

CADDISFLY ASSEMBLAGES (INSECTA, *TRICHOPTERA*) OF VALLEY WATER BODIES OF WIEPRZ AND TYŚMIENICA RIVERS (MARGINAL STREAM VALLEY WIEPRZ)

Edyta Buczyńska

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

Summary: Pradolina Wieprza is a mesoregion of small area encompassing the lower course of the River Wieprz as well as the short stretch of its tributary – Tyśmienica. The valleys of both rivers have been poorly transformed and remained almost natural. In the years 2004-2006 trichopterological studies were conducted at over 20 study sites encompassing both rivers, 8 oxbows, 7 astatic water bodies (including one sand excavation pit) and one ditch in alder forests. In general, 2052 specimens were found, representing 36 species. In the paper, analysis of caddisfly assemblages is given with respect to species diversity, species composition and faunistic similarities between all studied sites. Natural values of the examined area, distinguished as Protected Landscape Area „Pradolina Wieprza”, are also given on the example of caddisflies.

Key words: *Trichoptera*, caddisflies, permanent and temporary water bodies, Wieprz, Tyśmienica

INTRODUCTION

There are many scientific papers referring to riverine assemblages of caddisflies in Poland and in the whole world. Nevertheless, only a few focus on ecosystems of a lowland river valley as a whole, in the light of connections between caddisflies inhabiting water bodies within the flood plain and the river itself. The aim of this paper was to analyse the relationships between caddisflies inhabiting temporary and permanent water bodies situated in the valleys of two lowland rivers: Wieprz and Tyśmienica. Their size and the distance to the rivers were also taken into consideration while analysing the caddisfly fauna with respect to species composition, species diversity and faunistic similarities. The obtained results confirmed that the studied area deserved richly to be established as the Protected Landscape Area „Pradolina Wieprza”.

STUDY SITES, MATERIAL AND METHODS

The study area is entirely situated in a mesoregion called „Pradolina Wieprza” [Kondracki 2002]. It encompasses the lower course of the River Wieprz with a short stretch of its tributary – the River Tyśmienica, by three villages: Kolonia Białobrzegi,

Ruska Wieś and Bożniewice. Both river valleys are poorly transformed and rich in numerous oxbows of varied size and depth, as well as temporary water bodies in the spring time. Mentioned water bodies are placed within meadows, fields and *Salix* overgrowths.

Caddis larvae and pupae as well as imaginal forms were collected in the years 2004-2006 at over 20 study sites including: 8 oxbows – the largest ones with typical elongated shape are: Dębina (1 – numbers as in Fig. 1), Szewczak (2), Wieprzysko (3) and Kapuściska (4), the remaining ones are much smaller, compact and shallower: Rowek (6), Kęsy (7), Stawek (8) and a nameless one situated within meadows (5), 7 temporary water bodies (9-14) with one sand excavation pit (15), one ditch in alder forests (18), and several study sites along the banks of the Wieprz and Tyśmienica rivers (marked in Fig. 1 as 16 and 17).

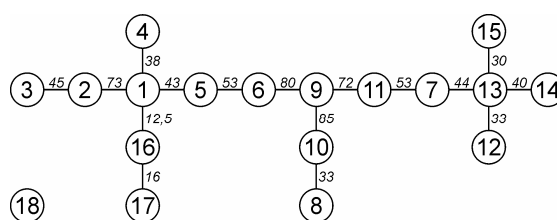


Fig. 1. Faunistic similarities (%) between *Trichoptera* of particular study sites.

Numbers of study sites – as in the text

Rys. 1. Podobieństwa faunistyczne (%) pomiędzy *Trichoptera* poszczególnych stanowisk.

Numeracja stanowisk – jak w tekście

Water stages were collected with a hydrobiological net and handpicked from submerged plants and objects. Imagines were caught with an entomological net from herbaceous plants and trees growing by the banks and shores.

The classes of dominance were taken after Biesiadka [1980], and species diversity index (PIE) values were calculated according to Hurlbert's formula [Lampert and Sommer 1996]. Faunistic similarities were calculated according to Jaccard's formula [Szujewski 1983].

