

MATERIALS TO THE KNOWLEDGE OF SOME AQUATIC INSECTS (PLECOPTERA, ODONATA, HETEROPTERA, TRICHOPTERA, COLEOPTERA) OF THE GORCE MOUNTAINS

Paweł Buczyński*, Grzegorz Tończyk**, Edyta Buczyńska***

*Department of Zoology, Maria Curie-Skłodowska University
Akademicka str. 19, 20-033 Lublin, pawbucz@gmail.com

**Department of Invertebrate Zoology and Hydrobiology
University of Łódź, Banacha str. 12/16, 90-237 Łódź, tonczyk.grzegorz@gmail.com

***Department of Zoology, Animal Ecology and Wild Life Management
University of Life Sciences in Lublin, Akademicka str. 13, 20-033 Lublin,
edyta.buczynska@gmail.com

Summary. The Gorce Mountains and the Gorceński National Park are still poorly known with respect to the occurrence of invertebrates: data is incomplete, partly out of date and insufficient to plan protection activities. Therefore, in the spring of the year 2006, we made a faunistic reconnaissance of the eastern part of the area, collecting the selected groups of aquatic insects. 77 species were recorded in total: Plecoptera – 17, Odonata – 1, Hemiptera-Heteroptera – 6, Coleoptera – 22, Trichoptera – 31. 25 species have been given for the Gorce Mts. for the first time. Moreover, for the part of the studied groups, the first data except for springs and natural running waters has been provided. The qualitatively and quantitatively richest and, at the same time, habitually typical of mountains were the entomocenoses of streams and the River Ochotnica. Relatively rich fauna of beetles was interesting – those were the insects of the widest – comparing to other groups – spectrum of the occupied habitats.

Key words: aquatic insects, Plecoptera, Odonata, Heteroptera, Trichoptera, Coleoptera, Gorce Mountains, Poland

INTRODUCTION

In spite of relatively high number of invertebrate species known from the Gorce Mts. and the Gorceński National Park (GNP) – ca. 1000 – the knowledge about them is still considered insufficient [Petryszak 1992, GPN 2008]. The first data on the fauna of the Gorce Mts. is from the second half of the 19th century and the first half of the 20th century, however, comprehensive studies on the

large scale were undertaken in the second half of the 20th century during the research of the River Raba [Mielewczyk 1973a, b, Szczęsny 1975, Sowa and Fiałkowski 1988]. Those papers have significantly improved the state of knowledge but the identification of particular groups and timeliness of data are still far insufficient. Therefore, the urgent need for further studies is essential in full evaluation of invertebrates in the GNP and in taking appropriate protection actions [Szczęsny 1998, Dyduch-Falniowska *et al.* 1999].

This paper is the answer for those postulates – it has been compiled on the basis of the material collected during several days of faunistic reconnaissance conducted during the 13th Polish Benthological Workshop of Polish Hydrobiological Society in May 2006.

The spring aspect of the fauna of Plecoptera, Odonata, Heteroptera, Trichoptera and Coleoptera was studied. All those groups had been examined before in the area of the Gorce Mts., nevertheless, the amount of data is highly variable. Dragonflies were recognized the best [Fudakowski 1932, Mielewczyk 1973a, Czekaj 1993, Łabędzki 1995, 2002, Szczęsny 1998, Buczyński and Tończyk 2004]. Relatively well known, but only in some areas of GNP (partly overlapping with the area studied by the authors of this paper), were caddisflies [Szczęsny 1975, 1986, 1987, 1998, Chaniecka 2002, Chaniecka and Wiedeńska 2006] and stoneflies [Fiałkowski and Olechowska 1987, Sowa and Fiałkowski 1988, Szczęsny 1998, Fiałkowski and Kitell 2002]. Much less information regarded other groups: Mielewczyk [1973b] studied aquatic heteropterans in a few springs in the valley of the Olszowy Stream while Chaniecka [2002] and Chaniecka and Wiedeńska [2006] provided two beetle species from spring areas in the Gorczański National Park.

