FOLIA HISTORICO NATURALIA MUSEI MATRAENSIS
2008 32: 135–147

Quantitative records of larvae of Ephemeroptera, Odonata and Plecoptera from the Zakarpats'ka Region, Ukraine (2004, 2006)

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ABSTRACT: The first part of this paper (Tables 1-2) provides data on 38 Ephemeroptera, 3 Odonata and 19 Plecoptera taxa from the Zakarpats'ka Region, Ukraine. The species *Taeniopteryx auberti* Kis & Sowa, 1964 and *T. schoenemundi* (Mertens, 1923) are recorded in the first time from Ukraine. The following species are new to Zakarpats'ka Region and Tysa River: *Cloeon dipterum* (Linnaeus, 1761), *Kageronia fuscogrisea* (Retzius, 1783) (Borzhava), *Isogenus nubecula* Newman, 1833 (Rika, Teresva, Tysa). The second part (Tables 3-5) is a still unpublished data list of GODUNKO & KOVÁCS (2008).

Introduction

This paper is divided into two parts. The first part (Tables 1-2) contains results of a quantitative sampling focused on the Tysa and its inflows (06.05.2004-07.05.2004, 29.06.2004-30.06.2004, 19.10.2004-20.10.2004). The water courses investigated are Chorna Tysa, Bila Tysa, Tysa (six sampling spots), Shopurka, Apshytsia, Teresva, Tereblia, Rika, Borzhava. Faunistic results of this work were published by KOVÁCS & GODUNKO (2008).

Composit type samples were taken using the "kick and sweep" method. Three semiquantitative samples were taken from five meter long sections at each sampling spot. This meant the sampling of a 3.75 m^2 (3 × 1.25 m^2) area at each site. The three separately processed samples represented characteristic habitat-types of the given river-section. The collectors are Péter Juhász, Béla Kiss and Zoltán Müller.

The Ephemeroptera and Plecoptera material on which the present part is based has been preserved in 70% ethanol and housed in the Mátra Museum (Gyöngyös, Hungary).

Identification of the genera: *Caenis luctuosa/macrura*, *Ecdyonurus*, *Rhithrogena* (Ephemeroptera); *Amphinemura*, *Chloroperla*, *Dinocras cephalotes/megacephala*, *Isoperla*, *Leuctra, Nemoura*, *Perla marginata/pallida*, *Perlodes*, *Protonemura*, *Rhabdiopteryx*, *Siphonoperla* (Plecoptera) is still in progress.

The second part (Tables 3-5) contains the unpublished data on which GODUNKO & KOVÁCS (2008) provided information and conclusions. Only one quantitative record was published in that paper, namely that of *Baetis beskidensis* Sowa, 1972 which was reported as new to Ukraine.

Table 1. Taxonomical composition and number of collected Ephemeroptera, Odonata, Plecoptera specimens of the Chorna Tysa, Bila Tysa, Tysa River (2004)

	I/1.			I/2.			I/3.			I/4.			I/5.			I/6.			I/7.			I/8.		
	a	**b**	**c**	**a**	**b**	**c**	**a**	**b**	**c**	**a**	**b**	**c**	**a**	**b**	**c**	**a**	**b**	**c**	**a**	**b**	**c**	**a**	**b**	**c**
Acentrella sinaica		3																						
Baetis alpinus	25			11																				
B. fuscatus					12			26	1		22			28	1		28	2		27	18		63	24
B. gracilis																				31			1	
B. lutheri	7	13		14	2		5			6			3			1			2					
B. melanonyx		2																						
B. muticus		5					3	1					1						8					
B. rhodani	36	5	6	30			9			9			9	1	1	1			3			3		
B. scambus		26	1		20			13			2													
B. vardarensis							2			9			17			14	12		44			11		
B. vernus		6							1			2			1									
Caenis beskidensis																	2			23			16	
C. luctuosa/macrura																1				2			3	
C. pseudorivulorum																				3	4		35	3
Centroptilum pulchrum																							5	
Ecdyonurus sp.	14	1	8	3	1	12	9	36	6	17	21	57	1		2	6	1	9	7	16	11	11	240	20
Electrogena lateralis		1		3	2								1			1			1					
Epeorus assimilis	3		3						4						2									
Ephemera lineata																1			1			2		
Ephemerella mucronata	14			21			16			48			10			2						1		
Habroleptoides confusa	22		8	1			2		1			1						2			1			
Heptagenia coerulans																	4			21			5	
H. sulphurea																4	2		9	1	1	34	1	5
Oligoneuriella rhenana					2			119			370			2			230			19			20	
Paraleptophlebia submarginata																1					1			3
Potamanthus luteus																						9		3
Rhithrogena sp.	154	156	139	4	7	6	189	78	101	151	32	81	47	22	10	24	37	31	155	14	20	33		2
Serratella ignita		10			24			69			42			7			6			46			17	
Torleya major	5	1	4	3	2	1										6			2	5			7	
Ephemeroptera ∑	**280**	**229**	**169**	**90**	**72**	**19**	**235**	**342**	**114**	**240**	**489**	**141**	**89**	**60**	**17**	**62**	**322**	**44**	**232**	**208**	**56**	**104**	**413**	**60**
Onychogomphus forcipatus										1			1			5	2		4	1		5	2	
Odonata ∑	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**5**	**2**	**0**	**4**	**1**	**0**	**5**	**2**	**0**

