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PRVO POSMATRANJE EKTOPARAZITA NA RIBAMA DONJEG TOKA RIJEKE TOLISE, BOSNA I HERCEGOVINA

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Sažetak

Tokom perioda mart – april 2014. godine istražili smo parazitofaunu riba rijeke Tolise, Bosna i Hercegovina. U uzorku od 100 jedinki i 8 vrsta riba (*Carassius gibelio*, *Cyprinus carpio*, *Esox lucius*, *Blicca bjoerkna*, *Alburnus alburnus*, *Ctenopharingodon idella*, *Ictalurus nebulosus* i *Silurus glanis*) pronađeno je 100 zaraženih jedinki. Bile su zaražene sljedećim ektoparazitima: protozom (*Chilodonella cyprini* i *Trichodina sp.*), trematodom (*Dactylogyrus sp.*, *Gyrodactylus sp.* i *Posthodiplostomum cuticola*) i crustaceom (*Argulus foliaceus*).

Ključne riječi: *rijeka Tolisa, biodiverzitet, ribe, ektoparaziti*

FIRST RECORD OF ECTOPARASITE COMMUNITY ON FISHES IN LOWER FLOW OF TOLISA RIVER, BOSNIA AND HERZEGOVINA

Abstract

Over the period March – April in 2014. we researched parasitic fauna of fishes in river Tolisa, Bosnia and Herzegovina. In the sample of 100 individuals of 8 fish species (*Carassius gibelio*, *Cyprinus carpio*, *Esox lucius*, *Blicca bjoerkna*, *Alburnus alburnus*, *Ctenopharingodon idella*, *Ictalurus nebulosus* and *Silurus glanis*) 100 infested specimens were found. They were infested with the following species of ectoparasites: protozoa (*Chilodonella cyprini* and *Trichodina sp.*), trematodes (*Dactylogyrus sp.*, *Gyrodactylus sp.* and *Posthodiplostomum cuticola*) and crustaceans (*Argulus foliaceus*).

Key words: *Tolisa river, biodiversity, fish, ectoparasite.*

INTRODUCTION

Tolisa river is the right tributary of the Sava river with length of 56.2 kilometers (fig. 1). It rises on the Trebava mountain at an altitude of 440 meters and flows into the Sava river between Tolisa and Domaljevac villages. Study of ectoparasitic species on fishes has an important role in modern biological science, but these researches are in deficit in Bosnia and Herzegovina. All earlier similar studies in Bosnia and

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Herzegovina were based on hydroaccumulations and Sava river. Tolisa river has never been investigated (Nedić i sar., 2014; Nedić, Riđanović i Halilović, 201); Nedić, Skenderović i Riđanović, 2014; Skenderović, 2015). Ectoparasitic species represent very heterogeneous group of parasitic organisms that parasitize on fish gills or the skin. Their connection with the parasitic hosts could lead to tissue damage or health metabolic problems (Fijan, 2006). For these reasons, it is very important to investigate ectoparasitic and fish biodiversity due to contributions to ecological and biological understanding of hydroecosystems.

