

CADDISFLIES (*TRICHOPTERA*) OF WATERS IN THE VICINITY OF
RADZYŃ PODLASKI (EASTERN POLAND)

Edyta Serafin

Department of Zoology, University of Agriculture, Akademicka 13 str., 20-033 Lublin, Poland
e-mail: eserafinek@wp.pl

Abstract. The researches based on larval material only. 17 taxa were found of which 6 species were new for Podlasie. The relatively small number of species did not correspond to many different types of examined sites. Probably this poverty of species resulted from the intensive agricultural use of the investigated area.

Key words: Podlasie, The Południowopodlaska Lowland, Trichoptera, larval ecology

INTRODUCTION

Very little is known about caddisflies of Podlasie, the zoogeographical region in the meaning of the Catalogue of Polish Fauna. The only one caddisfly species – *Agrypnia pagetana* – was known from this area till the year 1965 [13]. In the years 1995-2002 three papers were published: the paper about *Trichoptera* of the Biebrza Marshes [3], the contribution to the knowledge of caddisflies of the River Narew [10] (those two referred to the studies conducted within the Północnopodlaska Lowland) and the last one which contained some information about caddisflies of SE Podlasie, so called Western Polesie [4]. But still, the central part of Podlasie – the Południowopodlaska Lowland – has remained an unsurveyed area. The aim of this paper is to present the first preliminary list of caddisfly species on the basis of the larval material collected in the vicinity of Radzyń Podlaski. Attention was also paid to ecological characteristics of the examined larvae.

INVESTIGATED AREA AND METHODS

The studied area encompassed the vicinities of three villages situated south-east of Radzyń Podlaski: Stara Wieś, Tchórzew and Wola Chomejowa. This is an intensively cultivated area covered with poorly fertile podsolich soils [6, 8]. The River Krzna and the River Bystrzyca are the most important watercourses of this area. The marginal stream valley of the River Wieprz encompasses the River Tyśmienica and the lower course of the River Bystrzyca. The network of surface waters is well developed but the groundwater resources are small and shallow – as a result the number of springs is limited. In interior areas there are many temporary and permanent water bodies. The area is also heavily forested. Annual mean air temperature is 7.1°C, the sum of precipitations – 550 mm.

The study sites were located in the valleys of the Rivers: Tyśmienica, Bystrzyca and Wilkojadka. They represented different types of aquatic environments: running waters (a large and a small river, drainage ditches) and standing waters (peat excavations, small pools and the fish pond). Studies were conducted in 2001. The larvae were collected with a hydrobiological scoop and handpicked from submersed stones or branches. The evidence material is kept in the author's collection.

Faunistic similarities were calculated according to Jaccard's formula [12], species diversity – to Hurlbert's index [7]. According to Biesiadka [2] the following classes in structure of dominance were used: eudominants (above 10%), dominants (5.1-10%), subdominants (2.1-5%) and recedents (below 2%).

RESULTS

415 individual caddisflies belonged to 17 taxa were found to occur in the studied area (Table 1). The following 6 species new for Podlasie were identified: *Halesus digitatus*, *Halesus tessellatus*, *Ironoqia dubia*, *Limnephilus extricatus*, *Limnephilus fuscinervis* and *Oligostomis reticulata*. The eudominants were *Limnephilus flavicornis* and *L. rhombicus*, dominants – *Limnephilus lunatus* and *Halesus digitatus*, subdominants – *Limnephilus nigriceps*, the remaining species belonged to the class of recedents. Although five of seven sites were represented by running waters the majority of species belonged to eurytopes and stagnophiles. The only one species – *Hydropsyche pellucidula* – belonged strictly to flowing water species. The number of limnophiles was equal to limnexenes, the number of limnobionts was relatively smaller. The majority of species was associated with

bulrusches and helophytes in pools located in forests. Herbivorous and detritivorous species were dominants in trophic structure.

Table 1. *Trichoptera* of the vicinity of Radzyń Podlaski. A – the River Bystrzyca in Stara Wieś, B – the River Bystrzyca in Wola Chomejowa, C – the River Wilkojadka, D – drainage ditches, E – the fish pond in Wola Chomejowa, F – peat excavations, G – small pools; * – species new for Podlasie.

