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Veterinary-Sanitary Evaluation of Silver Sole Infected with Liguliasis

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Abstract: In the article, the epizootological status of fish liguliosis in the reservoir, which is considered a natural water reservoir of the Kattakurgan district of Samarkand region, and the length, mass, body length of L. intestinalis, II, IE indicators of fish infected with the disease (in the example of silverfish (karas)) and the changes of the main organoleptic and physico-chemical indicators of meat quality depending on the intensity of invasion are presented.

Keywords: Liguliasis, Ligula intestinalis, hydrogen ion indicator (pH), carp, carp, silver fish (karas), cypress, fish length, mass, body length of L. intestinalis, intensity of invasion, extensiveness of invasion.

Relevance of the topic. Today, the fishing industry provides employment to thousands of people and has become one of the main sources of economic development of our nation. As a result of the attention paid to the fishing industry by our government and the strengthening of state control over it, the quantity of fish and fish products necessary for the needs of the population of our country is increasing year by year. It's definitely good, but what about the quality? Therefore, production of high-quality, ecologically clean products that meet regulatory standards is one of the important tasks of today. In fulfilling these tasks, our scientific researches on the topic "Ligulosis, epizootology and veterinary-sanitary expertise of carp fishes" serve to a certain extent.

Parasites living in the body of fish include those that change the physico-chemical properties and microbiological parameters of raw materials, spoil the appearance of the fish, as well as those that are dangerous for humans and animals. One of them is Ligula intestinalis, the causative agent of Ligulosis in fish. When fish are infected with plerocercoids of this pathogen, the activity of digestive enzymes in the intestines and the content of glycogen in muscle tissue are significantly affected. At the same time, it reduces the activity of enzymes related to the mucous membrane of the stomach and intestines. Ligulosis causes a significant decrease in the number of fish and the quality of their products. This causes great economic damage [3].

Epizootological data. The disease is found in all regions of Samarkand region: in particular, in the reservoirs of Okdarya, Payarik and Kattakorgan districts where we conducted research, as well as in rivers and ponds of fish farms. Many types of fish are susceptible to the disease: red carp, carp, silver carp, carp, carp, white carp, gray pike, marinka, and others. Mainly, carp, silver heel fish (karas), and

gray head fish are more susceptible to the disease. The causative agents of the disease (plerocercoids) are more common in 2-4 year old fish. The extent of invasion is 40-60%, the intensity of invasion can be 3-7 pieces. The disease is mainly observed in spring and summer months [1].

The development cycle of Ligula intestinalis consists of five stages, which can be seen in the following sequence.

Step 1. Drop the egg into the water. Sexually mature stages of the helminth parasitize the intestines of the main hosts - fish-eating birds. Together with bird droppings, helminth eggs fall into water, where they develop. The temperature regime affects the rate of embryo development in eggs. So, at a temperature of 21-25 °C, the coracidium develops from an egg in 5-7 days, at a temperature of 16-19 °C, the development period of an egg can change to 8-10 days, at a temperature of 10-12 °C, the development period of an egg can change to 12-15 days.

Step 2. After five days, an embryo that floats independently in water is observed. The ciliated larva-coracidium with three pairs of hooks begins to swim freely in the water as a result of the opening of the ovary lid. Coracidium in water can live for 2-3 days, it also depends on the temperature regime.

Step 3. Embryo ingestion by microscopic crustaceans. Coracidium is swallowed by a cyclops. It is considered the first intermediate host of the helminth, and an oncosphere emerges from the coracidium in their body; it grows and after 10-15 days the invasion turns into prosercoid.

Step 4. Ingestion of infected crustaceans by second intermediate hosts (fish). Procercoids migrate from the intestinal tract of the fish to the abdominal cavity, and within 8-12 months they develop into large invasive plerocercoids that can persist for three years.

Step 5. Piscivorous birds eat fish infected with Ligula intestinalis, and in the bodies (intestines) of birds, plerocercoids of liguliids turn into sexually mature forms after 2-3 days, and eggs begin to be released into the environment through bird droppings. Egg hatching lasts 2-4 days, then the helminths die and are excreted with feces. This is how the life cycle of the pathogen continues.

When experimentally infecting other bird species, mature helminths could be found in the intestines of domestic chickens, ducks, pigeons, etc. But these bird species do not play an important role in the epizootology of liguliasis [4].

Pathogenesis. Settling in the abdominal cavity of the fish body, plerocercoids grow and reach a large size - 60-80 cm long. They compress the internal organs and disrupt their functions. Due to constant and increasing pressure, the liver, spleen, gonads and other organs gradually atrophy. Metabolic processes in the body are disrupted or undergo drastic changes. Affected fish gradually stop feeding, lag behind in development and become very emaciated. Gonadal atrophy occurs and the fish becomes infertile. All this will drastically reduce the fish productivity of the reservoir and the reproduction of fish. Simultaneously with the mechanical impact on the internal organs, helminths cause intoxication of the host's organism with the products of their secretion. Hematological indicators change. The amount of hemoglobin decreases by 20-25% compared to the norm, the number of polymorphonuclear cells and neutrophils increases by 2-3 times or more. EchT is accelerated by 1.5-2 times.

