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**CADDISFLIES (TRICHOPTERA)  
OF THE POLISH PART OF THE LITHUANIAN LAKE DISTRICT:  
NEW DATA, STATE OF KNOWLEDGE AND RESEARCH  
PERSPECTIVES**

**Abstract**

The authors present the information about the occurrence of 79 caddisfly species in the Lithuanian Lake District (North-Eastern Poland) on the basis of the material collected in the Suwalski Landscape Park in 2013. In this park 104 species have been recorded so far which makes this area protected the richest in terms of caddisflies in Poland. The paper also contains the synthesis of data from the entire Polish part of the Lithuanian Lake District, including 125 species together with the assessment of the state of knowledge on trichopteroфаuna as well as the attempt to estimate its character and species richness. Since this area is still insufficiently explored, the actual number of species is certainly much higher than given in this paper, and at least some areas may be the hot spots of species richness of caddisflies in Poland and Central-Eastern Europe. It is also a refuge for a number of rare and endangered species. The Suwalski Landscape Park undoubtedly belongs to the most valuable areas of the lake district. Both the park as well as the whole lake district require regular trichopterological studies which will give a more complete picture of their fauna. This will allow effective evaluation of the advantages

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of particular areas and habitats, which will give rise to more effective protection planning and monitoring the effects of this protection.

**Keywords:** caddisflies, Trichoptera, Poland, Lithuanian Lake District, records, check-list, rare species, red-listed species, protection

## **Introduction**

The Lithuanian Lake District (LLD) is an unique area at the scale of the entire country – its land relief is characterized by denivelation, different than the rest of Poland hydrographic position (this area is entirely situated in the basin of the River Neman) and the most severe climate with boreal influences. All these features could not be without influence on the formation of the caddisfly fauna of this area where one can expect a significant number of species of northern distribution. In addition, this area is characterized by a low degree of human pressure, which contributes to a good quality of surface waters, both standing and flowing. This is another important factor for the development of aquatic stages of caddisflies. Taking also into consideration the short-term cycles of destruction of the lake district in the Holocene, it can be assumed that the current trichopteroфаuna has not been transformed in large part and can be treated as a “primary” for the area with boreal influences. The more striking is the fact that the knowledge of its trichopteroфаuna is still very incomplete.

The objectives of this studies were: 1) to complete the knowledge of caddisflies of the Polish part of the Lithuanian Lake District; 2) on the basis of original an literature data to make the lists of Trichoptera of the entire LLD and – within its area – Suwalski Landscape Park; 3) to evaluate the importance of the LLD for the protection of caddisflies; 4) to indicate the perspectives and needs for further research.

## **Material and methods**

The studies were conducted in 2013 in south-western part of the Suwalski Landscape Park (SLP). It protects early postglacial landscape of the Lithuanian Lake District (in its area: the Wschodniosuwalskie Lake District), with rich land relief, large differences in altitudes (146–275 m a.s.l.) and dominating moraine

uplands and river valleys. Forestation of this area is ca. 20%, considerable areas are occupied by meadows and pastures. The park is rich in surface waters. These are mainly: streams and rivers, 24 lakes of different trophic status, numerous small water bodies. Fens and *Sphagnum* peat bogs are also numerous. There are frequent seepages and springs, with valuable spring-fed fens nearby at some places. Due to the extremely varied natural conditions and a good state of preservation of habitats, the SLP is considered one of the most valuable areas under protection in north-eastern Poland (Fałtynowicz et al. 2007).

The analyzed material was collected during two field expeditions: on May 1–3 and July 21–28, 2013.

Only in July, due to the favourable temperature of the air, imagines were caught into a screen light trap illuminated by high pressure sodium 250 W lamp. Caddisflies were collected manually from the screen. The catches were made in five times, at different locations in the village of Malesowizna-Turtul. 974 adult caddisflies were collected in total. Moreover, in July, imagines were caught manually and with the use of an entomological net by the Turtul Pond – under the bridge at the dam, from boulders and trees above the reservoir and the river. 52 imagines were obtained this way.

During both expeditions aquatic stages of Trichoptera (larvae and pupae) were also collected – with the use of a hydrobiological sampler, and, occasionally, hand picked from boulders, stones, branches submerged in water. Most of the material was collected in the Turtul Pond: 741 individuals. Other sites were explored less regularly.

Eight sites were studied: 1. Lake Hańcza, south-eastern part (54°15' N, 22°47' E, UTM: FF11). 2. The River Czarna Hańcza near the nature reserve „Erratics in Bachanowo at the River Czarna Hańcza” (54°13' N, 22°47' E, FF11). 3. The Turtul Pond (54°13' N, 22°48' E, FF11/FF10\*). 4. The Turtul Esker, *ad lucem* (54°13' N, 22°48' E, FF10). 5. Ditches and streams flowing out of the Turtul Pond (54°13' N, 22°48' E, FF10). 6. The River Czarna Hańcza below the outflow of the Turtul Pond (54°13' N, 22°48' E, FF10). 7. Peat excavation on meadows in the valley of the River Czarna Hańcza in Malesowizna-Turtul (54°13' N, 22°48' E, FF10). 8. Spring-fed fen of the River Szeszupa, *ad lucem* (54°13' N, 22°48' E, FF10) (Figure 1).

