MORPHOLOGICAL INDICATORS OF BLOOD IN CARP FISH INFECTED WITH LIGULIDES

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Аннотация. В данной статье проанализирован гидрохимический состав воды, морфологические показатели крови, а также экстенсивность и интенсивность инвазии у карповых рыб.

Ключевые слова: лигулез, карповые, цестодозы, органолептический, физиологический, морфологический, гельминтологический, патологоанатомический.

Annotation. Hydrochemical composition of water, morphological indicators of blood, as well as the extent and intensity of invasion in cyprinids were analyzed in the bottom layer.

Key words: ligulosis, cyprinids, cestodiasis, organoleptic, physiological, morphological, helminthological, pathoanatomical.

Introduction. Today, in our republic, special attention is paid to the development of the fishing industry and the training of specialists in this direction. At the moment, fishing is considered one of the most profitable sectors of agriculture and plays an important role in meeting the needs of the population for fish products. However, to solve the existing problems in this area, first of all, one of the important urgent tasks is to ensure the stability of the epizootological situation. Fish is an important source of protein for the human body, an easily digestible, valuable food product. Fish proteins are easily absorbed by the body, the vitamin and mineral composition of fish meat is somewhat richer and more diverse than that of mammals.

A stack of knowledge of the problem. Ligulosis is a widespread invasive disease of cyprinids, the causative agent of which is caused by a parasitic plerocercoid in the abdominal cavity, an invasive larva of the cestode Ligula intestinalis. [1; 2; 3]. Cestodes are highly specialized organisms, the biology and morphology of which reflect important features of adaptation to a parasitic lifestyle [8].

Fish parasites are a reliable indicator of the ecological state of water bodies. Under conditions of a strong anthropogenic load, the ecological stability of the system weakens, the immunity of fish decreases, their susceptibility to infectious and parasitic diseases increases, as well as the level of infection with parasites [4; 9; 10; eleven; 12].

The authors indicate that the objective facts of multivariate staining of granulocytes with acidic and alkaline dyes have been partially established [6; 7].

At present, despite the abundance of domestic and foreign data on the morphology of fish blood cells, there is much uniformity in their names. Based on these data, it can be concluded that the morphological composition of the blood of fish infected with ligulosis requires further study.

Purpose of the study. To determine the degree of extensiveness and intensity of invasion of carp fish infected with ligulosis, as well as the morphological parameters of the blood of healthy and infected fish.

Object and methods of research. The experiments were carried out in August-September 2022, the morphophysiological indicators of carp fish caught from the White Amur fish farm in the Samarkand region and from the Kattakurgan reservoir were studied. The examinations were carried out by organoleptic, clinical, morphophysiological, parasitological, helminthological and pathoanatomical research methods in the interdepartmental laboratories "Hematology" and "OPTATECH" of the Samarkand State University of Veterinary Medicine, Animal Husbandry and Biotechnology.

The results obtained and their discussion. The experimental process includes the study of the morphological and physiological characteristics of the body of fish infected with cestodosis, the correctness of the construction of an artificial pond, the hydrochemical parameters of water (in summer the temperature in fish ponds rises from + 220C to + 330C, oxygen (O2) 4-10 mg/l, depending on the density of fish in the pool, the amount of water exchange and sanitary condition, as well as the biochemical parameters of the water were also variable).

Fig 1. Infected fish L. intestinalis.

Organoleptic, morphological, physiological and helminthological methods were used to study the morphophysiological parameters of fish (carp and carp caught from the White Amur fish farm and carp from the Kattakurgan reservoir) (Fig. 1).

In our studies, when comparing healthy and cestode-infected fish, their morphophysiological and hematological parameters differed significantly.

Fig 2. Carp infected with L. intestinalis the process of taking blood.