RESULTS

During the research 2052 specimens were caught, representing 36 caddisfly species (Tab. 1). Some larvae of the family Hydroptilidae were identified to the level of genus only. In general, it makes 13% of the whole Polish trichopteroфаuna. As for dominance structure, four species belonged to eudominants: *Limnephilus griseus* (20%), *Triaenodes bicolor* (16%), *Limnephilus auricula* (11.6%) and *Limnephilus flavicornis* (11.5%). *Ithytrichia lamellaris* and *Anabolia furcata/laevis* were dominants, *Brachycentrus subnubilus*, *Athripsodes aterrimus*, *Limnephilus fuscinervis* and *Limnephilus politus* belonged to subdominants. The remaining species were included in the class of recedents.

The widest habitat spectrum was shown by *Triaenodes bicolor* found in the River Tyśmienica as well as in oxbows and temporary water bodies.

The highest number of specimens were found in oxbow no. 3 (288 ind.), the River Wieprz (272), in oxbow no. 5 (264), temporary pool no. 11 (211), and the largest and deepest oxbow no. 1 (204). The highest number of species were discovered in oxbow no. 3 (15), the River Wieprz (14), two oxbows – 1 and 2 (11 species each), and oxbow no. 6 (10).

Table 1. Trichoptera of the studied area
Tabela 1. Trichoptera badanego obszaru

Species/Gatunek Taxon/Takson	A	B	C	D	E	N	DM
Hydroptila sp.	•					3	0.14
1. <i>Ithytrichia lamellaris</i> EAT.	•	•				116	5.65
Orthotrichia sp.	•					2	0.09
Oxyethira sp.	•		•			34	1.65
2. <i>Neureclipsis bimaculata</i> (L.)	•					2	0.09
3. <i>Lype phaeopa</i> (STEPH.)	•					2	0.09
4. <i>Hydropsyche angustipennis</i> (CURT.)		•				1	0.04
5. <i>Hydropsyche pellucidula</i> (CURT.)	•					3	0.14
6. <i>Trichostegia minor</i> (CURT.)					•	1	0.04
7. <i>Brachycentrus subnubilus</i> CURT.	•					100	4.87
8. <i>Anabolia nervosa</i> (CURT.)	•					1	0.04
<i>Anabolia furcata</i> BRAU./ <i>laevis</i> ZETT.		•	•			142	6.92
9. <i>Grammotaulius nigropunctatus</i> (RETZ.)			•	•		13	0.63
10. <i>Limnephilus auricula</i> CURT.			•	•		240	11.7
11. <i>Limnephilus binotatus</i> CURT.			•			1	0.04
12. <i>Limnephilus decipiens</i> (KOL.)			•	•		27	1.31
13. <i>Limnephilus flavicornis</i> (FABR.)			•	•		237	11.5
Limnephilus sp. juv.			•	•		70	3.41
14. <i>Limnephilus fuscicornis</i> RAMB.	•		•			6	0.29
15. <i>Limnephilus fuscinervis</i> (ZETT.)			•			50	2.43
16. <i>Limnephilus griseus</i> (L.)			•	•		423	20.6
17. <i>Limnephilus ignavus</i> MCL.			•			9	0.43
18. <i>Limnephilus incisus</i> CURT.			•			1	0.04
19. <i>Limnephilus luridus</i> CURT.			•			16	0.77
20. <i>Limnephilus nigriceps</i> (ZETT.)			•			9	0.43
21. <i>Limnephilus politus</i> MCL.			•			43	2.09
22. <i>Limnephilus rhombicus</i> (L.)			•			1	0.04
23. <i>Limnephilus stigma</i> CURT.			•			10	0.48
24. <i>Limnephilus subcentralis</i> BRAU.			•			34	1.65
25. <i>Limnephilus vittatus</i> (FABR.)			•	•		12	0.58
26. <i>Halesus digitatus</i> (SCHR.)	•	•	•	•		4	0.19
27. <i>Halesus radiatus</i> (CURT.)	•					1	0.04
28. <i>Trienodes bicolor</i> (CURT.)	•		•			334	16.2
29. <i>Mystacides azurea</i> (L.)		•		•		3	0.14
30. <i>Mystacides longicornis</i> (L.)		•	•			34	1.65
31. <i>Mystacides nigra</i> (L.)			•			2	0.09
32. <i>Athripsodes aterrimus</i> (STEPH.)			•			57	2.77
33. <i>Ceraclea dissimilis</i> (STEPH.)	•	•				4	0.19
34. <i>Leptocerus tineiformis</i> CURT.			•			1	0.04
35. <i>Oecetis furva</i> (RAMB.)			•			2	0.09
36. <i>Oecetis lacustris</i> (PICT.)			•			1	0.04
Number of species (taxa)/ Liczba gatunków (taksonów)	11(14)	6(7)	26(28)	8(9)	1(1)	2052	100

