

TECHNOLOGIC PERFORMANCES OF CARP BREEDING (*CYPRINUS CARPIO*) IN GROUND BASINS OF SMALL DIMENSIONS

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Abstract

Once, with the development of pisciculture was sought the introduction of new technologies, with high breeding rhythm and the realization of bigger quantity of fish on the surface unit. The authors of this work proposed an experiment of breeding of the *Cyprinus carpio* species, in ground basins of small dimensions, using exclusively granulated fodder. The *Cyprinus carpio* species was chosen because it is the traditional species of the Romanian pisciculture and the most valuable species from the economical point of view. The experiment was realized in the conditions of an intensive system, in ground basins of small dimensions, at the experimental Base no. 1 Nucet, within CCDP-Nucet, in 2007, to obtain one output between 8640-19800kg/ha, given that one weight of material apart 64g/ex and to get to in one weight final included between 1500-2100g/ex.

Key words: carp, granulated fodder, small spaces.

INTRODUCTION

The aquaculture is the field which registered the most rapid evolution worldwide, of all the branches of the agriculture. Presently this sector of activity supplies almost 20% of the aquatic consumable products [5].

Considering the fact that during the last years the level of the captures in the natural environment registers a diminution due to over-fishing, it is more and more obvious the fact that only by fishing in fresh water, seas and oceans there can no longer be covered the global demand of aquatic animals. That is why the perspectives of development of the aquaculture are very high, it being an alternative for the insurance of the necessary of animal proteins of superior quality [5].

The production supplied by the aquaculture in our country is realized exclusively in classical settlements of the ponds and lakes type, where there are applied extensive and semi-intensive breeding technologies. The technical potential of these types of settlements is limited, reason for which they cannot be a solution for the alignment of the Romanian aquaculture to the European and global standards [2].

In this sense we propose the elaboration of a breeding technology in intensive system of the carp, in ground basins of small dimensions.

MATERIAL AND METHOD

The breeding experiment of the carp in ground basins of small dimensions was realized in three types of basins: 1000m², 2000m² and 5000m² at the experimental Base no. 1 - Nucet, of CCDP-Nucet (photo1).

All the three types of basins have independent alimentation and evacuation, with monk type installations and considering the great density of population the water depth is of 1,4-1,8 m.

The works of preparation of the basins for the population were done according to the classical [3], technology:

- verification and distribution of the dams, canals and hydro technical installations;
- mobilization of the bottom of the basins in the shallow areas and elimination of the harsh vegetation;
- administration of the amendments (500 kg/ha quick lime) by uniform distribution on the entire surface of the basins;



Photo 1 Basin of earth of little dimension

The inundation of the basins was done by filters of nyal fabric, with the side of 1.125 mm, to avoid the entrance of species of predatory fish or species without economic value. The inundation of the basins was effectuated on the 15.04.2007 and the population was done after 5 days.

The alimentation with water of the basins, during the entire breeding periods was maintained, in an optimal rhythm for the development of the fish material

Monitoring of the environment conditions

The fish production depends greatly on the physical and chemical quality of the water. At the intensive breeding the parameters taken for study are the following: temperature, dissolved oxygen, pH, content of essential mineral elements, turbidity and color.

The monitoring of these parameters was done as it follows:

- *the temperature of the water* was measured daily, in the morning, at noon and in the evening, with the mercury thermometer;
- *the dissolved oxygen* was measured daily, in the first hours of the morning, before the sunrise, using the portable oxygenometers OxiGuard;
- *the turbidity* was measured with the Secki disk.

The other parameters, *pH*, *alkalinity*, *hardness* were analyzed weekly. They are determined after the lab analyses based on the water samples.

The feeding of the fish material was done with two types of granulated fodder, at foddering tables (established according to the

surface of the basins), in two stages / day, during the entire foddering period.

The feeding of the fish material was done until the date of 24.10.2007, (total foddering days – 145 days).

Population of the basins

The material necessary for the population was from the proper production, with the age of one year, each basing being populated differently according to the surface, quantity and quality of the material that we want to obtain. From the sanitary point of view the material was clinically healthy, brought and populated in good conditions on the date of 20.04.2007.

