

THE APRECIATION OF HEALTH CONDITION OF CHINESE CYPRINIDS BY THE MEDIUM OF SOME BIOMETRICAL, BIOCHEMICAL AND HEMATOLOGICAL INDICES

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Abstract

By the mode in which it is implicated in the normal deploy of the major functions of the organism, the blood represents a key element in the underlining of fishes' general physiological condition. The data concerning the biochemical and hematological indices, with the most important bodily indices and coefficients, delineate the sanguine metabolic picture of fishes and the health condition of fish populations, heaving the role in the appreciation of trophicity degree of the studied aquatic basin. The biological material was represented of each ten representatives of two summer-old *Aristichthys nobilis* (bighead carp) and *Hypophthalmichthys molitrix* (silver carp), derived from the Piscicultural Farm Vladeni, County Iasi, determining a series of hematological indices (hemoglobin, hematocyte, number of erythrocytes, MCV, MCH, MCHC), biochemical (glucose and proteins), as well as the values of some indices of piscicultural maintenance (profile index, fleshy index, Kiselev index and the Fulton coefficient). Hereby, the hematological parameters were evaluated with the help of Melet Schloesing - MS 9.5 automatic hematological analyzer, the proteins through Lowry method, and the glucose through colorimetric method with o-toluidine. The experimental results obtained underlines the fact that, in general, all parameters taken into study present appropriated values of the limits considerate normal in the literature data, pointing out a kind of difference between the two species of east-Asiatic cyprinids.

Key words: piscicultural maintenance indices, hematological and biochemical indices

INTRODUCTION

The important place of cipriniculture in aquaculture is gave by the big quantity of cyprinids realized in hatcheries, the number of species, the improved natural trophic resources, the plasticity and the rigidity at medium conditions, the good capitalization of fodder, the quality of food's input and the low cost price.

It is known the fact that the living environment, as well as the type, respectively, the abundance of food, influence, the maintenance condition of fish, as well as the values of hematological diagram, putting its huge impress on substances and energy metabolism.

MATERIALS AND METHOD

Were taken samples from 10 bighead carp and silver carp individuals emerged in

the second summer of growth, estimating the health condition through the values prism of some morphological, biochemical and hematological indices. The fish maintenance indices and coefficients were determined by the obtained data from biometric and classical gravimetric techniques (the standard length of the body, the length of the head, the height, the circumference and the corporal weight), the proteins through Lowry method, the glucose through colorimetric method with o-toluidine, and the hematological indices with the help of automatic hematological analyzer Melet Schloesing - MS 9.5 [1, 4, 5, 6].

RESULTS AND DISCUSSION

The first objective of our study was the determination of values of the most representatives bodily indices and coefficients, on the base of which it can be

estimated the degree of physiological comfort of a population from a basin fish. So, as it can be seen also from the graphic representation (Fig. 1), the profile index indicates a slender body in silver carp exemplars (2.87) and, at the same time, on

Kiselev relation it can be said that the *Hypophthalmichthys molitrix* species has better conditions for selection forasmuch it presents a little more expressive corpulence (1.49) than the representatives of *Aristichthys* genre (1.4).

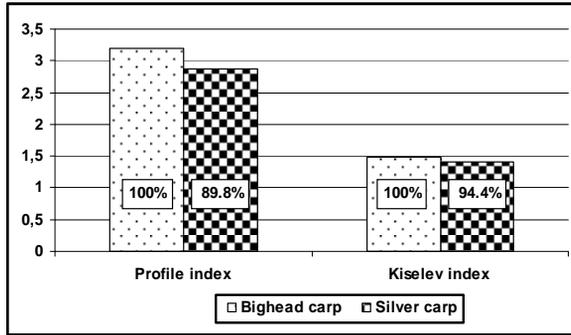


Fig.1. The mean values of profile and Kiselev indices in two summer-old *Aristichthys nobilis* and *Hypophthalmichthys molitrix*

The fattening index reflects the maintenance condition of the fishes from an aquatic basin, in silver carp values representing just 86.65% from those

registered in bighead carp, which denotes that this time the *Aristichthys nobilis* species is better developed (Fig. 2).

