

RESEARCHES CONCERNING THE BREEDING OF *CYPRINUS CARPIO CARPIO* (LINNAEUS, 1758) SPECIES, IN HIGH DENSITIES IN SMALL SPACES, USING MIXED FODDERS LIKE FARINACEOUS AND GRAINED TYPE*

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Abstract

The authors have set forth an experiment on breeding the *Cyprinus carpio* species in high densities, in small spaces, because this is the traditional species of Romanian pisciculture and the most valuable species from the economic point of view, by using mixed fodders (like farinaceous type) and grained type. The two variants of our experiment performed at C.C.D.P. - Nucet, were carried out in two ground basins each of 1000 m². The first variant consisted on feeding the fishy material with mixed fodders, with 24% gross protein; the second variant consisted on feeding the fishy material with grained fodders ALLER CLASIC 3mm, with 30% gross protein.

Taking into account the identical conditions of the life environment and the high densities of population, the breeding of fishy material depends only on the additional food administrated in terms of its qualities, obtaining thus the following results: variant I – the basin was populated with 3000 exemplaries resulting in a production of 2692 Kg, with a consumption of mixed fodders of 5000Kg; variant II – the basin was populated with 3000 exemplaries, obtaining a production of 3652 Kg, for a consumption of grained fodders of 6000 Kg.

Key words: carp, small spaces, high density.

1. Introduction

The scientific researches and the practices have proved that the breeding rates and the weight gain claimed by the big productions of carp per surface unit cannot be achieved unless it is applied to a dense population and a rationalized additional food, whose qualitative supply should be at least equivalent to the one brought by the organisms with trophic role from the natural environment (Burlacu, 1983).

Our researches and experiences carried on over the years, on the different problems raised by the culture carp food and the results obtained in the respective period are presented in this paper. The culture carp's food regime submitted to an accelerated rate of breeding and feeding must follow very close the physiological processes of the nutrition phenomena in the nursery's intensive rate of exploitation and of the additional food capitalization (Bogatu, 1991; Oprea, 1996; Oprea, 2000). In the fodder regime, the experiences performed have showed that, unlike the natural food regime, there is a difference concerning the carp's preference. However, for the dense populations, the abundance, the quality and the best conditions of using the additional food (Cadaru, 1990; Costin, 1992), as well as the water's quality from the ponds, the size and quality of the supply flows must be carefully analyzed (Cristea, 1998).

2. Material and method

The one summer-aged fish breeding experiments took place in two basins from the Base no. 1 - Nucet, of C.C.D.P. - Nucet, together having a 2000m² surface, each basin having 1000m² (Exp 1 and Exp 2). Both basins are alike in shape (rectangular), surface and depth, supplying the same conditions of breeding (Figure 1). The experimental basins are supplied with gravitational water from a channel,

* Paper presented at the International Symposium *Euro - aliment 2009*, 9th – 10th of October 2009, Galați – ROMANIA

which water comes from the Ilfoveni Barrier Lake, placed a few hundred meters, upstream. The average depth of the experimental basins is of 1.6 m, each being provided with a supply and delivery system. From this short presentation, it can be seen that the two experimental basins have displayed almost identical conditions of life for the fishy population.



Figure 1. Basins from the Base no. 1 - Nucet, at C.C.D.P. - Nucet

Before being populated, the basins were repaired and many improvement and maintenance works have been performed for the water supply and delivery channels, for the dams and for the hydro-technical systems, the aquatic plant growth from the basins being also removed.

Subsequently, on the basins' surfaces had been equally distributed soil liming – lime, amounting in a rate of 100 kg/basin.

The basins' flooding was performed through a sieve of 1 mm mesh, in order to prevent the wild fish larvae entering.

The breeding experiment, in the 2nd summer, took place in two variants:

- variant I of breeding in fodder regime, using mixed fodders in Exp 1 Nucet;
- variant II of breeding, in fodder regime, using grained fodders in Exp 2 Nucet.