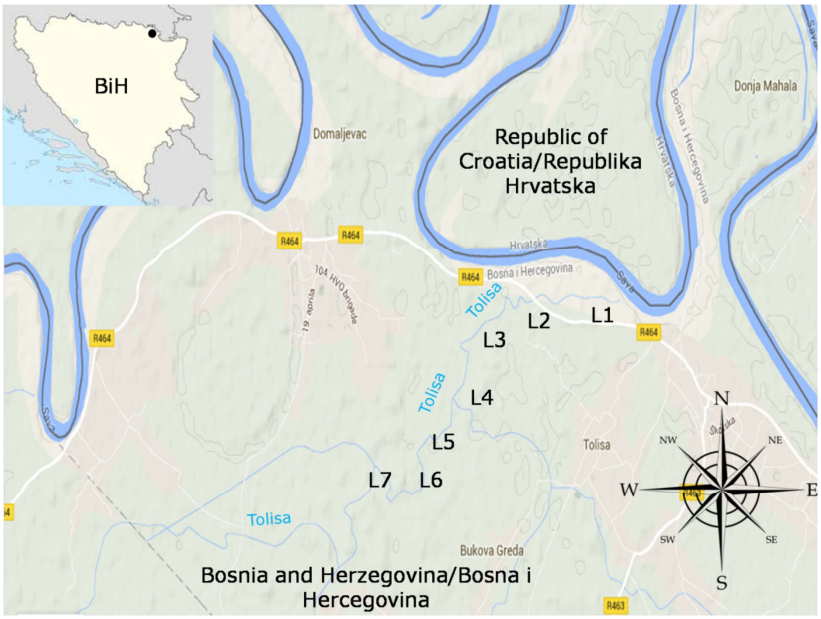

Figure 1. Tolisa river and investigated locations (L1 to L7) of its lower flow

MATERIAL AND METHODS

Material was collected from 7 locations (in the length of 2 km) of lower flow of the Tolisa river during spring period (March/April 2014). The fishes were collected from the local fishermen using fishing nets.

For live samples, squash slide was taken from skin and gills, and observed under light of the microscope (Micros; MC50 BAT) (400 X magnitude). The species were identified according to Bykhovskaya-Pavlovskaya i sar. (1962), Banina (1984) and Fijan (2006).

RESULTS

During the period of March and April of 2014. 100 fish individuals were collected for research purposes. In total fish sample four fish families were determined: Cyprinidae (*Alburnus alburnus*, *Blicca bjoerkna*, *Carassius gibelio*, *Cyprinus carpio* and *Ctenopharyngodon idella*), Esocidae (*Esox lucius*), Ictaluridae (*Ameiurus nebulosus*) and Siluridae (*Silurus glanis*). On researched fish species following ectoparasites were observed: *Chilodonella cyprini* (Moroff, 1902), *Trichodina sp.* (Ehrenberg, 1838) *Dactylogyrus sp.* (Diesing, 1850), *Gyrodactylus sp.* (Nordmann,

Table 1. Presence of ectoparasites on sampled fish species

Ectoparasites	*Chilodonella cyprini*	*Trichodina sp.*	*Dactylogyrus sp.*	*Gyrodactylus sp.*	*Posthodiplostomum cuticola*	*Argulus foliaceus*
Alburnus alburnus	+	+	+	+	+	-
Blicca bjoerkna	+	+	+	-	+	-
Carassius gibelio	+	+	+	+	+	+
Cyprinus carpio	+	+	+	-	+	+
Ctenopharyngodon idella	+	-	-	+	-	-
Esox lucius	-	+	-	-	-	-
Ameiurus nebulosus	+	+	+	-	-	-
Silurus glanis	+	+	+	+	-	-

1832), *Posthodiplostomum cuticola* (Nordmann, 1832) and *Argulus foliaceus* (Linnaeus, 1758). All identified ectoparasitic species are presented in table 1.

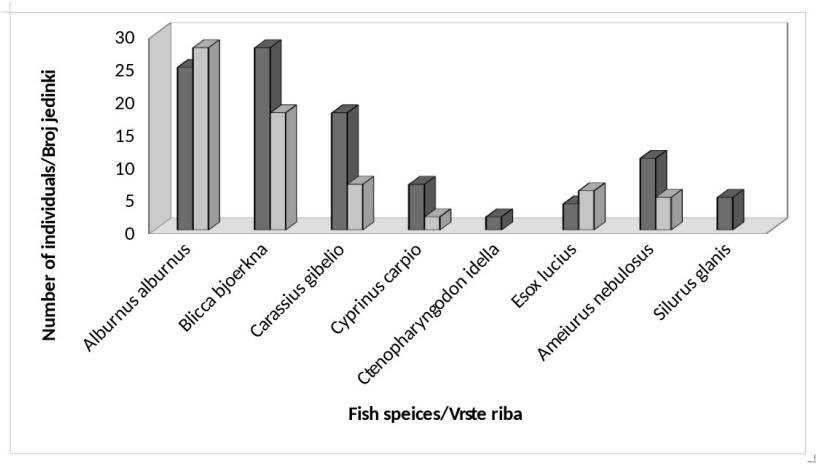

Figure 2. Prevalence values of *Chilodonella cyprini* (dark color – total sampled individuals, light color – number of infected individuals)

The prevalence of infestation with *Chilodonella cyprini* varied from 52% on *Alburnus alburnus* to 100% on *Blicca bjoerkna*, *Carassius gibelio*, *Cyprinus carpio* and *Silurus glani* (fig. 2).

