

The Odonata of southwestern Ukraine, with emphasis on the species of the EU Habitats Directive

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Abstract

From 2006 to 2008 a database with records of Odonata from southwestern Ukraine – the provinces of Odessa, Mykolaiv and Kherson – was built. This database holds records from literature, collections and fieldwork and contains over 1500 records. Distribution maps of all species have been made available on the Internet. In total 48 of the 74 Ukrainian species were recorded from this area. The area has a relatively low diversity of aquatic habitats and a large percentage of freshwater habitats consist of large lakes or large rivers characterised by high flood events in winter and spring. These habitats generally have a low diversity of Odonata, although densities can be very high. Species in the Habitats Directive occurring in the area are *Coenagrion ornatum*, *Gomphus flavipes* and *Sympecma paedisca*. Based on their occurrence and the presence of species of the Ukrainian Red List and species rare in southwestern Ukraine, six 'Important Dragonfly Areas' were selected: Reservoirs in a lower part of Khadzhibejski Liman, the basins of Southern Bug and Ingul rivers, the Lower Dniestr with tributaries and lakes and Dniestrovski Liman, the Kinburn Peninsula, the Dniepr delta, and the Lower Danube with the pre-Danube region. Large areas of southwestern Ukraine are poorly studied, and more fieldwork will undoubtedly result in the recognition of more areas with a high importance for Odonata.

Zusammenfassung

Die Libellenfauna der südwestlichen Ukraine, unter besonderer Berücksichtigung von Arten der EU-Flora-Fauna-Habitatrichtlinie (Odonata) – In den Jahren 2006 bis 2008 wurde eine Datenbank erstellt, die alle bislang bekannten Libellennachweise aus der südwestlichen Ukraine – den Provinzen Odessa, Mykolaiv und Kherson – zusammenfasst. Insgesamt wurden durch Kartierungen, die Auswertung von Sammlungsmaterial und Literaturauswertungen mehr als 1500 Nachweise gesammelt. Verbreitungskarten aller Arten wurden über das Internet zugänglich gemacht. In dem berücksichtigten Gebiet wurden bislang 48 der insgesamt 74 ukrainischen Libellenarten nachgewiesen. Das Gebiet besitzt nur eine relativ geringe Diversität aquatischer Lebensräume und der überwiegende Teil der Süßwasserhabitate besteht aus großen Seen

sowie großen Flüssen, die im Winter und im Frühjahr typischerweise starkes Hochwasser führen. Diese Lebensräume weisen generell nur eine geringe Diversität an Libellenarten auf, obgleich die Individuendichte einzelner Arten sehr hoch sein kann. Von den Arten der Flora-Fauna-Habitatrichtlinie der EU kommen in der Region *Coenagrion ornatum*, *Gomphus flavipes* und *Sympetrum pedisca* vor. Unter Berücksichtigung von Vorkommen dieser drei Arten sowie von Rote-Liste-Arten der Ukraine und von Arten, die in der Region selten sind, wurden sechs 'Gebiete von großer Bedeutung für Libellen' auserkoren: Stauseen in einem tiefer gelegenen Bereich des 'Khadzhibejski Liman', die Becken von Südlichem Bug und Ingul, der Untere Dniestr mit Nebenflüssen, Seen und dem 'Dniestrovski Liman', die Halbinsel Kinburn, das Delta des Dniepr sowie die Untere Donau mit ihrem Vorland. Weite Bereiche der südwestlichen Ukraine sind allerdings nur sehr ungenügend untersucht und weitere Kartierungen werden zweifellos noch zu der Identifikation zusätzlicher Gebiete mit hoher Bedeutung für die Libellenfauna führen.

Introduction

The Ukraine has a rich dragonfly and damselfly fauna, and 74 of the 130 European species are known from its territory. The distribution of the species occurring in Ukraine has been summarised by GORB et al. (2000), and a bibliography of the dragonflies of the Ukraine was published by KHROKALO (2005). The distribution of Ukrainian Odonata is only roughly known; compared to most other European countries detailed information on the distribution of the species is scarce. In recent years the number of publications has been rising and more persons are taking an interest in Odonata. Information on the dragonflies in the southwestern part of Ukraine was summarised by DYATLOVA (2006). However, that information was not easily available for use in nature conservation management and an overview of areas of importance to dragonflies was lacking. With a grant from the Dutch Ministry of Agriculture, Nature and Food Quality a database was built with records from literature and from the entomological collection of the Zoological Museum in Odessa. Additionally, fieldwork was conducted in poorly explored areas. The present paper gives an overview on the Odonata of southwestern Ukraine with emphasis on species in the EU Habitats Directive and species rare or localised in the study area. Based on this information, areas of high importance for dragonflies were identified.

