

Re: Fertilization Exp.

UNIVERSITY MUSEUMS
UNIVERSITY OF MICHIGAN
ANN ARBOR, MICHIGAN, U. S. A.

MUSEUM OF ZOOLOGY

April 24, 1931

Report No. 57

RESULT OF SOME FERTILIZATION EXPERIMENTS ON BROOK TROUT
EGGS, UNDERTAKEN AT THE GRAYLING FISH HATCHERY

During our visit at the hatchery in November, 1930, it was thought to be worth while to carry out some experiments in order to find out a method which would give us a larger percentage of eyed-eggs from diseased brook trout and to see whether it was worth while to take eggs at all from diseased trout.

A series of experiments was planned and carried out with the cooperation of Overseer Zalsman to whom much credit is due. Mr. Zalsman's report on the eyed-eggs was dated January 20, 1931. We are very grateful to Mr. Peterson for his patience in stripping and handling the eggs according to verbal directions.

The result of the experiments will probably be of interest to the Department. They are recorded and described individually in the following paragraphs.

Temperature of water used in the experiments was as follows: river water 45°F., well water 47°F., iced water 34°F.

No. 1.

Experiment for comparing "dry" and "wet" impregnation. In both parts of the experiment the males and females were taken more or less alternately and for the "dry" method the fish were stripped into a pan containing no water, for the "wet" method they were stripped into a pan containing water. The eggs from the fish were otherwise handled in the usual way.

Result of Experiment

Method	No. eggs taken	Dead Eggs	Eyed Eggs	% of eyed eggs
Wet	410 oz. at 350 to oz. = 143,500	119,350	24,150	16%
Dry	198 oz. at 350 to oz. = 69,300	58,800	10,500	15%

No. 2.

In this experiment, very similar to the one before, the eggs were taken in a dry pan from four females. The eggs were then divided and water was added to one pan. After that the milt was added and the contents of each pan agitated.

Result of Experiment

Method	No. eggs taken	Dead Eggs	Eyed Eggs
Wet	2,345	2,345	None
Dry	2,864	2,864	None

The failure of the experiment is, no doubt, due to the time interval between the taking of eggs and adding of milt. On a comparative basis, however, the time seemed only a very little longer than that which sometimes intervenes in the regular method.

No. 3.

Experiment to compare results of eggs taken in well water and water taken from the tub in which fish were isolated until stripped. The sex products in one case were taken in a pan containing well water, were washed and hardened in well water. The other lot was taken in a pan containing water from the tub in which the fish were kept, were washed and hardened in river water.

Result of the Experiment

Method	No. eggs taken	Dead Eggs	Eyed eggs	Percentage
Taken in well water	3,998	3,043	955	24%
Taken in tub water	5,881	3,250	2,631	45%

The discrepancy cannot be accounted for except by assuming that the milt emitted by the male remains functional in the tub water and that when this water is used there is a possibility of the eggs being fertilized at once.

No. 4.

In this experiment eggs from a fish showing only slight "curdle" were used. In this case 2428 eggs were taken of which 482 (20%) became eyed.

No. 5.

Experiment in which fish were ready to die as a result of furunculosis. Fish were covered with large "boils" and were badly fungused. Two males and two females were used. Number of eggs taken 1534, number of eyed eggs 120 (8%).

No. 6.

Experiment in which a small amount of milt was used on many eggs. Several females were stripped in a pan containing river water. The eggs were quickly and partially washed. More water was added and a single male stripped into the pan. Number of eggs taken was 4184 and 730 (18%) became eyed.

No. 7.

Experiment to show effect of washing, chilling and then impregnating eggs. Eggs were taken from several females in a dry pan. They were then washed quickly and partially in well water. Then they were split into two lots, to one was added iced water (34° F.) and to the other (control) well water. Milt from each of two males was stripped into each of the two pans. The experimental eggs were washed and hardened in the iced water, the controls in well water.

Result of Experiment

Method	No. eggs taken	Dead Eggs	Eyed eggs
Chilled eggs	3134	3134	None
Control eggs	3149	3149	None

Again the time interval between the taking of eggs and the adding of milt seems to be the logical explanation of the failure of the experiment.

No. 8.

In a similar experiment eggs were taken from several females in a pan of iced

water (34° F.) and milt from several males added. Eggs were then washed and hardened in ice water. In this experiment 6,968 eggs were taken, 3,135 died and 3,833 eggs (55%) became eyed.

This is by far the largest percentage of eyed eggs which resulted in any of the experiments and the number of eggs used we believe is large enough to be of some significance.

The negative findings in experiments 2 and 7 seem to be due to the elapse of time between the taking of eggs and adding of milt.

The 18% of eyed eggs in experiment 6 which was similar to 2 and 7 can be explained since they were not handled as much as those in 2 and 7 and the time before the milt was added was not as long as in the two cases.

The small percentage of eyed eggs is probably not due solely to weakened sex products. There, no doubt, is a very decided mechanical interference in fertilization in the film of what appears to be mucin surrounding the egg, and which becomes white when exposed to water.

The foregoing experiments emphasize the undesirable results of taking eggs from fish suffering from inflammation of the ovaries. The use of iced water in handling eggs of diseased fish is in need of further investigation.

We wish to follow the progress of the eyed eggs which were taken at the hatchery from diseased fish and also the progress of eggs taken from yearling fish which were not so badly affected. We shall write to Overseer Zalsman for this information, and if further information of value is obtained, this will be given in a supplementary report.

INSTITUTE FOR FISHERIES RESEARCH


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CC to Zalsman