The prevalence of infestation with *Trichodina sp.* varied from 10% on *Blicca bjoerkna* to 100% on *Cyprinus carpio* and *Silurus glanis* (fig. 3).

The prevalence of infestation with *Dactylogyrus sp.* varied from 9% on *Ictalurus nebulosus* to 76% on *Alburnus alburnus* (fig. 4).

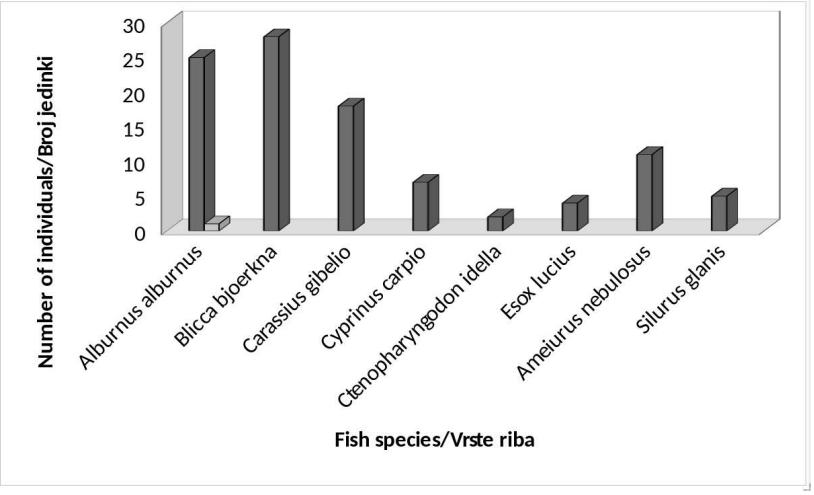

Figure 3. Prevalence values of *Trichodina sp.* (dark color – total sampled individuals, light color – number of infected individuals)

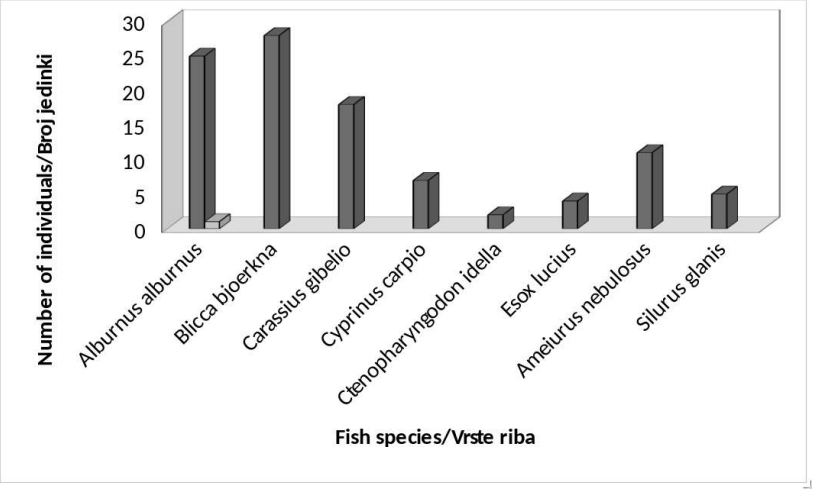

Figure 4. Prevalence values of *Dactylogyrus sp.* (dark color – total sampled individuals, light color – number of infected individuals)

The prevalence of infestation with *Gyrodactylus sp.* varied from 16% on *Alburnus alburnus* to 77% on *Carassius gibelio* (fig. 5)

The prevalence of infestation with *Posthodiplostomum cuticola* varied from 8% on *Alburnus alburnus* to 57% on *Blicca bjoerkna* (fig. 6)

The prevalence of infestation with *Argulus foliaceus* varied from 83% on *Carassius gibelio* to 100% on *Cyprinus carpio* (fig. 7).

