

TREMATODE FAUNA OF SOME FISH SPECIES IN THE RIVER SPREČA

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FAUNA TREMATODA KOD NEKIH VRSTA RIBA U RECI SPREČI

Abstrakt

U radu su prikazane trematode koje su nađene kod riba u reci Streči tokom ihtioparazitoloških ispitivanja. Parazitološka ispitivanja su obavljena tokom 2010. godine i pokazala su prisustvo parazita kod 7 vrsta riba od 11 pregledanih u reci Streči tj. 144 primerka je bilo zaraženo trematodama od ukupnog broja (365) ispitanih riba. Kod pet vrsta riba nađene su dve vrste monogenih trematoda (*Dactylogyrus* sp., *Gyrodactylus* sp.) odnosno u crvenperki, deveriki, šaranu, ukliji i klenu. Digene trematode (*Diplostomum spathaceum*, *Posthodiplostomum cuticola*) zarazile su 6 vrsta riba u reci Spreči, odnosno crvenperku, deveriku, podusta, babušku, ukliju i klenu. Najjača zaraza je nađena kod *Leuciscus cephalus* (63,63 %) i *Chondrostoma nasus* (54,54 %) Nešto slabiji stepen infekcije kod *Scardinius erythrophthalmus*, *Abramis brama* i *Alburnus alburnus*. Najmanja zaraženost je bila kod *Cyprinus carpio* i *Carassius gibelio*. Kod drugih vrsta riba nisu nađeni paraziti tokom perioda ispitivanja. Od pojedinačnih tipova trematoda najveći obim infekcije je bio sa *Diplostomum spathaceum* (14,79 %) i *Dactylogyrus* sp. (12,86 %) a najmanji sa *Gyrodactylus salaris*, samo 1,91 %. Intenzitet zaraze kod ispitivanih riba varirao je od slabog pa sve do visokog stepena infestacije. Obim infestacije je zavisio od sezone ispitivanja.

Ključne reči: reka Spreča, ihtioparaziti, trematode, ribe.

INTRODUCTION

The tremendous wealth of our rivers, lakes and artificial reservoirs provide ideal conditions for existence of many different kinds of living beings. The survey of ichthyofauna of Spreča river has shown that it is a typical cyprinid watercourse in which there has been identified a small number of species, due to its high pollution, particularly in its lower reaches. Unlike ichthyologic researches, a research in diversity of invertebrates - fish parasites that inhabit the river Spreča - has never been conducted. In the world there is a relatively small number of published papers on the trematodes, especially on surveying trematodes in fish of open waters. Thanks to extensive testing of materials from most important rivers of Bosnia and Herzegovina, Čanković (1963) discovered the presence of 17 species of digenean trematodes in fish. Parasitological studies give us the possibility to achieve proper assessment of the validity of fish as food products, as well as to identify the parasites carried by fish which are dangerous to humans and animals. Therefore, the study of trematodes represents a special interest and among them there are many species which are fish parasites that are transmitted to humans.

MATERIALS AND METHODS

In order to assess the current state of fish parasitic fauna in the river Spreča, there were conducted parasitological surveys of 365 individual fish in the year 2010. The fish were caught at a number of locations, according to the needs of the research, with the standing triple fishing nets of the type gillnet with different mesh sizes, as well as by using other fishing tools and accessories. The largest number of parasitological tests was done on the spot, on the fresh material because the vegetative forms of trematodes very rapidly decline after the death of their hosts. Our studies were focused on examination of the skin, fins, gills, organs of the digestive system and lenses. After the determination, all the specimens of the identified fish species were thoroughly examined and analyzed for the presence of parasites.

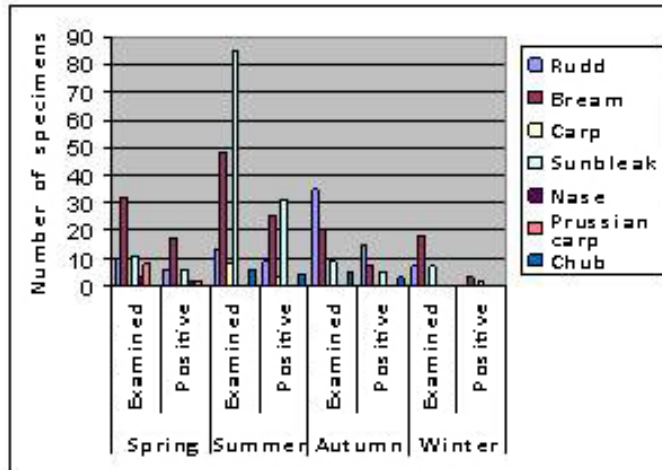
RESULTS AND DISCUSSION

Ichthyo-parasitological surveys of fish in Spreča river that were carried out during four annual seasons in 2010, have shown the presence of trematodes in a certain number of fish. Out of the total number (365) of the fish caught in river, the largest number belongs to the family *Cyprinidae* (333 individuals or 91.23%), significantly less percentage of the total ichthyo-sample is taken by *Percidae* (5.47%) and *Esocidae* (3.28%). (Table 1). The largest number within the total ichthyo-sample is taken by Bream with 118 individuals and Sunbleak with 112 individuals, whereas Ruffe was represented by only 2 individuals in Spreča river in the survey period.

