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National Ecological Network of Ukraine and the state of research on odonatofauna in protected territories

Narodowa Sieć Ekologiczna Ukrainy i stan badań nad odonatofauną obszarów chronionych

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ABSTRACT: An analysis of Odonata check-lists of protected species and territories of national and international significance have been carried out within the framework of a biodiversity data base of Ukrainian National Ecological Network's key areas. Summarised and updated information on 11 protected areas is reported. For five natural reserves, such as "Ielanetskyi steppe", "Kazantyp", "Cheremskyi" and "Karadagskyi" Nature Reserves and one branch of Ukrainian Steppe Reserve the check-lists of dragonflies are presented for the first time.

KEY WORDS: Odonata, Ukraine, National Ecological Network, protected territories.

Introduction

While occupying less than 6% of the European area, Ukraine holds approximately 35% of its biological diversity due to its location at the junction of various natural zones and the crossing of animals' and plants' migration paths. A relatively small surface area contains four natural zones: broad-leaved woodlands, a forest-steppe, a steppe, and Mediterranean zones. The least transformed natural landscapes are represented on nearly 25% of all the Ukrainian territory.

In 1994 the Ukrainian government made the decision to get involved in the activities of the European Community within the framework of the Convention on Biological Diversity (Rio de Janeiro, 1992). So, the activities related to creating the National Ecological Network and attention to the study of regional biodiversity as well as updating the information on species composition of state nature protection territories have been developing more and more intensively.

Up to now there has been no comprehensive study on the Odonata fauna from the localities of Ukrainian protected territories. The authors of this paper make an attempt to summarize all the data published in different journals and unpublished data in their own collections to come to the most informative conclusions as regards the state of research on Odonata fauna with checklists of Ukrainian protected territories of national significance.

Developmental aspects of the ukrainian National Ecological Network

The process of developing a national cultural and environmental network is regulated by the Convention on Preservation of the World Cultural and Natural Heritage, to which Ukraine is a party. In 2001, the State Programme of Forming the National Ecological Network in Ukraine for 2000–2015 was launched. The first stage of the programme (2000–2005) assumed expanding the area of the national econetwork's specific elements with the use of economic instruments to promote their creation on lands owned in various forms, conducting necessary scientific research and making necessary arrangements.

The National Ecological Network of Ukraine consists of 14 biosphere natural centres and 8 natural corridors (National report... 2003) (Fig. 1).

Most biosphere natural centres were formed around the core of Ukrainian natural reserves. The structure of Ukrainian natural reserves (FNR) comprises 11 categories of territories and places of national and local importance (Tab. I). The main FNR-listed places of national significance are biosphere reserves, nasture reserves, national nature parks and regional landscape parks.

One of recent tasks in the implementation of the program creating the National Ecological Network is to study the biodiversity of natural ecosystems within the bounds of biospheric natural centres, namely different places listed in the Ukrainian FNR. A basic form of summarizing the results of such a study is the "Nature annals" published in duplicate and maintained in natural reserves and at the Ukrainian Ministry of Ecology and Natural Recourses. Besides, the scientists who collected materials or monitored the protected territories usually publish articles or notes in scientific journals.