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\* The boundary between UTM squares runs through the northern part of the pond.

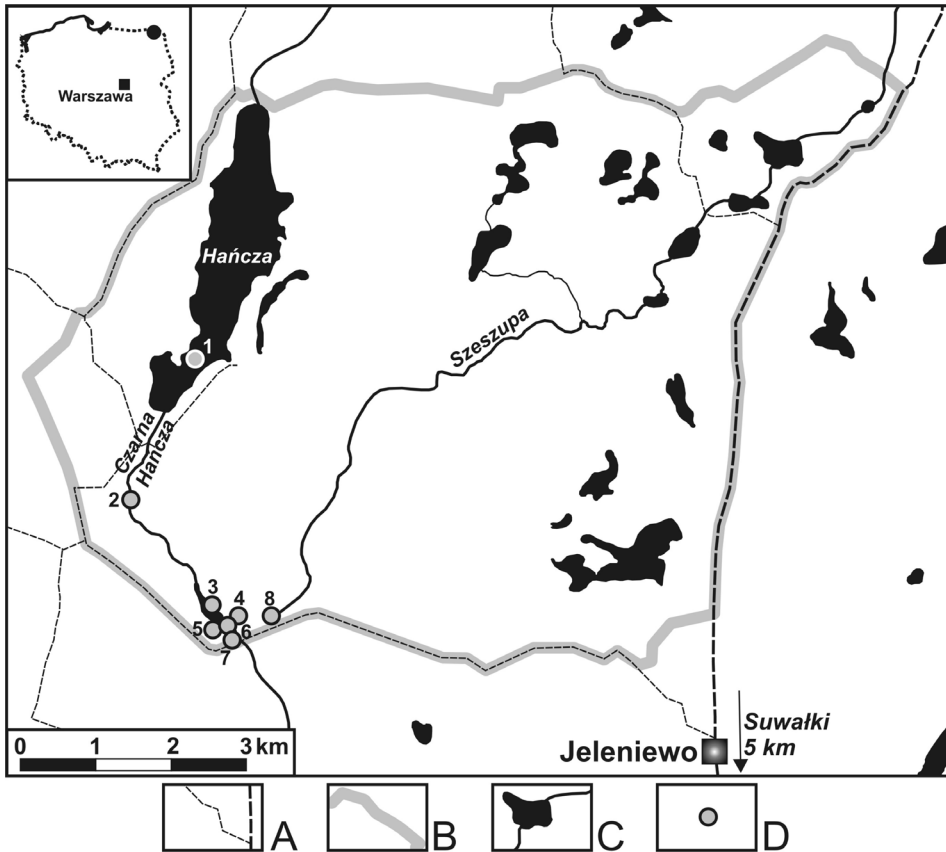


Figure 1. Study area and localisation of study sites. A – main roads, B – border of the Suwałki Landscape Park, C – larger water bodies, D – sites

In general the analyzed material encompasses 887 aquatic stages (larvae and pupae) as well as 1023 imagines. The vast majority of specimens was identified the species level with the following exceptions: among larvae – the genus *Beraea* Steph. and undistinguishable larvae of the genus *Anabolia* Steph. (*A. furcata* Brau. or *A. laevis* Zett.), among imagines – females from the genus *Hydropsyche* Pict. This part of the material has not been included in the Table 1. The taxonomic system of caddisflies in the table and list was performed according to Morse (2014).

Table 1. Caddisflies (Trichoptera) known from the Polish part of the Lithuanian Lake District. Sources: 1 – Pongràcz (1919), 2 – Demel (1922), 3 – Dembowski (1923), 4 – Demel (1923), 5 – Demel (1924a), 6 – Demel (1924b), 7 – Racięcka (1931), 8 – Rzóska (1935), 9 – Riedel (1961), 10 – Czachorowski (1998), 11 – Buczyński et al. (2001), 12 – Makiewicz (2001), 13 – Szczęsny and Majecki (2002), 14 – Majecki et al. (2007), 15 – Buczyńska et al. (2012), 16 – new data. SLP – species recorded in the Suwalski Landscape Park; RL – species from the Red list of animals of Poland (EX? – probably extinct; NT – lower risk, near threatened; LC – lower risk, least concern\*; DD – data deficient)