Table 1. The total number of examined and infested fish species in the river Spreča

Nr.	Fish species	Family	Examined (365)		Posit.	%
1.	Rudd - <i>Scardinius erythrophthalmus</i>	<i>Cyprinidae</i> (91,23%)	65	17,80 %	30	46,15
2.	Bream - <i>Abramis brama</i>		118	32,32 %	52	44,06
3.	Carp - <i>Cyprinus carpio</i>		8	2,19 %	3	37,50
4.	Sunbleak - <i>Alburnus alburnus</i>		112	30,68%	44	39,28
5.	Nase - <i>Chondrostoma nasus</i>		11	3,01%	6	54,54
6.	Prussian carp - <i>Carassius gibelio</i>		8	2,19%	2	25,00
7.	Chub - <i>Leuciscus cephalus</i>		11	3,01%	7	63,63
8.	Ruffe - <i>Acerina cernua</i>	<i>Percidae</i> (5,47%)	2	0,54%	-	-
9.	Perch - <i>Perca fluviatilis</i>		9	2,46%	-	-
10.	Zander - <i>Sander lucioperca</i>		9	2,46%	-	-
11.	Pike - <i>Esox lucius</i>	<i>Esocidae</i> (3,28%)	12	3,28%	-	-

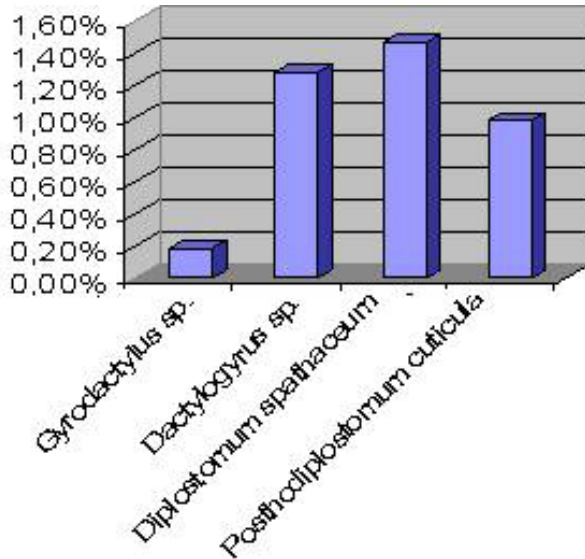
Of the 11 examined fish species in the river Spreča, 7 species were infested by trematodes. Fish with confirmed parasites belonged to the family *Cyprinidae*. The highest percentage of Trematodes (Graf 1.) was found among Chub individuals (63.63%) and Nase individuals (54.54%). In other studied species the extensity of infestation was lower. Our surveys showed certain regularity in the seasonal dynamics during the investigation period. Survey results in seasonal dynamics of trematodes found in fish of the river Spreča showed that during the spring the extensity of trematode invasion was the highest (57.81%), whereas it was slightly lower in the summer (54.60%) and autumn (50.70%). As expected, the extent of invasion during the winter period was the lowest, only 22.85%. Through parasitological examinations of fish in the river Spreča we found 4 species of trematodes so that two species of the order *Monogenea* belonged to the families *Dactylogyridae* and *Gyrodactylidae*, and two species of the order *Digenea* were classified in the family *Diplostomidae*.



Graph 1. Number of examined and trematode-infested fish by survey seasons

During the parasitological examinations of cyprinid fish from the river Spreča in 144 specimens were found parasites with the total extensity of infestation 39.45% and the intensity of infestation that ranged from low level up to a high degree of invasion. According to the data given by Čanković and et al. (1970), there was established a maximum extensity of trematode invasion in fish during the summer (58.5%), and during autumn and winter it gradually lowers and the next spring it amounts to only 7.36%. According to the data given by Komarova (1964) fish are invaded by parasites during the spring, and the infestation is reflected throughout the summer and autumn.

Byhovskaja - Pavlovskaja et al. (1963), give importance to the harmful effect of developmental forms of digenean trematodes on fish organisms. During our ichthyoparasitological (Graf 2.) surveys the ectoparasite *Gyrodactylus sp.* was found in 4 individuals of *Abramis brama* with the extensity of infestation 3.38% and a low intensity of infestation. In 3 specimens of *Leuciscus cephalus*, out of 11 examined, there was found the presence of *Gyrodactylus sp.* Overall, the extensity of infestation with *Gyrodactylus sp.* in the examined fish of Spreča river was 1.91%, with a low intensity of infestation. A significantly higher total extensity of infestation (12.86%) was determined with *Dactylogyrus sp.* also with a low intensity of infestation in the total ichthyosample. *Dactylogyrus sp.* was found in 4 species of fish in the river Spreča. Invasion degree of *Scardinius erythrophthalmus* with this kind of ectoparasites was 9.23%, with a low level of infestation. In *Abramis brama* was found the presence of *Dactylogyrus sp.* with the extensity of infestation 19.49% and with a medium-strong degree of infestation. The largest pathogenic impact had *Dactylogyrus sp.* (37,50%) in *Cyprinus carpio*, whereas the degree of infestation of *Alburnus Alburnus* by this parasite was significantly lower (13.39%) with a low infestation degree, as well as in the carp. According to the findings of Jažić, the largest presence of *Dactylogyrus* was in the period from May to October, which partially overlaps with our research results.