A – the River Wieprz, B – the River Tyśmienica, C – oxbows, D – astatic water bodies, E – the ditch, N – number of specimens, DM – dominance (%)

A – rzeka Wieprz, B – rzeka Tyśmienica, C – starorzecza, D – zbiorniki astatyczne, E – rów, N – liczba osobników, DM – dominacja (%)

The values of PIE Index ranged from 0.89 to 0. The highest values were obtained for four oxbows: no. 3 (0.89), no. 4 (0.86), no. 6 (0.84), no. 7 (0.84) and the River Tyśmienica (0.82). The zero values were acquired for the ditch in alder forest, the sand excavation pit, and temporary pool no. 12.

The highest number of taxa was found in the oxbows, the fauna of astatic pools was clearly poorer (Tab. 1). The fauna of the River Wieprz was richer than that of Tyśmienica, moreover, species composition varied significantly in both rivers despite the same morphological character of both courses.

The highest values of species similarities were found within temporary pools no. 9 and 10 as well as oxbows 1 and 2 (Fig. 1). Both types of standing waters (permanent and temporary) form definite blocks, however, they are also connected strongly between themselves due to the proximity of particular water bodies.

The fauna of the rivers was the most similar to the faunas of oxbows, especially those large and deep ones (nos 1, 2, 3, 4, 5) despite the significant distance from the rivers. The fauna of the ditch was completely outstanding.

DISCUSSION

The number of caddisfly species found in the study site can be regarded as high compared to similar examined lowland rivers and their valleys [Czachorowski 1988, Raczyńska *et al.* 2000, Serafin 2004]. The most valuable habitats for the development of caddisflies within the valleys of the River Wieprz and Tyśmienica are oxbows – especially the largest and the deepest ones with the fauna of lacustrine type with many representatives of the families Limnephilidae and Leptoceridae. It seems that the area of the water body, well developed aquatic and shore vegetation, and its permanent character influence the caddisfly fauna the most – the distance to rivers or the closest water bodies is rather less important. Mentioned oxbows reached the highest values of PIE Index, they were also rich in species while, astatic water bodies obtained middle and the lowest values. Collinson *et al.* [1995] also reported that temporary ponds support far fewer invertebrate species than permanent ones. However, many species typical of astatic waters were also developing in permanent oxbows – *Limnephilus griseus*, *L. auricula*, *L. vittatus*. The opposite phenomenon was also observed, especially in astatic pools that dry up very late in summer.

The connection between valley water body fauna and riverine one, typical of such habitats [Czachorowski and Szczepańska 1991, Malmqvist 2002], is not very strong in the examined area. Despite the floods there are no riverine caddisflies in astatic pools situated near the banks. Rheophilous species like *Limnephilus rhombicus* or *Halesus digitatus* were observed in the oxbow no. 4. The fauna of both rivers was similar to the faunas of largest oxbows (Fig. 1), however, the similarity was low.

Worth mentioning is the presence of *Ithytrichia lamellaris* in the River Wieprz – this species from the Red List [Szczęsny 2002] seems to occur in large numbers in the examined area. *Limnephilus fuscineris*, also red-listed, occurred abundantly as well in permanent water bodies. *Halesus radiatus* has been found in the Lublin region only in Roztocze so far [Riedel and Majecki 1994], *Mystacides azurea* – caught in the River Tyśmienica – in Roztocze [Riedel and Majecki 1994] and Lasy Janowskie Landscape Park [Czachorowski *et al.* 2000]. All of these facts, as well as high values of PIE Index in the

examined area, confirm that the valleys of the Wieprz and Tysmienica rivers are valuable and important for the maintenance of caddisfly diversity in south-eastern Poland.

