

ORIGINAL PAPERS

SOME PRELIMINARY DATA ON THE GROWTH AND GENERAL PHYSIOLOGICAL CONDITION OF SOME CYPRINIDES FROM HILLY PONDS

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Key words: *common carp (C_0), silver carp (S_0), preventive antiparasitary treatment, growth, hematological indices*

INTRODUCTION

Nowadays, a precocious diagnosis of the pathological condition in aquaculture fish, as well as a preventive therapy represent some of the main concerns of the modern fish breeding technologies, once known the direct correlation occurring between the physiological condition of the piscicultural material and the performances attained in aquaculture production (Misăilă and Misăilă, 2005; Vulpe, 2007).

The present investigation follows the comparative growth of the one summer-old cyprinids (common carp and silver carp) fry, in two experimental ponds belonging to the Fish Breeding Farm of Podu Iloaiei, the Iași District, under different conditions of antiparasitary prevention. The experiment permitted a correct estimation of the efficiency of some preventive antiparasitary treatments upon the growth and levels of some hematological indices, in one summer-old cultured common carp and silver carp.

MATERIAL AND METHOD

The experiments were performed during the active growth season (between June and September) 2006, in two ponds: Dudău I and Dudău II, from the Iași district. Both ponds - with a surface of 1 ha - have been populated, each, with 10, 000 common carp (0.5 g/piece) and 25, 000 (0.2 g/piece) silver carp individuals.

The experimental pattern was developed in two variants, namely:

- variant A: represented by the Dudău I pond, as the reference;
- variant B: represented by the Dudău II pond, the perimental batch.

The differences between the two variants referred to the treatment scheme applied. The treatments were performed in 3 successive stages, as follows: the first - in the moment of pond filling with the fish and the second - a month later, both of them involving administering of 20 kg sodium chloride - in variant A and of 40 kg, respectively, in variant B, while, in the third stage (performed in

August), the administered amounts of sodium chloride were of 30 kg (A) and 50 kg (B), respectively. Moreover, in variant B, an antibiotic diet (50 mg oxytetracyclin / kg fish) was administered - as an antibacterial prevention method - two times, at intervals of 7 days. Fish foddering followed the classical recipe, and control weightings were performed monthly.

In the end of the experiment, blood samples have been taken over from 11 carp representatives of each variant, and the basic hematological indices (hemoglobin - Hb, hematocyte - Ht, number of red (E) and white (L) cell corpuscles being analyzed, along with the derived erythrocytary constants (MCV - $Ht \times 10 / E$; MCH - $Hb \times 10 / E$ and MCHC - $Hb \times 100 / Ht$). Hemoglobin concentration was determined by the visual colorimetric method, with a Gowers - Sahli hemoglobinometer, the hematocyte - by centrifugation 12, 000 rpm, for 1 - 2 min., of the microhematocyte capillaries, while the red and white cell corpuscles were determined on a ML₄ microscope, with a Bürker - Türk hemocytometer (Misăilă and Comănescu, 1999).

RESULTS AND DISCUSSION

Analysis of the comparative growth of the common carp and silver carp fry from the two experimental variants (Fig. 1) evidenced that, in the end of the growing season, namely after an active feeding period of 120 days for common carp and of 105 days, respectively, for silver carp, the fry attains an average individual weight of 33 - 34 g/piece - in the case of silver carp, and of 55 - 65 g/piece, respectively, in the case of common carp. The different growing rhythm recorded between the two species is closely related to its dependence on the quantity and quality of concentrated fodders - in the case of common carp - and of the level of plankton biomass development - in the case of silver carp. From this last perspective, the results obtained in the two ponds suggest an average development level of the natural biomass. For example, in ponds from the same geographical area (the Fish Breeding Farm of Țigănași), where the natural production of plankton biomass is higher, in the end of its first summer, the silver carp attains a weight of 65 - 66 g/piece (Cuvinciuc, 2002).

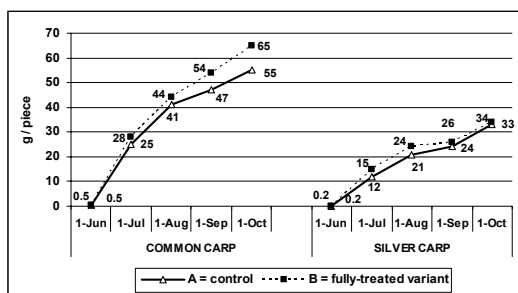


Fig.1. Comparative growth of common carp and silver carp fry in ponds Dudău I and Dudău II

As to the quantity and quality of the administered fodder, both were identical in the two variants, the different growing rhythms recorded for the common carp being possibly explained by the more consistent antiparasitary treatments applied in variant B - comparatively with the reference. Consequently, the final weight of the common carp fry in this variant is of 65 g/piece, *versus* only 55g/piece - the value recorded in the reference.

