

IS A NATURE RESERVE THE BEST FORM TO PROTECT INVERTEBRATES? - ON THE EXAMPLE OF DRAGONFLIES AND CADDISFLIES (INSECTA: ODONATA, TRICHOPTERA) OF THE „LAKE KOŚNO" RESERVE

Paweł Buczyński, Stanisław Czachorowski, Edyta Serafin, Witold Szczepański

Buczyński P., Czachorowski S., Serafin E., Szczepański W. 2003. Is a nature reserve the best form to protect invertebrates? - on the example of dragonflies and caddisflies (Insecta: Odonata, Trichoptera) of the „Lake Košno" reserve. *Acta. Biol. Univ. Daugavp. 3 (2): 125 - 132.*

In the year 2001 dragonflies and caddisflies of the „Lake Košno" landscape reserve and its surroundings were examined. On these rudiments the importance to the protection of aquatic insects was analysed. Clear differences in taxonomic diversity and the presence of special care species and indicator ones as well were stated to the reserve's disadvantage. The postulate of increasing the number of reserves and using other types (e.g. aquatic -, bog-, faunal- and landscape ones) for protection of water invertebrates was shown. The spreading out of the studied reserve was proposed in order to involve the most precious habitats of water invertebrates situated currently outside the reserve.

Key Words: Odonata, Trichoptera, Poland, evaluation, preservation, nature reserve

Paweł Buczyński. Department of Zoology, Maria Curie-Skłodowska University, Akademicka 19, 20-033 Lublin, Poland, e-mail: pbuczyns@biotop.umcs.lublin.pl;

Stanisław Czachorowski. Department of Ecology and Environmental Protection, University of Warmia and Mazury, Pl. Łódzki 3, 10-727 Olsztyn, Poland, e-mail: czachor@moskit.uwm.edu.pl;

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

Witold Szczepański. The Student Scientific Association of Entomologists „Kortoptera", University of Warmia and Mazury, Oczapowskiego 5, 10-718 Olsztyn, Poland, e-mail: w_szczep@poczta.fm

Introduction

Protected areas preserving biological resources through the protection of habitats are a very important form of nature protection. Their thickening network is the source of ecotourism with which official lobbies present the environmental state and protective actions. But the main question

must be raised: does it reflect the real situation of our environment? Very often nature protection loses with economic businesses. The problem is the delimitation of reserves. Without funds for scientific researches the knowledge about environment is based on existent studies, many a time out-of-date or incomplete. Sometimes there are any like these. Moreover, the main data that can

be used refer to vertebrates and higher plants only. In this case the newly set up reserves might not correspond with the needs for the protection of invertebrates.

The purpose of this paper was to analyse this problem on the basis of a reserve which encompassed main aquatic habitats. The researched object was the „Lake Košno” reserve. The paper was based on dragonflies and caddisflies for these orders are often used in bioindication. The data about their threats in Poland are also available (Bernard et al. 2002; Czachorowski & Buczyński 2000).

The authors would like to thank participants of the camp of the Student Scientific Association of Entomologists „Kortoptera” by the Department of Zoology at Warmia and Mazury University in Olsztyn for the help in works in the field.

Study area

The „Lake Košno” reserve covering the area of 1232,85 hectares is situated on the Olsztyn Lake District (the subregion of the Mazury Lake District) It encompasses an eutrophic lake Košno and its surrounding forests (Kondracki 2000; Panfil 1985).

The investigated area has the typical glacial relief with forms of ground and terminal moraines. Except some human settlements the area is covered with coniferous - with dominant pine-tree - and mixed forests. In depressions there are lakes: Košno (562,5 ha), Łajskie (40,0), Łowne Duże (40,0) Łowne Małe (12,5) and Czerwonka Mała (20,0) (Choiński 1991; Lewandowski 1992). These are eutrophic ones, only lake Łowne Małe is dystrophic and surrounded with a peatbog. The streams, which supply or link lakes, are numerous, usually natural and well preserved. Few small water bodies are present on inner-forest meadows. Among peatbogs the most common are transitional peatbogs originated from overgrowing lakes in different stage of succession. The only low peatbog, placed around the stream which supplied lake Košno, was found in south-west-

ern part of the reserve. Three of the examined peatbogs, all within the reserve area, were meliorated and partially degraded.

