

# **Improving the „dry” method for long-term transportation of fertilized eggs of common carp (*Cyprinus carpio* L.)**

## **Summary**

Long-term transport of common carp (*Cyprinus carpio* L.) fertilized eggs was studied. Developing eggs at the age of 24 hours were transported for 24, 36, 42 and 48 hours, upon which they were returned to Zuger jars for completing the incubation. Number of hatching larvae was counted. Based on our results it can be stated that the „dry” method of transportation of common carp fertilized eggs can be applied securely for 36 hours period. The period of transportation can be increased up to 42 and 48 hours, however the number of hatching larvae will be lower. Feasibility of these conditions can be decided by economic considerations.

## **Introduction and objective**

Since 2013, Hungarian fish producing company - Aranypony Halászati Zrt. successfully implemented three fish eggs transports to Russia and South Asia. The principle of the method is based on transportation of 24 hour fertilized eggs, cooled to 17 °C without water, maintaining humidity conditions, packed in plastic boxes, and shipped in polystyrene box as specified. The 24 hour transportation was successful in both cases, the transportation of 28 hours resulted in a 70 % survival of the larvae (Nagy G., 2015, unpublished data).

In the 1980's Woynarovich described a method by which a longer transportation period (6-8 hours) is possible. The following guidelines define the conditions for common carp egg transportation:

- Transportation of common carp eggs can only be successfully performed, if prior to transport, embryonic development processes have started;
- The incubation temperature significantly affects the embryonic development, so this should be taken into account when determining the starting time for the transportation;
- Keeping an adequate egg shell moisture provides better amount of oxygen to be taken up;
- The eggs should be treated in order to prevent *Saprolegnia* infection (Woynarovich, 1984).

Proposed objectives for the improvement of the „dry” method transportation of fertilized common carp eggs were to study:

- Amount of eggs to be transported
- Hatching percentage
- Longer transportation period

## **Materials and methods**

The experiment was conducted within the National Agricultural Research and Innovation Centre, Research Institute for Fisheries and Aquaculture in Szarvas, Hungary, using fertilized eggs of common carp (*Cyprinus carpio* L.) obtained from artificial propagation. Fertilized carp eggs were kept in Zuger jars for 24 hours at a water temperature of 22 °C, and after this time interval they were prepared for transportation.



The transportation box and its accessories before packaging



One hundred grams of eggs were fertilized. After fertilization and de-adhesion it has resulted an amount of 333 grams of swollen eggs. Control batch was represented by 1/3 from this amount, and it was incubated under standard conditions in Zuger jars. The rest 2/3 of fertilized eggs were represented by the four different time intervals of the transportation test. The tested eggs were divided into the 4 boxes under the following amounts; 1st box: 76.4 grams, 48 hours; 2nd box: 71.4 grams, 42 hours; 3rd box: 76.8 grams, 36 hours; 4th box: 55.2 grams, 24 hours.



Transferring fertilized common carp eggs into plastic boxes, and placing the boxes into the polystyrene transportation box.

## Results and discussions

Results interpretation for the experiment (transportation periods: 24, 36, 42 and 48 hours) is represented by comparing the weight of the swollen eggs with the counted number of hatched larvae. Due to the comparability, the results were converted to 100 grams of fertilized eggs

and that was compared, because we had different amount of fertilized eggs in each treatment. The results indicate that between the 24 and 36 hours transportation period of fertilized eggs of common carp, there is no significant difference regarding the total amount of hatched larvae (15440 and 15722 individuals). Between the 42 and 48 hours, transportation period of fertilized eggs total amount of hatched larvae was less. For the 42 hours transportation period of fertilized eggs, the total amount of hatched larvae (10574 individuals) was 32 % less, while for the 48 hours transportation period of fertilized eggs, total amount of hatched larvae ( 4777 individuals) was 70 % less than the 24 and 36 hours batches (**Table 4**).

**Table 1. : Measured (left side of table) and appraised (right side of table) data belonging to transportation periods and hatching results calculated from them.**

Transportation period (hours)	Swollen eggs weight (grams)	Number of hatched larvae (individuals)	Hatched larvae equivalent to 100 grams of swollen eggs (individuals)	Number of eggs (pieces)*	Hatching percentage (%)*
24	55,2	8523	15440	12432	68.55
36	76,8	12075	15722	17297	69.81
42	71,4	7550	10574	16081	46.95
48	76,4	3650	4777	17207	21.21

\* Estimated values Horvath et al., 1984 and based on preliminary measurements.

The time of hatching approximately shifted pro rata at the groups that were transported in different time intervals.



Development of the control and treated groups. Pictures were taken 78 hours after fertilization (with a magnification of 16x). It is visible that the embryonic development has slowed down because of the lower temperature during longer-term transportation

### Conclusions and recommendations

Based on the results it can be concluded that the fertilized common carp eggs are safely transportable in 36 hours of time interval if the "dry" transportation method is applied. The time interval of the transportation can be increased to 42 and 48 hours, however in these cases the number of hatched larvae are significantly lower. If it is necessary the feasibility of such a long transportation can be decided based on economical calculations.