

Chironomids (Diptera: Chironomidae) of the two streams in the Poloniny National Park (West Carpathians, Slovakia)

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Abstract: Chironomid pupal exuviae of two brooks in the Poloniny National Park were studied. In total 39 taxa were identified. *Paraboreochlus minutissimus* (STROBL, 1894) and *Stempellinella flavidula* (EDWARDS, 1929) are new species to Slovakia. Characteristics of the pupal exuviae of some species were found to be different from described known species. Chironomid assemblages of the investigated brooks resemble West Carpathian mountain and submountain streams with similar characteristics but their exceptionality is underlined by presence of *Paraboreochlus minutissimus*, *Corynoneura* Pe2a, *Orthocladus ruffoi*, *Parakiefferiella* sp., *Rheosmittia* sp.C, *Parametriocnemus* Pe2, *Micropsectra* Pe3 and *Stempellinella flavidula*.

Key words: Chironomidae, pupal exuviae, streams, East Carpathians, Slovakia.

INTRODUCTION

In the Slovakia 334 chironomid species have been recorded for the present. An investigation of the Chironomidae has accelerated during last 10–15 years in Slovakia. A present check list of chironomids (BITUŠÍK & LOSOS 1997) consists of more than double number of species in comparison with the list published in 80's (ERTLOVÁ & LELLÁK 1984).

Most of the faunistic data have been collected from the water habitats of the central part of Slovakia. Especially the eastern part of the Slovakian territory can be considered to be poorly investigated with respect to the chironomid species recorded. To fill a gap in the knowledge about distribution, ecology, biogeography and structure of chironomid taxocoenoses the investigations have been focused on streams in the eastern-most part of the Slovakia. The Poloniny National Park located at the junction of the state frontiers with Ukraine and Poland represents the western – most bulge of the East Carpathian mountain system. In terms of biogeography the territory correspond with the important

transition between the West Carpathians and the East Carpathians which is reflected in distribution of many plant and animal species. Moreover, the area belongs to the least affected by negative human impacts.

Comprehensive investigations of Diptera fauna (ROHÁČEK et al. 1995) have confirmed an exceptionality of the territory. A study of the Chironomidae immature stages as a part of macrozoobenthos in water bodies of the Poloniny National Park began in 1995 and some results have been published already (BITUŠÍK & NOVIKMEC 1997).

The paper presents basic information on species composition of two streams in the Poloniny National Park. Results have been obtained by sampling of pupal exuviae. Determination of the exuviae material is considered to be an important part of limnology research. It provides valuable information about species composition of chironomid coenoses considering difficulties with an identification of larvae.

STUDY AREA AND SAMPLING SITES

Stužická rieka brook (sampling sites Stu1 – Stu3) is the right tributary of the Uh river. The Slovak section of the brook is about 6 km long and flows across virgin fire – beech forest. More significant left-side tributaries spring at about 1 200 m a.s.l.

Hluboký potok brook (sampling sites HP1 – HP3) is one of the sources of the Ulička river. It springs at elevation of about 900 m in the Veľký Bukovec Mts. Its drainage basin is influenced by human activities (clearcutting, forest roads).

Both brooks can be considered to be mountain (epirithral) – submountain (metarithral) streams (RUŽIČKOVÁ et al. 1996). They are characterised by stony bottom (pebbles and cobbles are dominant substrata), with considerable part of organic matter (plant litter). Average maximum water temperature do not exceed 10°C (sites Stu1,2, HP1,2) or 14°C (sites Stu3, HP3). Mean current velocity values range from 0.35 to 0.80 m. s⁻¹. Great differences between minimal and maximal discharge values are a typical feature of the brooks (e.g. the values of the Stužická rieka brook at Stu3 range from 88.5–767.0 l.s⁻¹).

MATERIAL AND METHODS

Pupal exuviae were collected in June, September, November 1999 and March, May, July 2000. Material was sampled from the water surface using a fine – meshed (200 µm) hand net with diameter 20 cm above the sites where the benthic samples were taken. Length of the sampled sections was about 50 m. The material was placed into polythene bottles, labelled and preserved with 4% formaldehyd solution. After removal of coarse parts the material was preserved in 80% ethanol. The exuviae were mounted on to slides in groups using Berlese Fluid. Pupal exuviae were identified with reference to LANGTON (1991) and WIEDERHOLM et al. (1986). Identification was made to species level, if possible.

RESULTS AND DISCUSSION

In total 420 pupal exuviae were found and 39 taxa were determined. The identified taxa belong to 5 subfamilies (Tab.1).

Paraboreochlus minutissimus (STROBL, 1894) and *Stempellinella flavidula* (EDWARDS, 1929) are considered to be the most interesting determined species.

P.minutissimus is the first member of subfamily Podonominae found in the Slovakia. Larvae of this species seem to prefer mosses in cool springs and brooks. The species is known from some countries of West and South Europe. One pupal exuvium was found in the lower section of the Hluboký potok brook.

S.flavidula has been found already in Slovakia (BITUŠÍK 1996) but the species has not been listed in the last check – list (BITUŠÍK & LOSOS 1997). It seems to be common species in the investigated East Carpathians streams.

Characteristics of the pupal exuviae of *Rheosmittia* sp. C and *Parakiefferiella* sp. are not typical for described species of these genera. Pupal exuviae of *Heleniella* sp. "reticulata" are rather strange. It is difficult to decide if the reticulation of tergites can be included in an intraspecific variability or it characterises an undescribed species yet. The number of the found taxa is relatively low but it corresponds with conditions of upper sections of streams. More taxa were found in the lower sections of the brooks (HP3 and Stu3).