STUDY AREA

The Gorce Mountains are a mountain range stretching parallelly with the length of 42 km and the maximum width of 15 km. Together with the Beskid Żywiecki and Beskid Sądecki, they form the Beskid Wysoki which is the part of the Western Beskid [Michalik 1989, Matuszczyk 1992]. The area of the Gorce Mts. is 55 000 ha of which ca. 13% (7030 ha) encompasses the Gorczański National Park established in 1981 [Tomasiewicz 2000]. The Gorce Mts. are relatively low, about 40% of their area reaches the level of 600–800 m a.s.l. The areas above 1200 m a.s.l. cover only ca. 1% of the area. They are grouped around the vicinity of the highest peak of the Gorce Mts. called Turbacz (1311 m a.s.l.). Most of the area of the Gorce Mts. is the part of the drainage basin of the River Dunajec. The Gorce Mts. are characterized by: compact vegetation, abundant precipitation and low soil permeability – all of these factors determine a high degree of hydration. The network of watercourses and spring areas is dense, however, the number of standing water bodies is low [Nyka 1959, Tomasiewicz 2000].

METHODS AND MATERIAL

The material was collected on May 18–20, 2006.

22 study sites were examined (Fig. 1): 1. Gorczański NP, artificial water body on the ridge of Mt Kiczora, 49°32'30,4" N, 20°08'57,7" E, 1272 m a.s.l., UTM DV48; 2. Gorczański NP, transitional peat bog on the ridge of Mt Kiczora, 49°32'26,0"N, 20°09'02,0"E, 1255 m a.s.l., DV 38; 3. Gorczański NP, nameless stream, a tributary of the Forędówka stream, near the Pańska Przehybka Pass, 49°32'18,29" N, 20°10'25,06" E, 992 m a.s.l., DV48; 4. Gorczański NP, nameless stream, a tributary of the Forędówka stream, to the SE of the Przehybka Glade, 49°31'27,29" N, 20°11'18,03" E, 939 m a.s.l., DV48; 5. Gorczański NP, nameless stream, tributary of the Forędówka stream, at the foot of Mt Kiczora, 49°31'37,7" N, 20°10'26,1" E, 873 m a.s.l., DV48; 6. Ochotnica Górna, the Forędówka stream, DV48; 7. Ochotnica Górna, a puddle on the road in the valley of the Forędówka stream, 49°31'47,2" N, 20°10'29,5" E, 877 m a.s.l., DV48; 8. Ochotnica Górna, the Forędówka stream, 49°31'17,7" N, 20°10'37,2" E, 842 m a.s.l., DV48; 9. Ochotnica Górna-Małe Jaszczce, the Duże Jaszczce stream, Gorczański NP, 49°32'19,0" N, 20°11'17,2" E, 863 m a.s.l., DV 48; 10. Gorczański NP, a puddle on the road in the valley of the Duże Jaszczce stream, Ochotnica Górna-Małe Jaszczce, 49°32'19,0" N, 20°11'17,2" E, 864 m a.s.l., DV 48; 11. Ochotnica Górna-Groniówka, the Duże Jaszczce stream, near the field station of the Jagiellonian University, 49°31'25,1" N, 20°13'21,7" E, 695 m a.s.l., DV48; 12. Ochotnica Górna-Groniówka, a small water body near the Duże Jaszczce stream, 49°31'25,4" N, 20°13'19,6" E, 693 m a.s.l., DV 48; 13. Ochotnica Górna-Groniówka, nameless stream, a tributary of the Duże Jaszczce stream, 49°31'25,3" N, 20°13'20,2" E, 697 m a.s.l., DV48; 14. Ochotnica Górna, the River Ochotnica near the church, 49°30'39,2" N, 20°14'52,1" E, 592 m a.s.l., DV48; 15. Ochotnica Górna, nameless stream, a tributary of the River Ochotnica near the church, 49°30'32,4" N, 20°15'00,2" E, 652 m a.s.l., DV48; 16. Ochotnica Górna, a bog spring by the study site 15 15, 49°30'30,6" N, 20°14'59,2" E, 654 m a.s.l., DV48; 17. Ochotnica Górna, the River Ochotnica, above the domestic premises no. 41, 49°31'07,9" N, 20°16'17,4" E, 563 m a.s.l., DV48; 18. Ochotnica Górna, a fountain of the domestic premises no. 41, 49°31'05,5" N, 20°16'22,7" E, 550 m a.s.l., DV48; 19. Ochotnica Dolna, the Kudowski stream, above the dam, 49°31'15,1" N, 20°18'23,6" E, 532 m a.s.l., DV48; 20. Młynne, the Młynne stream – the stretch of pool type, above the dam, 49°32'55,7" N, 20°18'41,6" E, 574 m a.s.l., DV48; 21. Ochotnica Dolna, the River Ochotnica, the center of the village, 49°31'17,1" N, 20°18'02,5" E, 514 m a.s.l., DV58; 22. Ochotnica Dolna, the River Ochotnica by the eastern boundary of the village, 49°31'39,6" N, 20°21'41,7" E, 425 m a.s.l., DV58.