Graph 2. A comparative display of detected trematodes in fish of the river Spreča

For a five-year research period, with 5568 carps of different age categories, in all three fish farms in Bosnia and Herzegovina, Jažić (1995) found 21 species of parasites. The largest number of confirmed parasites belonged to helminths, 14 in total. Scrapings examination of fins, skin and gill of carp in the investigated fish farms discovered 11 species of monogenean trematodes, four of them belonging to the genus *Dactylogyrus*, six to the genus *Gyrodactylus* and one to the genus *Eudiplozon*. For species of the genus *Dactylogyrus* is known to extensively replicate at lower water temperatures, although it is possible to find them at higher temperatures as well, especially in the summer months. Of the total of 30 examined goldfish in three pet shops, Gjurčević et al. (2006) found that the parasite invasion degree in *Carassius* is for *Dactylogyrus* sp. 66.66% and for *Gyrodactylus* sp. 46.66%. During parasitological investigations of cyprinid fishes of Lake Prespa, Stojanovski et al. (2004) in three species of fish found in the gills 6 species of monogenean trematodes: *Dactylogyrus prostaе*, *D. sphyrna*, *D. erhardovae*, *D. elegantis*, *D. vistulae* and *Paradiplozoon Zeller*. The largest extensity of infestation was by *Dactylogyrus sphyrna* 25.08%. With *Leuciscus cephalus albus* the extensity of infestation was 62.22%, with *Rutilus rubilio prespansis* 59.87%, and with *Chondrostoma nasus prespansis* it was 41.59% - which is lower than the results that we achieved. In the examined specimens of fish from the river Spreča there was discovered the presence of *Diplostomum spathaceum* in five species.

The largest extensity of infestation was detected in Nase (54.54%) and Prussian carp (25%) with a low degree of intensity of infestation. In *Alburnus Alburnus* was detected the extensity of infestation 20.53% with *Diplostomum spathaceum* and a low degree of infestation. The extensity of infestation in *Abramis brama* was 14.40% with a medium-strong degree of infestation as well as in *Scardinius erythrophthalmus* but with significantly lower extensity of infestation (9.23%). According to Wilfried Haas et al. (2002) the cercaria *Diplostomum spathaceum* parasitize in the skin of fish and other animals,

depending on the appropriate stimulus on the basis of which they recognize the host. Studies have shown that stimulants which make possible prolonged contact of hosts and parasites are small molecules of carbohydrates, while amino acids, urea, electrolytes, and peptides do not enable contact. Parasitological examinations of fish caught in the river Spreča discovered the presence of *Posthodiplostomum cuticula* in 36 individuals or 9.86% of the total ichthyo-sample.

The largest extensity of infestation was found in *Leuciscus cephalus* 36.36% with a low degree of infestation. A significant presence of this parasite was found in Rudd with the extensity of infestation 27.69% and the highest intensity of infestation, with more than 30 examples of this endoparasite in each. Much less extensity of infestation was found in the examined specimens of *Abramis brama* (6.77%) and *Alburnus Alburnus* (5.35%) with a medium-strong degree of infestation. *Posthodiplostomum cuticula* shows the percentage prevalence of 73% in individual fish of the genus *Cobitis* (hybrid *C. x Elongatoides Cobitis* sp.) from the river Dyje in the Czech Republic, according to Halačka K. et al. (2000).

CONCLUSION

Exploring the presence of trematodes in fish of the river Spreča we found that 39.45% of the examined fish were invaded by parasites in the survey period. All the fish in which parasites were found belonged to the family *Cyprinidae*. The largest extensity of infestation was found in Chub 63.63% and Nase 54.54%. In Rudd, Bream, Carp and Sunbleak the extensities of infestation were lower whereas in Prussian carp it was only 25%. The highest intensity of infestation was found in Rudd. The parasitological examinations of fish in Spreča river discovered the presence of 4 species of trematodes, so that two species of the order Monogenea belonged to the families *Dactylogyridae* and *Gyrodactylidae*, and two species of the order Digenea were classified in the family *Diplostomidae*. Individually, we have found that the highest extensity of infestation was with *Diplostomum spathaceum* (14, 79%), slightly lower extensity was with *Dactylogyrus* sp. (12.86%) and 9.86% with *Posthodiplostomum cuticula*. The lowest invasion level in fish was with *Gyrodactylus* sp. as it was found to be only 1.91%. Invasion degree of the fish in Spreča river by trematodes shows proper seasonal dynamics.

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