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FAUNISTICAL INVESTIGATIONS OF MAYFLY LARVAE (INSECTA: EPHEMEROPTERA) IN THE NORTH-EASTERN CARPATHIANS, UKRAINE

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KÉRÉSZ-FAUNISZTIKAI (INSECTA: EPHEMEROPTERA) VIZSGÁLATOK AZ ÉSZAKKELETI-KÁRPÁTOKBAN

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ABSTRACT: Mayfly larvae were collected from the watercourses of the North-Eastern Carpathians in the summer of 2000., 2009. and 2012. Samples were taken from 19 sampling sites, mainly from small 1st and 2nd order streams but also from the upper Tisa and two of its larger tributaries. A total of 38 taxa were identified, among which 31 were determined on the species level. This is about 40 percent of the mayfly species recorded from the Zakarpats'ka Region. From faunistical point of view *Acentrella sinaica*, *Ecdyonurus rizuni*, *Rhithrogena beskidensis* and *Rhithrogena gorganica* are remarkable. Pupae and larvae of *Symbiocladius rhithrogenae* (Diptera: Chironomidae) were observed on some of the mayfly individuals.

Key words: Ephemeroptera, faunistics, streams, Zakarpats'ka Region, *Symbiocladius rhithrogenae*

KIVONAT: A 2000., 2009. és 2012. évek nyári időszakában Kárpátalja vízfolyásaiból, összesen 19 mintavételi ponton, főleg kis, első- és másodrendű patakokból de a Tisza felső szakaszáról és két nagyobb befolyójából is gyűjtöttem kérészlárvákat. Összesen 38 taxont sikerült azonosítani, ebből 31-t fajszinten. Ez a Kárpátaljáról kimutatott fajok körülbelül 40 százaléka. Faunisztikai szempontból kiemelendők az *Acentrella sinaica*, *Ecdyonurus rizuni*, *Rhithrogena beskidensis* és a *Rhithrogena gorganica* fajok. Több kérészfaj egyedein megfigyelhető volt a *Symbiocladius rhithrogenae* árvaszúnyog faj.

Kulcsszavak: Ephemeroptera, faunisztika, patakok, Kárpátalja, *Symbiocladius rhithrogenae*

Introduction

In the present work I publish the material of my summer collections of the year 2000., 2009. and 2012. Most of the investigations were focused on small watercourses in the catchment area of Tereblia (Talabor), Hoverla and Brebeneskul (Brebenyeszkul). One of the samples was taken on the outer side of the Carpathians, in the catchment area of the Prut. I collected mayfly larvae also from larger rivers, namely Tisa (Tisza), Tereblia (Talabor) and Rika (Nagyág) at one sampling site.

Material and method

Macroinvertebrates (mayflies) were collected partly with a pond net disturbing the bottom material („kick and sweep” method), and partly by hand, picking specimens from the surface of stones and other materials. The collected specimens were preserved in 70% ethanol. I identified the mayfly larvae using the following works: BAUERNFEIND and HUMPECH (2001), HAYBACH (1999), HEFTI et al. (1989), MALZACHER (1984), SOLDÁN and LANDA (1999), GODUNKO et al. (2004), KOVÁCS et al. (1999). Nomenclature follows the work of BAUERNFEIND and HUMPECH (2001).

Results and discussion

A total of 38 mayfly taxa were found at the 19 sampling sites (Table 1.) of which 31 could be identified on the species level (Table 2.). This is about 40 percent of the mayfly species recorded from the Zakarpats'ka Region (CSER, 2003, CSER and ANDRIKOVICS, 2001, GALDEAN, 1999, GODUNKO, 2000, GODUNKO and KOVÁCS, 2008, KOVÁCS and GODUNKO, 2008). The identification of the genera *Ecdyonurus* and *Rhithrogena* are especially difficult, therefore in certain cases only species groups were named. Concerning the genus *Rhithrogena* it is especially valid that the separation based on morphology of many of the species is doubtful and it does not agree with the results of molecular taxonomic methods (VUATAZ et al. 2011). Moreover, such kind of investigations concerning this area of the Carpathians are still not known.

The following mayfly species are remarkable from faunistical point of view: because of their rarity *Acentrella sinaica* and *Rhithrogena beskidensis*, because of they are endemic: *Ecdyonurus rizuni* (GODUNKO et al., 2004) and *Rhithrogena gorganica* (GODUNKO and SOLDÁN, 2001). Previous occurrence data of *Rhithrogena hybrida* are uncertain they should be confirmed (GODUNKO and KLONOWSKA-OLEJNIK, 2003).