Study area

The Ukraine covers an area of 603,628 km² and is the largest European country after Russia. The largest part of the Ukraine consists of low-lying steppe landscapes, and mountains are confined to the Carpathians in the Northwest and to southern parts of the Crimean peninsula. The territory of the Ukraine is divided into 24 provinces called 'oblasts'. This study focuses on southwestern Ukraine, namely the territories administratively belonging to the oblasts of Odessa, Mykolaiv, and Kherson (Fig. 1). This region covers 86,369 km² or 14 % of the Ukraine. The area belongs to the eastern European plain landscapes, which include steppe, dry-steppe and forest-steppe zones. The climate is tem-

perate-continental. The area experiences short, mild winters and hot summers. The deltas of the large rivers have specific climatic conditions characterised by lower daily and yearly oscillations of air temperature and a higher average value of humidity compared to the surrounding steppes. Southwestern Ukraine is dominated by agriculture with large areas of grain and sunflowers. The landscape is open with almost no natural forest and in large areas surface water is limited. More boreal habitats such as bogs and peat marshes are lacking and most surface waters are large lakes, lagoons or reservoirs of large rivers. The main water arteries are the large rivers: Danube, Dniestr, Southern Bug, Dniepr and their numerous tributaries. Most of these run from north to south and drain to the Black Sea (ANON. 2003). During winter and spring, high water levels occur in almost all of them leading to extensive reed-beds and forests of willow (*Salix alba* L., *S. cinerea* L.) and poplar (*Populus alba* L., *P. nigra* L.) bordering the river margins in large areas.

The main threats to freshwater ecosystems are hydroelectric power plants (e.g., Dniestr River), pollution of wetlands, regulation and modification of the rivers and degradation of biotopes as a result of agricultural activities such as mass grazing and tillage. In some areas the natural connection between floodplain and steppe lakes and river was disturbed due to the building of artificial dams (e.g., Danube River and the pre-Danube lakes). This had severe impacts on the water quality of some lake systems causing the mass loss of fish and other organisms. The transformation of naturally brackish lakes into reservoirs used for water storage also had negative impacts on the ecosystems. In some cases the soils surrounding the lakes became unsuitable for agriculture due to salinization (e.g., Sasyk Lake) (MARUSHEVSKY & ZHARUK 2006). Anthropogenic fires in wetlands have led to a decline of invertebrate diversity by impacting the substrates for development.



Figure 1: Map of Ukraine with neighbouring countries and the study area of southwestern Ukraine: ① Odessa province, ② Mykolaiv province, ③ Kherson province. — Abbildung 1: Karte der Ukraine mit Nachbarländern und dem Untersuchungsgebiet der südwestlichen Ukraine: ① Provinz Odessa, ② Provinz Mykolaiv, ③ Provinz Kherson.

Methods

Information on the distribution of dragonflies was gathered from literature and from the entomological collection of the Zoological Museum of Odessa National Mechnikov University. Many of the records prior to 2006 are listed in DYATLOVA (2006) and a list of literature used for the database was published by DYATLOVA & KALKMAN (2007).

When possible, records from literature were checked in the collection of the Zoological Museum of Odessa National University. This collection was also checked for hitherto unp Dniestr, the regional landscape park 'Islands of Izmail', the pre-Danube lakes, the 'Zmeiny' island and the Kinburn peninsula. The species were identified in the field and part of the material was collected as voucher. Figure 2 shows the localities from where records are known from 1990 onwards.