	I/1.			I/2.			I/3.			I/4.			I/5.			I/6.			I/7.			I/8.		
	a	**b**	**c**	**a**	**b**	**c**	**a**	**b**	**c**	**a**	**b**	**c**	**a**	**b**	**c**	**a**	**b**	**c**	**a**	**b**	**c**	**a**	**b**	**c**
Amphinemura sp.	3						1																	
Brachyptera risi			1																					
B. seticornis	2			4			1																	
Chloroperla sp.	7		1	1			9		1	6			4			1								
Dinocras cephalotes/megacephala	1		1			1							1						1					
Isogenus nubecula																		2			10			6
Isoperla sp.	62	17		13		2	15			52			18			4			46			6		
Leuctra sp.	16	4	1			1	2	3	2		1							1						
Nemoura sp.							1						1											
Perla bipunctata																			2					
P. burmeisteriana																				1				
P. grandis							1																	
P. marginata/pallida	1	2	5	5	7	8			2	1	1	3			1				1					
Perlodes sp.	4		13			75			4			5	1		1									
Protonemura sp.							2																	
Rhabdiopteryx sp.			1																					
Siphonoperla sp.	2			1																				
Taeniopteryx auberti			2			5						1												
T. schoenemundi															1			4						4
Plecoptera ∑	**98**	**23**	**25**	**24**	**7**	**92**	**32**	**3**	**9**	**59**	**2**	**9**	**25**	**0**	**3**	**5**	**0**	**7**	**50**	**1**	**10**	**6**	**0**	**10**
Total number of specimens	**378**	**252**	**194**	**114**	**79**	**111**	**267**	**345**	**123**	**300**	**491**	**150**	**115**	**60**	**20**	**72**	**324**	**51**	**286**	**210**	**66**	**115**	**415**	**70**

I/1. = Chorna Tysa: Chorna Tysa (Feketetisza: Fekete-Tisza); **a** = 07.05.2004, **b** = 29.06.2004, **c** = 20.10.2004 – **I/2**. = Roztoky: Bila Tysa (Nyilas: Fehér-Tisza); **a** = 07.05.2004, **b** = 29.06.2004, **c** = 20.10.2004 – **I/3**. = Vil'khovatyi: Tysa (Kiscserjés, Tisza); **a** = 07.05.2004, **b** = 29.06.2004, **c** = 20.10.2004 – **I/4**. = Khmeliv: Tysa (Komlós: Tisza); **a** = 06.05.2004, **b** = 29.06.2004, **c** = 20.10.2004 – **I/5**. = Luh: Tysa (Lonka, Tisza); **a** = 06.05.2004, **b** = 29.06.2004, **c** = 19.10.2004 – **I/6**. = Tiachiv: Tysa (Técső: Tisza); **a** = 06.05.2004, **b** = 29.06.2004, **c** = 19.10.2004 – **I/7**. = Vyshkiv: Tysa (Visk: Tisza); **a** = 06.05.2004, **b** = 29.06.2004, **c** = 19.10.2004 – **I/8**. = Tekovo: Tysa (Tekeháza: Tisza); **a** = 07.05.2004, **b** = 30.06.2004, **c** = 19.10.2004.