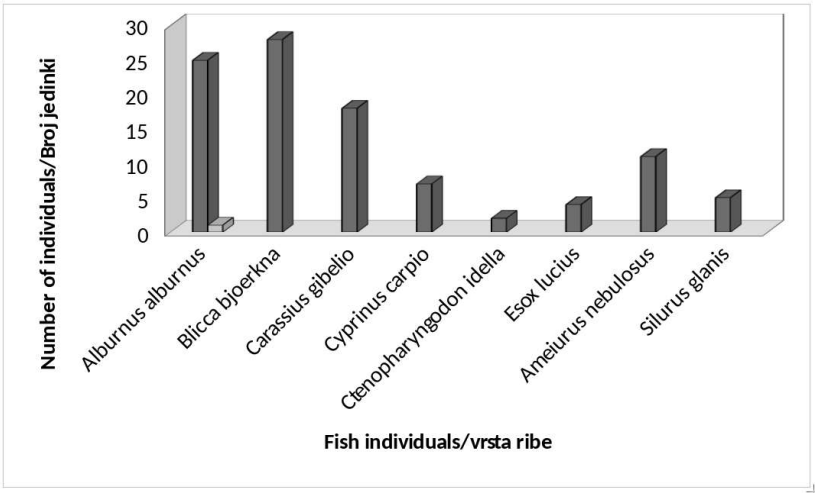

Figure 5. Prevalence values of *Gyrodactylus sp.* (dark color – total sampled individuals, light color – number of infected individuals)

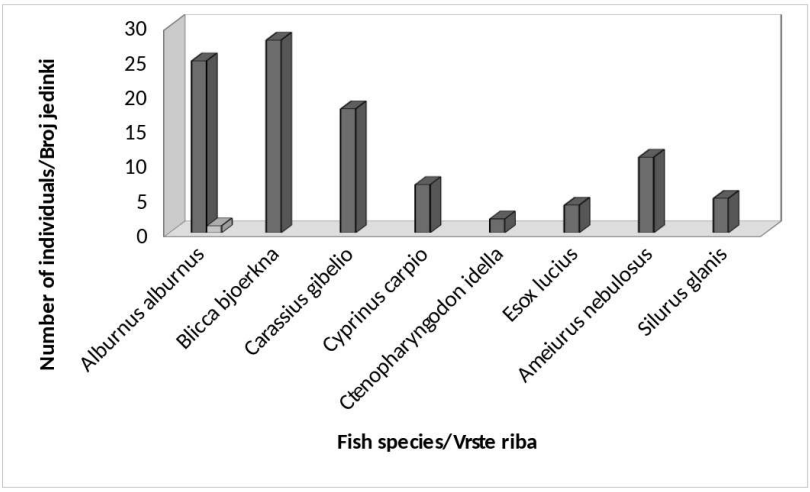

Figure 6. Prevalence values of *Posthodiplostomum cuticola* (dark color – total sampled individuals, light color – number of infected individuals)

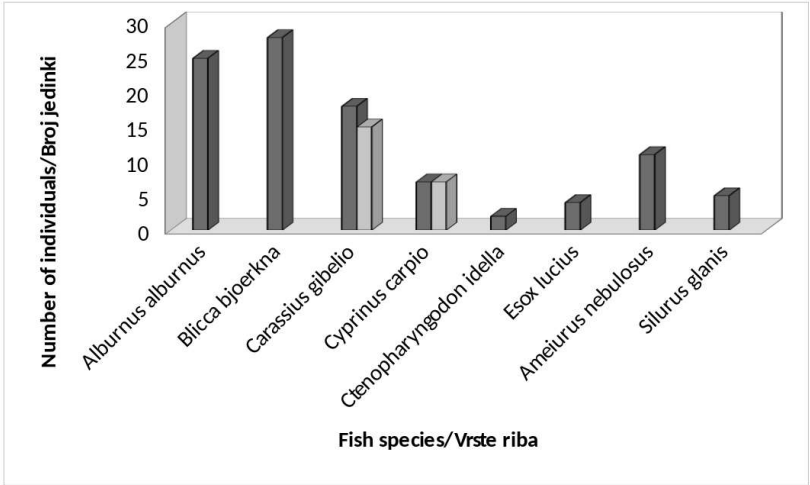

Figure 7. Prevalence values of *Argulus foliaceus* (dark color – total sampled individuals, light color – number of infected individuals)