Semi-quantitative samples with the use of a hydrobiological and entomological net were taken. A part of material was collected during the investigation of stones and branches covering the beds of the examined waters as well as vegetation in

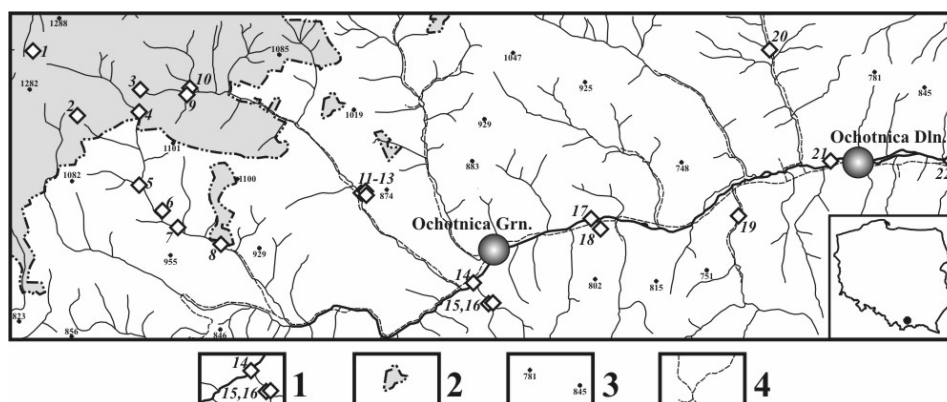


Fig. 1. Study area: 1 – running waters and study sites, 2 – area of the Gorczański National Park, 3 – hills, 4 – roads

their surroundings. In general, the collected material consisted of: 283 larval and 5 imaginal stoneflies, 1 larval dragonfly, 62 imagines of true bugs, 177 imaginal aquatic beetles as well as 875 larval, 11 pupal and 6 imaginal caddisflies.

Locations of the study sites were measured with the use of the instrument Garmin GPSMap 60CS.

RESULTS

The collected material is comprised of 77 species (Tab. 1). Moreover, the part of the material was identified to the level of a genus – those were the larvae of early instars with unformed species features.

17 species of stoneflies were recorded. They were collected in streams (15 species) and the River Ochotnica (8 species) only. *Isoperla grammatica* and *Protonemura intricata* were dominating quantitatively, however, *I. grammatica* was numerous in both habitats while *P. intricata* inhabited mainly the river. Particular species were noted at 1–8 study sites, the widest distribution was found for: *Isoperla grammatica* (8 study sites) as well as *Dicronas cephalotes* and *Perla marginata* (4 study sites for each species).

Dragonflies were represented by one larva of *Cordulegaster bidentata*, caught in the lateral fragment of the bed of the Duże Jaszczce stream cut off at low water level.

6 species of true bugs were found. The most species (5) was collected in the streams though their numbers were low. The second most important habitats were anthropogenic small water bodies (3 species), one species was caught in natural small water bodies as well as in peat bog waters. Most true bugs were collected at single study sites at low absolute height, only *Gerris gibbifer* had wider distribution: 5 study sites, the occurrence to 1272 m a.s.l.