CONCLUSIONS

1. The number of *Trichoptera* species found during the studies was quite high comparing to the similar habitats within Poland.
2. The most important habitats for holding the highest diversity of caddisflies are oxbows situated in the riverine valleys.
3. Morphological features of the oxbows seem to be the most crucial factor for development of many caddisfly species, the distance to the rivers is less important for colonization.

REFERENCES

- Biesiadka E., 1980: Water beetles (*Coleoptera*) of the eutrophic Lake Zbęchy (Leszno voiv.). Pol. Ecol. Stud., 6, 263-275.
- Collinson N.H., Biggs J., Corfield A., Hodson M.J., Walker D., Whitfield M., Williams P.J., 1995: Temporary and permanent ponds: an assessment of the effects of drying out on the conservation value of aquatic macroinvertebrate communities. Biol. Conserv., 74, 125-133.
- Czachorowski S., 1988: Caddisflies (*Trichoptera*) of the River Pasłęka (Northern Poland). Acta Hydrobiol., 30, 393-409.
- Czachorowski S., Buczyński P., Stryjecki R., 2000: Caddisflies (*Trichoptera*) of Lasy Janowskie Landscape Park. Parki Nar. Rez. Przyn., 19, 3, 65-84 (in Polish).
- Czachorowski S., Szczepańska W., 1991: Small astatic pools in the vicinity of Mikołajki and their caddisfly (*Trichoptera*) fauna. Pol. Arch. Hydrobiol., 38, 85-104.
- Kondracki J., 2002: Regional geography of Poland. Wyd. Nauk. PWN, Warszawa, pp. 450 (in Polish).
- Lampert W., Sommer U., 1996: Ecology of inland waters. Wyd. Nauk. PWN, Warszawa, pp. 416 (in Polish).
- Malmqvist B., 2002: Aquatic invertebrates in riverine landscape. Fresh. Biol., 47, 679-694.
- Raczyńska M., Żurawska M., Czachorowski S., 2000: Caddisflies of the river Rurzyca and Tywa at the Szczecin Lowland (north-western Poland). Prz.. Przyn., 9, 15-23 (in Polish).
- Riedel W., Majecki J., 1994: Caddisflies (*Trichoptera*) of Roztocze. Fragm. Faun., 12, 315-322 (in Polish).
- Serafin E., 2004: Species diversity of the caddisflies (*Trichoptera*) in the left-bank River Bug valley. Teki Kom. Och. Kszt. Środ. Przyn., 1, 195-201.
- Szczęsny B., 2002: Red list of animals – Caddisflies. [In:] Głowaciński Z. (ed.) Red list of threatened animals in Poland. Wyd. Instytutu Ochrony Przyrody PAN, Kraków, pp. 76-79 (in Polish).
- Szujecki A., 1983: Ecology of forest insects. PWN, Warszawa, pp. 603 (in Polish).

ZGRUPOWANIA CHRUŚCIKÓW (INSECTA, *TRICHOPTERA*)
ZBIORNIKÓW DOLINNYCH RZEK WIEPRZ I TYŚMIENICA
(PRADOLINA WIEPRZA)

Streszczenie. Pradolina Wieprza jest niedużym powierzchniowo mezoregionem obejmującym dolny bieg Wieprza wraz z krótkim odcinkiem jego dopływu – Tyśmienicy. Doliny obu rzek charakteryzują się małym stopniem przekształcenia. W latach 2004-2006 prowadzono odłowy chruścików (*Trichoptera*) na ponad 20 stanowiskach, obejmujących: obydwie rzeki, 8 starorzeczy, rów w olsie oraz 7 zbiorników astatycznych (w tym jedną piaskownię). Ogółem zebrano 2052 osobniki należące do 36 gatunków. W pracy przedstawiono analizę zgrupowań *Trichoptera* – pod uwagę wzięto bogactwo gatunkowe, różnorodność gatunkową oraz podobieństwa faunistyczne pomiędzy poszczególnymi typami wód. Wskazano także na cenne walory trichopterologiczne badanego terenu, należącego do Obszaru Chronionego Krajobrazu „Pradolina Wieprza”.

Słowa kluczowe: *Trichoptera*, chruściki, zbiorniki trwałe i okresowe, Wieprz, Tyśmienica