife and Parks. 10 pp.

Table 1. Effect of LHRHa injection on ripening of green female Walleye, April 1988.

Date of Capture	Number of Fish	Ripening within one week	
		Number	Percentage
		INJECTED FISH	
4-9	6	6	100
4-10	14	13	93
4-13	13	13	100
4-14	18	16	89
4-15	19	18	95
4-16	33	28	85
4-17	26	26	100
4-18	27	24	89
4-19	38	30	79
4-20	14	9	64
Total or mean	208	183	88
		UNINJECTED FISH	
4-11 & 12	14	4	29
4-21	12	7	58
4-22 & 23	5	1	20
Total or mean	31	12	39

Table 2. Walleye egg eye-up percentages for eggs from females injected or not injected with LHRHa and fertilized in three types of water.

Date	Injected Fish					
	River Water		Settled River Water		Filtered River Water	
	Percentage	Millions of eggs	Percentage	Millions of eggs	Percentage	Millions of eggs
4-14	46	0.40			32	0.67
4-16	11	0.35	7	0.52	9	0.62
4-18	43	1.90	16	1.10	31	1.72
4-20	33	2.64	35	2.33	39	0.80
4-22	20	2.54	21	1.28	17	1.64
4-24	16	0.98	9	0.77	8	0.72
Wt mean or Total	29.2	8.81	22.7	6.00	23.5	6.17
	Uninjected Fish					
4-14	0	0.23				
4-16						
4-18	60	0.24			18	0.35
4-20	49	0.57	36	0.45	34	0.75
4-22	37	0.41	21	0.53		
4-24	31	0.48				
Wt mean or Total	37.5	1.93	27.9	0.98	28.9	1.10