No.	Species/taxon	A	B	C	D	E	F	G
1	<i>Hydropsyche pellucidula</i> (Curtis, 1834)	•						
2	<i>Oligostomis reticulata</i> (Linnaeus, 1767)*			•				
3	<i>Isonychia dubia</i> (Stephens, 1837)*		•	•		•		
4	<i>Anabolia</i> sp.	•				•		
5	<i>Glyptotaelius pellucidus</i> (Retzius, 1783)			•		•	•	
6	<i>Limnephilus extricatus</i> (McLachlan, 1865)*				•			
7	<i>Limnephilus flavicornis</i> (Fabricius, 1787)	•	•	•		•	•	
8	<i>Limnephilus fuscinervis</i> (Zetterstedt, 1840)*						•	
9	<i>Limnephilus lunatus</i> (Curtis, 1834)	•	•	•		•		
10	<i>Limnephilus marmoratus</i> (Curtis, 1834)						•	
11	<i>Limnephilus nigriceps</i> (Zetterstedt, 1840)						•	
12	<i>Limnephilus politus</i> (McLachlan, 865)					•		
13	<i>Limnephilus rhombicus</i> (Linnaeus, 1758)		•	•		•		
14	<i>Limnephilus stigma</i> (Curtis, 1834)					•		
	<i>Limnephilus</i> sp.juv.		•	•		•	•	•
15	<i>Halesus digitatus</i> (Schränk, 1781)*	•		•		•		
16	<i>Halesus tessellatus</i> (Rambur, 1834)*	•				•		
17	<i>Mystacides nigra</i> (Linnaeus, 1758)					•		
Sum of species/taxon		6	5	8	1	12	6	1
Hurlbert's index		0.62	0.52	0.54	0	0.61	0.49	0

The highest number of species occurred in the fish pond in Wola Chomejowa, the River Wilkojadka, the River Bystrzyca in Stara Wieś and the peat excavations adjoining that river. The highest value of species diversity was found in the River Bystrzyca in Stara Wieś, almost equal was in the fish pond, little lower in the River Wilkojadka and the River Bystrzyca in Wola Chomejowa (Table 1). Generally, those values were very similar. The highest faunistic similarity was found between the River Wilkojadka and the River Bystrzyca in Wola Chomejowa and between the River Wilkojadka and the fish pond (Fig. 1). Noteworthy is the fact of the occurrence of a rare and endangered species in Poland – *Oligostomis reticulata* – in the River Wilkojadka and a species from the Red List [11] – *Limnephilus fuscinervis* – in peat excavations.

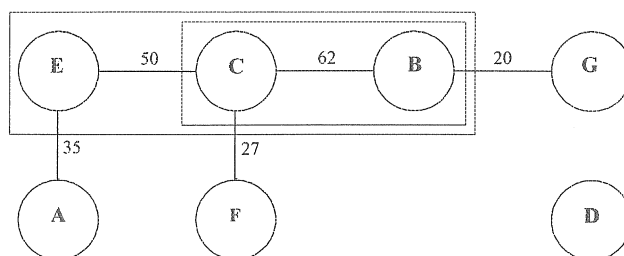


Fig. 1. Dendrite of faunistic quality similarity between assemblages of *Trichoptera*: A – the River Bystrzyca in Stara Wieś, B – the River Bystrzyca in Wola Chomejowa, C – the River Wilkojadka, D – drainage ditches, E – the fish pond in Wola Chomejowa, F – peat excavations, G – small pools

DISCUSSION

The number of caddisflies species collected in the vicinity of Radzyń Podlaski was small and constituted only 6.3% of caddisfly fauna in Poland. Due to the different types of waters examined the higher species richness might have been expected. The list presented in the paper must be treated as a preliminary one because of the fragmentary nature of the studies and methods (only larval stages were examined). River regulation and water pollution associated with agriculture were probably the main factor which influenced the species poverty.

The small number of species and the fact that except for *Hydropsyche pellucidula* there were no caseless caddisflies, suggested that caddisflies did not find suitable environmental conditions in waters in the vicinity of Radzyń Podlaski. Caddisflies bearing cases are more resistant to unfavourable environmental conditions, especially to low oxygen level, than caseless ones [14]. The lack of larvae of the genus *Hydropsyche* in the examined rivers and the predomination of reophilous species over stagnophilous ones connected with lakes were noted. Similar phenomena were also observed in the River Biebrza [3]. The large number of specimens and specimens of the family *Limnephilidae* in every examined site, especially the genus *Limnephilus*, was interesting. The majority of limnephilid species are typical of astatic water bodies, although in the examined area they occurred in rivers.

Taking into account the faunistic similarity between all sites the large block of the fish pond, The River Bystrzyca in Wola Chomejowa and the River Wilkojadka was distinctly separate. The similarity of fauna was probably due to the distance between sites because they differed considerably in terms of hydrology.

However, comparing the species assemblages of two similar sites located on two different stretches of the River Bystrzyca it turned to be that they were different (Table 1, columns A and B). The caddisfly fauna of peat excavations showed its own distinction and the high species richness despite the poor conditions of those habitats: sediment of dy type, brown water and the water surface covered entirely with the thick blanket of *Lemna minor*. The conditions of small pools and ditches were much better for the larval development: sandy bottom, transparent blue water and well developed helophytes and elodeids. Nevertheless, their species richness was very low. Perhaps the surroundings of those sites – meadows in case of peat excavations and ploughlands in case of small pools – had significant influence on the caddisfly species richness.