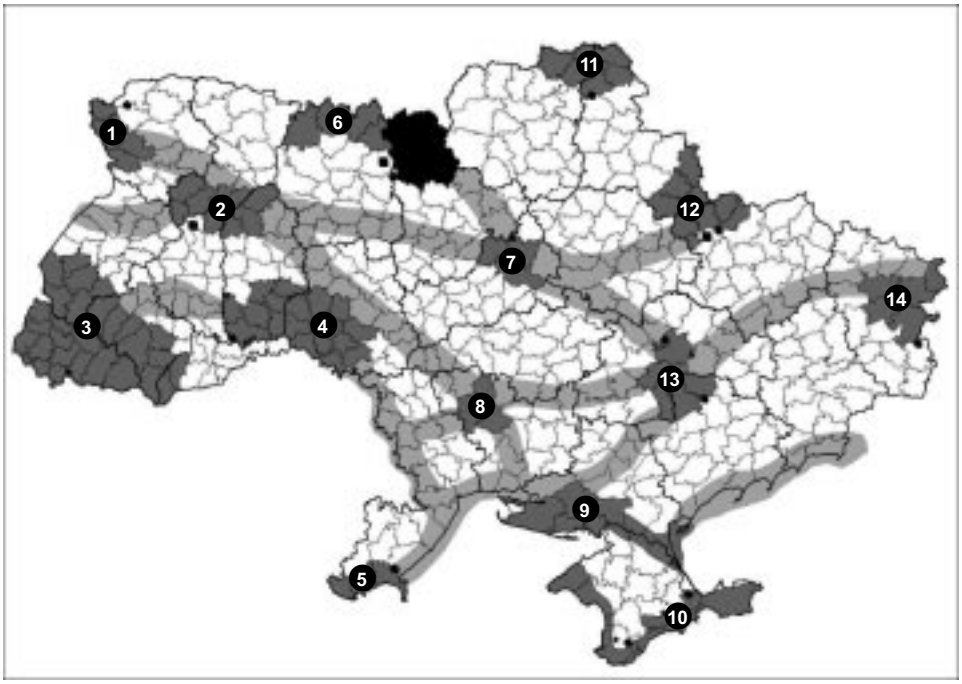

Fig. 1. National Ecological Network of Ukraine – Biosphere natural centres (BNC): 1 – Volynskyi, 2 – Malo-Poliskyi, 3 – Karpatskyi, 4 – Podilskii, 5 – Dunaiskyi, 6 – Tsentralno-Polisskyi, 7 – Tsentralno-Ukrainskyi, 8 – Boozko-stepovyi, 9 – Dniprovsko-Syvashskyi, 10 – Girsko-Krymskyi, 11 – Desniansko-Starogutskyi, 12 – Slobozhanskyi, 13 – Dniprovsko-stepovyi, 14 – Skhidnoukrainsko-stepovyi.

Ryc. 1. Narodowa Sieć Ekologiczna Ukrainy – przyrodnicze centra biosfery: 1 – Wołyńskie, 2 – Mało-Poleskie, 3 – Karpackie, 4 – Podolskie, 5 – Dunajskie, 6 – Centralno-Poleskie, 7 – Centralno-Ukraińskie, 8 – Bużańsko-stepowe, 9 – Dnieprzańsko-Sywaskie, 10 – Girsko-Krymskie, 11 – Desnańsko-Staroguckie, 12 – Słobożańskie, 13 – Dnieprzańsko-stepowe, 14 – Wschodnioukraińsko-stepowe.

Data on Odonata of the main protected territories of national significance

Up to now the data on Odonata fauna have been published only for 12 areas out of all the FNR places of national significance (biosphere reserves, nature reserves, national nature parks, regional landscape parks). Besides that, the paper includes some data on Odonata of "Chornomorskyi Biosphere reserve", "Kreidova Flora" – a branch of "Ukrainian Steppe Reserve", "Ielanetskyi Steppe Nature Reserve", "Kazantyp Nature Reserve", "Cheremskyi Nature Reserve" and "Karadagskyi Nature Reserve", which are published for the first time. The map of Ukraine with the above-mentioned localities is presented in figure (Fig. 2) and the sources of all the data are given in table (Tab. II).

