

# Infectioning of Fishes (Cypriniformes) with the Diplostomose Trematoda in Water Reservoirs of Bukhara Region

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**Abstract:** This article analyses the diplostomosis infection of fish (carp) in Agitma, Shurkul, Tudakul reservoirs, and the lower reaches of the Zarafshan River. A total of 267 fish specimens have been analyzed. The information on the cycle of development and activities of *Diplostomum spathaceum*, from parasitic trematodes, is given.

**Keywords:** Diplostomosis, trematode, helminth, invasion, primary and intermediate host, metacercaria, deinvation

## 1. Introduction

Fish are the main vertebrates including more than 80 species of all fishes in the water basins of Uzbekistan [3]. At present, the demand of the population of our country for food products is growing from year by year. In addition, the cultivation of fish products has particular importance.

With the adoption of the Resolution of the President of the Republic of Uzbekistan dated August 29, 2020 PQ-4816 "On measures to support the fishing industry and increase its efficiency", a wide range of opportunities for the development of the fishing industry. But one of the factors that negatively affect fish productivity is helminthiasis.

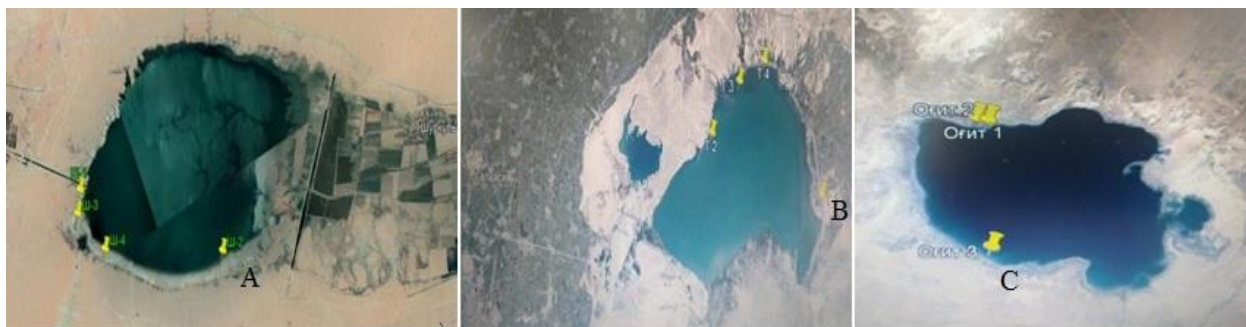
Diplostomosis is a common invasive disease among fish, the metacercariae of *D. spathaceum* trematode belonging to the

family Diplostomatidae is the causative agent of the disease. [4].

It is highly pathogenic in trematodes, causing paralysis in the eye of fish, i. e., the cornea, the lower part of the eyeball, the cornea of the eye, leading to dizziness and impaired visual function [1].

## 2. Material and Methods of Research

During the period 2020-2021, a total of 267 fish specimens, including *Cyprinus carpio*-61, *Ctenopharyngodon Idella*-42, *Hypophthalm molitrix*-22 pieces, *Carassius auratus gibelio* (Bloch)-53, *Rutilus rutilus*-66, orchid *Abramis brama* – 23 pieces were examined by common helminthological cracking methods [2].



Тадқиқотларда олиб борилган ҳудудларнинг Гисс 360<sup>0</sup> дастури орқали координата нуқталари

A) Шўркўл сув омбори  
(40°19'01.58"N, 64°51'38"E),  
(40°20'44.91"N, 64°50'35.64"E),  
(40°20'55.75"N, 64°50'28.02"E)

B) Тўдакўл сув омбори  
(39°52'32.36"N, 64°48'17.73"E),  
(39°54'38.11"N, 64°50'41.49"E),  
(39°55'29.31"N, 64°52'52.33"E),  
(39°50'06.47"N, 64°57'52.35"E),

C) Оёқоғитма сув ҳавзаси  
(40°39'26.57"N, 64°29'29.05 E),  
(40°39'21.69"N, 64°29'52.86"E),  
(40°35'15.87"N, 64°29'42.59"E)

The collected trematodes have been fixed in 70% ethanol solution. Literature data has been used to identify trematode species [1.4.5.7.8.9].

## 3. Research Results

Out of a total of 61 2-3-year-old *Cyprinus carpio* caught in the Shurkul Reservoir in Bukhara Province, 9 were infected

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with *Diplostomum spathaceum*, with an average prevalence of 14.8%. The lower reaches of the Zarafshan River are located in the watershed. Three of the 22 *Hypophthalmichthys molitrix* caught in the Tudakul Reservoir were found to be infested with metacercariae of the *Diplostomum spathaceum* trematode, with an invasiveness rate of 13.6%. The intensity of the invasion

varied depending on the type of water basin. When 53 of *Carassius auratus gibelio* (Bloch) caught from the footwater basin were examined, it was noted that 7 of them damaged the eyeball. The invasiveness was 13.2%. High rates of damage were observed mainly in young fish. Invasive intensity ranged from 1 to 10 copies. Fig.2.