Methods and material

Field works were conducted in July of the year 2001. They encompassed the southern part of the reserve and its surroundings. All types of surface waters were examined intensively, in general: one spring, 9 streams, 5 lakes, two small water bodies and 5 peatbogs were examined (Fig. 1). Adult dragonflies were observed away from waters, on roads and clearings.

Larval dragonflies and caddisflies were caught with a hydrobiological scoop. Exuviae of dragonflies and caddisfly imagines were directly handpicked, a light trap was also used in catching adult caddisflies. Adult dragonflies were not captured, they were only observed. Evidence material were: Odonata - 76 larvae, 18 exuviae; Trichoptera - 621 larvae, 302 imagines.

The listed dragonfly species were divided into three categories, with:

- * confirmed development (criterion: the identification of larvae, sloughs and/or metamorphosis),
- * probable development (mature imagines only, reproductive activities),
- * not stated/confirmed development (mature imagines only, lack of reproductive activities).

Results

31 dragonfly species - 14 in the reserve, 30 outside - were stated. The most taxonomically diverse were the faunas of lakes, peatbogs and flowing waters, the less diverse - of water bodies. There were no dragonflies in a spring (Table 1).

The dominants were the species with broad ecological spectrum: eurytopes and poorly specialised stagnophiles. Synecological groups with narrow specialisation were represented by species associated with flowing waters (*Calopteryx* spp., *Platycnemis pennipes*, *Pyrrhosoma*

Table 1. Dragonflies collected. 1-6 – biotopes (1 – springs, 2 – running waters, 3 – lakes, 4 – peatbogs, 5 – small water bodies, 6 – imagines observed far from water bodies); A – nature reserve, B – outside the reserve; N – number of larvae and exuviae collected. Status of the species: ● – development was stated, ⊙ – probable development, ○ – no development was stated.

Species	1	2	3	4	5	6	A	B	N
1. <i>Calopteryx splendens</i> (Harris, 1782)		⊙	○				○	⊙	-
2. <i>C. virgo</i> (Linnaeus, 1758)		⊙						⊙	-
3. <i>Lestes dryas</i> Kirby, 1890					○			○	-
4. <i>L. sponsa</i> (Hanseemann, 1823)			○	○	○		○	○	-
5. <i>L. viridis</i> (Vander Linden, 1825)			●		●			●	11
6. <i>Platycnemis pennipes</i> (Pallas, 1771)		●	●				●	⊙	1
7. <i>Ischnura elegans</i> (Vander Linden, 1840)		●	●				●	●	5
8. <i>Enallagma cyathigerum</i> (Charpentier, 1840)			⊙	○				⊙	-
9. <i>Pyrrhosoma nymphula</i> (Sulzer, 1776)		⊙			●			●	1
10. <i>Coenagrion hastulatum</i> (Charpentier, 1825)					●			●	1
11. <i>C. puella</i> (Linnaeus, 1758)		⊙	●		●		●	●	9
12. <i>C. pulchellum</i> (Vander Linden, 1825)			⊙		●			●	1
13. <i>Erythromma najas</i> (Hanseemann, 1823)			●				●	⊙	1
14. <i>Brachytron pratense</i> (O.F. Müller, 1764)			●					●	3
15. <i>Aeshna cyanea</i> (O.F. Müller, 1764)		?			●			●	2
16. <i>Aeshna grandis</i> (Linnaeus, 1758)		○	●		●	○	●	●	22
17. <i>A. isosceles</i> (O.F. Müller, 1767)			⊙					⊙	-
18. <i>A. juncea</i> (Linnaeus, 1758)		○			⊙		⊙	⊙	-
19. <i>A. mixta</i> Latreille, 1805			●			○		●	1
20. <i>A. viridis</i> Eversmann, 1836		○	●		●			●	4
21. <i>Cordulia aenea</i> (Linnaeus, 1758)			●		⊙	○		●	4
22. <i>Somatochlora flavomaculata</i> (Vander Linden, 1825)		⊙	⊙		?	○	○	●	8
23. <i>S. metallica</i> (Vander Linden, 1825)		●	●		●		●	●	5
24. <i>Libellula depressa</i> Linnaeus, 1758		○						○	-
25. <i>L. fulva</i> (O.F. Müller, 1764)			●				●		1
26. <i>L. quadrimaculata</i> Linnaeus, 1758		○	⊙		●			●	4
27. <i>Orthetrum cancellatum</i> (Linnaeus, 1758)		○	●		○	○	●	⊙	1
28. <i>Sympetrum danae</i> (Sulzer, 1776)					○			○	-
29. <i>S. flaveolum</i> (Linnaeus, 1758)		○		○	○		○	○	-
30. <i>S. sanguineum</i> (O.F. Müller, 1764)			⊙		●		○	●	2
31. <i>S. vulgatum</i> (Linnaeus, 1758)			●	○	●			●	7