Table 2. Taxonomical composition and number of collected Ephemeroptera, Odonata, Plecoptera specimens of the tributaries of the Tysa River: Shopurka, Apshytsia, Teresva, Tereblia, Rika, Borzhava (2004)

	II.			III.			IV.			V.			VI.			VII.		
	a	b	c	a	b	c	a	b	c	a	b	c	a	b	c	a	b	c
B. beskidensis		4																
B. buceratus																1		
B. fuscatus		7			3	5		12	1		6			15	3	1		
B. gracilis								2										
B. lutheri	34						1											
B. muticus	2		1	4			7											
B. rhodani	5		1	3			2			1			2			4		
B. scambus		1			1									2				
B. tricolor																	2	
B. vardarensis	49		1	2	2		28	3	5	3	16	4	8	7		2		
B. vernus						1												
Caenis beskidensis								2			9							
C. luctuosa/macrura				2	16			2				2		2		3	1	1
C. pseudorivulorum					1						3			1				
Centroptilum pulchrum														2				
Choroterpes picteti											1							
Cloeon dipterum																	2	
Ecdyonurus sp.	8	4	9	6	36	1	4	29	20	2	25		5	32	17	10	5	
Electrogena affinis																	4	
E. lateralis				5						3			2					
Epeorus assimilis	5		13						1									
Ephemera lineata									1									1
E. vulgata																		6
Ephemerella mucronata	46						2											
Habroleptoides confusa									6									
Heptagenia coerulans											1							
H. sulphurea									1			2	3	1	16	1		1
Kageronia fuscogrisea																		1
Oligoneuriella rhenana		458			38			698			760			621				
Paraleptophlebia submarginata			1						2			1			2			64
Potamanthus luteus														2		2	7	
Procloeon bifidum																	16	

	II.			III.			IV.			V.			VI.			VII.		
	a	**b**	**c**	**a**	**b**	**c**	**a**	**b**	**c**	**a**	**b**	**c**	**a**	**b**	**c**	**a**	**b**	**c**
Rhithrogena sp.	133	39	91	1	28	7	97	9	52		1	1	101	17	75	2		
Serratella ignita		44			16			32			39			33				
Torleya major	5		4				5		2		2		1		1			
Ephemeroptera ∑	**287**	**557**	**121**	**23**	**141**	**14**	**146**	**789**	**91**	**9**	**863**	**10**	**122**	**735**	**114**	**26**	**37**	**74**
Gomphus vulgatissimus																		2
Onychogomphus forcipatus	2	1	6	7	10		1			5	5	20	1	1				
Platycnemis pennipes																2	1	3
Odonata ∑	**2**	**1**	**6**	**7**	**10**	**0**	**1**	**0**	**0**	**5**	**5**	**20**	**1**	**1**	**0**	**2**	**1**	**5**
Amphinemura sp.	1						1											
Brachyptera risi	1																	
Chloroperla sp.	5																	
Dinocras cephalotes/megacephala	1																	
Isogenus nubecula									1						1			
Isoperla sp.	29						31						1					
Leuctra sp.			2		2				18		1			8	4			
Nemoura sp.																1		
Perla bipunctata							1	1										
P. burmeisteriana			1						1					1				
P. marginata/pallida	8	2	6															
Perlodes sp.			13						6									
Taeniopteryx auberti			1															
T. schoenemundi			17						18						15			
Plecoptera ∑	**45**	**2**	**40**	**0**	**2**	**0**	**33**	**1**	**44**	**0**	**1**	**0**	**1**	**9**	**20**	**1**	**0**	**0**
Total number of specimens	**334**	**560**	**167**	**30**	**153**	**14**	**180**	**790**	**135**	**14**	**869**	**30**	**124**	**745**	**134**	**29**	**38**	**79**

II. = Velykyi Bychkiv: Shopurka (Nagybocskó: Sopurka); **a** = 06.05.2004, **b** = 29.06.2004, **c** = 20.10.2004 – **III**. = Dibrova: Apshytsia (Alsóapsa: Apsica); **a** = 07.05.2004, **b** = 30.06.2004, **c** = 20.10.2004 – **IV**. = Teresva: Teresva (Taracköz: Tarac); **a** = 07.05.2004, **b** = 30.06.2004, **c** = 19.10.2004 – **V**. = Bushtyno: Tereblia (Bustyaháza: Talabor); **a** = 07.05.2004, **b** = 30.06.2004, **c** = 19.10.2004 – **VI**. = Iza: Rika (Iza: Nagy-ág); **a** = 07.05.2004, **b** = 30.06.2004, **c** = 19.10.2004 – **VII**. = Bene: Borzhava (Bene: Borzsa); **a** = 07.05.2004, **b** = 30.06.2004, **c** = 19.10.2004.