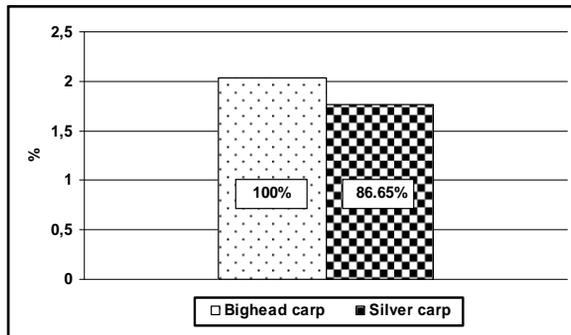


Fig.2. The mean values of Fulton coefficient in two summer-old *Aristichthys nobilis* and *Hypophthalmichthys molitrix*

In what concerns the fleshy index, the obtained results showed that the silver carp presents a bigger fleshy, the head representing just 27.8% from the standard length of the body, whereas in bighead carp this index gets a value of 33.1% (Fig. 3).

Another objective of our study was represented by the quantitative determination

of glucose and proteins concentration from blood. So, the glicemy (Fig. 4) fits in the limits considerate as normal [9, 12] for the culture common species (40 - 90 mg glucose/100 ml blood), the values obtained in the silver carp (59.62 mg%) being approximately with 5% smaller than those recorded in bighead carp (62.71 mg%).

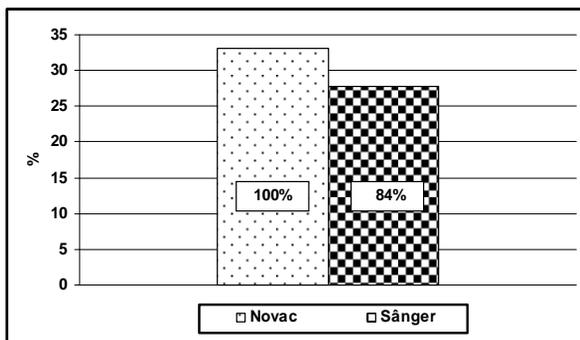


Fig.3. The mean values of fleshy index in two summer-old *Aristichthys nobilis* and *Hypophthalmichthys molitrix*

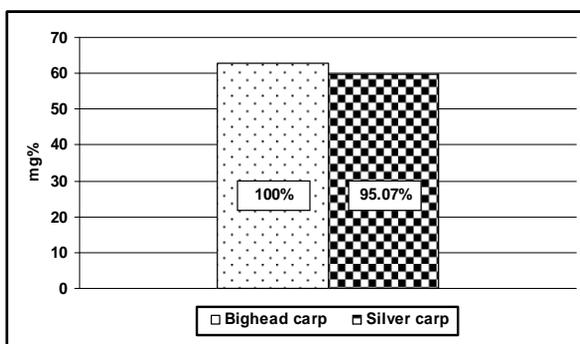


Fig.4. The mean values of glicemy in two summer-old *Aristichthys nobilis* and *Hypophthalmichthys molitrix*

The level of total serum proteins represents a synthetic indicator of the nutritional status of the organism, presenting ample variations under the qualitative and quantitative aspect depending on species, age, sex, water's temperature, food and, mostly, of health condition of fish [2, 3, 12].

The majority of authors are sustaining that the normal values of proteinemia in fish are, in general, between 0.9 and 4g% [13], but, there are authors which dignified values higher for proteinemia at the exemplars from rivers and, mostly, at those grew in piscicultural developments and lakes (11.9 - 12.7g%) fact that could explain through a bigger proteins content of food [11]. So, in the bighead carp the concentration of serum proteins is with 11.93% bigger than in the

silver carp, this difference being caused, probably, by the way of nourishment more greedy of *Aristichthys nobilis* species (Fig. 5).

