

## First Record of Ectobiont Community on Wild Salmonids in Serbia

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**Abstract:** During 2007 and 2008 133 graylings (*Thymallus thymallus*), 30 huchen (*Hucho hucho*) and 4 brown trout (*Salmo trutta*) were sampled from 3 rivers in Southwest Serbia and were examined for ectobionts. *Apiosoma piscicola*, *Epistylis lwoffii*, *Gyrodactylus derjavini* were the representative ectobiont species on fish examined. Greater ectobiont richness was observed in April in Poblacnica River.

**Keywords:** wild salmonids, ectobionts, Serbia.

### 1. INTRODUCTION

Up to now, investigations of ectobionts, including parasitic organisms, were not accomplished on the salmonids in Serbia. Parasitic investigations have been done on fish species from eight hill-mountainous watercourses, two lakes and one salmonid fishpond of Sjenicko-Pesterska plateau (Uvac River Basin, south-west region of Serbia) (Cacic, 1992). Also, studies of freshwater fish ectoparasites in lakes of Homolje area have been performed (Nikolic and Simonovic 2002; Nikolic et al. 2006).

Health condition of salmonid populations from Serbian waters, graylings above all, has become very important for the past few decades because constructing hydropower objects, reinforced catch and inadequate protection may lead to moving of distribution boundaries in Europe (Jankovic, 2010).

Evaluation of freshwater fish ectobionts in wild salmonid populations have been largely overlooked in the past (Schisler et al, 1999). Despite extensive salmon production, little is known about the infection dynamics of these ectobionts on salmonids in Europe. Wild fish in lakes and rivers are known to serve as reservoirs of ectobionts, infecting salmonids in hatcheries supplied with water from such watercourses (Wootten & Smith 1980, Bristow 1993, Rintamaki-Kinnunen 1997).

### 2. MATERIAL AND METHODS

During 2007 and 2008 133 graylings (*Thymallus thymallus*), 30 huchen (*Hucho hucho*) and 4 brown trout (*Salmo trutta*) were sampled from 3 rivers in Southwest Serbia and were examined for ectobionts (Figure 1).

Season Dynamics of Ectobiont Species Found on Wild Salmonids during 2007 and 2008						
Fish species	Ectobionts	April	June	July	August	October
<i>Thymallus thymallus</i>	<i>Apiosoma piscicola</i>	2/10				1/10
	<i>Epistylis lwoffii</i>		1/10	1/10		
	<i>Gyrodactylus derjavini</i>	2/10				
	<i>Chilodonella hexasticha</i>		2/10			
<i>Hucho hucho</i>	<i>Apiosoma piscicola</i>	4/10				
	<i>Epistylis lwoffii</i>	1/10				
	<i>Gyrodactylus derjavini</i>	2/10		1/10		
	<i>Chilodonella hexasticha</i>					
<i>Salmo trutta</i>	<i>Apiosoma piscicola</i>					
	<i>Epistylis lwoffii</i>					
	<i>Gyrodactylus derjavini</i>			4/10		
	<i>Chilodonella hexasticha</i>					

**Figure1.** Representative ectobiont species on fish species



**Figure2.** Map of the sampling sites on three rivers in Serbia

The material was analyzed using standard parasitological procedure. Parasites found were bleached, stained, prepared and fixed for determination and collection. Isolation, sorting and identification of parasite fauna have been done within laboratory. Appropriate identification keys were used for determination of parasite fauna representatives to the lowest taxonomic level. The level of parasitic infestation was studied by analyzing of number of parasites per fish specimen.

### 3. RESULTS AND DISCUSSION

Several protozoans and Platyhelminthes (Monogeneans) were detected. *Apiosoma piscicola*, *Epistylis lwoffii*, *Gyrodactylus derjavini* were the representative ectobiont species on fish examined.