Table 1. Aquatic insects recorded in the Gorce Mts. in the year 2006. Habitats: A – streams, B – the River Ochotnica, C – small natural water bodies, D – small anthropogenic water bodies, E – peat bogs. Mat. – material (LP – sum of specimens of larvae and/or pupae, I – sum of imagines, % – dominance within the particular taxonomical group)

Species	Localities	Altitudes	Habitats					Mat.		
			A	B	C	D	E	Aq	I	%
Plecoptera										
1. <i>Isoperla grammatica</i> (Poda)	11, 14, 15, 17, 19-22	425–695	48	53	–	–	–	101	–	35,1
2. <i>I. oxylepis</i> (Despax)	11, 15	642–695	4	–	–	–	–	4	–	1,4
3. <i>I. rivulorum</i> (Pict.)	8	873	1	–	–	–	–	1	–	0,3
<i>Isoperla</i> sp.	11	695	1	–	–	–	–	1	–	0,3
4. <i>Dicronas cephalotes</i> (Curt.)	11, 17, 19, 22	425–695	5	13	–	–	–	18	–	6,3
<i>Dicronas</i> sp.	17	563	–	2	–	–	–	2	–	0,7
5. <i>Perla marginata</i> (Panz.)	11, 17, 20, 22	425–695	11	5	–	–	–	16	–	5,6
<i>Perla</i> sp.	11	695	7	–	–	–	–	7	–	2,4
6. <i>Chloroperla tripunctata</i> (Scop.)	11	695	1	–	–	–	–	1	–	0,3
7. <i>Siphonoperla neglecta</i> (Rostock)	11	695	1	–	–	–	–	1	–	0,3
8. <i>Brachyptera seticornis</i> (Klap.)	8, 11, 15	642–873	7	–	–	–	–	6	1	2,4
9. <i>Amphinemura triangularis</i> (Ris)	17, 19, 21	514	1	7	–	–	–	7	1	2,8
<i>Amphinemura</i> sp.	21	514–563	–	1	–	–	–	1	–	0,3
10. <i>Nemoura cambrica</i> Steph.	4	939	1	–	–	–	–	–	1	0,3
11. <i>N. cinerea</i> (Retz.)	20	514	2	–	–	–	–	2	–	0,7
12. <i>Nemurella picteti</i> Klap.	13	697	3	–	–	–	–	3	–	1,0
<i>Nemoura</i> sp.	11	595	1	–	–	–	–	1	–	0,3
13. <i>Protonemura aubertii</i> Ill.	11	695	2	–	–	–	–	2	–	0,7
14. <i>P. intricata</i> (Ris)	4, 17, 19	532–563	3	66	–	–	–	67	2	24,0
<i>Protonemura</i> sp.	11, 15	642–695	3	–	–	–	–	3	–	1,0
15. <i>Leuctra albida</i> Kempny	17	563	–	6	–	–	–	6	–	2,1
16. <i>L. hippopus</i> Kempny	8, 17	563–873	3	9	–	–	–	12	–	4,2
17. <i>L. nigra</i> (Ol.)	22	425	–	1	–	–	–	1	–	0,3
<i>Leuctra</i> sp.	11, 15, 19, 20	532–695	20	–	–	–	–	20	–	6,9

