# *Diplostomiasis Ocular* in *Perca*

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**Keywords:** Diplostomumm spp., Perca fluviatilis, metacercarie, microdissection, eye, necropsi.

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## Abstract

This study identified the ocular diplostomiasis in fish Perca fluviatilis (parasite cataract in fish or eye fluke disease) in fish Perca fluviatilis (European perch) or in albanian language "Sharmak" which is fish in Drin river and Fierza lake. Causers of this pathology are the trematods metacercariae Diplostomum spp. The result of the presence of metacercariae in Perca fluviatilis was realised by necropsy with microdissection of eyes. The metacercariae of Diplostomum spp. were present to Perca fluviatilis in microdissection of eye examination. From an examination of 27 fish, during the years 2012 and 2013, only 22 samples or 81% resulted positive with metacercariae of Diplostomum spp. The level of infestation with metacercariae in values for each fish resulted from 2 to 9. The metacercariae causes cataracts in eyes and damages that depending on the level of infestation it may damage the fish overall. The recommendations for the control and prevention of the disease, based mainly on ecological methods, taking into account the cycle of the parasite and the characteristics of the building of the pisciculture are given.

### 1. Introduction

*Perca fluviatilis*, commonly known as the European perch, is a predatory species, found in Europe (Bartley, D.M. 2006). *Perca fluviatilis* is a fish of the family Percidae which is present in our nation's waterways (Closs, G. P. *et. al*, 2003). The species is a popular quarry for anglers, and has been widely introduced beyond its native area. It is predatory fish, dominant in Albanian waterways and often damaging other ichthyic species. *Perca fluviatilis* are greenish with red pelvic, anal and caudal fins. They have five to nine dark vertical bars on their sides. *Perca fluviatilis* can live for up to 22 years, the maximum recorded length is 60 cm and the highest value of the weight is 2.9 kg (Riede, K. 2004), but in our country these values results 1/2 lower than the values mentioned above. The *Diplostomum* spp. has a complex biological cycle, which includes sexual reproduction in the intestine of gulls or other waterfowl birds that represent the definitive host, (Kottelat, M. & J. Freyhof. 2007). The eggs come on the environment through the bird fecal. When the egg reaches the water it is borned a miracidium that comes into contact with the intermediate snail host *(Lymnaea spp.)* where asexual reproduction is occurred. At the end of asexual phase are formed cercariae which swim in the water and reach the second intermediate host. The second host are other fish species in sweet and salts waters (fresh water/sea water) where encysted in metacercariae. Mostly, the metacercariae are found in the fish's eyes of freshwater. The infestation with metacercariae can lead to severe ocular pathology and mortality of the fish. In order to close the biological cycle with metacercariae fish to be taken from fish eater's birds where their intestines parasite matures and lay eggs. The pathology of verminous cataract eye or verminous ocular diplostomiasis caused by different species of *Diplostomum*. The ocular diplostomiasis is a disease in freshwater fishes. The fish is the second intermediate host in the cycle of the parasite and become infected when the cercariae penetrate the integument, gills, eyes and do a quick migration to become after 24h of metacercariae in the lens, (Ferguson, 1989; Hoglund, 1991). The invasion of cercariae maturation and subsequent damage caused by the vitreous and retina, cataracts and eventually blindness (Ferguson, 1989). The ability to spread from the eggs of the trematoda by the final hosts, birds and low specificity of the parasite in successive hosts would be the causes of the cosmopolitanism of this ictioparasitosis, (Chapell *et al*., 1994). This disease affects wild fish as grown in different regions of the world,

causing mass mortalities in farming systems, especially under intensive conditions, but not in natural environments, (Hoglund and Thulin, 1990, Field and Irwin, 1994; Paperna, 1995). In our contry there are no data for the existence of this pathology in different species of sweet waters (fresh waters). The study highlighted the presence of *Diplostomum* spp. metacercariae to *Perca fluviatilis*.