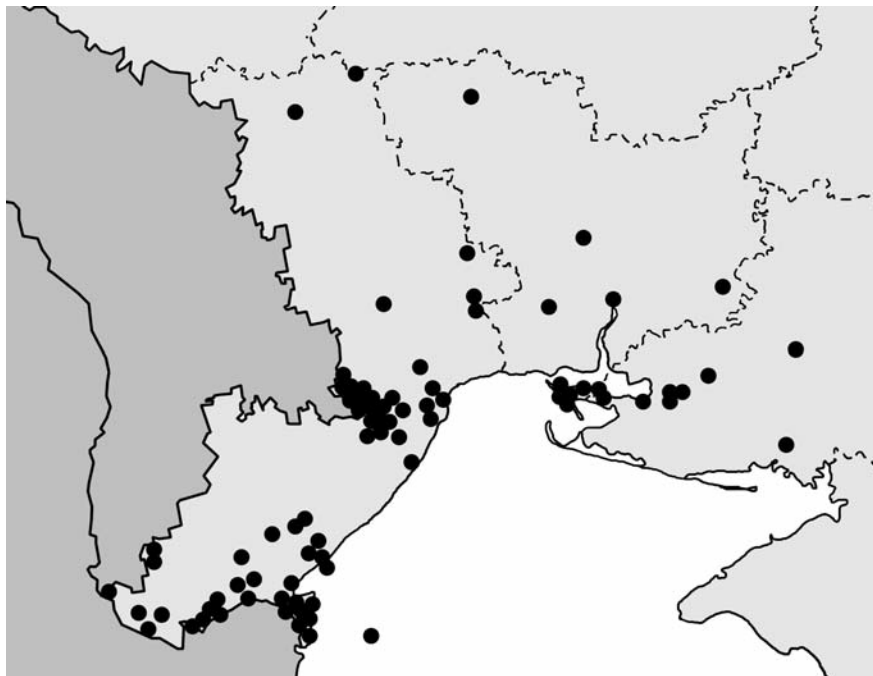


Figure 2: Localities in southwestern Ukraine with records of Odonata since 1990 from field-work, literary sources and museum collections. — Abbildung 2: Lokalitäten in der südwestlichen Ukraine mit Libellennachweisen nach 1990 aus eigenen Kartierungen, Sammlungs- und Literaturauswertungen.

Based on the distributional records in the database, Important Dragonflies Areas of the southwestern Ukraine were identified. For this a set of four criteria was applied. Areas matching three or more of the criteria were selected.

- I. The recent presence of at least one species of European concern:
 - ▶ *Lestes macrostigma* (declining in Europe, SAHLÉN et al. 2004)
 - ▶ *Sympecma paedisca* (Habitats Directive)
 - ▶ *Coenagrion ornatum* (Habitats Directive)
 - ▶ *Gomphus flavipes* (Habitats Directive)
- II. The recent presence of at least one species protected on the national level according to the Red Book of Ukraine (1994):
 - ▶ *Erythromma lindenii* (I category of conservation)
 - ▶ *Anax imperator* (III category of conservation)
- III. The recent presence of one or more species and subspecies that are rare in southwestern Ukraine: *Calopteryx splendens ancilla*, *Coenagrion scitulum*, *Gomphus vulgatissimus*, *Aeshna cyanea*, *Cordulia aenea*, *Selysiothemis nigra*, *Sympetrum danae*, *S. depressiusculum* and *S. pedemontanum*.
- IV. Areas with a high diversity of dragonflies: at least 21 species in a grid square of 100 km².

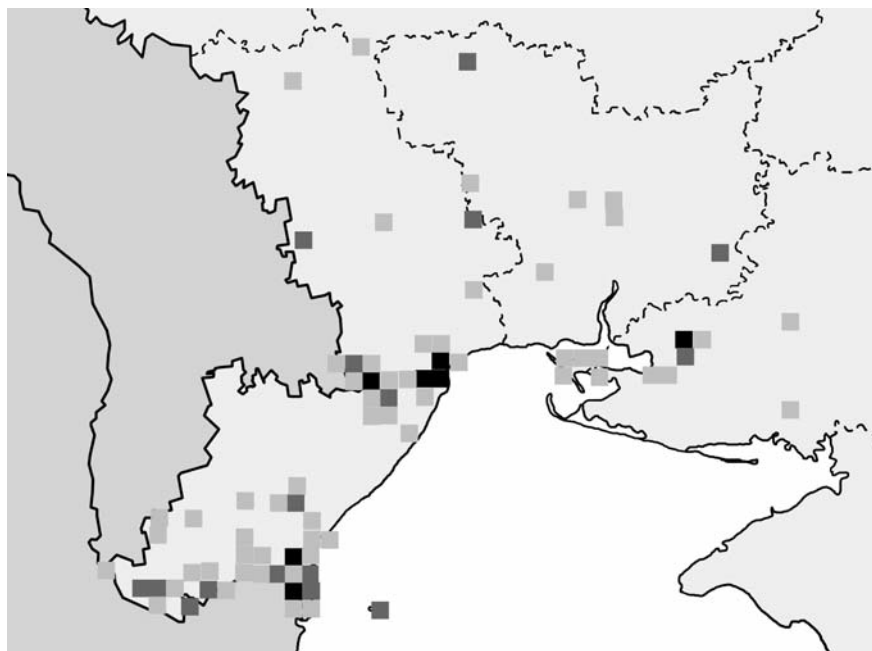


Figure 3: Diversity of Odonata in southwestern Ukraine (grid squares of 100 km²). — Abbildung 3: Nachweise von Libellen in der südwestlichen Ukraine (Größe der Planquadrate 100 km²). ■ 1-10 species/Arten; ■ 11-20 species/Arten; ■ 21 and more species/Arten und mehr.