2.1. The basins' population

The basins' population, in both breeding variants, took place in April 15, as follows:

- Exp 1 populated with 3000 ex, with the average weight of 85.6g/ex.;
- Exp 2 populated with 3000 ex, with the average weight of 86.1g/ex.

2.2. Evaluation of the environment conditions

In order to evaluate the ecological conditions in the two experimental basins, during May-September period, water and soil samples were taken in order to determine the hydro-chemical parameters. The fish production mostly depends on the water's physical and chemical quality (Billard, 1995). Upon an intensive increase, the parameters suited to the conditions are the following: temperature, dissolved oxygen, pH, essential mineral elements content, turbidity and color (Billard, 1995).

The experimental basins are supplied with water from the same supplying channel, which comes from the Ilfov River.

The monitoring of these parameters was performed as follows:

- *The water's temperature* was measured daily: in the morning, at noon and in the evening, with a mercury thermometer, and in the experimental basins it was between 17-27°C. During the June-August interval, the water's temperature was favorable (22-27°C) for the fishy activity, and in May and September, there were lower temperatures of 17-21°C.

- *The dissolved oxygen* was measured daily, in the first hours of the morning, before the sunrise, using Oxi-Guard portable oxygen meters and the highest values were registered during the period under study, i.e. 5.5-9.6mg/l, as well as the *pH* values of 7.2-8.5.
- *The turbidity* was measured using the Secchi disk and the values ranged between 15 and 30 cm. The other parameters, *pH*, *alkalinity*, *hardness* were weekly analyzed. They were determined following the experimental procedures dedicated to the water samples.

2.3. The fishy material's foddering

Starting from the practical realities of the culture carp foddering in the systematic carp breeding, we used as a research material one summer-aged carp population, having as a result a sharp rise in the breeding rhythm as a consequence of having distributed the fodders different in form and content and of reducing the period of breeding from three to two summer seasons.

In the variant I - (Exp 1 basin), the feeding of the material was performed using a mixed fodder, of farinaceous type, with gross protein of 24% and having the following ingredients: corn, wheat, barley, sunflower grist, soya grist, fish flour.

In the variant II - (Exp 2 basin), the feeding of the material was performed using a grained fodder Aller classic 3mm, with the following chemical composition: fish flour, soya grist, blood flour, rape, wheat, fish oil and vegetal oil. The fodder's biochemical characteristics proved to be as follows: protein 30 %, fat 7.0%, NFE 43 %, cellulose 5 %, ash 7.0 %, urease active 0.3 %, and as minerals Ca and P. The fodder also contains the vitamins: A, D₃ and E.

In order to follow up the rhythm of breeding and the sanitary state of the fishy material, control fishing was performed monthly. Based on the results obtained, the portions of fodders have been re-dimensioned.

The feeding of the fishy material in the experimental basins (Exp 1 and Exp 2) started on 08.05., in the first week the daily portion being of almost 5% of the fishy material weight. After the first week, the portion was gradually increased, based on the capacity of consumption of the fishy material populating the basin. The distribution of the fodders was performed twice a day, at 9:00 a.m. and 2:00 p.m., during the entire period of foddering.

In variant I, the fodder was administered manually, wet, as flours, and in variant II, being a grained fodder, it was administered as such.

3. Results and discussions

In the experimental basins, the survival rate was of 92% in variant I and of 96% in variant II, which constitutes a good survival according to the production rate obtained (26920-36520kg/ha).

The individual breeding of the fishy material in the experimental basins in high densities depends on the quantity and quality of the food to be administered, the natural one being insignificant. The feeding of the fishy material was made until 15.10., 160 days in all, and the whole amount of fodder distributed on months, for the entire period of feeding, is presented in Table 1.