When comparing the blood leukogram of healthy and cestode-infected cyprinids (Fig. 2), the number of metamyelocytic neutrophils in healthy fish was 0.6, respectively; segmented neutrophil 0.4; eosinophil 0.0; pseudoeosonafil 1.0; basophil 2.5; pseudobasophil 0.0; monocyte 10.3; lymphocytes 83.3 g/%. In carp fish infected with L.intestinalis, these figures are, respectively, metamyelocytic neutrophils 0.45; segmented neutrophil 1.3; eosinophil 0.0; pseudoeosonafil 2.3; basophil 0.0; pseudobasophil 1.5; monocyte 8.6; lymphocytes 83.9 g/%. In our experiments, an increase in the number of metamyelocytic neutrophils, segmented neutrophils, pseudoeosonophils and lymphocytes was observed with a decrease in basophils from 2.5 g/% to 0.0 and monocytes from 10.3 g/% to 8.6 g/%.

Table 1

Morphological parameters of blood one-year-old crucian carp infected with ligulids

Indicators		Healthy	*Infected*		
			Number of parasites, ind.		
			7-13	*9-16*	*13-19*
Amount of hemoglobin, g/l	Avarage	93	61	47	39
	Maximum	101	64	53	42
	Minimum	83	54	43	34
The number of	Avarage	1,70	1,07	0,74	0,56

erythrocytes, x 10 / l	Maximum	2,24	1,23	0,83	0,84
	Minimum	1,40	0,91	0,56	0,30
The number of leukocytes, x109/l	Avarage	23,9	43,4	57,6	98,0
	Maximum	30,7	57,6	75,0	175,0
	Minimum	17,6	32,1	45.8	64,3

When analyzing the morphological parameters of blood in the above table during the experiments, it was found that the amount of hemoglobin in healthy fish is on average 93 g/l, maximum 101 g/l and minimum 83 g/l. When studying the morphological parameters of blood in carp infected with L. intestinalis, with the number of parasites 7-13 ind. hemoglobin content averaged 61 g/l, maximum 64 g/l and minimum 54 g/l. With the number of L. intestinalis 9-16 specimens. the amount of hemoglobin, respectively, 47.0; 53.0; 43.0, with the number of parasites 13-19 ind. the amount of hemoglobin, respectively, amounted to 39.0; 42.0; 34.0 g/l. In cyprinids during the experiments, a decrease in the amount of hemoglobin was observed with an increase in the number of cestodes L. intestinalis (Table 1).

Also, when checking the number of erythrocytes (x 10 /l), the number of erythrocytes was on average 1.70, maximum 2.24 and minimum 1.40. When examining carp fish infected with L. intestinalis 7-13 specimens. this age, the number of erythrocytes was on average 1.07 maximum 1.27 minimum 0.91; with the number of parasites 9-16 ind. The number of erythrocytes, respectively, amounted to 0.74; 0.83; 0.56.

When infected 9-16 copies. respectively; were 0.83 and 0.56. When infected with 13-19 copies, the corresponding indicators are 0.56; 0.84; 0.30.

In experiments, it was observed that the number of erythrocytes decreases with an increase in the intensity of invasion.

When analyzing the number of leukocytes in healthy fish (x109/l), the average values were 23.9, the maximum was 30.7, the minimum was 17.6, the average in infected fish was 7-13 specimens. L. intestinalis, the number of leukocytes, respectively, was 43.4; 57.6; 32.1, in infected 9-16 specimens. and 13-19 copies, respectively, amounted to 57.6; 75.0; 45.8; 98.0; 175.0; 64.3. Along with an increase in the number of infection of cyprinids with cestodes L. intestinales, an increase in the number of leukocytes was observed (Table 1).

Conclusions.

1. As the intensity of invasion in the body of fish infected with ligulosis increased, it was observed that the change in morphological parameters, that is, the amount of hemoglobin and erythrocytes decreases, and the number of leukocytes, on the contrary, increases.

2. When analyzing the blood leukogram of healthy and ligulosis fish, it was noted that in infected fish, an increase in the number of metamyelocytes,

neutrophils, segmented neutrophils, pseudoeosinophils, lymphocytes and a decrease in the number of basophils and monocytes.

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