*Apiosoma piscicola* was observed on huchen (*Hucho hucho*) in 2007 and 2008 and on brown trout (*Salmo trutta*) in 2007 in the River Poblacnica. This ectobiont was also found on grayling (*Thymallus thymallus*) in 2007 in the River Rzav and in 2008 in the River Poblacnica. *Epistylis lwoffii* was detected on grayling in 2007 and on huchen in 2008, both in the River Poblacnica, and on grayling in 2007 in the river Ibar. *Gyrodactylus derjavini* was detected on huchen in 2007 and 2008, on brown trout in 2007 and on grayling in 2008, all in the river Poblacnica. *Chilodonella hexasticha* was found on grayling in 2007 in the river Ibar.

Peaks of infestation intensity and ectoparasite richness occurred in spring and in summer of both years, presumably because of sensitive health condition of fish during that time. The health of wild fish populations in Serbian rivers has recently become more important due to the decline or complete loss of year-classes of these fish species.

In order to collect enough samples of graylings and huchen, sampling was conducted in the lower salmonid region of rivers which these species prefer. However, in this region the presence of trout is very low because it prefers the upper salmonid region. For this reason we decided to carry out our research in lower salmonid region in which all three autochthonous salmonid species are present; because of the preference for the particular type of habitat, they are present in unequal numbers.

Our objectives were to identify species of ectoparasites, quantify the relative number of parasites, and identify seasonal trends that might contribute to the loss of these fish species in Serbian rivers. 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. Disappearance of some fish species as well as introduction of new ones, autochthonous fish species can cause/reduce complex problems and consequences and, therefore, the data on freshwater fish parasites are important for evaluation of general influence on the community structure (Simonovic, 2006).

Considering fish parasitic fauna diversity and richness in Serbia, it is necessary to continue parasite fauna research of all fish species, to attain more entire image in this investigation area and start adequate fishes safe garde in Serbia (Djikanovic et al, 2011).

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REFERENCES

- [1] Cacic P., Paraziti riba u vodama Sjenicko-pesterske visoravni i mogucnosti njihovog suzbijanja [Fish parasites in waters of Sjenicko-Pesterska plateau and possibilities of their decrease], Dissertation, Faculty of Veterinary Medicine, University of Belgrade, pp 1–277, (1992).
- [2] Nikolic V. and Simonovic P., First record on Chillodoneid parasite in trout fishery of Serbia, Arch Sci Belgrade. 54(1–2):9P–10P, (2002).
- [3] Nikolic V., Simonovic P. and Maric S., Occurrence of Chilodonella hexasticha (Ciliophora, Protista) on the farmed rainbow trout (*Oncorhynchus mykiss*) throughout the season. Acta Veterinaria. 56:55–61 (2006).
- [4] Jankovic D., Serbia – Part of the south zone of the range of distribution of the european grayling (*Thymallus thymallus* L.) Arch. Biol. Sci., Belgrade. 62 (1), 115-121 (2010).
- [5] Schisler G.J., Walker P.G., Chittum L.A. and Bergersen E.P., Gill Ectoparasites of Juvenile Rainbow Trout and Brown Trout in the Upper Colorado River, Journal of Aquatic Animal Health. 11:170–174 (1999).
- [6] Wootten R. and Smith J.W., Studies on the parasite fauna of juvenile Atlantic salmon, *Salmo salar* L., cultured in fresh water in eastern Scotland, Zeitschrift für Parasitenkunde. 63:221-231 (1980).
- [7] Bristow G.A., Parasites of Norwegian fresh-water salmonids and interactions with farmed salmon – A review, Fisheries Research. 17:219-227 (1993).
- [8] Rintamaki-Kinnunen P., Parasitic and bacterial diseases at salmonid fish farms in northern Finland, Acta Universitatis Ouluensis A 294. Department of Biology, University of Oulu, Finland (1997).
- [9] Simonovic P., Ribe Srbije [The fishes in Serbia], 2nd ed. Belgrade, Serbia: NNK International, 2006. Faculty of Biology & Agency for Environment protection. [in Serbian]
- [10] Djikanovic V., Paunovic M., Nikolic V., Simonovic P. and Cacic P., Parasitofauna of freshwater fishes in the Serbian open waters: a checklist of parasites of freshwater fishes in Serbian open waters, Reviews in Fish Biology and Fisheries. 22:297–324 (2011).

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