Table 3. Taxonomical composition and number of collected Ephemeroptera specimens of the right-bank tributaries of the Tysa River: Uzh, Latorytsia, Borzhava (2006)

	UZab0506	UZab0606	UZab0806	UDub0506	UDub0606	UDub0806	UPer0506	UPer0606	UPer0806	UOno0506	UOno0606	UOno0806	LSva0506	LSva0606	LSva0806	LCha0406	LCha0506	LCha0606	LCha0806	LKol0506	LKol0606	LKol0806	LMG0506	LMG0606	LMG0806	BHre0506	BHre0606	BHre0806	BKhm0506	BKhm0606	BKhm0806	BBen0506	BBen0606	BBen0806	BVar0506	BVar0606	BVar0806
Baetis beskidensis	13	10	2				17	9	4																											
B. buceratus																										6		8	12					4	1
B. fuscatus	51	78	56	18	33	53	142	192	113	121	116	52	22	398	74	152	132	199	192	12	19	28				45	32	38	31	46	33		23	14	25	49	22
B. lutheri	2																																			
B. muticus		6	9																																	
B. rhodani										29	26	9	2			2		20	6							14	3	8	12	19	16			5	6	17	12
B. vardarensis					2					6	18	19	14	28	13	132	101	17	12																	
B. vernus																3	2																			
Baetis spp. (young larvae)	56	44	72	48	64	102	43	27	7	77	62	77	31	17	21	27		82	138							72	18	61	32	18	11						
Centroptilum nanum																															9					
Procloeon bifidum							5			8	6	6											1	3	2		12	2	6	3	6		8		12	3	10
Oligoneuriella rhenana	107	249	105	59	68	42	68	166	88	144	192	84	47	320	52	11	20	242	218		4	6				9	20	4	22	53	10						
Epeorus assimilis										1	2																									
Ecdyonurus aurantiacus																										2	5		4	1	3				5	7	1
E. dispar	3	10	2				20	8	2	5	7	2	3	28	1			27	14								3	7									
E. insignis	7	17	11	17	57	14	84	2		16	34	14	1	2	2				3																	
E. cf. *dispar* (young larvae)				23	46																															
E. submontanus		5						3																												
E. cf. *submontanus*							4	2	3	2									3																	
E. torrentis													21	2	7	10				3	1	3														
E. venosus														6																						
E. gr. *venosus* (young larvae)																										27	16					1				
Ecdyonurus spp. (young larvae)	68	69	43	143			78	20	17	57	56	61	37	127	16			24	22																	
Heptagenia sulphurea																										4	7		4	7	7	36	15	7	1	4	4
Rhithrogena germanica													24		3																					
R. semicolorata	4	8	17														8																			
Rhithrogena spp. (young larvae)		25	22																																	

	UZab0506	UZab0606	UZab0806	UDub0506	UDub0606	UDub0806	UPer0506	UPer0606	UPer0806	UOno0506	UOno0606	UOno0806	LSva0506	LSva0606	LSva0806	LCha0406	LCha0506	LCha0606	LCha0806	LKol0506	LKol0606	LKol0806	LMG0506	LMG0606	LMG0806	BHre0506	BHre0606	BHre0806	BKhm0506	BKhm0606	BKhm0806	BBen0506	BBen0606	BBen0806	BVar0506	BVar0606	BVar0806
Torleya major		6	2										37	13	4	3	3			1	1	7														
Ephemerella mucronata													4				1																				
Serratella ignita	96	255	123	105	123	73	291	182	124	162	150	122	17	217	22			223	207							25	34	14	17	20	19	6	6	9			
Caenis luctuosa		5	2	3	2	7	6	2		1						4	2	5	6							17	1	5	15	13	13	6	4	4	10	8	15
C. macrura																					2	9															
C. pseudorivulorum																														5							
C. robusta																								1	4												
Habrophlebia fusca										2	3	5																									
H. lauta																							1		2						3	6	3			
Paraleptophlebia cincta																	1																				
P. submarginata																										3	5	2	1	4	5				4	16	1
Ephemera danica		3	1							1											1																
E. vulgata																													3						1		
Potamanthus luteus																														11	6		11		2	5	7
Total number of specimens	407	790	467	416	395	291	758	613	358	632	672	451	260	1158	215	344	270	839	821	16	28	53	2	4	8	218	162	141	155	212	129	61	73	42	65	114	73
Σ	6250 specimens: 6191 – larvae; 59 – imagoes female												4018 specimens: 3994 – larvae; 24 – imagoes female													1445 specimens of larvae											
	11713 specimens: 11630 – larvae; 83 – imagoes female																																				

Remarks. The localities of the Uzh River: UZab0506-0806 – 2 km up of Zabrid' village; UDub0506-0806 – Dubrynychi village, near the bridge towards of Chornoholova village; UPer0506-0806 – Perechyn town, near of the mouth of Turiia River; UOno0506-0806 – vicinity of Onokivtsi village, near the bridge towards Orikhovytsia village; the localities of the Latorytsia River: LSva0506-0806 – Svaliava town, near the bridge towards Mukacheve town; LCha0406-0806 – Chanadievo village, near railway station; LKol0506-0806 – Kolchyno village, near railway station; LMG0506-0806 – 3 km S of Mali Heivtsi village, near the bridge towards Chop town; the localities of the Borzhava River: BHre0506-0806 – Hreblia village, near the bridge towards Vilkhivka village; BKhm0506-0806 – 2 km S of Khmilnyk village; BBen0506-0806 – Bene village, near the bridge towards Berehove-Vilok; BVar0506-0806 – Vary village, near the bridge in the village centre.