No.	Species	Source																SLP	RL
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1.	<i>Ecnomus tenellus</i> (Ramb.)														+	+		+	+
2.	<i>Cheumatopsyche lepida</i> (Pict.)															+		+	+
3.	<i>Hydropsyche angustipennis</i> (Curt.)										+		+	+		+		+	+
4.	<i>H. contubernalis</i> McL.															+			+
5.	<i>H. instabilis</i> (Curt.)																	+	+
6.	<i>H. pellucidula</i> (Curt.)															+			+
7.	<i>H. saxonica</i> McL.																	+	+
8.	<i>H. siltalai</i> Doehl.													+		+			+
9.	<i>Cyrnus crenaticornis</i> (Kol.)											+	+	+	+	+		+	+
10.	<i>C. flavidus</i> McL.				+					+		+		+	+	+		+	+
11.	<i>C. insolutus</i> McL.											+	+	+	+	+		+	+
12.	<i>C. trimaculatus</i> (Curt.)				+					+	+	+		+	+	+			+
13.	<i>Holocentropus dubius</i> (Ramb.)									+									
14.	<i>H. picicornis</i> (Steph.)																	+	+
15.	<i>Neureclipsis bimaculata</i> (L.)													+		+			+
16.	<i>Plectrocnemia conjuncta</i> Mart.														+				LC
17.	<i>P. conspersa</i> (Curt.)												+	+		+		+	+
18.	<i>Polycentropus flavomaculatus</i> (Pict.)				+	+				+	+		+	+	+		+	+	
19.	<i>P. irroratus</i> Curt.														?	?			+
20.	<i>Lype phaeopa</i> (Steph.)												+	+	+		+	+	
21.	<i>L. reducta</i> (Hag.)									+			+		+			+	
22.	<i>Psychomyia pusilla</i> (Fabr.)									+	+		+	+	+		+	+	
23.	<i>Tinodes waeneri</i> (L.)				+		+				+		+	+	+		+	+	
24.	<i>Agraylea multipunctata</i> Curt.				+						+		+	+	+		+	+	
25.	<i>A. sexmaculata</i> Curt.												+	+	+	+	+	+	
26.	<i>Hydroptila cornuta</i> Mos.														+	+			
27.	<i>H. dampfi</i> Ulm.														+				LC
28.	<i>H. lotensis</i> Mos.														+	+			

\* In the Red List of Animals in Poland established 12 years ago there is still the system of the categories of IUCN from 1999. In this system, the LC category includes species of lower risk, which neither show clear symptoms of population decline (do not qualify the categories of endangered taxa), nor are rare; they may even locally and/or temporarily show an increase in numbers or occupied area but which require monitoring/control, because the causal factors threatening their existence have not been eliminated (Głowaciński 2002; Głowaciński and Nowacki 2004).



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
75.	<i>A. laevis</i> Zett.										+		+	+	+				+
76.	<i>A. nervosa</i> (Curt.)				+		+												
77.	<i>Glyphotaelius pellucidus</i> (Retz.)										+		+	+	+			+	+
78.	<i>Grammotaulius nigropunctatus</i> (Retz.)														+				
79.	<i>Limnephilus affinis</i> Curt.																	+	+
80.	<i>L. auricula</i> Curt.														+			+	+
81.	<i>L. binotatus</i> Curt.										+					+			+
82.	<i>L. bipunctatus</i> Curt.														+				+
83.	<i>L. borealis</i> (Zett.)												+	+					LC
84.	<i>L. decipiens</i> (Kol.)					+					+				+			+	+
85.	<i>L. extricatus</i> McL.												+	+	+			+	+
86.	<i>L. flavicornis</i> (Fabr.)										+	+	+	+	+			+	+
87.	<i>L. fuscicornis</i> Ramb.										+		+	+	+				+
88.	<i>L. griseus</i> (L.)													+					
89.	<i>L. hirsutus</i> (Pict.)																	+	+
90.	<i>L. lunatus</i> Curt.				+					+	+		+		+			+	+
91.	<i>L. marmoratus</i> Curt.				+		+	+	+		+		+	+	+			+	+
92.	<i>L. nigriceps</i> (Zett.)				+						+							+	+
93.	<i>L. politus</i> McL.				+		+				+							+	+
94.	<i>L. rhombicus</i> (L.)				+		+			+	+		+	+	+			+	+
95.	<i>L. sericeus</i> (Say)														+				
96.	<i>L. sparsus</i> Curt.														+				
97.	<i>L. stigma</i> Curt.													+	+			+	+
98.	<i>L. vittatus</i> (Fabr.)									+			+	+	+				
99.	<i>Nemotaulius punctatolineatus</i> (Retz.)				+										+			+	+
100.	<i>Halesus digitatus</i> (Schr.)										+		+					+	+
101.	<i>H. radiatus</i> (Curt.)																	+	+
102.	<i>H. tessellatus</i> (Ramb.)				+						+							+	+
103.	<i>Mesophylax impunctatus</i> McL.				+						?								
104.	<i>Potamophylax cingulatus</i> (Steph.)														+			+	+
105.	<i>P. latipennis</i> (Curt.)		+								+		+		+			+	+
106.	<i>P. nigricornis</i> (Pict.)										+								+
107.	<i>P. rotundipennis</i> (Brau.)												+		+				+
108.	<i>Stenophylax lateralis</i> (Steph.)																	+	+
109.	<i>Wormaldia subnigra</i> McL.														+			+	+
110.	<i>Brachycentrus maculatus</i> (Fourcr.)						+			+			+		+				
111.	<i>B. subnubilus</i> Curt.														+				
112.	<i>Lepidostoma hirtum</i> (Fabr.)						+								+			+	+
113.	<i>Crunoecia irrorata</i> (Curt.)		+															+	+
114.	<i>Agrypnia obsoleta</i> Kol.					+				+	+			+					
115.	<i>A. pagetana</i> Curt.					+	+				+				+	+	+	+	+
116.	<i>A. picta</i> Kol.		+															+	+
117.	<i>A. varia</i> (Fabr.)												+	+	+			+	+
118.	<i>Oligotricha striata</i> (L.)												+	+				+	+
119.	<i>Phryganea bipunctata</i> Retz.																	+	+
120.	<i>P. grandis</i> L.					+	+		+		+		+	+	+	+	+	+	+