On the following mayfly species pupae and larvae of *Symbiocladius rhithrogenae* (Zavrel, 1924) (Diptera: Chironomidae) were observed: *Ecdyonurus picteti*, *Ecdyonurus rizuni*, *Electrogena lateralis*, *Rhithrogena beskidensis*, *Rhithrogena gorganica*, *Rhithrogena puytoraci*, *Rhithrogena semicolorata* (Table 3.). The occurrence of *Symbiocladius rhithrogenae* on the *E. rizuni* was not detected previously (cf. GILKA et al. 2007).

References

- BAUERNFEIND, E. – HUMPECH, U.H. (2001): Die Eintagsfliegen Zentraleuropas (Insecta: Ephemeroptera): Bestimmung und Ökologie. – Verlag des Naturhistorischen Museums Wien, 239 pp.
- CSEER, B. (2003): Újabb adatok Kárpátalja kérészfauájának ismeretéhez. [New data to the knowledge of mayflies of the Zakarpats'ka Region, Ukraine.] – In: PENKSZA, K. – KORSÓS, Z. – PAP, I. (eds.): III. Kárpát-medencei Biológiai Szimpózium. Magyar Biológiai Társaság, Budapest: 121–124.
- CSEER, B. – ANDRIKOVICS, S. (2001): A Tisza-forrásvidék patakjainak gerinctelen makrofauája. (Invertebrate macrofaunal investigations on the streams of Tisza headwater area) – Hidrológiai Közlöny 81(5-6): 346–348.
- GALDEAN, N. (1999): Some considerations about the reophilic elements of the benthic fauna (ord. Ephemeroptera, Plecoptera and Trichoptera) of the Upper Tisza Region. – In: HAMAR, J. – SÁRKÁNY-KISS, A. (eds.): The Upper Tisa Valley, Tiscia monograph series, Szeged: 413–425.
- GILKA, W. – KLONOWSKA-OLEJNIK, M. – GODUNKO, R.J. (2007): On the biology of *Symbiocladius rhithrogenae* (Zavrel, 1924) (Diptera: Chironomidae) from the Chornohora Mts., Ukraine. – Polish Journal of Entomology 76: 285–291.
- GODUNKO, R.J. (2000): Historical changes of the fauna and questions of reservation of mayfly (Ephemeroptera, Insecta) of Ukrainian Carpathians. – Proceedings of State Natural History Museum, 15: 158–168. (in Ukrainian with English summary)
- GODUNKO, R.J. – KLONOWSKA-OLEJNIK, M. (2003): A checklist of the Ukrainian mayflies (Ephemeroptera). – Polskie Pismo Entomologiczne 72: 203–210.
- GODUNKO, R.J. – KLONOWSKA-OLEJNIK, M. – SOLDÁN, T. (2004): *Ecdyonurus rizuni* sp. nov. (Ephemeroptera: Heptageniidae) from the eastern Carpathians. – Annales Zoologici (Warszawa) 54(3): 519–524.
- GODUNKO, R.J. – KOVÁCS, T. (2008): Личинки одnodенок (Insecta: Ephemeroptera) української частини басейну р. Тиси, зібрані протягом 2006 року. (The mayflies larvae (Insecta: Ephemeroptera) of the Ukrainian section of the Tysa river-basin, collected during 2006). – Scientific Bulletin of the Uzhgorod University. Series Biology 23: 164–166. (in Ukrainian with English summary)
- GODUNKO, R.J. – SOLDÁN, T. (2001): Lectotype fixation and male imago distinguishing characters of *Rhithrogena gorganica* (Ephemeroptera: Heptageniidae). – Klapalekiana 37: 453–460.
- HAYBACH, A. (1999): Beitrag zur Larvaltaxonomie der *Ecdyonurus venosus*-Gruppe in Deutschland. – Lauterbornia 37: 113–150.
- HEFTI, D. – TOMKA, I. – ZURWERRA, A. (1989): Revision of morphological and biochemical characters of the European species of the *Ecdyonurus helveticus*-group (Ephemeroptera, Heptageniidae). – Mitteilungen der Schweizerischen Entomologischen Gesellschaft 62: 329–344.
- KOVÁCS, T. – AMBRUS, A. – BÁNKUTI, K. (1999): Data to the distribution of *Oligoneuriella* larvae in Hungary (Ephemeroptera: Oligoneuriidae). – Folia Entomologica Hungarica LX: 349–354.
- KOVÁCS, T. – GODUNKO, R. J. (2008): Faunistical records of larvae of Ephemeroptera, Odonata and Plecoptera from the Zakarpats'ka Region, Ukraine. – Folia Historico-Naturalia Musei Matraensis 32: 87–91.
- MALZACHER, P. (1984): Die europäischen Arten der Gattung *Caenis* Stephens (Insecta: Ephemeroptera). – Stuttgarter Beiträge zur Naturkunde. Ser. A, 373: 1–48.