The population of the fish material in the experimental basins was done as it follows:

- ▶ for the basin with the surface of 1000m² were populated 1500 exemplars, with the average weight/ exemplar of 62g, total weight of 93 kg.
- ▶ for the basin with the surface of 2000m² were populated 1750 exemplars, with the average weight/ exemplar of 66g, total weight of 115.5kg.
- ▶ for the basin with the surface of 5000m² were populated 2500 exemplars, with the average weight/ exemplar of 63g, total weight of 157.5 kg.

Foddering of the material

The necessary of protein for the fish is higher than at the terrestrial animals, especially for the fact that the fish are animals with rapid growth [1].

The foddering in the three experimental basins began on the 01.05.2007, in the first week the daily ration being of 10% of the

weight of the populated fish material, for the realized experiment, this meaning:

- 9.3 kg of fodder for the basin with the surface of 1000m²;
- 11,5 kg of fodder for the basin with the surface of 2000m²;
- 15,7 kg of fodder for the basin with the surface of 5000m²;

After the first week the ration was gradually increased, according to the consumption capacity of the populated material, the feeding being done "ad libitum".

The feeding of the fish material in the realized experiment began with the ALLER CLASSIC 3mm, which has the following content: fish flour, soya grit, blood flour, rape, wheat, fish oil and vegetal oils.

The biochemical characteristics of the fodder were the following: protein 30%, fats 7.0%, NFE 43%, cellulose 5%, ashes 7.0%, active urease 0,3% and as minerals N and P. The fodder also contains the vitamins: A, D3 and E.

From the date of 25.08.2007 was switched to another type of fodder SOPROFISH 25/12 STANDARD SP, which has the following content: fish flour, soya grit, corn, minerals and vitamins, with a smaller raw protein, considering the fact that the fish material at that date had an average weight of 1000-1500 kg.

The biochemical characteristics of the fodder were the following: protein 25%, fats 12,0%, water 8,0%, cellulose 3,0%, ashes 5,0%, active urease 0,3% and as minerals Ca and P. The mixture also contains the vitamins: A, D3, E and C and the essential amino-acids Lizina și Metionina + Cisteina. The energetic value of this type of fodder is 18,7 MJ/kg raw energy, respectively 15,2 MJ/kg metabolizing energy.

RESULTS AND DISCUSSIONS

Even if in the intensive breeding system the natural food has a reduced influence, the preparation of the basin must be done according to the classical technology.

The breeding technology of the culture carp, in intensive system, in ground basins of small dimensions, is adequate to the current requirements of production of the fish with high economic value, the carp being the traditional species of the Romanian pisciculture.

The breeding of the culture carp, in intensive system, in ground basins of small dimensions, gives the possibility of providing for the markets also outside the fishing seasons.

Analysis of the physical chemical factors

The experiment basins are alimented with water from the same alimentation canal, which comes from the Ilfov river. As the basins are close to each other, and the alimentation source is common, the physical chemical factors will naturally have close values.

The temperature of the water in the experiment basins was comprised between 17-27°C. During the interval June-August the temperature of the water was favorable (22-27 °C) [3], for the pisciculture activity, and during the months of May and September were registered lower temperatures 17-21°C.

The *dissolved oxygen* has registered optimal values during the entire studied period 5.5-7.6mg/l, as well as the values of the *pH* 7.2-8.5.

The *turbidity* had values comprised between 15 and 30 cm.

The other physical chemical factors (total *hardness*, *alkalinity*, *chlorines*, *organic substance*) have oscillated around the optimal values, without any dangerous evolutions for the fish population.

The fodder quantity distributed for months, for the entire feeding period, is rendered in table no. 1.

During the period of the warm season, on the date of 15 of each month, was effectuated a trial fishing, watching: growing and sanitary state of the fish material, etc.

The dynamic of breeding of the fish material, in the three experimental basins, is presented in chart no. 1.