Results

Table 1 gives a list of all species found in southwestern Ukraine. In total 48 species are known of which *Aeshna cyanea* was not found since 1927 (the exact date is not indicated in a publication) and *Sympetrum danae* since 1919 (ARTOBOLEVSKII 1927). Maps of all species can be found online on the internet, URL: <<http://tinyurl.com/2brh5n>>.

For ten species (*Calopteryx virgo*, *Lestes virens*, *Nehalennia speciosa*, *Pyrhosoma nymphula*, *Aeshna juncea*, *Epitheca bimaculata*, *Somatochlora flavomaculata*, *S. metallica*, *Leucorrhinia caudalis* and *L. pectoralis*) only old records are available and no voucher specimens were found in the Odessa collection. For the time being the occurrence of these species in southwestern Ukraine is regarded as doubtful.

The list includes three species of the EU Habitats Directive, *Coenagrion ornatum*, *Gomphus flavipes*, *Sympecma paedisca* and includes also *Lestes macrostigma*, a species listed as of European concern (SAHLÉN et al. 2004). *Anax imperator* and *Erythromma lindenii* are included on the Red list of the Ukraine. *Anax imperator* is a common and widespread species in the Ukraine. The Red List of the Ukraine was largely based on the Red List of the former USSR for which reason *A. imperator* is included; the species is however not threatened by any means. Another eight species and one subspecies are rare in Southwestern Ukraine: *Calopteryx splendens ancilla*, *Coenagrion scitulum*, *Gomphus vulgatissimus*, *Aeshna cyanea*, *Cordulia aenea*, *Selysiothemis nigra*, *Sympetrum danae*, *S. depressiusculum* and *S. pedemontanum*. Figure 3 shows the diversity of odonate species based on all available records.

Calopteryx splendens ancilla (Fig. 4)

The first to use this name for the populations of *Calopteryx splendens* from the lower Danube was BARTENEF (1912). The subspecies was originally described from Prussia (Königsberg, now Kaliningrad), based on the wing pattern in the males and in the large percentage of females of the androchromous morph. Populations fitting the description of *C. splendens ancilla* are found from Finland to eastern Germany and Poland, but are also known from the catchment of River Ob and Uzbekistan (H. Dumont pers. comm.). The *ancilla*-like populations are common in the lower Danube (DYATLOVA 2005b, 2006; MATUSHKINA 2006) but have not been found in other parts of the southwestern Ukraine.

Lestes macrostigma (Fig. 5)

This species has a scattered distribution, and its European distribution is largely confined to the Mediterranean region and to saline wetlands in southeastern Europe. It is listed as being of European concern due to its scarcity and decline (SAHLÉN et al. 2004). In southwestern Ukraine the species is largely confined to areas bordering the Black Sea where it is found in coastal reservoirs and in wetlands near saline lakes. It is found in the Danube region (DYATLOVA 2005b, 2006;

GORB & ERMOLENKO 1996; PAVLYUK 1981) and in the Dniepr delta (BRAUNER 1902; MATUSHKINA 2006). One specimen was collected in Odessa in the middle of the 20th century (DYATLOVA 2007a). It is also recorded from the Kinburn peninsula (V. Tytar pers. comm).



Figure 4: Records of *Calopteryx splendens ancilla* in southwestern Ukraine before (▲) and after 1990 (●). — Abbildung 4: Nachweise von *Calopteryx splendens ancilla* in der südwestlichen Ukraine vor (▲) und nach 1990 (●).



Figure 5: Records of *Lestes macrostigma* in southwestern Ukraine before (▲) and after 1990 (●). — Abbildung 5: Nachweise von *Lestes macrostigma* in der südwestlichen Ukraine vor (▲) und nach 1990 (●).

Sympecma paedisca

One male and one female were recorded in Kherson province, Golopristsansky district in the Black Sea Biosphere reserve (salt lakes area) on 18-19 July 2005 by Yu. Verves (RIDEI et al. 2007; L. Khrokalo pers. comm.). This is the southernmost record of the species in Ukraine. Additional investigations into its distribution in southwestern Ukraine are of great importance.

Coenagrion ornatum (Fig. 6)

The species is known from old literature records from the Danube region (BARTENEV & POPOVA 1928, BEZVALI 1932), the north of Odessa Province (ARTOBOLVSKII 1927) and from the Dniepr Delta (BRAUNER 1902). The only recent population known is from the surroundings of Odessa in the village Usatovo (DYATLOVA 2005c, 2006). Here the species was found at a small lake fed by a large stream. This habitat was impacted by work on a nearby road in 2005 and the population is threatened.

Coenagrion scitulum

Only known from one reliable record of two specimens (male and female) in Odessa far from freshwater (DYATLOVA 2004a, 2006). The reproductive habitat of these two specimens is not clear. The other records have been omitted as they are based on the challenging determination of larvae (POLISCHUK 1974).