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
121.	<i>Trichostegia minor</i> (Curt.)									+			+	+	+				
122.	<i>Rhyacophila fasciata</i> Hag.					+									+		+	+	
123.	<i>R. nubila</i> Zett.					+				+			+		+		+	+	
124.	<i>Sericostoma personatum</i> (Spence)		+									+	+		+		+	+	
125.	<i>Notidobia ciliaris</i> (L.)		+														+	+	

## Results

In the collected material 82 taxa of Trichoptera with 79 species belonging to 15 families were identified. 57 taxa (56 species) were caught as imagines, 46 taxa (44 species) as aquatic stages (larvae/pupae). 21 species were obtained both as aquatic and terrestrial (aerial) stages.

Below there is the species list together with sites at which they were recorded (Figure 1), as well as the number of specimens (in square brackets)\*:

- **Ecnomidae** – *Ecnomus tenellus* (Ramb.): 4 [6♂♂, 5♀♀].
- **Hydropsychidae** – *Cheumatopsyche lepida* (Pict.): 4 [1♂]; *Hydropsyche angustipennis* (Curt.): 3, 4, 6, 8 [72AS, 17♂♂]; *H. instabilis* (Curt.): 4, 8 [10♂♂]; *H. saxonica* McL.: 2 [6AS]; *Hydropsyche* sp. (Pict.): 4, 8 [216♀♀].
- **Polycentropodidae** – *Cyrnus crenaticornis* (Kol.): 3 [1AS, 1♂]; *C. flavidus* McL.: 3, 4, 6, 8 [2AS, 46♂♂, 8♀♀]; *C. insolutus* McL.: 6 (1♂, 1♀); *Holocentropus picicornis* (Steph.): 3 (1AS); *Plectrocnemia conspersa* (Curt.): 4, 8 [4♂♂]; *Polycentropus flavomaculatus* (Pict.): 4, 6 [2AS, 3♂♂, 6♀♀].
- **Psychomyiidae** – *Lype phaeopa* (Steph.): 6, 8 [2♂♂, 1♀]; *Psychomyia pusilla* (Fabr.): 4 [1♀]; *Tinodes waeneri* (L.): 4 [2♂].
- **Hydroptilidae** – *Agraylea multipunctata* Curt.: 3, 4, 8 [2AS, 15♂♂, 20♀♀]; *A. sexmaculata* Curt.: 3, 4 [3LL, 1P, 7♂♂, 5♀♀]; *Hydroptila sparsa* Curt.: 8 [1♂]; *H. tineoides* Dalm.: 4 [1♂]; *Oxyethira flavicornis* Pict.: 3, 4, 6, 8 [28AS, 54♂♂, 117♀♀]; *O. tristella* Klap.: 4, 8 [5♀♀]; *Ithytrichia lamellaris* Eat.: 8 [4♀♀]; *Orthotrichia costalis* (Curt.): 4 [1♀]; *O. tragetti* Mos.: 4 [1♀].

\* Abbreviations and symbols: AS – aquatic stage(s) (larvae/pupae), ♂ (♂♂) – male (males), ♀ (♀♀) – female (females).