Chironomid assemblages of the investigated streams resemble West Carpathian mountain and submountain streams with similar characteristics: relatively low discharge, stony bottom, drainage basin covered by deciduous forests, input of amount of plant litter and other detritus utilised by aquatic macroinvertebrates as a food. Larvae of the most identified taxa belong to collectors of detrital particles (*Corynoneura*, *Heleniella*, *Krenosmittia*, *Limnophyes*, *Parametriocnemus*, *Paratrissocladius*, *Thienemaniella*, *Tvetenia*, all taxa of subfamily Chironominae). Presence of species feeding on wood debris (*B.modesta*, *S.lignicola*) is characteristic feature of the brooks. *O.frigidus*, *O.rivicola*, *S.semivirens* were found in the Hluboký potok brook only. Larvae of these species are grazers of epilithic algae and their occurrence can be connected with higher primary production of periphyton in the Hluboký potok brook compared with Stuzická rieka brook as a consequence of deforested basin area.

Exceptionality of the brooks is underlined by *P.minutissimus*, *Corynoneura* Pe2a, *O.ruffoi*, *Parakiefferiella* sp., *Rheosmittia* sp. C, *Parametriocnemus* Pe2, *Micropsectra* Pe3 and *S.flavidula*. They have not been found in streams of the West Carpathians yet or they have been collected rarely (*Parametriocnemus* Pe2, *O.ruffoi*, *S.flavidula*).

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Tab.1: List of taxa with number of pupal exuviae collected (altitude (m a.s.l). of the sampling sites is shown in brackets).

taxa	sampling sites					
	HP1 [780]	HP2 [683]	HP3 [537]	Stu1 [840]	Stu2 [685]	[640]
Podonominae						
<i>Paraboreochlus minutissimus</i> (STROBL, 1894)	0	0	1	0	0	0
Tanypodinae						
<i>Conchapelopia pallidula</i> (MEIGEN, 1818)	0	0	1	0	0	0
<i>Nilotanypus dubius</i> (MEIGEN, 1804)	0	0	0	0	1	4
Diamesinae						
<i>Boreoheptagyia</i> spp.	1	0	0	2	0	7
<i>Pseudodiamesa branickii</i> (NOWICKI, 1873)	1	0	0	0	0	0
Orthoclaadiinae						
<i>Brillia modesta</i> (MEIGEN, 1830)	0	0	1	1	0	0
<i>Bryophaenocladus subvernalis</i> (EDWARDS, 1929)	0	0	0	0	1	0
<i>Corynoneura celtica</i> EDWARDS, 1924	0	0	6	0	0	1
<i>Corynoneura</i> cf. <i>lacustris</i> EDWARDS, 1924	0	0	37	0	0	3
<i>Corynoneura</i> Pe 2a LANGTON, 1991	0	2	27	0	1	19
<i>Corynoneura</i> Pe 4 LANGTON, 1991	0	0	9	0	0	18
<i>Eukiefferiella coerulescens</i> KIEFFER, 1926	1	0	2	1	1	2
<i>Eukiefferiella fuldensis</i> LEHMANN, 1972	0	0	1	0	0	0
<i>Eukiefferiella minor/fittkai</i>	5	0	0	0	0	0
<i>Heleniella serratosioi</i> RINGE, 1976	0	4	20	0	3	4
<i>Heleniella</i> sp. "reticulata"	0	0	0	0	0	1
<i>Krenosmitia boreoalpina</i> GOETGHEBUER, 1944)	0	0	13	0	2	4
<i>Krenosmitia camptophleps</i> (EDWARDS, 1929)	0	0	9	3	2	4
<i>Limnophyes ninae</i> SAETHER, 1975	0	0	0	0	3	0
<i>Limnophyes</i> sp.	0	0	0	0	1	0
<i>Orthocladus frigidus</i> (ZETTERSTEDT, 1838)	0	0	1	0	0	0
<i>Orthocladus</i> (O.) <i>ruffoi</i> ROSSARO & PRATO, 1991	0	7	1	1	0	0
<i>Orthocladus</i> (E.) <i>rivicola</i> KIEFFER, 1921	0	0	1	0	0	0
<i>Parakiefferiella</i> sp.	0	0	4	0	0	0
<i>Parametricnemus boreoalpinus</i> GOUIN, 1942	0	8	9	0	1	5
<i>Parametricnemus</i> Pe 2	0	7	30	0	2	2
<i>Paratrissocladius excerptus</i> (WALKER, 1856)	0	0	0	0	0	1
<i>Rheocricotopus effusus</i> (WALKER, 1856)	0	0	1	0	0	0
<i>Rheosmittia</i> sp. C	0	0	3	1	1	2
<i>Symposiocladius lignicola</i> (KIEFFER, 1915)	2	2	1	1	1	3
<i>Synorthocladus semivirens</i> (KIEFFER, 1909)	0	1	36	0	1	0
<i>Thienemaniella</i> Pe 2a LANGTON, 1991	0	0	1	0	0	7
<i>Tvetenia calvescens</i> (EDWARDS, 1929)	0	2	4	0	2	8
Chironominae						
<i>Polypedilum</i> sp.	0	0	0	0	0	1
<i>Micropsectra</i> cf. <i>lindrothi</i> GOETGHEBUER, 1931	0	0	0	0	0	1
<i>Micropsectra</i> Pe3 LANGTON, 1991	0	0	5	0	7	1
<i>Neozavrelia</i> Pe1 LANGTON, 1991	0	0	1	0	0	0
<i>Stempellinella flavidula</i> (EDWARDS, 1929)	0	0	6	0	1	2
<i>Tanytarsus heusdensis</i> GOETGHEBUER, 1923	0	0	5	0	0	2