The dates of sampling of mayflies (Insecta: Ephemeroptera) of the basins of the Uzh River (1), the Latorytsia River (2) and Borzhava River (3): 1 – 04.05.2006, 14-15.06.2006, 05.08.2006; 2 –30.04.2006, 05.05.2006, 16.06.2006, 06.08.2006; 3 – 06.05.2006, 17.06.2006, 07.08.2006.

UZab0506

The acronym of locality — The date of sampling (April, 2006)

Table 4. Taxonomical composition and number of collected Ephemeroptera specimens of mountain part of the Tysa river-basin (main current of the Chorna Tysa River and three small tributaries) (2006)

	UTLa0506	UTLa0606	UTLa0806	UTYa0506	UTYa0606	UTYa0806	UTKe0506	UTKe0606	UTKe0806	Keve0506	Keve0606	Keve0806	UTBi0506	UTBi0606	UTBi0806	BiSt0506	BiSt0606	BiSt0806	UTBT0506	UTBT0606	UTBT0806	RbSt0506	RbSt0606	RbSt0806	UTKo0506	UTKo0606	UTKo0806	UTDh0506	UTDh0606	UTDh0806
Baetis alpinus										35	22	45				43	57	36												
B. fuscatus	26	57	27	42	61	123	29	8	16				42	110	147				18	37	28				102	127	72	64	88	75
B. lutheri	13	27	23	15	9	38								16	28				3	8	1				5	21		6	10	2
B. melanonyx										15	7	6										13	10	6						
B. muticus	2	9	6	1	4	11			2					18	40				1	5	6				11	6	2			
B. rhodani	2	31	21	6	4	9			3	6	1	12		8	13					4	3	17	8	14	32	18	7	11	23	6
B. vernus	19	34	43	3	8	11			1											6	1				7	8	5	17	20	
Baetis spp. (young larvae)	35	50	36	37	29	13			26	50				28	17	72			64	20	24	62	46	23	51	46	16	47	59	29
Procloeon bifidum		1	3																											
Oligoneuriella rhenana							1	4	6				21	22	9										38	48	62	17		20
Epeorus assimilis																									24	15	4			
Ecdyonurus carpathicus		7	24			3	5	1	4		3	2	7	5	9										7	25	11	8	4	
E. dispar		9	11																											
E. cf. *dispar* (young larvae)	7	3		7	60	84	52	103	129				26	45	36				15	56	39				17	19	7	25	16	5
E. nigrescens												27						12												
E. cf. *submontanus*								1	2																					
E. rizuni																						28	35	31						
E. gr. *helveticus* (young larvae)	5									32	38					15	21													
Ecdyonurus spp. (young larvae)				24	41	17						8		30	26				7	9	6				30	6	22	50	30	
Electrogena quadrolineata		3																												
Rhithrogena carpatoalpina	2	5				6																								
R. gorganica	11	3								10	21	15				8	6	1				6	3	12						
R. iridina	7	28				17				16	13	25				25	13	9												
R. gr. *semicolorata* (young larvae)				2	6	10	8	4	2				9	4	5				18	4					6	37	15	9	18	11
Rhithrogena spp. (young larvae)	22	4		13	14	31	25	18	9				30	17	48					14	14				12	52	20	33	37	7
Serratella ignita	20	28	19	55	71	182	12	28	35				15	21	24				12	18	14				55	71	58	29	46	31
Caenis luctuosa				3	5	12																								

	UTLa0506	UTLa0606	UTLa0806	UTYa0506	UTYa0606	UTYa0806	UTKe0506	UTKe0606	UTKe0806	Keve0506	Keve0606	Keve0806	UTBi0506	UTBi0606	UTBi0806	BiSt0506	BiSt0606	BiSt0806	UTBT0506	UTBT0606	UTBT0806	RhSt0506	RhSt0606	RhSt0806	UTKo0506	UTKo0606	UTKo0806	UTDi0506	UTDi0606	UTDi0806
C. macrura				10	22	32	6	15	32				7	35	56				4	26	8				8	17	6	12	26	2
C. rivulorum	3	10	8																											
Caenis spp. (young larvae)						9																								
Habrophlebia lauta									1																					
Paraleptophlebia submarginata					1	3			1					3						2	1									
Habroleptoides confusa												4													2	6		8	12	
Total number of specimens	174	309	221	218	335	611	138	182	269	164	105	144	157	362	458	163	97	58	142	209	145	126	102	86	407	522	307	336	389	188
∑	**7124 specimens: 7119 – larvae; 3 – imagoes female; 2 – subimagoes female**																													