- **Molannidae** – *Molanna angustata* Curt.: 1, 3, 4, 8 [17AS, 4♂♂, 43♀♀]; *Molannodes tinctus* (Zett.): 4, 8 [1♂, 5♀♀].
- **Leptoceridae** – *Athripsodes albifrons* (L.): 6 [1♂, 1♀]; *A. aterrimus* (Steph.): 3, 6 [42AS, 1♂, 1♀]; *A. cinereus* (Curt.): 4, 8 [3♂♂, 7♀♀]; *Ceraclea albimacula* (Ramb.): 4, 6, 8 [5AS, 39♂♂, 169♀♀]; *C. dissimilis* (Steph.): 4 [1♂]; *C. nigronervosa* (Retz.): 6 [1AS]; *Leptocerus tineiformis* Curt.: 4, 6, 8 [19♂♂, 27♀♀]; *Mystacides azurea* (L.): 4 [2♂♂, 1♀]; *M. longicornis* (L.): 3, 4, 6, 8 [1AS, 22♂♂, 25♀♀]; *M. nigra* (L.): 3, 4, 6, 8 [16AS, 3♂♂, 2♀♀]; *Oecetis furva* (Ramb.): 3, 4 [1AS, 2♂♂]; *O. lacustris* (Pict.): 4 [4♀♀]; *O. ochracea* (Curt.): 4 [10♂♂, 5♀♀]; *O. testacea* (Curt.): 4, 8 [1♂, 18♀♀]; *Triaenodes bicolor* (Curt.): 3, 6 [8AS, 5♂♂]; *T. detruncatus* (Mart.): 4 [1♀]; *T. simulans* (Tjeder): 4 [1♀]; *T. unanims* McL.: 4 [1♀].
- **Goeridae** – *Goera pilosa* (Fabr.): 2, 3, 4, 8 [6AS, 5♂♂, 5♀♀].
- **Limnephilidae** – *Ironoquia dubia* (Steph.): 5 [1AS]; *Anabolia brevipennis* (Curt.): 8 [1♀]; *Anabolia* sp. (Steph.) (*A. furcata* or *A. laevis*): 3 [1AS]; *Glyphotaelius pellucidus* (Retz.): 3, 4 [7AS, 1♂]; *Limnephilus affinis* Curt.: 8 [1♂]; *L. auricula* Curt.: 3 [1L]; *L. decipiens* (Kol.): 3 [1AS]; *L. extricatus* McL.: 3, 4 [1AS, 1♂, 1♀]; *L. flavicornis* (Fabr.): 1, 3, 4, 7, 8 [34AS, 9♂♂]; *L. hirsutus* (Pict.): 4 [1♂]; *L. lunatus* Curt.: 3, 4 [10AS, 1♂]; *L. marmoratus* Curt.: 3 [8AS, 1♀]; *L. nigriceps* (Zett.): 3 [19AS]; *L. politus* McL.: 3 [22AS]; *L. rhombicus* (L.): 1, 3, 4, 5 [50AS, 1♂, 2♀♀]; *L. stigma* Curt.: 3, 4 [8AS, 1♂]; *Nemotaulius punctatolineatus* (Retz.): 4 [1♀]; *Halesus digitatus* (Schr.): 3 [61AS]; *H. radiatus* (Curt.): 1, 6 [9AS]; *H. tessellatus* (Ramb.): 3, 6 [38AS]; *Potamophylax cingulatus* (Steph.): 2 [1AS]; *P. latipennis* (Curtis, 1834): 3 [4AS]; *Stenophylax lateralis* (Steph.): 8 [1♂].
- **Philopotamidae** – *Wormaldia subnigra* McL.: 6, 8 [1♂, 5♀♀].
- **Lepidostomatidae** – *Lepidostoma hirtum* (Fabr.): 4, 8 [11♂♂, 28♀♀]; *Crunoecia irrorata* (Curt): 6 [3AS].
- **Phryganeidae** – *Agrypnia pagetana* Curt.: 3 [1AS]; *A. picta* Kol.: 3 [1AS]; *A. varia* (Fabr.): 4 [1♂]; *Oligotricha striata* (L.): 3 [2LL]; *Phryganea bipunctata* Retz.: 3 [22LL, 10AS]; *P. grandis* L.: 4, 6 [2AS, 10♂♂, 5♀♀].
- **Rhyacophilidae** – *Rhyacophila fasciata* Hag.: 2, 5 [5AS]; *R. nubila* Zett.: 6, 8 [3♂♂, 1♀].
- **Beraeidae** – *Beraea* sp. (Steph): 1 [1AS].

- **Sericostomatidae** – *Sericostoma personatum* (Spence): 2 [4AS];  
*Notidobia ciliaris* (L.): 3 [39AS].

Among imagines caught to a light trap two species were definitely dominating: *Ceraclea albimacula* and *Oxyethira flavicornis* (ca. 200 specimens each), however, in case of the first species sex ratio was 1 : 4 (males : females) and in case of the second one – 1 : 2. To the species with moderate numbers, fluctuating around 50 individuals, belonged: *Cyrnus flavidus*, *Mystacides longicornis*, *Hydropsyche instabilis* and *Leptocerus tineiformis*. As many as 20 species were collected as a single specimen. Among aquatic stages the most numerous recorded were: *Limnephilus rhombicus*, *Hydropsyche angustipennis*, *Halesus digitatus* and *Molanna angustata*. Eleven species were caught as a single larva.

## Discussion

The Lithuanian Lake District is one of the most interesting and valuable regions of Poland, distinguished by its specific climate and geological past, which has a strong impact on the land relief and water relations. However, any comprehensive and thorough trichopterozoological studies have been conducted here. The first data from this area appeared only in the first half of the twentieth century (Pongrácz 1919; Demel 1922, 1923, 1924, 1924b; Dembowski 1923; Racięcka 1931; Rzóśka 1935). They were the analysis of the fauna of specific hydrological objects (lakes, rivers, springs) or species (experimental works), performed mostly in the vicinities of Lake Wigry due to the existing hydrobiological station at that time which was the basis for the studies and the place of employment of some researchers. The first data from the second half of the twentieth century is brought by the paper of Szczepańska (1958) about the caddisflies of the Masurian Lake District which also contained marginal data from the western edge of the Lithuanian Lake District. However, the author did not give the species any sites, therefore there is no way to indicate which of them was found in the Lithuanian Lake District, and the vast majority of species were caught with high probability only in the Masurian Lake District. For this reason, we omit this paper in our study. Soon after, the paper of Riedel (1961) was published, containing, *inter alia*, occasional data from Suwałki and their surrounding areas. Finally, Tomaszewski (1965) published a volume “Catalogue of Polish fauna” devoted to caddisflies. However, the only original information in this work which may involve the Lithuanian Lake District