From Figure 6 it can be observed that hemoglobin has values that aren't different significantly from a species to another, meaning that in the bighead carp was remarked a decrease with 4.3% towards the medium level estimated in the silver carp. These results are correlated with the observations of some authors [10], which identified the levels of hemoglobin of 7.4g/dl in the bighead carp and 8.7g/dl in the silver carp, knowing the fact that in the peaceful fish species the assurance of necessary oxygen is done to an increase of hemoglobin quantity from blood [7].

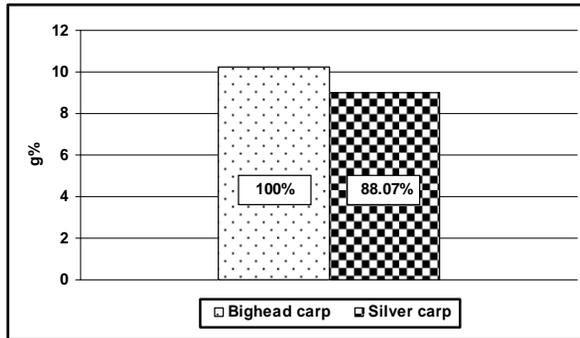


Fig.5. The mean values of proteinemy in two summer-old *Aristichthys nobilis* and *Hypophthalmichthys molitrix*

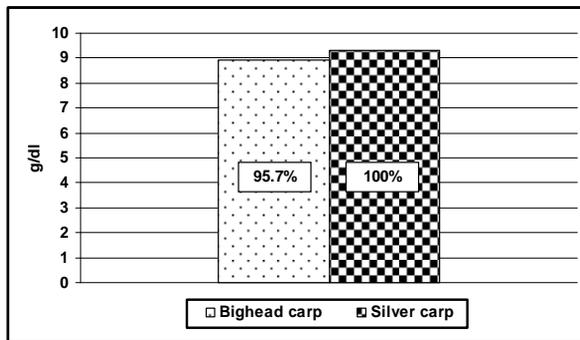


Fig.6. The mean values of hemoglobin in two summer-old *Aristichthys nobilis* and *Hypophthalmichthys molitrix*

The medium values of the hematocyte are between 50.1 - 54.3%, in the silver carp the percentage of figurate elements representing only 92.26% from the estimated

value in the bighead carp exemplars (Fig. 7). And in this case, too, the obtained values are appropriated from those existed in literature data [8].

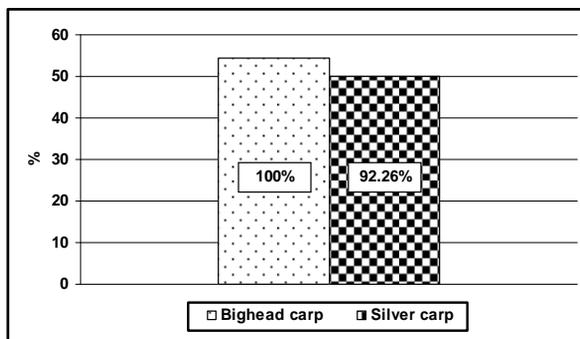


Fig.7. The mean values of hematocyte in two summer-old *Aristichthys nobilis* and *Hypophthalmichthys molitrix*

Unlike the others two preceding analyzed hematological indices, in what concerns the

evolution of erythrocytes number we can appreciate that exists significantly differences

between the two Asian cyprinids species, in silver carp those representing, in average,

83.03% from the registered value in bighead carp (Fig. 8).