Tab. I. Structure of the Ukrainian protected territories' resources
Struktura obszarów chronionych Ukrainy

No. Lp.	Category of protected area Kategoria obszaru chronionego	Number of areas Liczba obiektów	% of all Ukrainian territory % obszaru Ukrainy
1.	Biosphere reserves Rezerwaty biosfery	4	0,37
2.	Nature reserves Rezerwaty przyrody	17 (24)	0,34
3.	National nature parks Narodowe Parki Przyrodnicze	15	1,05
4.	Regional scenic parks Regionalne Parki Przyrodnicze	43	1,0
5.	Game reserves Rezerwaty dzikiej zwierzyny	292+2303	1,8
6.	National monuments Narodowe pomniki przyrody	3000	
7.	Reserve paths Aleje rezerwatowe	762	
8.	Dendroparks Ogrody dendrologiczne (Dendroparki)	37	
9.	Botanical gardens Ogrody botaniczne	22	
10.	Zoos Ogrody zoologiczne	12	
11.	Parks-monuments of landscape architecture Parki-pomniki architektury krajobrazu	536	
	Total localities– Suma obiektów	>7120	>4.5

The check-lists for the Odonata species registered in protected territories of national significance are reported below (Tab. III).

Conclusions

The Odonata checklists for areas and environs of 16 protected territories of national significance such as 3 biosphere reserves, 8 nature reserves, 2 national nature parks, 3 regional landscape parks are presented. Of all the mentioned territories the best investigated ones, due to regular monitoring,

Fig. 2. Protected territories of national significant in Ukraine, for which check–lists on Odonata are given in resources and original data

Biosphere reserves: 1 – Danube Biosphere Reserve; 2 – Carpathian Biosphere Reserve (two branches): 2.1 – Environs of Khust, 2.2. – The Chornogory mountain ridge; 3 – Chornomorskyi Biosphere Reserve

Nature reserves: 4 – Polissia nature reserve; 5 – "Medobory" nature reserve; 6 – Kaniv Nature Reserve; 7 – Ukrainian Steppe Reserve (four branches): 7.1 – Striltsivsky Steppe, 7.2 – Stanuchno-Luganskyi, 7.3 – Provalskyi Steppe, 7.4. Kreidova flora; 8 –"Ielanetskyi steppe" Nature Reserve; 9 –"Kazantyp" Nature Reserve; 10 – Karadagskyi Nature reserve: 11 – Cheremskyi Nature Reserve

National nature parks: 12 – Shatskyi National Nature Park; 13 – Desniansko-Starogutskyi National Nature Park

Regional scenic parks: 14 – Golosiivskyi Regional Scenic Park; 15 –„Granitno-Stepove Pobuzhzhia" Regional Scenic Park; 16 –„Ismail Islands" Regional Scenic Park

Ryc. 2. Mające znaczenie ogólnokrajowe obszary chronione Ukrainy, dla których podano wykazy ważek w oparciu i literaturę lub dane oryginalne

Rezerwaty Biosfery: 1 – Dunajski; 2 – Karpacki (w dwóch częściach): 2.1 – Okolic Khustu, 2.2. – Grzbietu Czarnohory; 3 – Czarnomorski

Rezerwaty Przyrody: 4 – Poleski; 5 – „Medobory"; 6 – Kanivski; 7 – Ukraiński Rezerwat Stepowy (w czterech częściach): 7.1 – Striltsiwski Step, 7.2 – Stanuchno-Ługański, 7.3 – Prowalski Step, 7.4. Kredowa Flora; 8 – „Jelaniecki Step"; 9 – „Kazantyp"; 10 – Karadagski; 11 – Czeremski.

Narodowe parki przyrodnicze: 12 – Szacki; 13 – Desnańsko-Starogucki.

Regionalne Parki Krajobrazowe: 14 – Golosiivskyi; 15 – „Granitowo-Stepowe Pobuże"; 16 – „Ismail Wyspy".