## 2. Materials and methods

The affected area is located in the region of Kukesi (42°0.5'23.89" N, 20°24'37.99" E) in the north-east of Albania. The microdissection of the eyes of 27 fishes was realized in the Laboratory of Veterinary Parasitology (Faculty of Veterinary Medicine) during the years 2012 and 2013. It was used fresh fish material and canned material in 70° alcohol. The eyes microdissection was seen by a microscope. Samples that were examined during the years 2012-2013 were represented by fish species caught in the Drin River and the Lake of Kukës for which the fishermen had observed pathology of the fish eyes. The fishermen observed to the fish their eyes which were lighter colored and in some cases they found some dead fish with this change. The samples were fresh when they were brought to the laboratory and were immediately examined. The techniques used in this study were consisted in the necropsy of the eyes microdissection. Based in the technique described by Schell 1970, the metacercariae which belonged to the *Diplostomum* spp., were identified, collected and kept in alcohol 70°. Through the stereomicroscope, the metacercariae of *Diplostokum* spp. were counted for each sample examined in relation to the level of infestation.

## 3. Results and discussion

By examining the microdissection of eyes it resulted positive with metacercariae of *Diplostomum* spp. only 22 samples or 81% (the dimension of the fish examined: 14.8 – 23.2 cm). Parasitized with metacercariae resulted almost the same (uni/bilateral eye infested). The level of infestation ranged from 2 - 9 parasites in the eye for all positive samples. Stereomicroscopic examination showed that metacercariae belonged to the *Diplostomum* spp. and that as a result of the identification of morphological characteristics that were identified: lack of cyst, body prolix and clearly divided into two pieces, bulbous body and two tribocytice pseudo sucker in the back. The cataracts in the eye (examined samples) were also evident in macroscopic evaluation. They were at high levels and such that can modify the behavior of fish. These cataracts prevented fish from food, they were expose more to the surfaces (on the sides of the river and lake), exposed to the sun, exposed much more against ectoparasites, with slight back rests of the predators, etc. A simple examination of microdissection of the lens resulted sufficient to determine the origin of parasitic (L. Semenas, 1998). Turbulence in the white of the eye (uni/bilateral) resulted characteristic ocular diplostomiasis (Roberts & Shepherd, 1974; Inchausty & Heckmann, 1997). The number of metacercariae founded, from 2 to 9, resulted infestation which cause problems but we believe that it was not proven to be sufficient to cause complete blindness. In this sense we highlight that the infestation level damage the viewing but without causing blindness. The study highlights that the level of infestation with metacercariae eye was in the right proportion to the size of the fish. In the larger fish (> 20cm) were observed on average from 2 to 4 metacercariae more than the smaller size fish.

**Figura 1.** *Perca fluviatilis* infested with metacercariae of *Diplostokum* spp.

The diplostomidos life cycle in this area has seen intermediate host snails of the species *Lymnaea* spp. By studying their level of infestation resulted in values of about 10%. These snails are common in these areas; they are very active during spring, while during winter they are sleeping underground. Increased water flows with cercariae from snails are high, especially in the late spring and early autumn. The last host of *Diplostomum* spp. are the anseriforme birds (gulls and other birds from Laridae family). Various types of fish with metacercariae parasitic are consumed by birds that are definitively hosts. In their intestine grow trematoda which is able to produce eggs 2 months after infestation (adult).

**4. Conclusions**

The metacercariae of *Diplostomum* spp. resulted present to *Perca fluviatilis* fished in the river Drin and Fierza Lake. There resulted positive 22 samples (81%) with metacercariae of *Diplostomum* spp. from a total of 27 samples examined. During the examination with steromicroscope of microdissection of the eyes there were numbered from 2 to 9 the *Diplostomum* metacerkarie spp. for each individual. The metacercariae cause cataracts in the eye and modify the behavior of the fish by exposing them to predators.

In order to reduce the level of infestation of fish from the *Diplostomum* metacerkariet spp. there are required a adequate knowledge of the biology of the parasites and their relationship with the fishes. Infections are mainly due to the presence of plants which provides the presence of snails. Furthermore the water temperature determines the appearance of the cercariae and fish infestation which serves as food for anseriforme birds. So it should be considered to eliminate the snail population by preserving in this way the ecosystems that prevent algae growth beyond their targets level of growth that serve as food of snails. Taking into consideration the fact that the development of aquacultures in sweet waters in Albania is not developed and the lack of a national registry for fish diseases and parasites, especially those with an impact on the economy, the objective of this study is to describe the characteristics of an infection *Perca fluviatilis* to fish in the Drin river and Fierza Lake cascade.

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