Odonata											
18.	<i>Cordulegaster bidentata</i> (Sél.)	20	693	–	–	1	–	–	1	–	100,0
Hemiptera–Heteroptera											
19.	<i>Sigara nigrolineata</i> (Fieb.)	18	550	–	–	–	6	–	–	6	9,7
20.	<i>S. semistriata</i> (Fieb.)	20	574	1	–	–	–	–	–	1	1,6
21.	<i>Nepa cinerea</i> (Retz.)	20	574	1	–	–	–	–	–	1	1,6
22.	<i>Velia saulii</i>	20	574	1	–	–	–	–	–	1	1,6
23.	<i>Gerris gibbifer</i> Schum.	1, 2, 10, 18, 20	550–1272	2	–	2	16	29	–	49	79,0
24.	<i>G. lacustris</i> (L.)	18, 20	550–574	3	–	–	1	–	–	4	6,5
Coleoptera											
25.	<i>Haliplus lineatocollis</i> (Marsh.)	18	550	–	–	–	15	–	–	15	8,4
26.	<i>Agabus biguttatus</i> (Ol.)	12, 16, 20	574–693	1	–	7	–	–	–	8	4,5
27.	<i>A. bipustulatus</i> (L.)	1	1272	–	–	–	1	–	–	1	0,6
28.	<i>A. didymus</i> (Ol.)	3, 13	697–1005	3	–	–	–	–	–	3	1,7
29.	<i>A. melanarius</i> Aubé	1, 2, 7	877–1272	–	–	11	1	2	–	14	7,8
30.	<i>Platambus maculatus</i> (L.)	12, 14, 21	514–693	–	2	1	–	–	–	3	1,7
31.	<i>Rhantus suturalis</i> (Mac L.)	18	550	–	–	–	2	–	–	2	1,1
32.	<i>Hydroglyphus geminus</i> (Fabr.)	18	550	–	–	–	15	–	–	15	8,4
33.	<i>Hydroporus elongatulus</i> Sturm	2, 16	654–1255	–	–	5	–	1	–	6	3,4
34.	<i>H. incognitus</i> Sharp	1, 2, 18	550–1272	–	–	–	12	5	–	17	9,5
35.	<i>H. morio</i> Aubé	12, 20	574–693	1	–	1	–	–	–	2	1,1
36.	<i>H. planus</i> (Fabr.)	7, 18	550–877	–	–	6	7	–	–	13	7,3
37.	<i>H. striola</i> (Gyll.)	18	550	–	–	–	1	–	–	1	0,6
38.	<i>Oreodytes sanmarkii sanmarkii</i> (C.R. Sahlberg)	21	514	–	6	–	–	–	–	6	3,4
39.	<i>O. septentorialis</i> (Gyll.)	14, 17, 19–22	425–592	10	33	–	–	–	–	43	24,0
40.	<i>Hygrotus impressopunctatus</i> (Schall.)	20	574	1	–	–	–	–	–	1	0,6
41.	<i>Helophorus granularis</i> (L.)	10, 18	550–864	–	–	1	1	–	–	2	1,1
42.	<i>H. montenegrinus</i> Kuw.	18	550	–	–	–	1	–	–	1	0,6
43.	<i>Anacaena lutescens</i> (Steph.)	7, 8, 16–18	550–877	1	1	4	1	–	–	7	3,9
44.	<i>Laccobius minutus</i> (L.)	17, 18, 20, 21	514–654	1	3	1	–	–	–	5	2,8
45.	<i>Elmis latreillei</i> (Bedel)	17	563	–	1	–	–	–	–	1	0,6
46.	<i>Limnius perrisi perrisi</i> (Duf.)	5, 11, 19	532–695	13	–	–	–	–	–	13	7,3