Remarks. The localities: UTLa0506-0806 – Yasinia village, the mouth of Lazeshchyna River; UTYa0506-0806 – E vicinity of Yasinia village, the bridge towards Chorna Tysa village; UTKe0506-0806 – mouth of Keveliv stream, vicinity of Kvasy village, Keveliv settlement; Keve0506-0806 – N vicinity of Kvasy village, near Keveliv settlement, Keveliv stream (left-bank tributary of the Chorna Tysa River), 1 km up the stream mouth; UTBi0506-0806 – Bilyn village (central part of village); BiSt0506-0806 – Bilyn village, W slope of the Shtev'era Mountain, small unnamed stream (left-bank tributary of the Chorna Tysa river), river), 0.2 km at the stream mouth; UTBT0506-0806 – vicinity of Rakhiv town, near the mouth of Bila Tysa river; RhSt0506-0806 – E slope of the Lisina Mountain, small unnamed stream near the quarter office of the Carpathians Biosphere Reserve, Long. 47°57'25" E, Lat. 24°9'28" N, 14.07.2001, type locality of *E. rizuni* Godunko et al. 2004; UTKo0506-0806 – near Kostyliv village, near bridge; UTDi0506-0806 – Dilove village, near bridge.

The dates of sampling of mayflies (Insecta: Ephemeroptera) of mountain section of the Tysa river-basin (main current and small tributaries): 19-20.05.2006, 26-27.06.2006, 09-10.08.2006.

Table 5. Taxonomical composition and number of collected Ephemeroptera specimens of submountain and flat section of the Tysa River between Luh village – Vilok village (2006)

	LTLu0506	LTLu0606	LTLu0806	LTVB0506	LTVB0606	LTVB0806	LTSo0506	LTSo0606	LTSo0806	LTHr0506	LTHr0606	LTHr0806	LTTr0506	LTTr0606	LTTr0806	LTTe0506	LTTe0606	LTTe0806	LTBu0506	LTBu0606	LTBu0806	LTVy0506	LTVy0606	LTVy0806	LTVe0506	LTVe0606	LTVe0806	LTHR0506	LTHR0606	LTHR0806	LTHu0506	LTHu0606	LTHu0806	LTVc0506	LTVc0606	LTVc0806	LTMK0506	LTMK0606	LTMK0806	LTTe0506	LTTe0606	LTTe0806	LTVI0506	LTVI0606	LTVI0806
Baetis beskidensis				4	10	7																																					
B. buceratus									2		4	1					2											3			3													3
B. fuscatus	29	84	26	34	72	108	46	39	71	30	69	92	13	25	37	20	44	35	33	77	52	12	55	78	50	77	34	62	89	45	41	21	31	28	30	29	45	67	63	33	78	126	24	48	69
B. lutheri	7	13	3											6	17					2	7			9		15	6		11	2		6	10							1	12	9			
B. muticus	4	9		6	11	9					3	7			2								2	5																3	7	12			
B. rhodani					16	7	6	12	8	3	16	12	10	17	5	4	9	2	4	11	18	1	4	11	6	12	8	11	17	22	10	13	7	14	4	14				7	2	16			
B. vernus	8	10	4					2	5											7	6				3	6	10	7	2	5	7	3		6	1			6	2	2					
Baetis spp. (young larvae)	68	31	7	50	27	64	32	20	14	26	10	34	49	26	18	16	23	11	35	11	5	22	5	17	58	25	16	32	40	10	33	38	8	37	52	20	83	24	16				18	27	7
Centroptilum luteolum																																15		1	4			10	3						
Procloeon bifidum											3	1			5																									5	2	7			1
Oligoneuriella rhenana	16	21	35		30	75	10	16	27	14	28	45				2	15	5	12	28	15	16	23	41	23	45	33	14	35	19	13	10	16	19	37	21		23	15	30	38	27			
Ecdyonurus aurantiacus									3								3	7							3	5	1	8	4	5		16	12		5	8		5	6			2			
E. dispar		10	1	4	10	13														5	18																							
E. cf. *dispar* (young larvae)								1	6														1																					
E. cf. *submontanus*		3	6	1		1																																						
E. gr. *venosus* (young larvae)	18	13	25	8	20	4	12	5	3				2	6		9	6	14	20	25	6	10	24	19	5	12	9													14	22	6	7	4	13
Ecdyonurus spp. (young larvae)	31	16		17						11	6	1	9			4	12	3	60	46	10	38	8	26	19	8		25	15		28	5		20	22		27			7			10	9	19
Electrogena lateralis		15	7		2	10													2	5	12																			6	13	18			
Heptagenia sulphurea											8	3													1	5	11	5	2	7											2	1			
Rhithrogena savoiensis																		3																	13	11		9	9					2	
R.semicolorata	5	25	4					10	8					6						3	3		6	15	7	15	10																	1	
Rhithrogena spp. (young larvae)	12	36					18	22	6				7	1	4	19	15	8	24	11	16	17	32	20	34	18	24	17	9	12	37	29		11	5		18			5		9	16	27	3
Torleya major																									6	9	4	16	7	2															
Serratella ignita	41	28	36	19	37	59	15	38	30		15	9	10	14	6	27	33	56	12	8	17	21	36	48	12	42	25	36	21	8	8	3	12	16	52	44	26	17	7	4	11	26	6	9	11
Caenis luctuosa				14		8		6	14		4	12		12	10		14	8	8	10	11	2	13	6	7	15	8	10	2	3	4	6	5	15	8	6				5	2	12	5	2	8