is the record of *Potamophylax rotundipennis* (Brau.) based on a specimen from the collection of the Institute of Zoology PAS. Unfortunately, it was generally given for the Masurian Lake District in a provisional regionalization used in the Catalogue, where the LLD is not a separate region. So again, the exact site of this specimen remains unknown. For this reason, the study of Tomaszewski (1965) is also omitted as a source of information about caddisflies of the LLD.

A lot of the data is provided by the contemporary papers (Czachorowski 1998; Buczyński et al. 2001; Makiewicz 2001; Szczęsny and Majecki 2002; Majecki et al. 2007; Buczyńska et al. 2012). They concern mainly the fauna of lakes and/or protected areas: the Wigry National Park, the Suwalski Landscape Park, some nature reserves.

Taking into consideration all of the literature data (Pongrácz 1919; Demel 1922, 1923, 1924a, 1924b; Dembowski 1923; Racięcka 1931; Rzóska 1935; Riedel 1961; Czachorowski 1998; Buczyński et al. 2001; Makiewicz 2001; Szczęsny and Majecki 2002; Majecki et al. 2007; Buczyńska et al. 2012), 113 species of caddisflies have been recorded in the Polish part of the LLD so far. The materials presented in this paper increase this number by 12 more, which gives the total sum of 125 species (Table 1). This comprises 43.8% of the number of species known from Poland (Szczęsny and Majecki 2007). However, if one skips about 40 species occurring in Poland only in the mountains (Szczęsny and Majecki 2007), it turns out that in the LLD there is 51.0% of the species occurring in the areas of upland and lowland Poland. Moreover, this number is still incomplete for the most of the species recorded by us for the first are common. The present lack of data on their occurrence in the analyzed area must have resulted from the insufficient penetration of many habitats of the LLD but not from their actual absence.

It is hard to make any comparison between the studied regions of Poland due to the differences in land relief, hydrographic networks and different degree of the recognition of caddisflies. However, some distinguishable features of the fauna of the LLD can be observed. As for species composition: the most frequently collected taxa should be *Molanna angustata* and the representatives of the genera *Athripsodes* Bill., *Mystacides* Latr. and *Cyrnus* Steph. *Phryganea grandis* and *Tinodes waeneri* as well as two species from the genus *Limnephilus*: *L. marmoratus* and *L. rhombicus* are also frequent. In this composition, lake species connected with elodeids and uncovered bottom predominating. Among species associated with running waters, *Polycentropus flavomaculatus* and *Goera*

*pilosa* are the most frequently found. Although this data should be treated as preliminary due to the fragmentary character of the studies, it gives some insight into the nature of the trichopteroфаuna of the LLD.

The contribution of the boreal species in the best studied habitat of the LLD – lakes – is moderately marked. Out of 12 species distinguished as boreal ones by Czachorowski (1998) in the caddisfly fauna of lakes in Poland, only 6 were found in the LLD. Among them, only *Limnephilus fuscicornis* and *L. stigma* can be regarded as common, the remaining ones were collected rarely and in small numbers. The same refers to north-European species (element): in the LLD only *Halesus radiatus*, *Potamophylax rotundipennis* as well as the representatives of the genus *Hydroptila* Dalm. and *Oxyethira* Eat. were found. In this group only a large part of the species of the family Hydroptilidae can be defined as a common element of the examined area.

Another characteristic aspect of the fauna of LLD is related to running waters. In regard to the morphology and water parameters, many stretches of rivers of the northern lake districts of Poland refer to mountain or submountain courses. This feature is observed e.g. in dragonflies (Odonata) where *Onychogomphus forcipatus* (L.) is widespread (Bernard et al. 2009; Buczyński unpubl. data). However, the species composition of the well-studied River Czarna Hańcza differs from similar rivers of the Mazurskie Lake District, e.g. Pasłęka (Czachorowski 1988). For example, in the Czarna Hańcza there are no representatives of the genera *Agapetus* Curt. and *Drusus* Steph. and the species number of the family Rhyacophilidae is very low. The same can be found in the entire Polish part of the LLD. Similar relationships can be observed in the rivers of neighboring Lithuania (Pliūraitė 2001, 2007; Pliūraitė and Kesminam 2004; Ruginis 2007; Višinskienė 2009). The River Pasłęka resembles the rivers of Carpathians (Czachorowski 1988) but in case of the courses of the LLD there is no relationship of such kind despite the expectations.

