

## COMPARATIVE STUDY OF QUALITY AND QUANTITY OF SEMINAL FLUID IN CULTURED SALMONIDS OF IRAN

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### Introduction

Rainbow trout scientifically called, *Oncorhynchus mykiss*, is one of the cultured fishes in cold and more fresh waters of the world. Its culture in Iran goes back to forty years ago which it was first done, through importing eyed eggs and was bred in several of private and governmental centers .A lot of researches have been done in Iran on this species which mainly focused over the female fish. In the world some scientists such as Billard & Cosson have done study on reproduction in rainbow trout, sex differentiation, dynamics of gametogenesis, biology and preservation of gametes Aquaculture. Also Ginzburg has written one book about polyspermy in fishes, So Hultz has researched about Cryopreservation and so on..

This research is the first classic one on male broodstocks of rainbow trout.

### Aims

In this project, the main objective was qualitative & quantitative evaluation of semen in two years old spawners of 3 phenotypes which could be found in Iran and finally to determine effect of different factors , their influencing on fertilization process and percentage.

This task accompanied from the beginning of the reproductive cycle up to the end in one of the advanced Aquaculture centers of trout in the country (Karaj Mahi Sarai).

Other objectives of this research were;

- Identify more accurately the present phenotypes of male broodstocks
- Identification of the exact time of breeding.

## **Experimental Procedures**

A- In order to identify the three phenotypes namely,

1. UNCLEAR
2. CLEAR
3. CLEAR WITH ORANGE BANDS

were compared. The factors, length, width, thickness, weight of body, weight of gonad, GSI, sperm motility, total volume and concentration of sperm were measured as the major characteristics of phenotypes in this fish.

B- In the second experiment, a randomized complete block design was run in two different periods of time (21 days intervals). In each incubator an artificial insemination was run on eggs from different female broodstocks which was divided into 15 blocks having three rows and five columns, so as the columns represent fish from different phenotypes & the rows indicate the changes in sperm volume from each phenotype.

In each period following insemination with different volume of sperm (0.1 ml to 0.3 ml for each 500 ova from several brood female fish) changes occurred in the percentage of fertilization in different phenotypes.

C- In the third stage of experiment, the aim was to compare the effect of each phenotype sperm to a mixture of sperms of all phenotypes on ova, which mimics the traditional procedure.

D- In the 4<sup>th</sup> stage, the insemination was done with application of a two factor, factorial design, with time as factor A, phenotype as factor B and different volumes of 0.1, 0.2 & 0.3 ml as replications.

E- The last part of the research was to obtain the factors influencing percentage of fertility.

F- Along with the above experiment, and after staining the sperms with eosin, the length of spermatozoid, length and width of spermatozoid head was measured and recorded.

## **Conclusion & Discussion Summary**

The results of above experiments is respectively;

A- These measurements proved that male broodstocks are of three different phenotypes in their body weight, sperm motility and concentration, ( $p < 0.05$ ) but statistical difference.

B- The results showed that in the first period phenotype-3 (clear with orange band) was superior than the other two ( $P < 0.05$ ) and in the second period phenotype-2 (clear) showed superiority to the other two ( $P < 0.01$ ). During this experiment the percentage of infertility and mortality of the eggs was also measured.

For different volumes of sperm, a Duncan Multiple Range Test (D.M.R.T) was run and the 0.1 ml volume of sperm was put in one group and the other group volumes assigned to the other two groups ( $P < 0.05$ ).

C- The results showed that only the phenotype-1 was inferior ( $P < 0.01$ ) relative to the other treatments. Some experts believe this population isn't safe and there are some reasons for unclear skin in addition to originate such as ecological factors (high temperature, low oxygen, etc), stress, misfeeding, low healthy, diseases, and so on.

D- For the first period the average percentage of fertility was 82.44 and second period was 67.93. Also the fertility was in the order of phenotype-2, then 3 and 1, respectively. The interaction of the time and phenotype showed a considerable fall in percent of fertility for the phenotypes-3 during the second period.

E- With the assumption that in all treatments, the qualitative factors of the eggs kept the same, and the only fluctuation in fertility was by different sperms, factors responsible for such fluctuation can be classified as, volume of sperm used to fertilize, density of sperm, sperm motility and number of spermatozoa used for one ovum and GSI.

Considering all above factors, a regression equation was developed with an  $R^2 = 0.82$

F- The values are as follows;

Total length of spermatozoid =  $41.25 \pm 1.5$  micron

Length of Spz Head =  $4.25 \pm 0.25$  micron

Width of Spz Head =  $3.5 \pm 0.2$  micron

## References

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