nymphula), peatbogs (*Lestes sponsa*, *Coenagrion hastulatum*, *Aeshna juncea*, *Sympetrum danae*) and astatic small water bodies (*Lestes dryas*, *Sympetrum flaveolum*).

The dragonfly assemblages of examined area were characteristic of the mixture of synecological elements. Not only were particular species noted in typical environments but also in different ones - usually adjacent. But that referred mainly to imagines. Larval assemblages were more typical, that means that they were dominated with specific and eurytopic species. The exceptions were the sites where the hydrological connection with different

environments was stated. Especially in the upper stretches of streams flowed out of lakes the larvae of stagnophiles were noted numerously.

49 caddisfly species - 14 in the reserve and 42 outside it - were stated (Table 2). Taking into account the cases found in the area a next few species might have been expected. The most numerous were lacustrine species - 26. Four of them were typical of dystrophic and peatbog waters. The next four species were typical of small water bodies, 10 species were potamophiles and 9 were connected with small streams, two of which were typical of inner-forest, dystrophic streams and

Table 2. *Trichoptera* collected (l – larvae, i – imagines). 1–5 – biotopes (like in the Tab. 1), ☉ – imagines collected with a light trap; A – reserve, B – outside the reserve; L – number of larvae collected, I – of imagines, ? – of all specimens.