- SOLDÁN, T. – LANDA, V. (1999): A key to the Central European species of the genus *Rhithrogena* (Ephemeroptera: Heptageniidae). – Klapalekiana 35: 25–37.
- VUATAZ, L. – SARTORI, M. – WAGNER, A. – MONAGHAN, M. T. (2011): Toward a DNA taxonomy of alpine *Rhithrogena* (Ephemeroptera: Heptageniidae) using a mixed Yule-Coalescent Analysis of mitochondrial and nuclear DNA. – PLoS ONE 6(5): e19728.

Table 1. Sampling sites with dates of sampling and geographical coordinates (WGS 84)

No.	Watercourses	Dates	Coordinates (Lat. N, Lon. E)
1.	Little brook under the Hoverla peak in the catchment area of Hoverla brook	27.07.2000.	48°09'29", 24°28'34"
2.	Little brook under the Hoverla peak in the catchment area of Hoverla brook	28.07.2000.	48°09'30", 24°28'49"
3.	Hoverla brook	29.07.2000.	48°08'01", 24°27'50"
4.	Little brook without name in the catchment area of Brebeneskul brook	31.07.2000.	48°05'50", 24°28'59"
5.	Brebeneskul brook	31.07.2000.	48°05'46", 24°29'03"
6.	Little brook without name in the catchment area of Brebeneskul brook	02.08.2000.	48°04'32", 24°32'14"
7.	Little brook under the Hoverla peak in the catchment area of Prut river	16.07.2009.	48°11'29", 24°31'40"
8.	Little brook under the Hoverla peak in the catchment area of Hoverla brook	17.07.2009.	48°08'43", 24°29'46"
9.	Brebeneskul brook	19.07.2009.	48°04'29", 24°32'48"
10.	Little brook without name in the catchment area of Brebeneskul brook	19.07.2009.	48°04'34", 24°33'18"
11.	Little brook without name in the catchment area of Brebeneskul brook	19.07.2009.	48°04'26", 24°32'45"
12.	Brebeneskul brook	20.07.2009.	48°04'41", 24°33'11"
13.	Tisa (Tisza) river above Dilove (Terebesfejpatak) village	21.07.2009.	47°57'12", 24°11'13"
14.	Svoboda brook, Svoboda (Szvoboda) village	05.08.2012.	48°37'57", 23°44'20"
15.	Chorna brook in the catchment area of Ozeryanka brook	07.08.2012.	48°33'25", 23°49'23"
16.	Pesya brook	09.08.2012.	48°32'01", 23°48'27"
17.	Little brook without name in the catchment area of Pesya brook	11.08.2012.	48°32'02", 23°48'25"
18.	Tereblia (Talabor) river, above Synevyr (Szinevér) village, sawmill	13.08.2012.	48°31'34", 23°38'12"
19.	Rika (Nagyág), above Berezovo (Berezna) village	13.08.2012.	48°20'28", 23°30'24"

Table 2. Number of mayfly individuals collected at sampling sites.

[illegible]

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
<i>Rhithrogena iridina</i> (Kolenati, 1839)														1	1	8	7		
<i>Rhithrogena iridina/picteti</i>		16	5	24	7				13	4	5	11							
<i>Rhithrogena puytoraci</i> Sowa et Degrange, 1987				67						1							2		
<i>Rhithrogena semicolorata</i> (Curtis, 1834)																3			
<i>Rhithrogena sp. juv.</i>	15		45	23	19		1		8		3	4			1	2	1		
Leptophlebiidae Banks, 1900																			
<i>Habroleptoides confusa</i> Sartori et Jacob, 1986				5								1		10	12	13		1	
Ephemerellidae Klapálek, 1909																			
<i>Ephemerella ignita</i> (Poda, 1761)														1				2	6
<i>Ephemerella mucronata</i> (Bengtsson, 1909)							1												
<i>Torleya major</i> (Klapálek, 1905)														1	1				
Caenidae Newman, 1853																			
<i>Caenis beskidensis</i> Sowa, 1973													4						

Table 3. Number of mayfly individuals infected by *Symbiocladius rhithrogenae*

Mayfly taxa	Number of sites						
	4.	7.	9.	12.	16.	17.	18.
<i>Ecdyonurus picteti</i>		2					
<i>Ecdyonurus rizuni</i>	1						
<i>Ecdyonurus sp. juv.</i>			2				
<i>Electrogena lateralis</i>					1		
<i>Rhithrogena beskidensis</i>						1	
<i>Rhithrogena gorganica</i>		1	1	2			
<i>Rhithrogena puytoraci</i>						1	
<i>Rhithrogena semicolorata</i>					1		