Thus, in the first breeding variant, in which the feeding relied on flours fodder, an average weight of 975g/ex. was notices at the end of the breeding season, with a conversion coefficient of 2.05, in comparison with variant II, when the average weight was of 1268g/ex., and the conversion coefficient was of 1.76. The differences are visible and can be explained, in variant I, by the greater food losses, accounted for by the dispersion of fodder in the water mass, but also by a more complete combination and last but not least by a higher-protein content variant II.

Table 1. Fodder's distribution on months

Month Basin	May (kg)	June (kg)	July (kg)	August (kg)	Sept. (kg)	October. (kg)	Total (kg)
Exp 1 [variant I]	460	750	1240	1390	920	235	5000
Exp 2[variant II]	575	1050	1395	1550	1050	380	6000

The dynamic of the fishy material, for the two experimental basins, is represented in Figure 2. The results registered at the crop fish that started on 30.10. are registered in Table 2.

The sanitary state of the fishy material in the two experimental basins was good, in general, during the entire breeding period. We specify that, upon the first control fishing, it was signaled the presence of the ectoparasites *Lernaea sp.* (the power of the infestation being weak, 1-2 parasites/ex.) and *Dactylogyrus sp.* Upon the second control fishing, the ectoparasite *Lernaea sp.* was met only at the degree of signaling and for *Dactylogyrus sp.* the situation was improved by washing the fish in NaCl solution, 25-30g/l, time of exposure: 5 min.

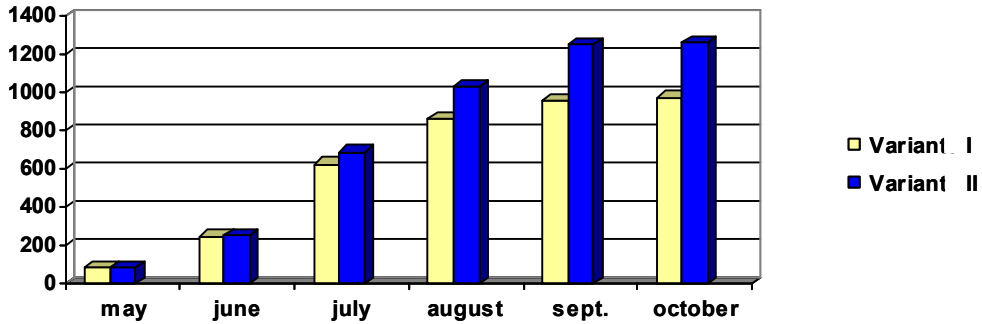


Figure 2. The dynamics of the material's breeding registered after the control fishing

Table 2. The results obtained by the end of the breeding season

Basin	Population			Sv, %	Production			Fodders	
	No ex	Average Weight, g	Qty, kg		No ex	Average Weight, g	Qty, kg	Qty, kg	K
Exp 1 [variant I]	3000	86.5	259.5	92	2760	975	2692	5000	2.05
Exp 2 [variant II]	3000	83.8	251.4	96	2880	1268	3652	6000	1.76

The breeding differences between the two experimental basins can be observed also in the Figure 3.



Figures 3. Carp at the crop fishing

4. Conclusions

The technology of breeding the culture carp, in high densities, in ground basins of small dimensions, is appropriate to the current requirements for the production of fish of high economic value, the carp being the traditional species of Romanian fishing.

By elaborating the breeding experiments, one can see that the species under analysis (*Cyprinus carpio*) has an intensive rhythm of breeding when the food is of high quality and the life conditions are better. Through the results obtained in this experiment, we can ascertain that, in the case of obtaining a

qualitative spawn in the 1st summer, the next year we shall obtain a fish material that can be delivered on the market demands.

The main technical problems that have been taken into consideration when exploiting the basins of small dimensions for the breeding of the carp were in connection with the assurance of the flows of water necessary for obtaining the best conditions, concerning the content in oxygen and the nitrogen compounds. The supply flow has assured a complete change of the water volume from the system, every 24 hours.

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