Species	1	2	3	4	5	☉	A	B	L	I	?
1. <i>Rhyacophila fasciata</i> Hagen, 1859		i						l	7	0	7
2. <i>Orthotrichia costalis</i> (Curtis, 1834)						i		i	0	68	68
- <i>Orthotrichia</i> sp.						i		i	0	1	1
3. <i>Agraylea sexmaculata</i> Curtis, 1834 (?)						i		i	0	1	1
4. <i>Ecnomus tenellus</i> (Rambur, 1842)			i			i		i	0	4	4
5. <i>Holocentropus picicornis</i> (Stephens, 1836)						i		i	0	1	1
6. <i>Cyrnus crenaticornis</i> (Kolenati, 1859)		i	i					i	0	2	2
7. <i>C. flavidus</i> McLachlan, 1864			l					l	3	0	3
- <i>Cyrnus</i> sp.						i		i	0	1	1
8. <i>Polycentropus irroratus</i> (Curtis, 1835)						i		i	0	1	1
9. <i>Psychomyia pusilla</i> (Fabricius, 1781)						i		i	0	10	10
10. <i>Tinodes waeneri</i> (Linnaeus, 1758)			i					i	0	10	1
11. <i>Hydropsyche angustipennis</i> (Curtis, 1834)		li	li			i	l	li	172	57	238
12. <i>H. pellucidula</i> (Curtis, 1834)		l						l	3	0	3
- <i>Hydropsyche</i> sp.			i			i			0	28	28
13. <i>Agrypnia obsolata</i> (Hagen, 1858)					l		l	l	2	0	2
14. <i>A. varia</i> (Fabricius, 1793)			i						0	1	1
15. <i>Oligostomis reticulata</i> (Linnaeus, 1767)		l						l	1	0	1
16. <i>Ohgotrichia striata</i> (Linnaeus, 1758)					l			l	1	0	1
17. <i>Trichostegia minor</i> (Curtis, 1834) (?)								l	1	0	1
18. <i>Phryganea bipunctata</i> Retzius, 1783		l	l		l			l	5	0	5
19. <i>P. grandis</i> Linnaeus, 1761			li				l	i	2	1	3
20. <i>Goera pilosa</i> (Fabricius, 1775)			l					l	3	0	3
21. <i>Silo pallipes</i> (Fabricius, 1781)		l							7	0	7
22. <i>Lepidostoma hirtum</i> (Fabricius, 1781)			i						0	1	1
23. <i>Isonychia dubia</i> (Stephens, 1837)		l						l	1	0	1
24. <i>Anabolia laevis</i> (Zetterstedt, 1840) (?)		l	l				l	l	88	0	88
25. <i>Glyptotaelius pellucidus</i> (Retzius, 1783)			l				l		2	0	2
26. <i>Linnephilus auricula</i> Curtis, 1834		l						l	1	0	1
27. <i>L. flavicornis</i> (Fabricius, 1787)			i		l	i		li	8	2	10
28. <i>L. lunatus</i> Curtis, 1834		l	l	l			l	l	47	0	47
29. <i>L. marmoratus</i> Curtis, 1834			l			i		li	1	1	2
30. <i>L. nigriceps</i> (Zetterstedt, 1840)			l				l	l	5	0	5
31. <i>L. politus</i> McLachlan, 1865		l	l				l	l	40	0	40
32. <i>L. rhombicus</i> (Linnaeus, 1758)		l				i		li	4	1	5
33. <i>L. stigma</i> Curtis, 1834					l			d	10	0	10
- <i>Linnephilus</i> sp.		l	l					l	5	0	5
34. <i>Chaetopteryx villosa</i> (Fabricius, 1798) (?)		l	l					l	129	0	129
35. <i>Potamophylax rotundipennis</i> (Brauer, 1857)			l						2	0	2
36. <i>Halesus digitatus</i> (Schränk, 1781)		l	l	l			l	l	10	0	10
37. <i>H. radiatus</i> (Curtis, 1834)		l						l	11	0	11
- <i>Halesus</i> sp.		l							1	0	1
38. <i>Sericostoma personatum</i> (Spence, 1826)						i		i	0	2	2
39. <i>Notidobia ciliaris</i> (Linnaeus, 1761)		l						l	1	0	1
40. <i>Molanna angustata</i> Curtis, 1834		l	li				i	li	9	5	14
41. <i>Trisaenodes bicolor</i> (Curtis, 1834)			l		l			l	19	0	19
42. <i>Mystacides azurea</i> (Linnaeus, 1761)			i				i		0	2	2
43. <i>M. longicornis</i> (Linnaeus, 1758)		l	li			i	i	li	6	5	11
- <i>Mystacides</i> sp.			l					l	9	0	9
44. <i>Athripsodes aterrimus</i> (Stephens, 1836)			i				i		0	1	1
45. <i>A. cinereus</i> (Curtis, 1834)						i		i	0	1	1
- <i>Athripsodes</i> sp.			l					l	5	0	5
46. <i>Leptocerus lineiformis</i> Curtis, 1834						i		i	0	59	59
47. <i>Oecetis furva</i> (Rambur, 1842)								i	0	6	6
48. <i>O. lacustris</i> (Pictet, 1834)						i		i	0	25	25
49. <i>O. ochracea</i> (Curtis, 1825)						i		i	0	5	5