Worth mentioning is the fact that among 125 species recorded from the LLD as many as 18 are included in the Red List of threatened animals in Poland (Szczęsny 2002). Four of them belong to EX? (probably extinct in Poland in the last four centuries) category: *Leptocerus interruptus*, *Oecetis notata*, *Erotesis baltica* and *Agrypnia picta*. *Ceraclea senilis* and *Wormaldia subnigra* are NT (near threatened). The biggest group are LC (least concern) species – *Plectrocnemia conjuncta*, *Hydroptila dampfi*, *Oxyethira distinctella*, *Ceraclea nigronervosa*, *Triaenodes detruncatus*, *T. simulans*, *T. unanimitis* and *Limnephilus*

*borealis*. Four species share the DD (data deficient) category – *Ithytrichia lamellaris*, *Orthotrichia angustella*, *Ceraclea albimacula* and *Oecetis testacea*. Except for *Leptocerus interruptus*, given only by Riedel (1961), all of the species were contemporarily recorded (Table 1). While analyzing the Red List (Szczęsny 2002) it can be found that in the LLD 19.4% of all the species included in it are present, with 30.8% species with EX? category among them. If we skip the exclusively mountain species, these numbers are 25.0% and 33.0% respectively. This confirms the great significance of this area in the protection of caddisflies.

In the LLD the only caddisfly species under protection in Poland (Rozporządzenie... 2014): was discovered: *Crunoecia irrorata*. It is more difficult to assess how many species recorded in this area are rare in the country. In theory, such data should be included in the monograph “The Fauna of Poland” (Bogdanowicz et al. 2007), in which species are classified as very rare, rare and locally occurring. However, in the chapter about caddisflies (Szczęsny and Majecki 2007) this aspect was marginally treated: even many extremely rare species known from single sites in Poland were not distinguished. Among the discussed species (Table 1) only *Ceraclea nigronervosa* and *Limnephilus hirsutus* were determined as rare taxa (Szczęsny and Majecki 2007). However, worth mentioning is also the obtaining during the discussed studies such rare species like *Triaenodes detruncatus* (third record in Poland – Mohammad et al. 1987; Majecki et al. 2007), *Triaenodes unanimitis* (second record in Poland – Szczęsny and Majecki 2002) or *Orthotrichia tragetti* (fourth record in Poland – Serafin 2003; Buczyńska 2012b; Majecki et al. 2007). Noteworthy are also *Wormaldia subnigra*, a species of running waters, until recently regarded as doubtful in Poland (Szczęsny 1991), and *Oecetis testacea*, regarded as a species preferring waters of lower trophy (Czachorowski 1998), in the LLD found at the only site so far – by the eutrophic Turtul Pond, where imagines were present during each light trapping.

The data given in this paper is essential not only as a supplement to the list of species known from the LLD. It is also an important contribution to the knowledge of caddisfly fauna of the Suwalski LP – the area considered as valuable as the Wigierski National Park (Buczyński et al. 2014) but so far fragmentary and poorly explored for the presence of caddisflies. First information about Trichoptera from the SLP was provided in the paper of Czachorowski (1998): in three lakes (mainly Lake Hańcza) 16 species were recorded. Then Buczyński et al. (2001) reported 10 species from the basin of Lake Jaczno. Majecki et al. (2007) caught 71 species of caddisflies in the upper course of the River Czarna

Hańcza, however, a large part of the material collected in the light traps was rather from the Turtul Pond than the river itself. Buczyńska et al. (2012) gave 17 species, mainly from small water bodies. In total, in the SLP 80 caddisfly species were recorded in the literature. This paper presents data on 79 species of which as many as 25 have been found for the first time. Thus, the list of species known from the SLP so far has 104 positions (Table 1).

Species richness of trichoptero fauna of the SLP is impressively high, especially on the background of other protected areas in Poland. Comparing other well studied landscape parks (LP) situated in lowlands or highlands, the numbers of caddisflies are as follow: 63 – the Lasy Janowskie LP (Czachorowski et al. 2000), 56 – Iława Lake District LP (Serafin and Czachorowski 2004), 45 – Brudzeński LP (Abraszewska-Kowalczyk et al. 2002), 45 – Wzniesienia Łódzkie LP (Majecka and Majecki 2010), 43 – Spalski LP (Majecka and Majecki 2009) as well as Nadwieprzański LP (Buczyńska 2012a), Krzczonowski LP (Czachorowski and Buczyński 2004) and Bolimowski LP (Kowalczyk et al. 2002) – 35 species each. Even in national parks the numbers are lower, not exceeding record 79 species that were given for the Bieszczadzki National Park (with different mountain fauna) or even the most valuable primeval forests under protection in Poland – the Białowiecki National Park where 72 species were found (Czachorowski and Majewski 2003). Moreover, the latter park and the SLP share the same feature – they are the areas with minimal anthropic pressure. In this light, the caddisfly fauna of the SPK can also be regarded as non-transformed, highly primary one typical of early postglacial areas with cold climate.

It should be emphasized that in the SLP as many as 83.2% of species known from the Polish part of the LLD were discovered. This indicates its good representativeness of habitats within the region and confirms the high diversity of habitats, as well as the good state of preservation and the richness of their fauna. In addition, 50% of the species known in the lake district from the Red List were found in the park. The presence of the only species under protection – *Crunoecia irrorata* (the only contemporary data from the examined area) was also found, moreover, the park is the only place of the occurrence of the species distinguished as rare in Poland by Szczęsny and Majecki (2007): *Ceraclea nigronervosa* and *Limnephilus hirsutus* (Table 1).

