Spatial and temporal distribution of Plecoptera larvae in the Prishtina River (Kosova)

Esad Dauti, Halil Ibrahimi, Agim Gashi and Linda Grapci-Kotori

Abstract

In this paper the spatial and temporal distribution of Plecoptera larvae in the Prishtina River (Kosova) was studied. Surber samples were taken every month during a one-year period at six selected stations.

The results showed variability on the presence of Plecoptera in respect to temporal, spatial and anthropogenic factors. Seven different families of Plecoptera were found (Nemouridae, Capniidae, Perlodidae, Perlidae, Leuctridae, Chloroperlidae and Taeniopterigidae) with 23 taxa and 588 individuals.

Keywords: Plecoptera, Prishtina River

Introduction

There are about 2 000 named species of Plecoptera, all with aquatic larva, most of whom live only in cool waters, generally running streams or lakes with a upper temperature limit of 25 ˚ C. Partial stonefly investigations were carried over within general studies of benthic macroinvertebrates in these rivers in Kosovo: Drini i Bardhë, Llap, Sitnica, Bistrica e Prizrenit, and some smaller streams. Prishtina River, which is a left tributary of Sitnica River and belongs to Black Sea water basin, is investigated for the first time in regard to Plecoptera larvae.

The aim of this study was to explore spatial and temporal distribution patterns along the river and throughout the year. The percentage of Plecoptera larvae with respect to the overall macroinvertebrate fauna was also determined at selected stations.

Material and methods

Quantitative samples were taken every month with a Surber sampler (30 x 20 cm, 600 cm2) during November 2004 – December 2005. The criteria for choosing sampling stations were: type and slope of the river bad, altitude and vegetation structure. The collected material was preserved in 4 % formaldehyde. In the laboratory, the material was sorted out and the larvae of Plecoptera were identified and transferred to 75% ethanol. The material was determined at the Department of Biology (University of Prishtina - Kosova).

Results

The investigations at six selected stations along the Prishtina River yielded 23 taxa of Plecoptera with 588 individuals belonging to seven different families (Nemouridae, Capniidae, Perlodidae,

Table 1

Distribution of species of Plecoptera (larvae) at six selected stations of the Prishtina River (December 2004 – November 2005).

Stations						
Taxa	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**
Plecoptera						
Nemoura cinerea	62		13			
Nemoura sp.	20		2			
Nemurella picteti	2					
Nemurella sp.		2				
Leuctra nigra	2		8			
Leuctra hippopus	15	7				
Leuctra fusca	4					
Leuctra sp.	10					

Stations						
Taxa	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**
Perla marginata	1		18			
Perla burmeisteriana		2	3			
Perla sp.		2				
Dinocras cephalotes	10	5				
Dinocras sp.		10				
Perlodes intricata	1	24	4			
Perlodes microcephala	32	15	4			
Perlodes sp.			2			
Isoperla grammatica		4	14			
Arcynopteryx compacta	3	5				
Chloroperla sp.		31	2			
Capnia vidua	98	93	32	4		
Taeniopteryx sp.		4				
Brachyptera seticornis		6				
Brachyptera risi	12					
Σ of individuals	**272**	**210**	**102**	**4**	**0**	**0**

Perlidae, Leuctridae, Chloroperlidae and Taeniopterigidae) (Table 1).

Although at station P1 Plecoptera are found in high number of taxa (14), their density is very low compared to other macrozoobenthos groups. Capnia vidua Klapalek, 1944 is an exception, which reached the level of subdominant appearance during January (10.53 %) and even being dominant during February (36.46 %). Other frequent taxa at station P1 are Perlodes microcephala Pictet, 1833 and Brachyptera risi Morton, 1896 which are present usually during winter-spring. Nemoura cinerea Retzius, 1783 was found only twice during investigation period.

Fourteen taxa of Plecoptera were found at station P2 as well, mostly during the end of the winter and during the spring. Capnia vidua reaches the level of dominant appearance in March with 47.4 % of total macrozoobenthos specimens. Chloroperla sp. and Perlodes intricata Pictet, 1841 are present with high densities as well.

At station P3 eleven taxa of Plecoptera are present. Perla marginata Panzer, 1799, although in small number of individuals was present throughout the year.

The only taxa of Plecoptera found in station P4, Capnia vidua was present only during February and March in very small number of individuals.

Plecoptera are completely absent from last two stations.

The mean percentage of Plecoptera with respect to overall macrozoobenthos density of the Prishtina river sampling sites was 13.48 % with specific stations ranging from 0.18 % (station P4) to 16.49 % (station P1) (Fig.1).

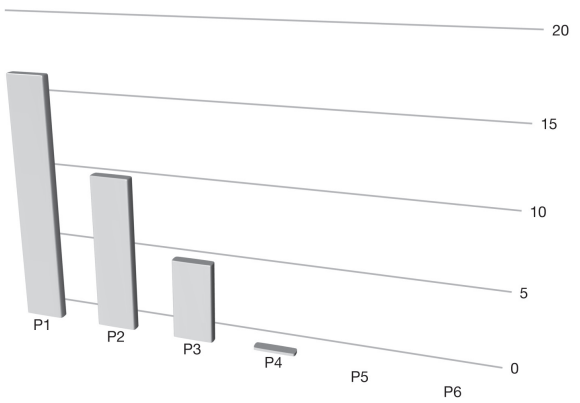

Fig. 1. The percentage of Plecoptera larvae with respect to overall macrozoobenthos density at six selected stations of the Prishtina River.

Discussion and conclusions

This study presents the first attempt to investigate Plecoptera larvae in the Prishtina River. Dauti (1980) found 73 taxa of Plecoptera in Kosova's rivers, 45 of which belong to Black Sea water basin. With 23 species at six selected stations of the Prishtina River, Plecoptera are one of the richest orders of aquatic insects in this river. 15 of these taxa were earlier found in the rivers which belong to Black Sea water basin (Dauti, 1980), while following taxa are specific only for the Prishtina River: Nemoura sp., Nemurella picteti, Nemurella sp., Perla sp., Perlodes sp. and Isoperla grammatica Poda, 1761.

The spatial distribution of Plecoptera can be influenced by several factors such as chemical factors, altitude, temperature, stream size, vegetable cover etc (Macan, 1962; Hynes, 1976; Hassage & Stewart, 1991).

Kamler (1967) concludes that Plecoptera dominate with taxa and individuals above 800 meters of sea level, which was a case in our investigations in the Prishtina river where most of taxa and their highest density was found in first three locations which belong to upper river flow. Only one taxa was found in station P4 and absence of Plecoptera in this station besides being result of lower altitude is an outcome of relatively high degree of organic pollution. Plecoptera are completely absent in last two stations as a result of organic enrichment due to the discharge of organic sewage. The influence of organic pollution is a very important factor in the variation of the Plecoptera density (Rosenberg & Resh, 1993; Giller & Malmqvist, 1998).

Plecoptera larvae in first three stations are present randomly, sometimes only once or twice during investigation period. This could be a result of ecological drift, whose nature and detailed causing elements are to be described in further studies. Drift - the downstream transport of invertebrates in the water column - is a feature of rivers worldwide. Reviews by Waters (1972), Brittain & Eikeland (1988), have cited many biotic and abiotic variables that influence drift.

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