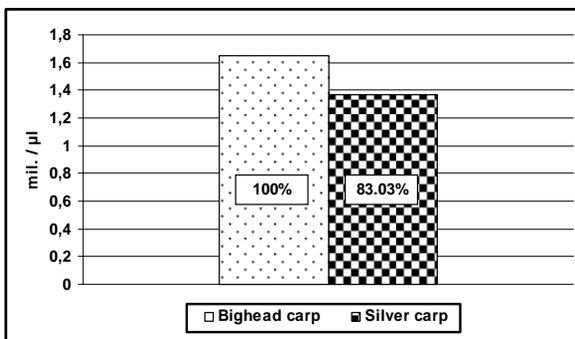


Fig.8. The mean values of erythrocyte number in two summer-old *Aristichthys nobilis* and *Hypophthalmichthys molitrix*

The values of mean cell volume (MCV) correlate with those of MCH (mean cell hemoglobin), the two cyprinid species having an upload a kind comparative of erythrocytes with hemoglobin (53.93 pg Hb/erythrocyte in

bighead carp and 67.88 pg Hb/erythrocyte in silver carp), with mention that the bighead carp has with approximately 20% less Hb/erythrocyte (Figs. 9 - 10).

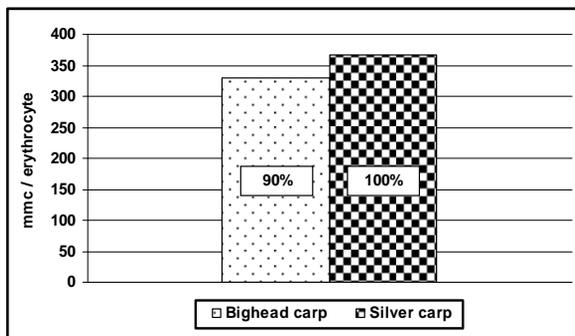


Fig.9. Mean cell volume in two summer-old *Aristichthys nobilis* and *Hypophthalmichthys molitrix*

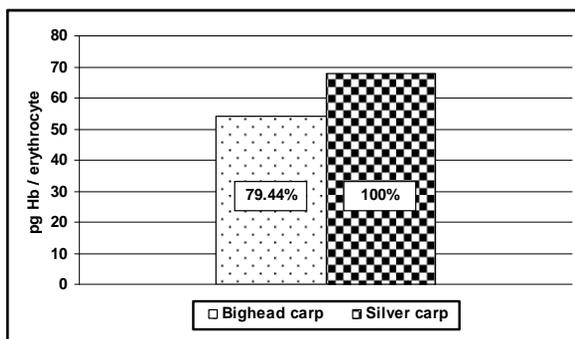


Fig.10. Mean cell hemoglobin in two summer-old *Aristichthys nobilis* and *Hypophthalmichthys molitrix*

The mean cell hemoglobin concentration (MCHC) is correlated with the hemoglobin level, in the sense that, in this case too, littler values are registered in the case of

Aristichthys nobilis species (16.4 g Hb/100 ml erythrocytary mass), representing only 88.3% of estimated concentration in silver carp (Fig. 11).

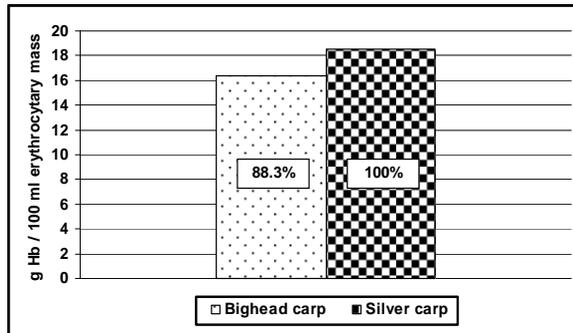


Fig.11. Mean cell hemoglobin concentration in two summer-old *Aristichthys nobilis* and *Hypophthalmichthys molitrix*

CONCLUSIONS

From the analyzed values of corporal, biochemical and hematological indices, we can affirm that, in general, the two cultured cyprinid species, present a good maintenance condition, the obtained results for profile, Kiselev and fleshy indices, Fulton coefficient, proteins and glucose concentration, as well as for the main indicators and hematological constants being comparable with those of literature data.

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