	LTLu0506	LTLu0606	LTLu0806	LTVB0506	LTVB0606	LTVB0806	LTSo0506	LTSo0606	LTSo0806	LTHr0506	LTHr0606	LTHr0806	LTTr0506	LTTr0606	LTTr0806	LTTc0506	LTTc0606	LTTc0806	LTBu0506	LTBu0606	LTBu0806	LTVy0506	LTVy0606	LTVy0806	LTVe0506	LTVe0606	LTVe0806	LTHR0506	LTHR0606	LTHR0806	LTHu0506	LTHu0606	LTHu0806	LTVc0506	LTVc0606	LTVc0806	LTMK0506	LTMK0606	LTMK0806	LTTe0506	LTTe0606	LTTe0806	LTVl0506	LTVl0606	LTVl0806
C. macrura	6	14	3	8		12																																					
C. pseudorivulorum											3									6	8		2	8																2	5			
Caenis spp. (young larvae)	27	9		10	30		9			8	2		25	6		16	1					29	15	4	14	6													17	4		6		
Habrophlebia fusca												1																															
Paraleptophlebia submarginata					4	2		5	7								2	5		1	4					1	5	2	5	1									10	4			
Habroleptoides confusa		15	8														3							2																			
Ephemera vulgata																																4											
Potamanthus luteus																										3		6				2							4	7			
Total number of specimens	272	352	165	175	269	379	148	176	204	92	171	218	125	119	104	117	182	157	210	256	208	168	226	309	248	316	207	245	268	141	181	168	107	167	233	153	199	161	121	139	209	287	92	129	134
∑	**8707 specimens of larvae**																																										

Remarks. The localities: LTLu0506-0806 – Luh village, near the mouth of the Kosivs'ka River; LTVB0506-0806 – Velykyi Bychkiv village, near the mouth of the Shopurka River; LTSo0506-0806 – Solotvyno town, Ukrainian part of the water-flows; LTHr0506-0806 – vicinity of Hrushovo village, near two bridges; LTTr0506-0806 – Teresva town, near railway station; LTTc0506-0806 – vicinity of Tiachiv town (4 km towards Bushtyno village); LTBu0506-0806 – vicinity of Bushtyno village, near mouth of the Tereblia River; LTVy0506-0806 – vicinity of Vyshkovo village, near the bridge; LTVe0506-0806 – the bridge towards Veliatyno village; LTHR0506-0806 – near Khust town, mouth of the Rika River; LTHu0506-0806 – near Khust town, 2 km down at the bridge towards Kryva village; LTVc0506-0806 – near Veriatsia villlage, the bridge; LTMK0506-0806 – near Mala Kopania village; LTTe0506-0806 – Tekovo village; LTVl0506-0806 – Vilok village.

The dates of sampling of mayflies (Insecta: Ephemeroptera) of submountain and flat section of the Tysa River: the river-section between Luh village – vicinity of Tiachiv town – 20.05.2006, 27.06.2006, 10.08.2006; the river-section Bushtyno village – Vyshkovo village – 21.05.2006, 28.06.2006, 11.08.2006; the river-section between Veliatyno village – Vilok village – 07.05.2006, 18.06.2006, 07.08.2006.