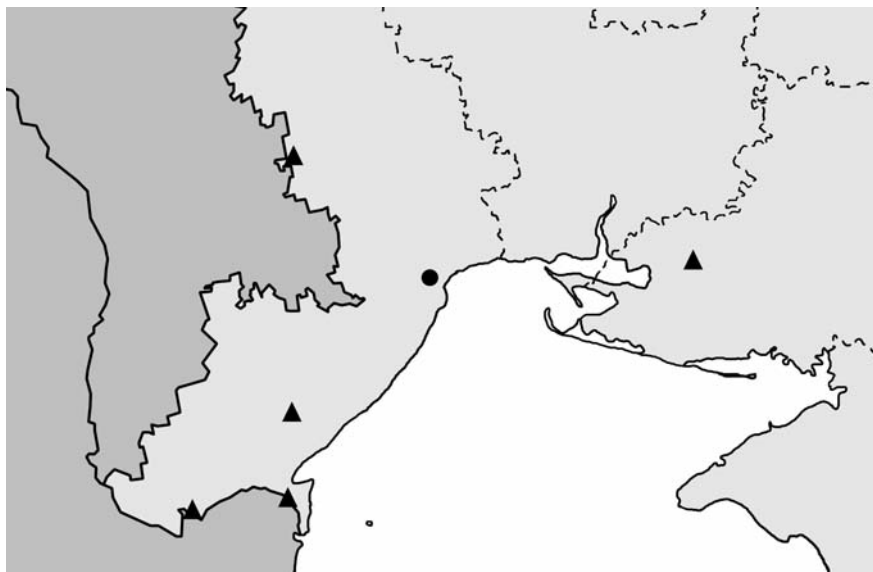


Figure 6: Records of *Coenagrion ornatum* in southwestern Ukraine before (▲) and after 1990 (●).
— Abbildung 6: Nachweise von *Coenagrion ornatum* in der südwestlichen Ukraine vor (▲) und nach 1990 (●).

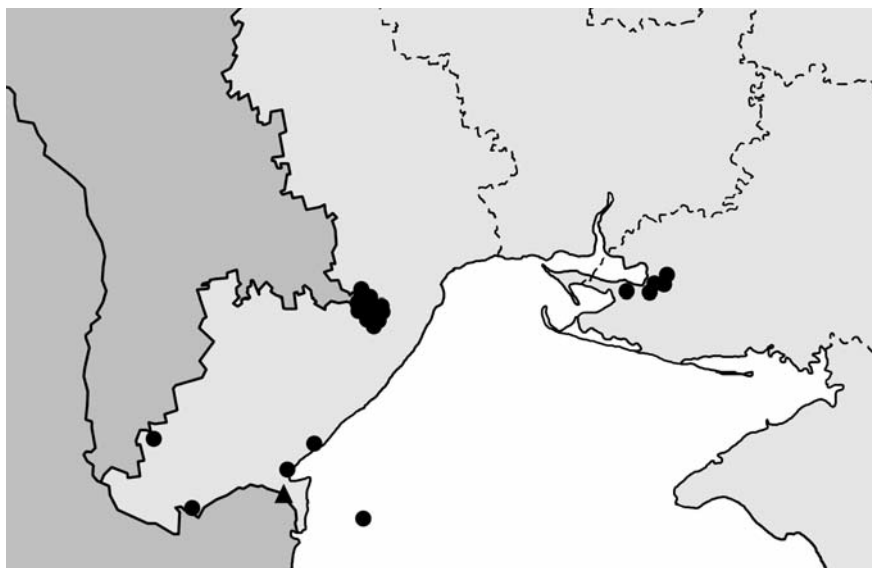


Figure 7: Records of *Erythromma lindenii* in southwestern Ukraine before (▲) and after 1990 (●). — Abbildung 7: Nachweise von *Erythromma lindenii* in der südwestlichen Ukraine vor (▲) und nach 1990 (●).

Erythromma lindenii (Fig. 7)

Recorded in Danube Region (DYATLOVA 2004b, 2005b, 2006; DYATLOVA & MARTYNOV 2008; GORB & ERMOLENKO 1996; PAVLYUK 1981), Lower Dniestr (DYATLOVA 2004b, 2005a, 2006) and Dniepr river (DYATLOVA 2004b, 2006; MATUSHKINA 2006). The record of *E. lindenii* on Zmeiny Island in the Black Sea probably relates to a migrant from the populations in the Danube delta situated more than 35 km from the island. The species is scarce, but can be locally common. In southwestern Ukraine it is recorded from lakes and large slow-flowing rivers. It does not occur in other parts of the Ukraine.