Table no. 1
 Quantity of forage to manage and to tell off on lunar

Basin No.	ALLER CLASSIC					SOPROFISH			
	May (kg)	June (kg)	July (kg)	August (kg)	Total (kg)	August (kg)	September (kg)	October (kg)	Total (kg)
Basin no.1 (1000m ²)	162.5	406	893	1029	2490.5	242.5	857.5	360	1478
Basin no.2 (2000m ²)	236	570	1520	1592.5	3918.5	377.5	1472.5	580	2430
Basin no.3 (5000m ²)	328	725	1805	2072.5	4930.5	491	1877.5	740	3108.5
Total	726.5	1701	4218	4693	11338.	1111	4207.5	1680	6998.5

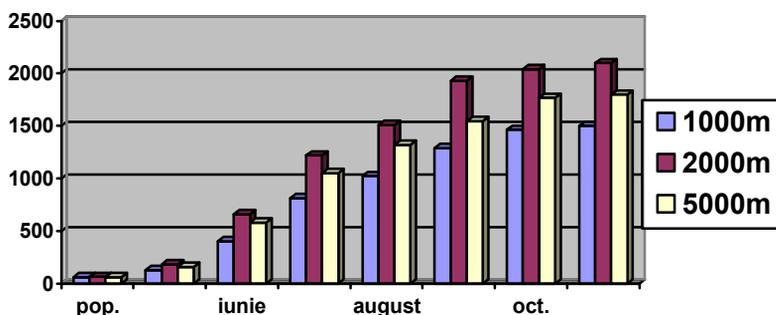


Chart no.1 Dynamics rhythmic of increase flax the three basin experimental

The more accentuated growing rhythm registered in the first part of the season is explained by the fact that the food administrated in the first period was richer in protein.

This way the carp has grown in foddered regime, in intensive system and has multiplied its weight with 24-32 times.

The final results registered in the crop fishing which began on the date of 30.10.2007, are centralized in table no. 2.

Table no. 2
 Data of output acquired in fishing of autumn

Basin	No. of populates pieces	W(g) environment at population	W(kg) total at population	Sv (%)	No. of harvested pieces	W(g) environment at crop	W (kg) total at crop	Kg/ha	Conversion coefficient K
1000m ²	1500	62	93	88	1320	1500	1980	19800	2,09
2000m ²	1750	66	115.5	91	1592	2100	3344	16721	1,96
5000m ²	2500	63	157.5	96	2400	1800	4320	8640	1,96

The difference of the growing rhythm by basins is explained by the different population density.

The sanitary state of the fish material in all three experimental basins was generally good, during the entire breeding period. We mention that, at the fist trial fishing was signaled the

presence of ectoparasites *Lernaea sp.* (the intensiveness of the parasites being low, 1-2 parasites / exemplar) and *Dactylogyrus sp.* At the second trial fishing the *Lernaea sp.* ectoparasite was encountered only at the signaling level, and for *Dactylogyrus sp.* the situation was remedied by bathing the fish with

a solution of ammonia, 30%, flax dose of 1ml/l, exposure time 30sec. [4].

We can say that, the survival was good due to the quality of the fodder that the fish material was fed with, but also due to the quality water and the volume that disposed of and that we transited in the basins.

This way the basin with the surface of 1000m² where the biggest production of approximately 20000kg/ha (19800kg/ha) was obtained, the individual growth of 1500g/exemplar was lower than at the basin with the surface of 2000m², where the production was of 16721 kg/ha, at an individual growth of

2100g/exemplar. At the basin with the surface of 5000m² the production was of 8640 kg/ha, the individual growth being of 28,5 times reaching an average weight of 1800g, as compared to the basin with the surface of 2000m² where the growth was 31 times, but at the same time, very high was the production on the surface unit. The highest production was at the basin with the surface of 1000m², but the individual accretion was lower compared to the other basins.

The growing differences at the three experimental basins can also be observed in the following photos (photo 2, photo 3 and photo 4):



Photo 2. Carp from the basin of 1000 m²



Photo3. Carp from the basin of 5000 m²



Photo 4. Carp from the basin of 2000 m²

CONCLUSIONS

► By the elaboration of the breeding experiences, we observe that the species that have experienced with (*Cyprinus carpio*), has an intense growing rhythm when the food is of superior quality and the life conditions are optimal.

► By the results obtained in this experiment we can assert that, in the case of obtaining a qualitative spawn in the I summer, in the following year we obtain fishing material which can be delivered on the market at the dimensions requested by it.

► As means of increase of the carp production on a small surface, that we have or that we can build at a small price, can be realized by using the quality fodder and the monitoring of the environment conditions, this being a manner of adjustment at the conditions of our country.

► The difference of the conversion coefficient K, between the basin with the surface of 1000m² and the other two basins is explained by the population density, but also

by the fact that at the basin of 2000m² and 5000m² the water volume was greater, due also to the big surface.

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