Pathological changes. Due to the constant pressure of plerocercoids developing day by day in the abdominal cavity of the affected fish, liver, spleen, gonads and all other internal organs suffer from anemia, retardation of development or atrophy (their mass is 2-3 times less than that of healthy fish).

Research object and methods. As the research object, carp and silver fish (karas) from natural and artificial water reservoirs of Kattakorgan reservoir of Samarkand region were used. 'change was studied. Experiments were conducted on healthy and naturally infected fish brought from the Kattakurgan reservoir in the "Veterinary-sanitary expertise" laboratory of the department of veterinary-sanitary expertise of the university (Fig. 1).

Organoleptic (color, smell, consistency, boiling test) as research methods; parasitological, physico-chemical (hydrogen ion concentration (pH) determination) methods were used. All this allows for an

objective assessment of the safety of these raw materials and products when parasites are detected in fish.

Figure 1. Sample fish.

Research results. The epizootological status of fish ligulosis in the reservoir, which is considered a natural reservoir of Kattakorgan district, Samarkand region, and the length, mass, and body length of L. intestinalis, the causative agent of the disease, II, IE indicators of fish infected with the disease (Kumushtovan fish (karas) and changes of the main organoleptic and physico-chemical parameters of meat quality depending on the intensity of invasion were studied.

Favorable conditions for the spread of ligulosis in this area, influencing factors: hydrological and hydrobiological characteristics of water bodies, climatic conditions; failure to control the sanitary and epizootic condition of water bodies; the location is located on flat or swampy land; due to having many shallow areas surrounded by vegetation and mud layers.

Figure 2. Favorable conditions for the spread of ligulosis, influencing factors.

All this contributes to the development of phytoplankton and zooplankton in them, especially crustaceans (daphnia and cyclops), which are intermediate hosts in ligulosis, the predominance of carp fish, which are sensitive to ligulosis, as well as the nesting of migratory fish-eating birds, which are the main hosts, and helps to accumulate (Figure 2).

Figure 3. Manifestation of fish damage.

It was found that the degree of invasion of the disease is directly related to the season. It was observed that the manifestation of the disease state of fish is more common in early spring than in autumn (late winter to February, early spring to early March) (Fig. 3).

As can be seen from Figure 4 and Table 1, out of the 10 samples examined, sample 4 and sample 6 show a small body length and mass, and a large number and size of plerocercoids. In this case, the average body length of the fish was 26.55 cm, the mass was 362.2 g, the average body length of L.intestinalis was 8.5-35.5 cm, II average 3 to 13 triggers, and IE was 100%.

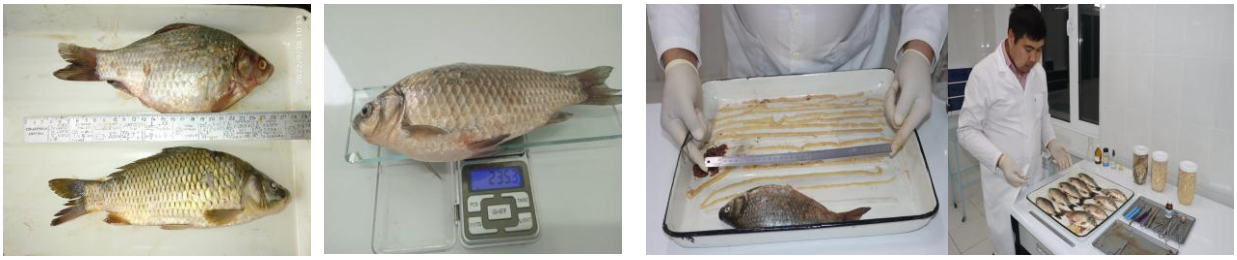

Fig. 4. The main indicators of the fish and the trigger.

Table-1. Body length, mass of fish infected with ligulosis, body length of L. intestinalis, II, IE indicators. (In the case of silver fish (Karas))

Samples	Indicators				
	Fish body length, cm	Mass of fish, g	*Body length of L.intestinalis, cm*	II, copy	IE, %
Sample 1	29.5	401	3-11	3	100
Sample 2	27	387	11-18	4	
Sample 3	26	376	7-28	9	
Sample 4	25	323	13-62	13	
Sample 5	25.5	356	6-36	11	
Sample 6	24	235	8-53	9	
Sample 7	28	391	3-32	8	
Sample 8	27.5	390	8-46	12	
Sample 9	26	375	12-35	9	
Sample 10	27	388	14-34	7	
Average	**26,55**	**362,2**	**8,5-35,5**	**8,5**	**100**

Most of the cestodes found in the body of the fish are longer than the size of the fish's body and are freely located in the abdominal cavity, because they are completely mixed between the intestines, it can be seen that they have significantly compressed the internal organs. With such an effect, the fish becomes very weak and cannot live for a long time. Because the given number and size of ligules is very important, this leads to compression of internal organs and almost complete disruption of their function. At the same time, it causes a delay in growth and development, which is natural, because sick fish cannot eat normally, and most of the nutrients it receives are absorbed by the parasite. Therefore, we can conclude that infected fish are small, emaciated, and their nutritional value is significantly reduced.