Aeshna cyanea

Aeshna cyanea is only known from one old record from the north of Odessa province (ARTOBOLEVSKII 1927).

Anax imperator

The species is present on the Red list of the Ukraine but is rather common and widespread although it is less common than *A. parthenope*. Records have been published by BEZVALI (1932), BRAUNER (1902), DYATLOVA (2006), POLISCHUK (1974), TYTAR (2004), and VOLKOVA et al. (1970).

***Gomphus flavipes* (Fig. 8)**

The species is confined to larger rivers and is known from the Danube (BEZVALI 1932; DYATLOVA 2005b, 2006; MATUSHKINA 2006; POLISCHUK 1974), Dniestr (BRAUNER 1910; DYATLOVA 2005a, 2006), Southern Bug (DYATLOVA 2006) and Dniepr (BRAUNER 1902). The records suggest that the species is mostly present in the lower parts of the rivers. This is however likely to be an artefact of the higher intensity of research in those areas.

Gomphus vulgatissimus

Known from Danube and Southern Bug rivers, the surroundings of Odessa and the northern part of the Odessa province. The old records are from the early 20th century from Odessa (SHUGUROV 1903) and the northern part of Odessa province (ARTOBOLEVSKII 1927). Records in the middle of 20th century based on larvae from the Danube delta (POLISCHUK 1974). Since 1974 only recorded from the Southern Bug (DYATLOVA 2006). The species is probably quite common and widespread, but under-recorded.

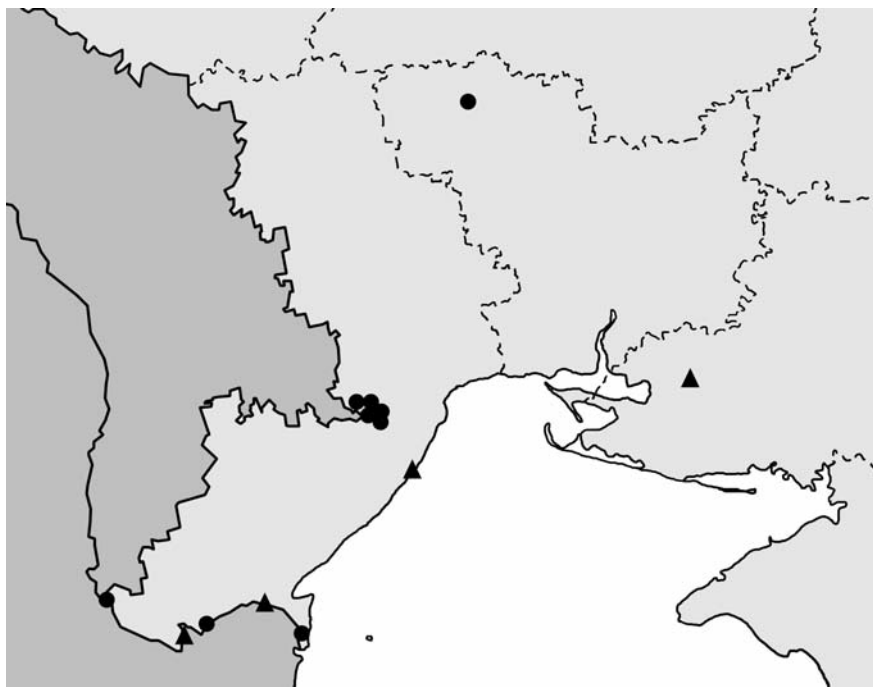


Figure 8: Records of *Gomphus flavipes* in southwestern Ukraine before (▲) and after 1990 (●).
— Abbildung 8: Nachweise von *Gomphus flavipes* in der südwestlichen Ukraine vor (▲) und nach 1990 (●).

Table 1. List of all Odonata species, including two subspecies, recorded in southwestern Ukraine. Records are defined as a taxon on a day on a location. — Tabelle 1: Liste aller Libellenarten, einschließlich zweier Unterarten, die bis dato in der südwestlichen Ukraine nachgewiesen wurden. Die Nachweise ('records') sind als Taxon pro Tag und Fundort definiert.