Information about the importance of the SLP for the protection of caddisflies match those of other groups of aquatic invertebrates. A record qualitatively rich fauna which abounds in rare and endangered species was found during the studies

on aquatic beetles (Coleoptera) – although, as in the case of caddisflies, this data is also incomplete (Buczyński et al. 2014). The fauna of dragonflies (Odonata) was also varied and valuable (Buczyński et al. 2001, 2012, unpubl. data; Bernard et al. 2009). Similar data was given for terrestrial insects like butterflies (Lepidoptera) (Dawidowicz et al. 2014) and weevils (Coleoptera: Curculionioidea) (Marczak and Lasecki 2012), as well as vascular plants and lichens (Kukwa and Fałtynowicz 2002; Jando and Kukwa 2003; Zalewska et al. 2004; Lazarus et al. 2010).

It should be taken into account that the both areas of LLD and SLP have not been studied entirely. In the SLP there is still no data about the spring aspect of the fauna of small water bodies. The knowledge about fens and peat bogs is also very incomplete. As for running waters only the River Czarna Hańcza can be considered well studied (Majecki et al. 2007; data in this paper), almost nothing is known about caddisflies of the River Szeszupa and numerous streams. The fauna of springs was analyzed only near Lake Jaczno (Buczyński et al. 2001). Even the knowledge about the fauna of lakes is fragmentary: only 5 were the objects of the studies and most of the data comes from Lake Hańcza (Czachorowski 1998; Buczyński et al. 2001; data in this paper). These deficiencies indicate that the number of 104 species known from this park is very incomplete – the real number may be estimated at at least 130 or even, as high as about 150.

Similar remarks but only at the level of larger numbers of species one can report on the entire Polish part of the LLD. Except for the SLP, caddisflies have been examined actually only in the Wigierski National Park and, at some places, in the valley of the River Czarna Hańcza. Vast areas with hundreds of lakes as well as fens and bogs, thousands of small water bodies, numerous rivers and streams still remain unexplored. Including very interesting natural areas like the Romincka Forest characterized by climate which refers to the utmost to the boreal conditions in Poland (Szmigiel-Rawska et al. 2013) or the Augustowska Forest. Taking into consideration natural conditions and a very good state of preservation of many habitats, one can generally expect the qualitatively rich fauna, with numerous stenotopic elements and/or endangered with extinction, especially in lakes, running waters as well as fens and peat bogs.

In the described situation the undertaking regular studies on the caddisflies of the Lithuanian Lake District is a must: they should be especially focused on the geographic distribution of the species, their assemblages in different types of habitats, the occurrence of rare and/or endangered species in Poland and Europe. Such studies would allow to fully assess the importance of this region for the

protection of biodiversity of caddisflies. This, in turn, would enable the planning of effective nature protection of this region and the monitoring of its effects which would have the positive impact on the protection of other aquatic organisms.

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**CHRUŚCIKI (TRICHOPTERA)  
POLSKIEJ CZĘŚCI POJEZIERZA SUWAŁSKIEGO:  
NOWE DANE, STAN WIEDZY I PERSPEKTYWY BADAŃ**

**Streszczenie**

Autorzy przedstawiają informacje o występowaniu 79 gatunków chruścików na Pojezierzu Litewskim (Polska Północno-Wschodnia) na podstawie danych zebranych w Suwałskim Parku Krajobrazowym w 2013 roku. W parku tym znaleziono dotąd 104 gatunki, co czyni go najbogatszym pod tym względem obszarem chronionym w Polsce. Praca zawiera też syntezę danych, z całej polskiej części Pojezierza Litewskiego, obejmujących 125 gatunków, z oceną stanu poznania jej trichopterofauny oraz próbą oszacowania jej charakteru i bogactwa gatunkowego. Jako że obszar ten jest zbadany niewystarczająco, faktyczna liczba występujących tu gatunków jest na pewno znacznie większa od wskazanej w artykule, zaś przynajmniej niektóre obszary mogą być gorącymi plamami bogactwa gatunkowego chruścików w Polsce i Europie Środkowo-Wschodniej. Jest on też refugium wielu gatunków rzadkich i zagrożonych. Do najcenniejszych obszarów pojezierza należy bez wątpienia Suwałski Park Krajobrazowy. Zarówno ten park, jak i całe pojezierze, wymagają systematycznych badań trichopterologicznych, które dadzą pełniejszy obraz występującej tu fauny. Umożliwi to efektywną ocenę walorów poszczególnych obszarów i siedlisk, co da podstawę do skuteczniejszego planowania ochrony przyrody i monitorowania skutków tej ochrony.

**Słowa kluczowe:** chruściki, Trichoptera, Polska, Pojezierze Litewskie, stwierdzenia, wykaz, gatunki rzadkie, Czerwona lista, ochrona

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