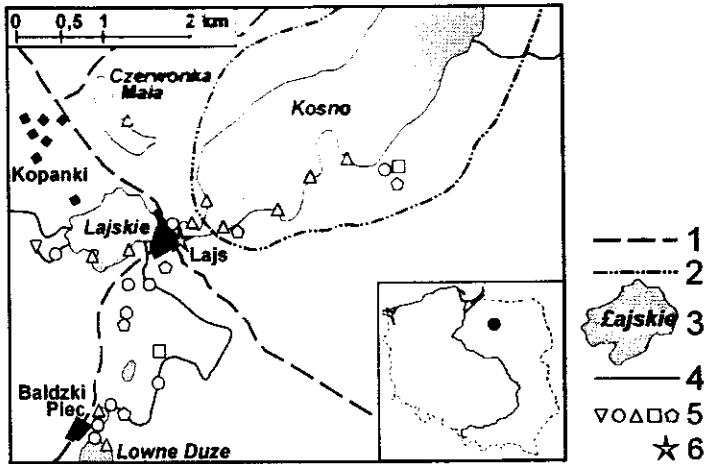


Fig. 1. Study area: 1 – main roads, 2 – borders of the reserve, 3 – lakes, 4 – streams, 5 – sites of hydrobiological studies (from left to right: springs, streams, lakes, small water bodies and peat bogs), 6 – place of catching with a light trap

one was typical of streams that dry up in summer.

Definitely more species were caught outside the reserve. But to a large extent it was caused by collecting caddisflies to a light trap. A huge part of species caught in this way represented lacustrine species descended from the protected part of lake Košno. However, the proportion between the numbers of species (caught only in larval stages) - 9:27 - was the same when taking into account all development stages.

The most numerous caddisfly was *Hydropsyche angustipennis* - a potamophile, preferring river stretches flowing out of a lake. The second place took *Chaetopteryx villosa*, species typical of inner-forest streams. Lacustrine species like: *Orthotrichia costalis* (typical of eutrophic lakes), *Anobolia laevis* (typical of the shallowest littoral with a tree-covered shore) and *Leptocerus tineiformis* (typical of the zone of elodeids) were also numerous. Species associated with small water bodies were not numerous. Noteworthy was the fact of the occurrence of *Oligostomis reticulata* regarded as rare and endangered in Poland (Serafin & Czachorowski 2002). This species is connected with small watercourses in woodland areas, marshy grounds and peatbogs. Nevertheless this species has not been included in

the Polish red list (Szczęśny 1992, 2002).

Similarly to the number of species in examined orders, the disproportion between fauna of the reserve and the fauna of its surroundings was very clear in terms of the occurrence of special care species and indicator species (Bernard et al. 2002, unpubl.; Czachorowski et al. 2000; Hilton-Taylor 2000; Instytut... 1997a; Rozporządzenie... 2001)(Fig. 2).

Discussion

Taking into consideration the short period of studies the collected material was rich: it represented 43% of the Polish dragonfly fauna and 18% of caddisfly fauna (Czachorowski 2002; Mielewczyk 1990, 1997). It presented the mixture characteristic of glacial areas, comprised of lacustrine, peatbog, stream and small water body species. About 10 next dragonfly species and 10-20 caddisfly species can be expected in area, especially spring ones associated with small water bodies and bog pools with *Sphagnum*. Nevertheless, the obtained results are sufficient for the aim of this paper.

A reserve should protect particularly valuable

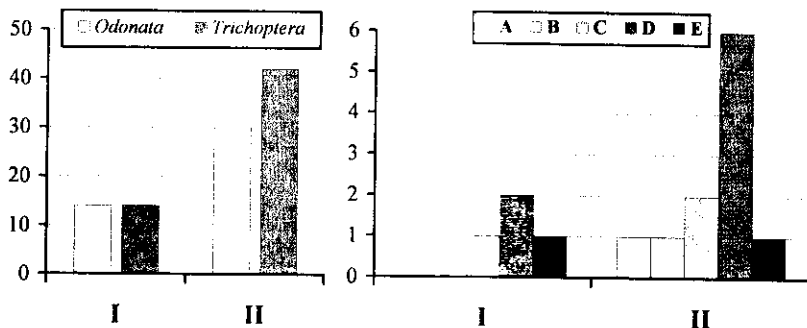


Fig. 2. Comparison of the reserve (I) and its vicinities (II). Diagram on left: number of species. Diagram on right: numbers of special care species and indicator species (A – species protection, B – IUCN Red list, C – Polish red list, D – list of the CORINE program, E – umbrella species)

natural areas. Interesting was the result of comparison between the reserve and its unprotected surroundings - to the reserve's disadvantage. Despite the similar habitats in two examined areas, in the surroundings the number of dragonfly species was double and caddisfly species - treble than in the reserve. The contrast in occurring special care species and species used in marking out areas of special natural value was also clear. Besides, the obtained numbers showed that the faunistic values of the whole investigated area were high.