Trichoptera											
47.	<i>Rhyacophila evoluta</i> McL.	11, 15	652–695	4	–	–	–	–	4	–	0,4
48.	<i>R. fasciata</i> Hag.	11, 15, 21	514–695	3	1	–	–	–	4	–	0,4
49.	<i>R. nubila</i> (Zett.)	15, 17, 22	425–652	–	6	–	–	–	6	–	0,7
50.	<i>R. polonica</i> McL.	15	652	3	–	–	–	–	3	–	0,3
51.	<i>Rhyacophila tristis</i> Pict.	15	652	1	–	–	–	–	1	–	0,1
	<i>Rhyacophila</i> sp.	6	873	1	–	–	–	–	1	–	0,1
52.	<i>Agapetus fuscipes</i> Curt.	13	697	3	–	–	–	–	3	–	0,3
53.	<i>A. ochripes</i> Curt.	6, 11, 13, 15	652–873	18	–	–	–	–	18	–	2,0
54.	<i>Philopotamus ludificatus</i> McL.	3, 6	873–1005	6	–	–	–	–	3	3	0,7
55.	<i>Plectrocnemia conspersa</i> (Curt.)	6, 20, 22	425–873	4	1	–	–	–	5	–	0,6
56.	<i>Hydropsyche instabilis</i> (Curt.)	11, 14, 17, 18, 21, 22	425–695	38	65	–	–	–	103	–	11,4
57.	<i>H. pellucidula</i> (Curt.)	22	425	–	1	–	–	–	1	–	0,1
58.	<i>H. saxonica</i> McL.	15	652	1	–	–	–	–	1	–	0,1
59.	<i>Lithax niger</i> (Hag.)	13, 15	652–697	5	–	–	–	–	5	–	0,6
60.	<i>Silo nigricornis</i> (Pict.)	3, 6	873–1005	–	1	11	–	–	12	–	1,3
61.	<i>S. pallipes</i> (Fabr.)	6, 11	695–873	5	–	9	–	–	14	–	1,6
62.	<i>Ecclisopteryx madida</i> McL.	6, 15, 19, 20	532–873	160	216	–	–	–	376	–	41,7
63.	<i>Drusus discolor</i> (Ramb.)	15	652	–	4	–	–	–	4	–	0,4
64.	<i>D. trifidus</i> McL.	13	697	1	–	–	–	–	1	–	0,1
65.	<i>Limnephilus binotatus</i> Curt.	2	1255	2	–	–	–	–	0	2	0,2
66.	<i>L. coenosus</i> Curt.	2, 16	654–1255	19	–	–	–	–	19	–	2,1
67.	<i>Potamophylax cingulatus</i> (Steph.)	6, 11, 14, 15, 19, 21	514–873	19	12	2	–	–	33	–	3,7
68.	<i>P. nigricornis</i> (Pict.)	9, 12, 17	563–863	4	2	1	–	–	7	–	0,8
69.	<i>Halesus digitatus</i> (Schrank)	12, 17, 21	514–693	32	1	–	–	27	59	–	6,5
70.	<i>H. rubricollis</i> (Pict.)	6, 14, 19–22	425–873	–	20	5	–	–	25	–	2,8
71.	<i>Allogamus auricollis</i> (Pict.)	6, 7, 11, 12, 14, 17, 19–22	425–877	55	55	2	–	–	112	–	12,4
72.	<i>A. unctaus</i> (Brau.)	3	1005	–	1	–	–	–	1	–	0,1
73.	<i>Parachiona picicornis</i> (Pict.)	13	697	2	–	–	–	–	2	–	0,2
74.	<i>Acrophylax zerberus</i> Dziędz.	17	563	30	–	–	–	–	30	–	3,3
75.	<i>Sericostoma personatum</i> (Spence)	13, 20, 21	514–697	1	14	–	–	–	14	1	1,7
76.	<i>S. schneideri</i> Kol.	12, 17, 21	514–693	11	–	–	–	–	11	–	1,2
	<i>Sericostoma</i> sp.	9	863	6	–	–	–	–	6	–	0,7
77.	<i>Odontocerum albicorne</i> (Scop.)	17	563	–	12	–	–	–	12	–	1,3

22 aquatic beetle species were recorded. They were collected in every examined environments; most of them inhabited anthropogenic small water bodies (11 species), next – in natural small water bodies (9 species), streams (8 species), the River Ochotnica (6 species) and peat bog waters (3 species). Particular species were caught on small numbers of study sites, the most common was *Oreodytes septentorialis* (5 study sites). In running waters two species were quantitatively dominating: *Oreodytes septentorialis* (streams and the River Ochotnica) and *Limnius perrisi perrisi* (streams only). In small water bodies the dominance structure was more balanced and to the dominants belonged *Haliphus lineatocollis* and the part of *Dytiscidae* (*Hydroglyphus geminus*, *Hydroporus incognitus*, *Agabus melanarius*). The most beetles did not occurred above 700 m a.s.l., above 1000 m a.s.l. only four species were recorded.

The collected specimen of *Agabus bipustulatus* belonged to a montane subspecies *Agabus bipustulatus solieri* Aubé, which had been regarded as a separate species until recently [Nilsson 2010].