This additional growth increase of 18.2% is due to the reduction of parasitary stress in the fish from variant B, to which additional treatments had been administered, so that large part of the ingested energy is spent for growing, unlike in the fish from variant A, which consumes metabolic energy, too, for counteracting the additional parasitary stress.

Again, different growing increases in the two experimental variants may be noticed for the silver carp, as well, a case in which the curve of the individual growth dynamics in variant B (Fig. 1) is situated above the curve of the reference, although the differences are much lower than in the case of common carp.

Mention should be here made of the fact that the survival ratio attained quite similar values in the fish of the two variants (*i.e.*, of 95.6% in variant A and of 97.2%, respectively, in variant B), which explains the comparable levels of the effectives from the two basins.

The results of the hematological investigations are illustrated graphically in Figures 2 to 8.

A first observation to be made is that, generally, the values recorded for fresh water fish range between normal values (Ghittino, 1983). A comparative analysis between the values of hemoglobin (Fig. 2) and hematocrite (Fig. 3) in the two variants will indicate 4.2 - 10.2% higher values in the experimental variant (B), comparatively with the reference.

Nevertheless, comparatively with the reference, the number of erythrocytes is 4.1% lower in the fish from Dudău II, in which additional preventive treatments and food enriched in oxytetracycline had been administered (Fig. 4).

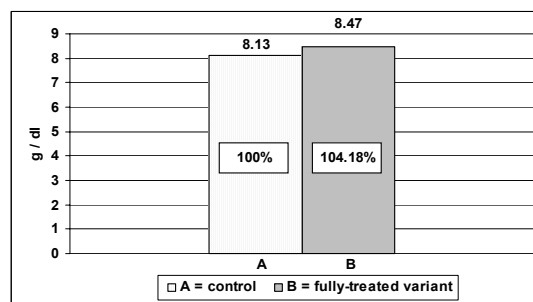


Fig.2. Hemoglobin variation (g/dl blood) in the common carp under experiment

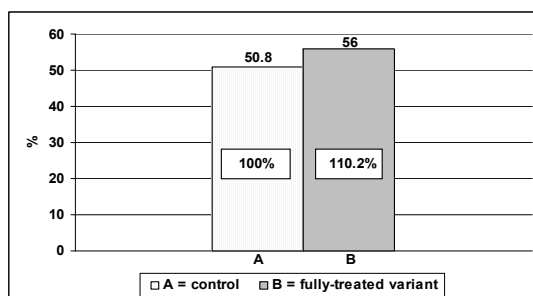


Fig.3. Mean values of hematocrite (%) in the common carp under experiment

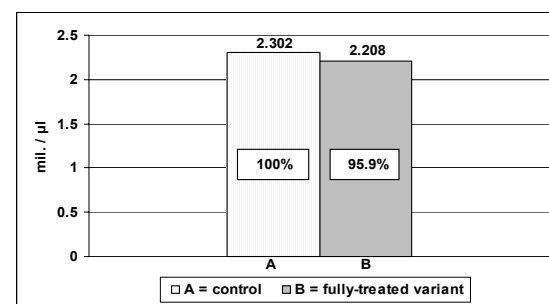


Fig.4. Mean number of erythrocytes (mil. / µl) in the common carp under experiment

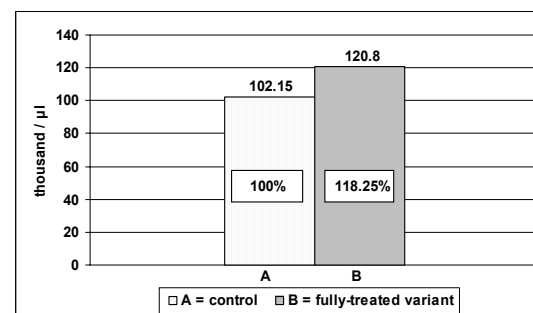


Fig.5. Mean number of leucocytes (thousand / µl) in the common carp under experiment

As to the number of leucocytes (Fig. 5), the mean value recorded in variant B is of 120, 800 / µl, *versus* 102, 500 / µl - in the reference, which means a 18.25% higher value in the experimental variant. This increase suggests an adequate hematological response from the

part of the fish, to infectious agents, included. On correlating the above-mentioned data with the results obtained on the derived erythrocytary constants, one could observe that, in variant B, the mean value of MCV is 14.8% higher in the reference, while that of MCH is of 8.8%, while the MCHC value is 5.5% lower than that of the reference (Figs. 6 to 8). More than that, as a result of the more intense parasitary stress, the fish from variant A makes additional efforts, more intense than the fish from the variant to which preventive treatments had been applied. Hematologically, this is expressed by a 4.1% higher number of red cell corpuscles in the reference, alongwith a 14.8% lower mean erythrocytary volume. In this way, the fish from variant A adapts the breathing function for counteracting the additional stress so that, by totalizing all breathing exchange surfaces, values comparable to those of the experimental variant - in which the fish evidences a lower number of erythrocytes and higher MCV values - should be attained (Misăilă *et al.*, 2005; 2008).