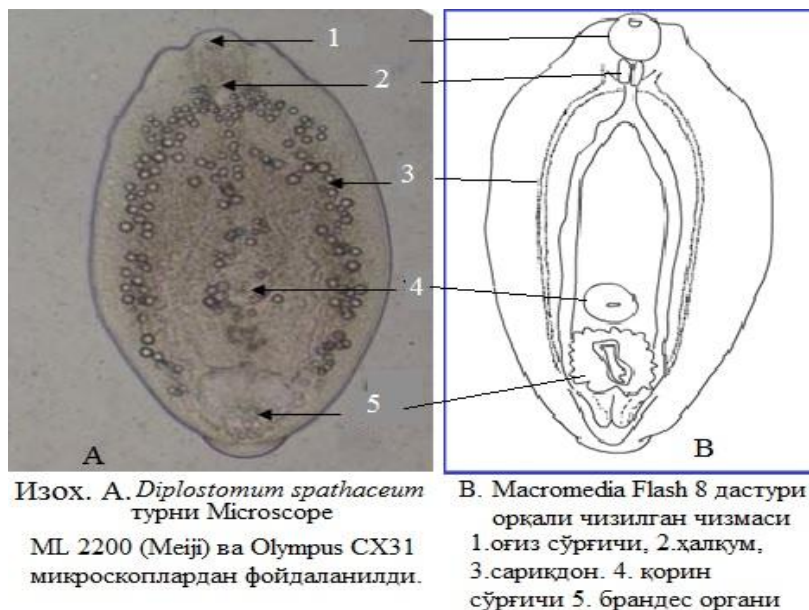


Figure 2

In natural lakes and ponds, diplostomosis are more common among fish larvae. In such ponds, infected molluscs overwinter, they begin to secrete large amounts of cercariae in the spring, and fish fry in such ponds are infected with diplostomosis. The extensiveness and intensity of the invasion increases rapidly.

The disease is common in all water bodies, and as a result of damage to adult carp, they lag behind in growth and development than healthy fish and feed on predators. As a result of infection with *Diplostomum spathaceum* metacercariae, up to 70-85% of fish fry die. 1-2 metacercariae are sufficient to kill larvae and 3-5 metacercariae are required to kill larvae [5].

The main pathogens are *D. spathaceum* metacercariae of the *Diplostomum* genus. The main host of the *diplostomum spathaceum* trematode is fishing birds. The fisherman catches and eats the infected fish, in their gut, the metacercariae reach sexual maturity in 4-5 days and begin to lay eggs. *Diplostom* metacercariae are not encapsulated. The full life cycle of helminths is completed in 2.5-3 months, but this depends on the temperature of the water. In summer, when the water temperature is 18-20 0 C, the larvae hatch from eggs and enter the body of the intermediate host faster than in autumn and winter. They begin to lay eggs, which fall into the water along with the excrement of the birds. From the eggs that fall into the water emerge larvae-miracidia, the body of which is covered with cilia. It swims in the water for a while with the help of its lashes and enters the body of the intermediate host-the gastropod mollusc. *Lymnaea auricularia*, *L. bactriana*, *L. pereger* molluscs act as intermediate hosts in Uzbekistan [6].

In the mollusc organism, the larva reproduces asexually and goes through the stages of sporocyst, cercariae. The cercariae separate from the mollusc's body and swim in the water for a day using their tails. Finding fish, they enter the body of the fish through the skin, gills, digestive organs, cercariae leave the tail and turn into metacercariae. It reaches the eye and eyeball through the blood vessels. The cercariae enter the cornea through the cornea of the eye. Metacercariae retain their viability in the body of fish for up to 4 years and infect fishing birds.

Diplostomosis is common in all water bodies, lakes, rivers, reservoirs. More carp fish are prone to this disease. Different age groups get sick, but the disease is more common among young fish. The source of invasion is fish infested with molluscs and metacercariae, which are infested with larvae that overwinter in water bodies. Fishing birds play a key role in the spread of diplostomosis, as birds migrate from one body of water to another and participate in the spread of helminth eggs. Infected molluscs and cercariae pass into water bodies along with the water flow, causing the spread of the invasion. In studies, the incidence of diplostomosis was higher in spring and summer.

Metacercariae damage the eyeball with the help of their suckers. As a result of parasitism in the eyeball of the larva, an inflammatory process occurs. The visual function of the eye is completely and partially impaired. As a result, fish lose their normal nutrition, lose weight or die, and become prey for fishing birds. Diplostomosis is acute and chronic.

The acute course is observed among young fish. Cercariae penetrate through the skin and injure it, darkening of the body and curvature of the spine are observed.

Chronic diarrhoea is more common in older fish. Diplostomosis to some extent affects the productivity of trout.

Inflammation and swelling of the eye, the opacity of the retina are the basis of diplostomosis. The final diagnosis is made by microscopic examination of the eyeball. Metacercariae are often located at the edges of the eyeball, and in our study, their number ranged from 1–10 copies.

Treatment measures are not fully developed. The development of the pathogen in the presence of intermediate and primary hosts allows taking measures to combat this invasion at different stages of development of the helminth. Prophylaxis is aimed at interrupting the life cycle of the pathogen at certain stages. This is achieved by eliminating molluscs in water bodies. Deinvation should be carried out in water bodies.

#### 4. Conclusion

The invasion rate by *Diplostomum spathaceum* of Carp (*Cyprinus carpio*), white carp (*Hypophthalmichthys molitrix*), silver carp (*Carassius auratus gibelio* (Bloch) in the Shurkul reservoir and Tudakul reservoir and Ayakogitma water basins of Bukhara region was investigated. According to our study results, invasion extensivity has been observed from 13.6%, 13.2% to 14.8%, and the intensity ranged from 1 to 10 specimens. However, no other types of Carps were found to be damaged.

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