



# PREVALENCE, SEASONAL DYNAMICS AND DIAGNOSTICS OF SAPROLEGNIOSIS IN CARPSIMON FISH

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## Abstract

This article presents information on the causative agent of infectious diseases in fish caused by aquatic fungi belonging to the saprolegniosis family, which are found in cyprinid fish, and explains that the disease causes significant economic damage to fish farms and that treatment in affected farms is ineffective, therefore, it is very important for practice to study its seasonal dynamics for prevention.

**Keywords:** Fish, saprolegniosis, Saprolegnia, carp, seasonality, distribution, diagnostics.

## Introduction

Fisheries are one of the sectors of strategic importance in the economy of Uzbekistan, playing an important role in ensuring food security of the population, increasing employment, and expanding export potential. A number of measures are being implemented in Uzbekistan to develop fisheries. In recent years, infectious and non-infectious diseases of fish in fisheries, especially saprolegniosis, have caused significant economic damage. The disease is especially significant in the spring and autumn seasons due to its widespread distribution. Saprolegniosis affects the skin, fins, and gills of fish, reducing their growth, reproduction, and viability. This disease develops under the influence of aquatic fungi (Oomycetes) belonging to the Saprolegnia family and is often observed in cases of external stress, cold water temperature, water pollution, impaired water chemical parameters, and reduced fish immunity. Therefore, determining the seasonal dynamics of this disease, its prevalence, clinical symptoms and diagnostic methods are currently one of the most relevant scientific and practical issues. This study will serve to study the seasonal dynamics and distribution characteristics of saprolegniosis in Uzbekistan, to identify the disease early and to develop effective preventive measures.

**The purpose of the study.** is to determine the seasonal distribution dynamics of saprolegniosis among fish kept in reservoirs located in the Samarkand district of the Samarkand region and to conduct diagnostic tests on fish in which the disease was detected.





**Research object and methods.** The research was conducted on spontaneously infected fish of different ages, which are bred at the “Oq Amur” fishery in the Samarkand district of the Samarkand region. The research used diagnostic examination of smear samples taken from the body of the fish and pathological anatomical examination of the bodies of dead fish.

**The level of research on the topic.** Saprolegniosis is one of the most common fungal diseases in fish, mainly caused by aquatic fungi such as *Saprolegnia parasitica*, *S. diclina*. The etiology, pathogenesis, clinical signs and diagnostic methods of this disease have been widely studied in the literature. In particular, Roberts R.J. (2012) in his studies on fish diseases emphasizes that the main reasons for the development of saprolegniosis infection are cold temperatures, damaged skin, low immunity and an abundance of organic matter [2,4]. Bruno & Wood (1999) described the occurrence of saprolegniosis in various fish species, especially in cyprinids, and its specific pathoanatomical signs. Their studies proved that the increased spread of the disease in the spring and autumn seasons is associated with climatic factors. In recent years, scientific studies have deeply analyzed the molecular biology of *Saprolegnia* fungi, their interaction with the aquatic environment, and the complex processes associated with fish immunity. It was also noted that the possibilities for early detection of the disease through PCR and immunofluorescence methods are expanding [1,3]. Although the local literature provides a general description of fish diseases, in particular saprolegniosis, occurring in the water bodies of Uzbekistan, the seasonal dynamics and the relationship of the disease to environmental factors have not been deeply analyzed. Therefore, an analysis of the existing literature shows that there is a need for a systematic scientific study of saprolegniosis in the context of seasons in Uzbekistan [5,6].

**Conducting the examinations and their results.** Our research was conducted in the Samarkand district of the Samarkand region. During the scientific research, clinical, experimental, laboratory, microscopic, pathoanatomical and statistical methods were used.

**Clinical examination method.** Fish infected with saprolegniosis were first evaluated based on clinical observation. In the first stage of the disease, attention was paid to external signs. Infected fish were observed with cotton-like whitish, yellowish or grayish fungal hyphae. These fungi were mainly located on the skin, fins, head, dorsal and caudal areas, and were manifested by slow movement, loss of appetite and frequent surfacing of the fish. Clinical signs usually worsened with a decrease in water temperature and were especially pronounced in the spring and autumn seasons.

**Microscopic examination method.** Samples of affected tissues were taken from fish selected based on clinical signs for microscopic examination. The samples were examined under a microscope with a magnification of 100–400 times. During microscopic observations, the presence of long, branched hyphae was noted. These hyphae exhibited a morphological structure typical of *Saprolegniosis* fungi, which served as an important factor in confirming the diagnosis.

**Microbiological (culture) examination method.** In order to accurately isolate the fungus, microbiological cultivation (culture) was carried out. Damaged fish tissues were inoculated onto glucose peptone agar. The inoculated plates were kept in a thermostat at a temperature of 18–22°C for 3–5 days. As a result of storage in a thermostat, a whitish, cotton-like colony was formed,



which is typical for *Saprolegnia* spp. Microscopic analysis of the colony revealed the presence of hyphae and zoosporangia.

**Pathomorphological examination method.** In cases where the disease was severe and the fish died, a pathomorphological examination was performed. The internal organs of the fish - liver, kidneys, intestines and heart - were examined, and spots on the surface of the liver, internal hemorrhages and softening, necrotic changes in muscle tissue were detected. These changes help determine the stage of development of saprolegniosis infection and its impact on the general pathological condition.

**Final diagnosis.** According to the results of a study on saprolegniosis of fish (a fungal infectious disease caused by the reproduction and spread of saprolegniosis), it was once again noted that the causes contributing to the spread and development of the disease depend on the water environment, feeding and indicators of effective implementation of preventive measures. The main reasons are the lack of sufficient hygienic conditions for keeping fish in farms and the use of high-quality feed for feeding, as well as changes in the aquatic environment.

## Conclusion

As a result of clinical, microscopic, microbiological and pathoanatomical examinations, it was determined that the disease observed in cyprinid fish is saprolegniosis. The main cause of the disease is the fungus *Saprolegnia* spp., which is characterized by active spread mainly in the spring and autumn months. A comprehensive diagnostic approach was effective in early detection of the disease and assessment of the epidemiological situation. The results obtained provide an important scientific basis for the development of preventive and control measures against saprolegniosis in the conditions of Uzbekistan.

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