Tab. II. Sources of data on dragonflies of the protected areas in Ukraine
Źródła danych o ważkach obszarów chronionych Ukrainy

No. Lp.	Area – Obszar	Sources of data – Źródła danych
	Biospere reserves	
1.	Danube BR	CHERNY 2005; DYATLOVA 2006; ERMOLENKO et al. 1999; GORB, ERMOLENKO 1996; MARTYNOV, MARTYNOV 2004a; PAVLIUK 1981a; POLISCHUK 1974
2.	Carpathian BR	PAVLIUK 1981b, 1990
3.	Chornomorskyi BR	MATUSHKINA 2006; original data (2005–2006, leg. I. PAVLUSENKO and Yu. VERVES)
	Nature Reserves	
4.	Polissia NR	NADVORNYI 1996; VOROBIOV 2005
5.	NR "Medobory"	KAPELIUKH 1999
6.	Kaniv NR	GORB 1991a, 1992; KHROKALO 2003; KHROKALO, MATUSHKINA 1999, 2005; MATUSHKINA 2006
7.	Ukrainian Steppe NR	MARTYNOV, MARTYNOV 2004b; original data (2006, leg. I. PAVLUSENKO)
8.	NR "Ielanetskyi steppe"	original data (2000 and 2005, leg. I. PAVLUSENKO)
9.	NR "Kazantyp"	original data (2005, leg. L. KHROKALO)
10.	Karadagskyi NR	original data (2006, leg. A. DROZDOVSKA)
11.	Cheremskyi NR	original data (2006, leg. I. PLYUSCH)
	National nature parks	
12.	Shatskyi NNP	PAVLIUK 1974; original data (2005, leg. Yu. VERVES)
13.	Desniansko-Starogutskyi NNP	KHROKALO 2004
	Regional scenic parks	
14.	Golosiivskyi RLP	GORB 1991b; KHROKALO 2003; original data (2006, leg. L. KHROKALO)
15.	RLP "Granitno-Stepove Pobuzhzhia"	DYATLOVA 2006; SHESHURAK 2001
16.	RLP "Ismail Islands"	DYATLOVA 2006; MATUSHKINA 2006

are "Danube Biosphere Reserve" and "Kaniv Nature Reserve". For most protected territories we obtain the data by sporadic observation only. So, such research needs to be continued and some data (for example for "Carpathian Biosphere Reserve") need updating. The lists for "Medobory Nature Reserve" and "Karadagskyi Nature Reserves" included one species only, such results being due to lack of observation. We also observed the expansion of southern species into more northern latitudes, like new records of *Sympecma fusca* and *Sympetrum striolatum* in "Shatskyi National Nature Park" (Volinska region), which is the northernmost point in Ukraine for both species. Recently *Crocothemis erythraea* has occurred more frequently in northern Ukraine, as proven by its new records in "Golosiivskyi Regional Landscape Park" (Kyiv, Ukraine). Such phenomenon could be additional proof of global climatic changes, which are clearly reflected on the flora and fauna of Europe (OTT 2001; KHROKALO, MATUSHKINA 2005).

To conclude, the monitoring of Odonata fauna has to be started in most protected territories but in other areas has to be continued.

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STRESZCZENIE

Praca przedstawia aspekty tworzenia Narodowej Sieci Ekologicznej Ukrainy w ramach programu państwowego na lata 2000–2015. Jako jedno z ważniejszych zadań program przewiduje rozpoczęcie badań nad zróżnicowaniem fauny Odonata głównych obszarów chronionych; praca przedstawia te dane. Do dzisiaj dane na temat ważek opublikowano dla 11 lokalizacji z głównych obszarów chronionych o znaczeniu krajowym (rezerwaty biosfery, rezerwaty, parki narodowe i regionalne parki krajobrazowe). Praca przedstawia pierwsze listy kontrolne dla rezerwatów: „Jelaneckyj Step" – 9 gatunków ważek, „Kazantypskyj" – 4 gatunki, „Čeremskyj" – 6 gatunków, „Krejdova flora" (filia Ukraińskiego Rezerwatu Stepowego) – 4 gatunki, „Karadagskyj" – 1 gatunek. Dla rezerwatu biosfery „Čornomorskyj" zanotowano 12 nowych gatunków, a 2 gatunki (*Sympecma fusca* i *Sympetrum striolatum*) z parku narodowego Šatskyj. *Crocothemis erythraea* został po raz pierwszy zanotowany z parku krajobrazowego „Golosiivskyj" (Kijów).