Veterinary-sanitary expertise of damaged fish meat.

Veterinary-sanitary examination of fish consists of a complex set of studies, observations and activities, starting from the observation of fish caught in fishing grounds and ending with the production of finished products that must meet safety and quality requirements. [2;5].

Changes in the organoleptic and chemical composition indicators of crucian carp infected with Ligula intestinalis were found. When fish are heavily infected with parasites, the organoleptic characteristics of the meat (muscles firmly attached to the bones, body color, smell, muscle elasticity, consistency, muscle fiber pattern, broth transparency, pleasant natural smell and taste) are characteristic of fresh fish. was found to have changed. When the fish is severely damaged (up to 13 parasites), the meat easily separates from the bone, the consistency of the muscles softens, the broth becomes cloudy, and a sharp smell appears.

Therefore, experts of veterinary-sanitary expertise should evaluate the veterinary-sanitary expertise in fish processing processes and fish brought to the markets before selling them to consumers and give an appropriate conclusion [6].

During the study of the physico-chemical properties of the fish carcass, it was found that the concentration of hydrogen ions (pH) increases with the intensity of invasion. Checks Gost 7631-2008. (organoleptic and physico-chemical inspection) methods. In the process of determining the concentration of hydrogen ions (pH), 50 ml of distilled water was added to 5 g of fish mince and kept for 30 minutes, stirring occasionally. It was filtered through a paper filter, and the ready-made filtrate was used for testing. In healthy fish, the filtrate is clear, has a specific smell, pH is up to 6.7±0.36; In the sample with low II - the filtrate is slightly cloudy, pH - 6.8±0.42; In the sample with II average - the filtrate is slightly cloudy, pH - 7.0 - 0.24; In the sample with high II, it was found that the filtrate was cloudy, had an unpleasant smell, and the pH was 7.3±0.32 and higher (Table 2).

Table-2. Affected by ligulosis depending on the intensity of infestation change of hydrogen ion index of fish meat

Indicators	II*			Healthy
	Low	Medium	Medium	
pH	6,8±0,31	7,0±0,24	7,3±0,32	6,7±0,36

*** Intensity of infestation.**

Conclusions:

1. It was observed that the manifestation of the disease state of fish is more common in the early spring than in the autumn season (from the end of the winter season to February, early spring to the beginning of March).

2. If the body length of the fish is 26.55 cm on average, and the mass is 362.2 g, the body length of the trigger is on average 8.5-35.5 cm, II o averaged 3 to 13 triggers, and IE was 100%.

3. During the study of the physico-chemical properties of infected fish meat, it was found that the concentration of hydrogen ions (pH) in the meat increases with the intensity of invasion. In the sample with high II - the filtrate is cloudy, has an unpleasant smell, pH - 7.3 ± 0.32 and higher. Such fish are considered unfit for human consumption.

REFERENCES:

1. Xolmirzayev D., Haqberdiyev P.S., Shohimardonov D.R., Shaptaqov E.S., Baliqchilik asoslari. Kasb-hunar kollejlari uchun o‘quv qo‘llanma. Toshkent, 2016. 179-182 bet.
2. Головина Н.А. Ветеринарно-санитарная экспертиза гидробионтов. Лабораторный практикум / Н.А. Головина // - М. - МОРКНИГА – г. 2010. - 198 с.
3. Извекова Г.И., Кузьмина В.В., Влияние заражения плероцеркоидами *Ligula intestinalis* на активность пищеварительных ферментов и содержание гликогена в тканях леща // Паразитология, г.1996. №1. С. 45.
4. Серветник Г.Е., Зотов В.В., Медников А.В. Ветеринарно-санитарные и экологические мероприятия, обеспечивающие безопасность выращиваемой рыбы на водоемах комплексного назначения. Российский журнал «Проблемы ветеринарной санитарии, гигиены и экологии». М.: г. 2017. №2. -88-92 с.
5. Соколова А.М. Санитарно-гигиеническая экспертиза пресноводной рыбы: методическое пособие / А.М. Соколова, Ю.А. Черемин, С.Н. Ченцова.Ю.Р. Горбунова // - Астрахань - Изд-во Астраханской медицинской академии – г. 2008. - 34 с.
6. Khamrayev A.Kh., Daminov A.S. Veterinary and sanitary expertise of the meat of carp-like fish with ligulosis disease. In Volume 8, Issue 4, of JournalNX- A Multidisciplinary Peer Reviewed Journal, **ISSN: 2581-4230 Impact Factor:7.223.** April, 2022, Published by Novateur Publication, M.S. India. www. journalnx.com –pp. 136-140