The "Lake Košno" reserve was set up to protect the specific features of the Olsztyn Lake District landscape (Instytut... 1999). In that case a question may be asked: are these critical comments justified in case of the reserve that protects a landscape not a fauna?

In 1999 there were 1251 reserves with the area of 140 000 hectares in Poland, of which about 120 were faunal ones. But only 6 of them with the area of 723,66 hectares protected invertebrates, always terrestrial insects - xerothermophilous ones those associated with forests (Baza... 1999; Instytut... 1997b). In that case where there are no reserves for protecting aquatic invertebrates, one can hope that insects are properly protected in floristic, aquatic and peatbog reserves. It is obvious that suitably chosen object like these should be inhabited by valuable assemblages of invertebrates which show in favour of their nature values.

According to the results presented in this paper practice does not reflect theory. The dragonfly and caddisfly assemblages of the „Lake Košno" reserve were less taxonomically diverse, less specific and had fewer indicator or special care species than the surroundings of the reserve. From this point of view the less valuable area is under protection. This situation probably refers also to other groups of invertebrates.

On the basis on one case it is hard to judge all system of protected areas - this subject needs to be investigated further. But it seems to be that chosen example is representative and can picture the current state of at least in other than aquatic and peatbog reserves. If it is so, the following postulates can be proposed:

* for the efficient protection of aquatic invertebrates there is a necessity to set up reserves with taking into account their needs. In other cases, even the productive protective influence will be a side effect of the protection of other environmental elements, coincidental and hard to plan and control;

* the planned use of non-faunal reserves for the protection of aquatic invertebrates is possible. For this purpose the evaluation of these object must be done. The first step is to establish particularly valuable habitats and their fauna as well but not only in the area of the reserve but also in its surroundings. Then, if necessary, some

changes in the plan of protection can be made (if there is no conflict with the main aim of setting up a reserve) and/or the spreading out the protected area.

In case of the „Lake Košno” reserve the attachment of a few forest section towards the south-west direction would be a solution. Then the area would encompass a dozen or so valuable streams and peatbogs, more interesting than these in the reserve what would elevate its natural features.