Tab. III. Odonata species registered in the analysed protected areas of Ukraine (numbering of the areas like in the Tab. II): ● – certain records in resources, ○ – doubtful records, ▲ – original data. 2a. – Khust Branch, 2b. – the Chornogory ridge branch; 7a. – Striletskyi Steppe Branch, 7b. – Stanychno-Lugansk Branch, 7c. – Provalsky Steppe Branch, 7d. – "Kreidova flora" Branch

Gatunki ważek stwierdzone na analizowanych obszarach chronionych Ukrainy (numeracja obszarów jak w Tab. II): ● – pewne informacje z literatury, ○ – wątpliwe informacje z literatury, ▲ – dane oryginalne. 2a. – filia Chust, 2b. – filia Pasmo Čornohora; 7a. – filia „Strileckyj Step", 7b. – filia Stanyčno-Luganska, 7c. – filia „Provalskyj Step", 7d. – filia „Krejdova flora"

No. Lp.	Species – Gatunek	Protected area – Obszar chroniony																		
		1.	2a.	2b.	3.	4.	5.	6.	7a.	7b.	7c.	7d.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1.	*Calopteryx splendens* (HARR.)	●				●		●		●						▲	●	●	●	●	
	- *C. splendens ancilla* SÉL.	●														▲				●	●
2.	*C. virgo* (L.)	○				○	●											●			
3.	*Sympecma fusca* (VANDER L.)	●	●	●	▲	●		●		●					▲		▲				●
4.	*S. paedisca* (BRAU.)				▲			●		●							●▲				
5.	*Lestes barbarus* (FABR.)	●	●	●	▲			●		●				▲			●▲	●	●		
6.	*L. dryas* KIRBY			●	▲	●		●		●						▲	●▲	●			
7.	*L. macrostigma* (EVERSM.)	●			●▲																
8.	*L. parvidens* ARTOB.	●						●													●
9.	*L. sponsa* (HANS.)	●	●	●	▲	●		●		●							●▲	●	●		●
10.	*L. virens* (CHARP.)		●	●		●		●									●▲		●		
11.	*L. viridis* (VANDER L.)		●																		
12.	*Platycnemis pennipes* (PALL.)	●				●		●	●	●	●	▲						●	●	●	●
13.	*Ischnura elegans* (VANDER L.)	●			▲			●	●	●	●		▲	▲			●▲		●	●	
14.	*I. pumilio* (CHARP.)	●	●	●				●		●			▲	▲			●				

Tab. III. cont.

No. Lp.	Species – Gatunek	Protected area – Obszar chroniony																		
		1.	2a.	2b.	3.	4.	5.	6.	7a.	7b.	7c.	7d.	8.	9.	10.	11.	12.	13.	14.	15.	16.
15.	*Enallagma cyathigerum* (CHARP.)	●				●		●		●							●▲		●		
16.	*Pyrrhosoma nymphula* (SULZ.)			●																	
17.	*Coenagrion hastulatum* (CHARP.)																●	●	●		
18.	*C. lunulatum* (CHARP.)					○															
19.	*C. ornatum* (SÉL.)							●			●								●		
20.	*C. puella* (L.)		●			●		●		●	●		▲				●	●	●		
21.	*C. pulchellum* (VANDER L.)	●				●		●		●		▲	▲				●	●	●		●
22.	*Erythromma lindeni* (SÉL.)	●			●																
23.	*E. najas* (CHARP.)	●	●					●		●	●						●▲	●	●		
24.	*E. viridulum* (CHARP.)	●								●	●								●	●	●
25.	*Gomphus flavipes* (CHARP.)	○								●											●
26.	*G. vulgatissimus* (L.)									●		▲					●			●	
27.	*Ophiogomphus cecilia* (FOURCR.)															▲					
28.	*Onychogomphus forcipatus* (L.)			●							●										
29.	*Brachytron pratensis* (O. F. MÜLL.)	●																	●		
30.	*Aeshna affinis* VANDER L.	●		●	▲			●		●										●	●
31.	*A. cyanea* (O. F. MÜLL.)		●	●														●	●		

Tab. III. cont.