SPECIES	RECORDS BEFORE 1990	RECORDS AFTER 1990
<i>Calopteryx splendens</i> (Harris, 1780)	7	59
<i>Calopteryx splendens ancilla</i> Hagen in Selys, 1853	1	19
<i>Lestes barbarus</i> (Fabricius, 1798)	6	42
<i>Lestes dryas</i> Kirby, 1890	3	5
<i>Lestes macrostigma</i> (Eversmann, 1836)	3	4
<i>Lestes parvidens</i> Artobolevskii, 1929	1	22
<i>Lestes sponsa</i> (Hansemann, 1823)	6	20
<i>Sympecma fusca</i> (Vander Linden, 1820)	2	18
<i>Sympecma paedisca</i> (Brauer, 1877)	-	1
<i>Platycnemis pennipes</i> (Pallas, 1771)	3	89
<i>Coenagrion ornatum</i> (Selys, 1850)	8	4
<i>Coenagrion puella</i> (Linnaeus, 1758)	2	5
<i>Coenagrion pulchellum</i> (Vander Linden, 1825)	4	96
<i>Coenagrion scitulum</i> (Rambur, 1842)	-	1
<i>Enallagma cyathigerum</i> (Charpentier, 1840)	5	12
<i>Erythromma lindenii</i> (Selys, 1840)	2	29
<i>Erythromma najas</i> (Hansemann, 1823)	7	13
<i>Erythromma viridulum</i> (Charpentier, 1840)	4	53
<i>Ischnura elegans</i> (Vander Linden, 1820)	8	107
<i>Ischnura pumilio</i> (Charpentier, 1825)	9	34
<i>Aeshna affinis</i> Vander Linden, 1820	3	20
<i>Aeshna cyanea</i> (Müller, 1764)	1	-
<i>Aeshna isoceles</i> (Müller, 1767)	8	50
<i>Aeshna mixta</i> Latreille, 1805	8	22
<i>Anax ephippiger</i> (Burmeister, 1839)	1	4
<i>Anax imperator</i> Leach, 1815	8	22
<i>Anax parthenope</i> (Selys, 1839)	10	46
<i>Brachytron pratense</i> (Müller, 1764)	1	23
<i>Gomphus flavipes</i> (Charpentier, 1825)	7	17
<i>Gomphus vulgatissimus</i> (Linnaeus, 1758)	6	2
<i>Cordulia aenea</i> (Linnaeus, 1758)	5	1
<i>Crocothemis erythraea</i> (Brullé, 1832)	9	88
<i>Libellula depressa</i> Linnaeus, 1758	7	7
<i>Libellula fulva</i> Müller, 1764	-	13
<i>Libellula quadrimaculata</i> Linnaeus, 1758	6	7
<i>Orthetrum albistylum</i> (Selys, 1848)	5	54
<i>Orthetrum brunneum</i> (Fonscolombe, 1837)	5	13
<i>Orthetrum cancellatum</i> (Linnaeus, 1758)	6	32
<i>Orthetrum coerulescens anceps</i> (Schneider, 1845)	-	22
<i>Selysiothemis nigra</i> (Vander Linden, 1825)	-	1
<i>Sympetrum danae</i> (Sulzer, 1776)	1	-
<i>Sympetrum depressiusculum</i> (Selys, 1841)	2	1
<i>Sympetrum flaveolum</i> (Linnaeus, 1758)	6	7
<i>Sympetrum fonscolombii</i> (Selys, 1840)	-	29
<i>Sympetrum meridionale</i> (Selys, 1841)	3	53
<i>Sympetrum pedemontanum</i> (Müller in Allioni, 1766)	-	3
<i>Sympetrum sanguineum</i> (Müller, 1764)	5	44
<i>Sympetrum striolatum</i> (Charpentier, 1840)	1	20
<i>Sympetrum vulgatum</i> (Linnaeus, 1758)	4	28

Cordulia aenea

Rare and known only from a few recent records in the Dniepr delta (DYATLOVA 2007). The species was recorded in the Danube region at the beginning of the 20th century (BARTENEV & POPOVA 1928; BEZVALI 1932) and in the north of Odessa province (ARTOBOLSKII 1927). The species was found along the banks of the delta of the Dniepr river in May 2007. The reed vegetation at this river stretch is very scant and it might be that nearby small reservoirs are the actual habitat of the species.

Selysiothemis nigra

The first Ukrainian record of this species was obtained in 2002. One female was collected in the western part of Pokrovka (Kovalevka) village on the bank of Chirmino lake on Kinburn peninsula (TYTAR 2007). The only other record for the Ukraine is from the Crimea where the species was found in the vicinity of Karadag Nature Reserve in 2006 (MATUSHKINA 2007).

Sympetrum danae

Sympetrum danae is only known from one old record in the north of Odessa province (ARTOBOLSKII 1927).

Sympetrum depressiusculum

Very rare and known only from two old records in Tatarbunary (BEZVALI 1932) and Kherson (BRAUNER 1902) and one recent record of one specimen in Dniestr delta (DYATLOVA 2005a, 2006). The recent record is from the banks of a large, slow-running river. It is not known if the species breeds in southwestern Ukraine or only occurs as a migrant.