The most important agents which influence the number and species assemblage of caddisfly on intensively cultivated area are: stream morphology, substrate composition and sediment distribution within water bodies. Water chemistry is secondary to factors mentioned above [9]. These refers to the situation noted in the examined rivers: their waters represent the second and third river water quality [1], moreover, the presence of *Aphelocheirus aestivalis* – the species of clean and well oxygenated waters [5] – also shows that the first group of factors may be more important than chemistry. The cases of teratology stated within the fish pond (referred to 5 specimens – 4 *Limnephilus flavicornis* larvae and one *Limnephilus stigma* larva) was probably associated with its locally polluted waters. Nevertheless, the species richness in the fish pond was the highest in the investigated area. The lack of the common predatory families *Polycentropodidae* and *Phryganeidae* in the studied area is intriguing but at the moment not possible to explain and requires further studies.

CONCLUSION

The number of caddisflies species collected in the vicinity of Radzyń Podlaski was small and constituted 6.3% of caddisfly fauna in Poland.

REFERENCES

1. **Bańkowska-Królikowska J., Tracz A., Pomorska E. (Eds):** The report on the environmental state of the Lublin province in the year 2001 (in Polish). Biblioteka Monitoringu Środowiska, Lublin, 1-232, 2002.
2. **Biesiadka E.:** Water beetles (*Coleoptera*) of the eutrophic Lake Zbęchy (Leszno voiv.) (in Polish). Pol. Ecol. Stud. 6, 263-275, 1980.

3. **Czachorowski S.:** Caddisflies (*Trichoptera*) of Biebrza Marshes – the results of preliminary studies (in Polish). *Fragm. Faun.* 37, 19, 427-438, 1995.
4. **Czachorowski S., Serafin E., Buczyński P.:** Caddisflies (*Insecta: Trichoptera*) of the Lublin province – distribution and the state of knowledge (in Polish) (in print).
5. **Karg J.:** Heteropterans (*Heteroptera*) of waters in the vicinity of Gliwice and Rybnik (in Polish). *Fragm. faun.* 12, 281-307, 1966.
6. **Kondracki J.:** Regional Geography of Poland (in Polish). PWN, Warszawa, 2000.
7. **Lampert W., Sommer U.:** Ecology of inland waters (in Polish). Wydawnictwo Naukowe PWN, Warszawa, 1996.
8. **Nowak M., Nowak J.:** The Lublin province (in Polish). WSiP, Warszawa, 1996.
9. **Richards C., Host G.:** Identification of predominant environmental factors structuring stream macroinvertebrate communities within a large agricultural catchment. *Freshwater Biol.* 29, 285-294, 1993.
10. **Serafin E., Buczyński P.:** An urgency is the mother of invention: about construction a light trap without a generator and a screen. *Trichopteron* 4, 5-6, 2002.
11. **Szczęsny B.:** Red list of animals – Caddisflies. In: Red list of threatened animals in Poland (Ed. Z. Głowaciński) (in Polish). Wydawnictwo Instytutu Ochrony Przyrody PAN, Kraków, 76-79, 2002.
12. **Szujecki A.:** Ecology of forest insects (in Polish). PWN, Warszawa, 1983.
13. **Tomaszewski C.:** Catalogue of Polish Fauna. *Catalogus Faunae Poloniae*. Part XXVIII, Caddisflies *Trichoptera* (in Polish). PWN, Warszawa, 1-104, 1965.
14. **Williams D.D., Tavares A., Bryant E.:** Respiratory device or camouflage? – A case for the caddisfly. *Oikos* 50, 42-52, 1987.

CHRUŚCIKI (*TRICHOPTERA*) WÓD OKOLIC RADZYŃNIA PODLASKIEGO (POLSKA WSCHODNIA)

Edyta Serafin

Katedra Zoologii Akademia Rolnicza, ul. Akademicka 13, 20-033 Lublin,
e-mail: eserafinek@wp.pl

Streszczenie. Niniejsza praca przedstawia listę gatunków *Trichoptera* okolic Radzyna Podlaskiego opracowaną na podstawie stadiów larwalnych. Ponieważ Nizina Południowopodlaska, na której znajduje się badany obszar, nie była dotychczas objęta badaniami trichopterologicznymi, prezentowane wyniki mają charakter pionierski. Znaleziono 6 nowych gatunków dla Podlasia. Liczba stwierdzonych gatunków jest mała zważywszy na różnorodność badanych siedlisk. Interesujący jest prawie zupełny brak chruścików bezdomkowych (m.in. z rodziny *Hydropsychidae*) oraz drapieżników (np. z rodziny *Polycentropodidae*). Być może ubóstwo gatunkowe *Trichoptera* badanego terenu związane jest z jego intensywnym użytkowaniem rolniczym. Problem ten został rozpatrzony w dyskusji.

Słowa kluczowe: Podlasie, Nizina Południowopodlaska, *Trichoptera*, ekologia larw