Results and discussion

Thirty-eight Ephemeroptera (8246 specimens, 328 data), 3 Odonata (88 specimens, 23 data) and 19 Plecoptera taxa (699 specimens, 106 data) have been recorded from 14 sites sampled between 6th May 2004 and 20th October 2004 in the Zakarpats'ka Region, Ukraine. *Taeniopteryx auberti* Kis & Sowa, 1964 and *T. schoenemundi* (Mertens, 1923) are new to Ukraine (cf. Godunko & Kłonowska-Olejnik 2003, Godunko & Kovács 2008, Godunko *et al.* 2004, Kharchenko *et al.* 2003, Kovács 2006, Kovács & Godunko 2008, Zhiltzova 2003).

The following species represent new records to the Zakarpats'ka Region and Tysa River: *Cloeon dipterum* (Linnaeus, 1761), *Kageronia fuscogrisea* (Retzius, 1783) (Borzhava), *Isogenus nubecula* Newman, 1833 (Rika, Teresva, Tysa) (cf. Cser 2003, Cser & Andrikovics 2001, Găldean 1999, Godunko 2000, Godunko & Kovács 2008, Kovács 2006, Kovács & Godunko 2008, Mocsáry 1900, Zhiltzova 1967, 1968).

Acknowledgements: Thanks are due to Ottó Merkl (Hungarian Natural History Museum, Budapest) for linguistic help. This study was supported by the Grant Agency of the Academy of Sciences of the Czech Republic (Project No. QS500070505) for the second author.

References

Cser, B. (2003): Újabb adatok Kárpátalja kérészfaunájának 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.

Cser, B. & Andrikovics, S. (2001): A Tisza-forrásvidék patakjainak gerinctelen makrofaunája. (Invertebrate macrofaunal investigations on the streams of Tisza headwater area) – Hidrológiai Közlöny 81(5-6): 346-348.

Găldean, N. (1999): Some considerations about the reophilic elements of the bentic 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.

Godunko, R. (2000): Historical changes of the fauna and questions of reservation of mayfly (Ephemeroptera, Insecta) of Ukrainian Carpathians. (Історичні зміни фауни та питання охорони одноденок (Ephemeroptera, Insecta) Українських Карпат). – Proceedings of State Natural History Museum 15: 158-168. (in Ukrainian with English summary)

Godunko, R. J. & Kłonowska-Olejnik, M. (2003): A checklist of the Ukrainian mayflies (Ephemeroptera). – Polskie Pismo Entomologiczne 72: 203–210.

Godunko, R. J. & Kovács, T. (2008): The mayflies larvae (Insecta: Ephemeroptera) of the Ukrainian section of the Tysa river-basin collected during 2006. (Личинки одноденок (Insecta: Ephemeroptera) української частини басейну р. Тиси зібрані протягом 2006 року.) – Scientific Bulletin of the Uzhgorod University. Series Biology. Issue 23: 164-166. (in Ukrainian with English summary)

Godunko, R. J., Kłonowska-Olejnik, M. & Soldán, T. (2004): Ecdyonurus rizuni sp. nov. (Ephemeroptera: Heptageniidae) from the eastern Carpathians. – Annales Zoologici (Warszawa) 54(3): 519–524.

Kharchenko, T. A., Karpezo, Yu. I. & Liashenko, A. V. (2003): Gidrobiota r. Tisy i ee izmeneniia v usloviiakh antropogennogo pressa. (Гидробиота р. Тисы и ее изменения в условиях антропогенного пресса). – Gidrobiol. zhurn. 39(3): 11-26. (in Russian with English summary)

Kovács, T. (2006): Cloeon petropolitanum Kluge et Novikova, 1992 in the Carpathian Basin (Ephemeroptera: Baetidae) – Folia Historico-Naturalia Musei Matraensis 30: 139–142.

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: in press.

Mocsáry, S. (1900): Ordo. Pseudo-neuroptera. – In: A Magyar Birodalom Állatvilága (Fauna Regni Hungariae) III. K. M. Természettudományi Társulat, Budapest: 23–32.

ZHILTSOVA, L. A. (1967): Survey of Plecoptera of the Ukrainian Carpathians I. Families Taeniopterygidae and Nemouridae. – Vestnik Zoologii 4: 34-42. (in Russian with English summary)
ZHILTSOVA, L. A. (1968): A review of Plecoptera of the Ukrainian Carpathians. II. Families Leuctridae, Capniidae, Perlodidae, Perlidae, Chloroperlidae. – Vestnik Zoologii 2: 61-67. (in Russian with English summary)
ZHILTZOVA, L. A. (2003): Plecoptera, gruppe Euholognatha. – Fauna of Russia and Neighbouring Countries 145: 1–538.

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