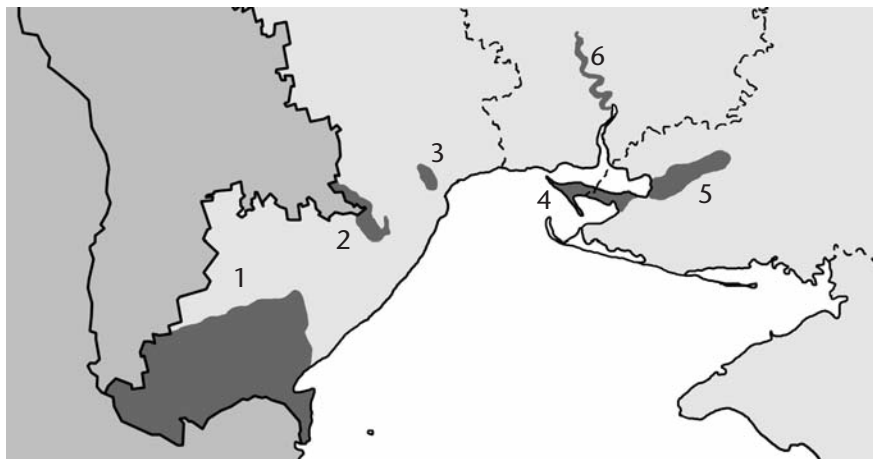


Figure 9: 'Important Dragonfly Areas' in southwestern Ukraine. For short characterisation of respective areas see Table 2. — Abbildung 9: Gebiete von großer Bedeutung für Libellen in der südwestlichen Ukraine. Kurzbeschreibung der einzelnen Gebiete siehe Tabelle 2.

Table 2. 'Important Dragonfly Areas' in southwestern Ukraine and the criteria for the selection of those six areas. For explanation of criteria see methods section. — Tabelle 2. Gebiete von großer Bedeutung für Libellen in der südwestlichen Ukraine und die angewendeten Kriterien für ihre Einstufung. Erklärung der Kriterien im Methodenteil.

IMPORTANT DRAGONFLY AREA	CRITERION			
	I	II	III	IV
1 Lower Danube and pre-Danube region	x	x	x	x
2 Lower Dniestr with tributaries and lakes and Dniestrovski Liman	x	x	x	x
3 Reservoirs in a lower part of Khadzhibejski Liman	x		x	x
4 Kinburn peninsula	x	x	x	
5 Dniepr delta	x	x	x	x
6 Basin of Southern Bug and Ingul rivers	x		x	x

Sympetrum pedemontanum

Very rare and found in the surroundings of Odessa and in the Southern Bug basin (Mykolaiv and Nova Odesa cities) (DYATLOVA 2006; DYATLOVA & MARTYNOV 2008). Near Odessa the species was found at a permanent, well-vegetated reservoir with stagnant shallow water near a large river.

'Important Dragonfly Areas' in southwestern Ukraine

Based on the results six areas with a relatively high importance for Odonata were identified (Tab. 2; Fig. 9).

Discussion

The Ukraine is of immense size, and although the study area comprises only 14 % of the country, this is still an incredibly large area. Compared to most other European countries the fauna of the Ukraine is relatively poorly known. This is also true for the southwestern Ukraine, even though many new records were collected during recent years. Although much remains to be discovered, based on the present data the reader can get a general idea of the odonate fauna there. The fauna is roughly comparable to that of central Europe. However, unlike most areas in central Europe, species with a more northern distribution are missing or are rare. The species not regarded as northern species (*Cordulegaster* spp., *Calopteryx virgo* and some of the Corduliidae) are lacking as well because of the absence of suitable habitats in the region.

The diversity of Odonata in the southwest of the Ukraine is relatively low. This is mostly due to the low variation of freshwater habitats. The most important freshwater habitats are extensive marsh systems associated with the large rivers. These undergo yearly floods during winter and spring. This is the reason why more stable fen-like habitats are missing, which might be the reason for the scarcity or absence of common central European species like *Pyrrho-*

soma nymphula, *Aeshna cyanea* or *Cordulia aenea*. Although the diversity of the marsh areas along the rivers is generally low, they do support immense numbers of certain species, as was evidenced for *Aeshna mixta* and *Sympetrum meridionale* (DYATLOVA & KALKMAN 2008).

The project resulted in the identification of six areas of importance for Odonata in southwestern Ukraine. Large areas of that region are, however, poorly studied and more fieldwork will undoubtedly result in the recognition of more areas with a high importance for dragonflies. Making the distribution data of dragonflies available and identifying areas of high importance for dragonflies is the first step to increasing the role of dragonflies in the conservation of freshwater habitats in southwestern Ukraine. Another important step was the creation of an informal working group on Ukrainian Odonata.

Acknowledgements

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