Caddisflies were the most diversified element of the fauna of the studied environments: 31 species were recorded in total. The richest fauna was found in streams (23 species) and the River Ochotnica (16 species). The fauna of natural small water bodies was qualitatively and quantitatively poor, in anthropogenic small water bodies any caddisflies were noted. Some species of Trichoptera belonged to the widest distributed aquatic insect in the study area, e.g. *Allogamus auricollis* was present at 10 study sites while *Hydropsyche instabilis*, *Potamophylax cingulatus* and *Halesus rubricollis* – at 6 ones. The most numerous were: *Ecclisopteryx madida*, *Allogamus auricollis* and *Hydropsyche saxonica*. Above 1000 m a.s.l. only *Philopotamus ludificatus*, *Silo nigricornis*, *Limnephilus binotatus*, *L. coenosus* i *Allogamus uncatatus* were found. The rest of species occurred between 425 and 873 m a.s.l.

DISCUSSION

Most of the recorded stoneflies has been already known from the Gorce Mts. [Fiałkowski and Olechowska 1987]. A new species for the study area is only *Isoperla rivulorum* recorded in the upper stretch of the Forędówka stream. This species inhabits springs and small streams with cold water [Fiałkowski and Kitell 2002], therefore it was found in its typical habitat. In the Western Beskidy this species had been caught only by Sowa [1965], in the Wielka Puszcza stream situated over 80 km farther.

The collected material can be compared to the data from 30 years ago, coming from almost the same study sites in Forędówka and Ochotnica [Fiałkowski and Olechowska 1987]. The assemblages of species and their altitude ranges are very similar. Only *Leuctra nigra* was found much lower than in the cited paper (425 and 600–800 m a.s.l. respectively). Therefore there are no bigger changes in the fauna of stoneflies of the examined area. It can be also concluded, that the fauna is very simi-

lar to the faunas of other, nearby mountains massifs: Babia Góra [Sowa and Szczęsny 1970], Tatry [Kamler 1964], Pieniny [Fiałkowski 2000].

Mountain areas have poor fauna of dragonflies. This results from severe climate, domination of fast flowing cold waters, impoverishment in large and permanent standing waters [Bernard *et al.* 2009]. It was evident in the study area and small number of the recorded species is associated with this. Early – as for mountains – period of the studies resulted in the lack of imagines.

Cordulegaster bidentata has been recorded several times from the Gorce Mts. and the Gorczański NP [Mielewczyk 1973a, Czekał 1993, Łabędzki 1995, Szczęsny 1998]. This is a dragonfly typical of streams of mountain and higher parts of foothills, found in all of the mountains massifs of middle and southern Europe, including the whole Carpathian Mts. and Sudety Mts. [Dijkstra 2006, Bernard *et al.* 2009]. In the study area it was caught at the level of ca. 700 m a.s.l., near the study sites located in a spring stretch of the Olszowy Stream known from literature [Mielewczyk 1973a].

All of the true bugs recorded in the study area had been given from the Gorce Mts. by Mielewczyk [1973b]. The most numerous caught in May 2006 was *Gerris gibbifer*, a species typical of mountains [Wróblewski 1980]. Other recorded true bugs are commonly found in other mountains massifs of Poland, in the Pieniny Mts, Mt Babia Góra and the Tatra Mts. among others [Mielewczyk 1977, 1978].

Chaniecka [2002], in her doctor's thesis about the spring areas of the Gorczański NP, gave 9 species of aquatic beetles. Data on *Hydroporus kraatzi* Schaum and *Crenitis punctatostriata* (Letzner) has only been published so far [Chaniecka 2004, Chaniecka and Wiedeńska 2006]. In 2006, 21 beetle species new for the Gorce Mts. were found. This material, especially from running waters, is characterized by large quantitative share of typical mountain species. This is the first time when new data concerns habitats different than spring areas. Moreover, *H. striola* has been found for the first time in the Western Beskid (in terms of the Catalogue of Polish Fauna) [Burakowski *et al.* 1976].