DISCUSSION

Study of ectoparasitical infections by different types of ectoparasites showed very high prevalence of infection. Similar study was conducted during 2012–2013. on Sava river. One part of mentioned study analyzed the localities near confluence of the Tolisa river and result showed very similar ectoparasitic species: *Chilodonella cyprini*, *Trichodina sp*, *Dactylogyrus sp.* and *Dyrodactylus sp*, *Posthodiplostomum cuticola* and *Argulus foliaceus*. Except these ectoparasitic species, study found following species: *Ichtyobodo necator*, *Ichthyophthirius multifillis* and *Ergasilus sieboldi* (Nedić i sar., 2014).

Similar ectoparasitic communities were localized in some hydroaccumulations in Bosnia and Herzegovina. One of very important hydroaccumulations in Bosnia and Herzegovina is Modrac lake near Tuzla city. The data of ectoparasites of Modrac lake shows very similar ectoparasitic communities with Sava river and Tolisa river (Skenderović, 2015). The prevalence of infection of fishes from Sava river and Modrac lake was lower. One possible reason for that condition is the size of ecosystem. Sava river and Modrac lake are much bigger than the area of lower flow of Tolisa river. In small ecosystem density of fish population is bigger and there is a better chance of having parasitic-host relationship (Fijan, 2006). According to the analysis of Serbian experts, ectoparasitic protozoa, trematodes and crustaceans are often parasites of freshwater fishes of Serbian open waters (Đikanović, Paunović, Nikolić, Simonović i Cakić, 2011).

Some authors agree that infestations by *Chilodonella* are an important cause of metabolic disorders. *Chilodonella* spp. lives on skin and gills of fish. Heavy infestations have been reported to cause mass mortality among farmed and wild fish (Urawa i Yamao, 1992). According to Nikolić and Simonović (Nikolić i Simonović, 1996), *Chilodonella species* were present in April in open waters in significantly lower prevalence. The possible cause of high infestation percentage of ciliates in March and April could be its high densities which favoured the infestation. Low water temperature is also favorable for trichodinids development (Fijan, 2006) who found higher prevalence of ciliates at lower temperatures. It may be assumed that ciliate parasites in summer and autumn disappear due to increased immunological response of the host (Aaltonen, Jokinen i Valtonen, 1994).

Infections by ectoparasitic trematodes are very dangerous for normal homeostasis of freshwater fishes. Most of termatodes species are often localized on fish gills. That leads to their damage and worst health conditions of infested fish individuals (Skenderović, 2015).

According to the earlier studies, infestations by ectoparasitic crustaceans are not primary reasons for worst condition of fish (Nedić i sar., 2014).

This study could lead to the hypothesis that condition factor of the fish from Tolisa river is lower than condition factor of fish from Sava river. One of the earlier studies on condition factor of the fish from lower flow of Sava river showed that infected fish individuals have lower condition factor than the others (S. Riđanović, Nedić i L. Riđanović, 2015). For that fact, following research of fish from Tolisa river could lead to research of condition factor of aforementioned fishes.

CONCLUSION

According to the above results, it may be concluded that analyzed species of ectoparasite have no prominent type of infection. Peaks of infestation and ectoparasite richness occurred in spring, presumably because of sensitive health condition of fish during that time. Their pathogenic effects are the greatest on fish fry after its overwinting, when the fish is most sensitive to all infections. Our objectives were to identify species of ectoparasites, quantify the relative number of parasites and identify seasonal trends. Studies of freshwater fish parasitofauna in open waters are of importance for effective breeding in aquaculture. Ichthyofauna has a great importance for structure and function of trophic chains in open waters. Considering fish parasitic fauna diversity and richness, it is necessary to continue parasitofauna research of all fish species, to attain more complete image in this research area and to start adequate natural fish protection in Bosnia and Herzegovina.

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