No. Lp.	Species – Gatunek	Protected area – Obszar chroniony																		
		1.	2a.	2b.	3.	4.	5.	6.	7a.	7b.	7c.	7d.	8.	9.	10.	11.	12.	13.	14.	15.	16.
32.	*A. grandis* (L.)			●				●									●▲	●			
33.	*A. isoceles* (O. F. MÜLL.)		●			●		●		●									●		
34.	*A. juncea* (L.)			●																	
35.	*A. mixta* (LATR.)	●		●				●		●							●▲		●	●	
36.	*A. viridis* EVERSM.	○															●				
37.	*Anax imperator* LEACH	●	●					●		●			▲						●		
38.	*A. ephippiger* (BURM.)	●																			
39.	*A. parthenope* (SÉL.)	●			▲			●		●											●
40.	*Cordulegaster bidentata* SÉL.			●																	
41.	*Cordulia aenea* (L.)					●		●		●							●		●		
42.	*Somatochlora alpestris* (SÉL.)			●																	
43.	*S. flavomaculata* (VANDER L.)															▲	●	●			
44.	*S. metallica* (VANDER L.)			●				●										●	●		
45.	*Epitheca bimaculata* (CHARP.)							●											●		
46.	*Libellula depressa* L.		●	●				●	●	●	●						●	●	●	●	
47.	*L. fulva* (O.F. MÜLL.)							●				▲	▲						●		
48.	*L. quadrimaculata* L.	●	●			●		●		●							●	●	●		
49.	*Orthetrum albistylum* (SÉL.)	●	●					●		●							●		●	●	●
50.	*O. brunneum* (FONSC.)												▲	▲						●	

Tab. III. cont.

No. Lp.	Species – Gatunek	Protected area – Obszar chroniony																		
		1.	2a.	2b.	3.	4.	5.	6.	7a.	7b.	7c.	7d.	8.	9.	10.	11.	12.	13.	14.	15.	16.
51.	*O. cancellatum* L.	●			▲			●		●							●▲		●	●	●
52.	*O. coerulescens* (FABR.)	●																		●	
53.	*Crocothemis erythraea* (BRULLÉ)	●	●					●											▲		●
54.	*Sympetrum danae* (SULZ.)			●													●▲	●			
55.	*S. depressiusculum* (SÉL.)																●				
56.	*S. flaveolum* (L.)					●		●		●						▲	●▲	●		●	●
57.	*S. fonscolombii* (SÉL.)	●								●											●
58.	*S. meridionale* (SÉL.)	●	●	●	▲			●		●	●								●		●
59.	*S. pedemontanum* (ALL.)			●						●											
60.	*S. sanguineum* (O. F. MÜLL.)	●	●		▲			●		●			▲			▲	●▲	●	●	●	●
61.	*S. striolatum* (O. F. MÜLL.)	●	●	●													▲			●	
62.	*S. vulgatum* (L.)		●	●	▲			●					▲				●▲		●	●	
63.	*Leucorrhinia albifrons* (BURM.)	○															●		●		
64.	*L. caudalis* (CHARP.)	○						●									●		●		
65.	*L. dubia* (VANDER L.)			●														●			
66.	*L. pectoralis* (CHARP.)	○						●									●	●	●		
67.	*L. rubicunda* (L.)							●										●			
	Total species Suma gatunków	34	19	23	14	15	1	38	3	31	9	4	9	4	1	6	33	22	33	16	16
			32						34												

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