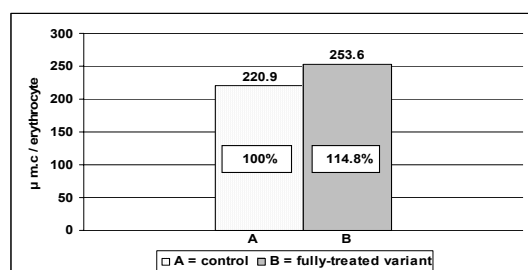


Fig.6. MCV variation in the common carp form experiment

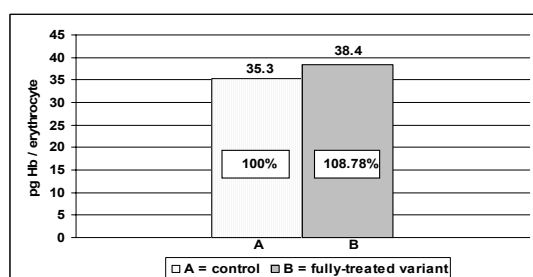


Fig.7. MCH variation in the common carp form experiment

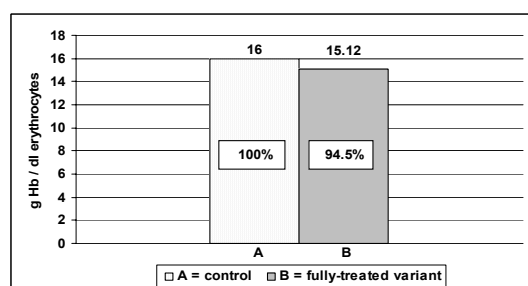


Fig.8. MCHC variation in the common carp form experiment

CONCLUSIONS

1. Application of higher doses of preventive antiparasitary treatments leads to additional growth increases, of 18.2%, in one summer-old common carp fry and of 0.3%, respectively, in the case of silver carp fry, comparatively with the reference.
2. Diminution in the intensity of parasitary stress by means of preventive treatments improves the degree of hematological comfort in common carp fry, which is reflected by the 4.18% higher mean values of hemoglobin - comparatively with the reference - as well as by a 10.2% increase of the hematocyte values.
3. The more intense parasitary stress forces the fish from variant A to adapt its breathing function towards extending the surface of gaseous exchange so that, in this variant, the number of red cell corpuscles is 4.1% higher, while the MCV value is 14.8% lower, comparatively with values of the experimental variant.

ABSTRACT

The paper analyze the comparative growth of the anger and crap sapling during the active nourishing period (105-120 days), in the Dudău I and Dudău II ponds, from Iassy, in different conditions of ihtopatologic prevention. The stipulated treatment scheme included 3 rounds, from wich the first one at population, the second one after one month, (when in the experimental basins were administrated each 20 (A), respective, 40 kg lime chlorine/ha (B), and the third round in August, when the quantities were increased at 30 (A), respectively 50 kg lime chlorine /ha (B). In addition, at variant B two diets with antibiotic were administrated at intervals of 7 days. This treatment was administrated as prevention for the bacterial contamination. At the end of experiment, the rate of survival was of 95,6% at variant A and 97,2% at variant B. In addition we observe that at crap, comparing with the control, a supplementary increase was registered – 18.2%, and at singer a supplementary increase of 0.3%.

In what regards the values of hematological indexes determined at the end of the experimental period for the specie crap, we observed an increase of hemoglobin with 4.18% at variant B, comparative with the control, as well as higher values of hematocrite – with 10.2% and of number of white globules with 18.25%. Moreover, as a result of parasite stress more intense, the fishes from control variant, depose a larger adaptive effort comparing with the variant with preventive treatments. This is expressed at hematological level through a larger number of red globules from the control with 4.1% and the average erythrocyte volume smaller with 14.8%. This is a response through which the fish better adapt their respiratory function counteract the supplementary

stress, therefore by totalizing the surfaces of respiratory exchange to result values comparable with the one from the researched lot, where the fishes had a smaller number of erythrocytes and highest level of VEM.

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