The most of 31 recorded caddisfly species had been given before from streams and spring areas of the Gorce Mts. including the Gorczański NP [Szczęsny 1987, 1998, Chaniecka 2002]. New for the studied part of the Gorce Mts. are: *Rhyacophila evoluta*, *Limnephilus binotatus* and *Acrophylax zerberus*. Our data let also to accomplish the list of Trichoptera of the Gorczański NP with two new species: *Limnephilus binotatus* and *Silo nigricornis*, and together with the data provided earlier by Szczęsny [1998] it makes 75 caddisfly species.

The conducted studies was of a reconnaissance type and it is hard to form detailed conclusions of ecological kind on their basis – however, some general regularities can be pointed out.

The obtained results show clearly that the insect groups typical of mountain habitats are stoneflies and caddisflies. In the examined streams and the River Ochotnica these both groups reached the highest species richness and numbers. Worth mentioning is the fact that the assemblages of small streams situated

mainly in forest and the river of mountain type were clearly of different character. Similar data were provided earlier by Fiałkowski and Olechowska [1987]. The fauna of true bugs turned out to be much less taxonomically diversified: they are associated mainly with well heated standing waters which are not a typical element of the hydrologic system of the Gorce Mts. [Mielewczyk 1973b]. The lack of big differentiation of standing waters is also the reason for small diversity of dragonflies [Bernard *et al.* 2009]. Small diversity of this group of insects refers also to the assemblages inhabiting running waters. Water courses of medium and high mountains are not inhabited by rheophilous dragonfly species for their hydrologic and geomorphologic features. The finding of only one dragonfly species, *Cordulegaster bidentata*, regarded as a crenophilous one [Buczyński 1999, Tończyk and Mielewczyk 2007], is a very typical picture for these areas of Poland. The fauna of small water bodies and peat bogs was very interesting in terms of ecology – with the rich assemblage of aquatic beetles discovered within. They turned out to be the group with the widest distribution in the examined area and found in every studied habitats. In waters of small water bodies and peat bogs 6 caddisfly species occurred, with *Halesus rubricollis* as a definite dominant. The studies on caddisflies in the described area have been limited to running waters so far [Szczęsny 1987, 1998]. Our data shows that standing waters are also interesting with respect to caddisflies and – in the future – more detailed studies could profit in results equally important for science, showing the fauna rich in species and providing valuable information about their habitat preferences.

In terms of species composition, the analysed fauna was not particularly valuable in zoological aspect. There were no species under protection as well as so called „Nature 2000” species. Species included in Red list of Poland were recorded: *Isoperla grammatica* (LC), *Hydroporus elongatulus* (VU), *Rhyacophila evoluta* (LC), *Agapetus fuscipes* (NT), *A. ochripes* (NT) [Fiałkowski and Sowa 2002, Szczęsny 2002, Pawłowski *et al.* 2002].

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MATERIAŁY DO POZNANIA WYBRANYCH OWADÓW WODNYCH (PLECOPTERA, ODONATA, HETEROPTERA, TRICHOPTERA, COLEOPTERA) GORCÓW

Streszczenie. Gorce i Gorczański Park Narodowy są wciąż zbyt słabo rozpoznane pod względem występowania bezkręgowców: dane są niepełne, częściowo nieaktualne i nie wystarczają do planowania działań ochronnych. Dlatego wiosną 2006 r. wykonano rekonesans faunistyczny wschodniej części tego obszaru, badając wybrane grupy owadów wodnych. Stwierdzono 77 gatunków: Plecoptera – 17, Odonata – 1, Hemiptera-Heteroptera – 6, Coleoptera – 22, Trichoptera – 31. 25 gatunków stwierdzono po raz pierwszy w Gorcach. Ponadto dla części badanych grup przedstawiono pierwsze dane pochodzące spoza źródeł i naturalnych wód bieżących. Najbogatsze jakościowo i ilościowo, a jednocześnie typowe siedliskowo dla gór Polski, były entomocenozy potoków i rzeki Ochotnicy. Interesująca okazała się stosunkowo bogata fauna chrząszczy, które cechowało też najszersze spośród badanych grup spektrum zajmowanych siedlisk.

Słowa kluczowe: owady wodne, Plecoptera, Odonata, Heteroptera, Trichoptera, Coleoptera, Polska, Gorce