References

- Bernard R., Buczyński P., Łabędzki A., Tończyk G. 2002. Ważki Odonata (Dragonflies Odonata). In: Z. Głowaciński (Ed.): Czerwona lista zwierząt ginących i zagrożonych w Polsce (Red List of Threatened Animals in Poland). Instytut Ochrony Przyrody Polskiej Akademii Nauk, Kraków: 125 - 127. (In Polish; summary in English).
- Choiński A. 1991. Katalog jezior Polski. Część druga - Pojezierze Mazurskie (Catalogue of Polish lakes. Second part - Mazury Lake District). Uniwersytet im. Adama Mickiewicza w Poznaniu, Poznań. 157 pp. (In Polish).
- Czachorowski S. 2002. Trichoptera - chruściki Polski (Trichoptera - Caddisflies of Poland). *Trichopteron*, 3: 2 - 7. (In Polish).
- Czachorowski S., Buczyński P. 2000. Zagrożenia i ochrona owadów wodnych w Polsce (Threats to and protection of water insects in Poland). *Wiad. ent.*, 18 (supl. 2): 95-120. (In Polish; abstract and summary in English).
- Hilton-Taylor C. (compiler) 2000. 2000 Red Data Book - List of Threatened Species. IUCN, Gland - Cambridge. xviii + 61 pp.
- Instytut Ochrony Przyrody Polskiej Akademii Nauk 1997a. Koordynacja informacji o środowisku. Aneks 2. Gatunki zagrożone wyginięciem (Coordination of information on the environment. Annex 2. Invertebrate species). <http://botan.ib-pan.krakow.pl/przyroda/coran2.htm>. (In Polish).
- Instytut Ochrony Przyrody Polskiej Akademii Nauk 1997a. Ochrona przyrody w Polsce (Nature protection in Poland). <http://botan.ib-pan.krakow.pl/przyroda/indexpl.htm>. (In Polish).
- Instytut Ochrony Środowiska Polskiej Akademii Nauk 1999. Baza danych obszarów chronionych (Database of protected areas). <http://www.biodiversity-chm.org.pl/9/baza1.htm>
- Kondracki J. 2000. Geografia regionalna Polski (Regional geography of Poland). Państwowe Wydawnictwo Naukowe, Warszawa. 441 pp. (In Polish).
- Lewandowski K. 1992. Krainy jezior w Polsce (Lake districts in Poland). Państwowe Wydawnictwa Rolnicze i Leśne, Warszawa. 211 pp. (In Polish).
- Mielewczyk S., 1990: Ważki - Odonata (Dragonflies - Odonata). In: J. Razowski (Ed.): Wykaz zwierząt Polski (Checklist of Animals of Poland). Vol. I., part XXXII/1-20. Ossolineum, Wrocław - Warszawa - Kraków: 39 - 41. (In Polish and English).
- Mielewczyk S., 1997: Odonata. In: J. Razowski (Ed.): Wykaz zwierząt Polski (Checklist of Animals of Poland). Vol. V, part XXXII/24. Wydawnictwa Instytutu Systematyki i Evolucji Zwierząt Polskiej Akademii Nauk, Kraków: 161. (In Polish and English).
- Pardoll J. 1985. Pojezierze Mazurskie (Mazury Lake District). Wiedza Powszechna, Warszawa. 184 pp. (In Polish).
- Rozporządzenie Ministra Środowiska z dnia 26 września 2001 r. w sprawie określenia listy gatunków zwierząt rodzimych dziko występujących objętych ochroną gatunkową

ściłą i częściową oraz zakazów dla danych gatunków i odstępstw od tych zakazów (Regulation by Minister of the Environment of 26 September 2001 concerning the determination of the list of native wild living species under partial and full species protection and prohibitions for given species and deviations from these prohibitions). Dz. U. 130 poz. 1456.

Received: 28.05.2003.

Accepted: 15.12.2003.

Serafin E., Czachorowski S. 2002. Ocena wielkości populacji i zagrożenia chruścika *Oligostomis reticulata* (L.) (The estimate of population size and danger of *Oligostomis reticulata* (L.) caddisfly species). In: Czachorowski S., Buchholz L. (Eds): Ogólnopolska konferencja naukowa „Ochrona owadów w Polsce - Ekologiczne i gospodarcze konsekwencje wymierania i ekspansji gatunków” (National scientific conference „Insect protection in Poland - the ecological and economic consequences of the extinction and expansion of species). Olsztyn 21-23.IX.2002. Polskie Towarzystwo Entomologiczne, Uniwersytet Warmińsko-Mazurski, Poznań - Olsztyn: 8 - 9. (In Polish).

Szczęsny B. 1992: Chruściki Trichoptera (Caddisflies Trichoptera). In: Z. Głowaciński (Ed.): Czerwona lista zwierząt ginących i zagrożonych w Polsce (Red List of Threatened Animals in Poland). Polska Akademia Nauk, Zakład Ochrony Przyrody i Zasobów Naturalnych, Kraków: 59 - 63. (In Polish).

Szczęsny B. 2002. Chruściki Trichoptera (Caddisflies Trichoptera). In: Z. Głowaciński (Ed.): Czerwona lista zwierząt ginących i zagrożonych w Polsce (Red List of Threatened Animals in Poland). Instytut Ochrony Przyrody Polskiej Akademii Nauk, Kraków: 76 - 79. (In Polish; summary in English).