



## A CONTRIBUTION TO THE KNOWLEDGE OF THE DRAGONFLIES (Odonata) OF MOUNTAINOUS AREA LUKAVICA (MONTENEGRO)

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### SYNOPSIS

**Key words:**  
dragonflies,  
Manito Lake,  
Lukavica,  
Montenegro.

An updated list of the dragonflies (Odonata) of the mountainous area Lukavica (Montenegro) is given, including 12 species. The finding of the species *Aeshna cyanea* on Manito jezero Lake represents the highest altitude of finding of this species in Montenegro.

### SINOPSIS

**Ključne riječi:**  
vilini konjici,  
Manito jezero,  
Lukavica,  
Crna Gora.

*DOPRINOS POZNAVANJU FAUNE VILINIH KONJICA (ODONATA)  
PLANINSKE OBLASTI LUKAVICA (CRNA GORA)*

U radu je data lista koja uključuje 12 vrsta vilinih konjica (Odonata) planinske oblasti Lukavica. Nalaz vrste *Aeshna cyanea* na Manitom jezeru predstavlja nalaz ove vrste na najvećoj nadmorskoj visini u Crnoj Gori.

### INTRODUCTION

Although the order Odonata is an important group among the insects, studies of the Odonata fauna in Montenegro are still incomplete (e.g., ADAMOVIĆ, 1949; ADAMOVIĆ *et al.*, 1996; GLIGOROVIĆ *et al.*, 2007; JOVIĆ *et al.*, 2008). The aim of our studies is both to give a new insight in the fauna of the country, and to obtain valuable documentation of the occurrence of dragonflies in the previously unstudied area of the Lukavica. In the course of this survey, we detected 12 species.

### MATERIALS AND METHODS

In 2007 the dragonflies fauna from three localities (Zelena bara swamp in sites Nišin kiljan (Fig.11), 42° 48' 18,20" N, 19° 13' 45,94" E; altitude: 1597m.; Kapetanovo jezero Lake (Fig.10), 42° 48' 43, 1" N, 19° 14' 14, 27" E, altitude: 1654 m.; Manito jezero Lake (Fig.12), 42° 48' 22, 8" N, 19° 14' 56, 8" E altitude: 1764 m.) on the mountainous area Lukavica were studied (Fig.1, 9). The area of Lukavica is situated north-east from Nikšić. In this area herbaceous ecosystem is dominant. Large number of the hydrographical objects: mountainous lakes, brooks, swamps and around 250 springs of different type exist in the area of Lukavica.

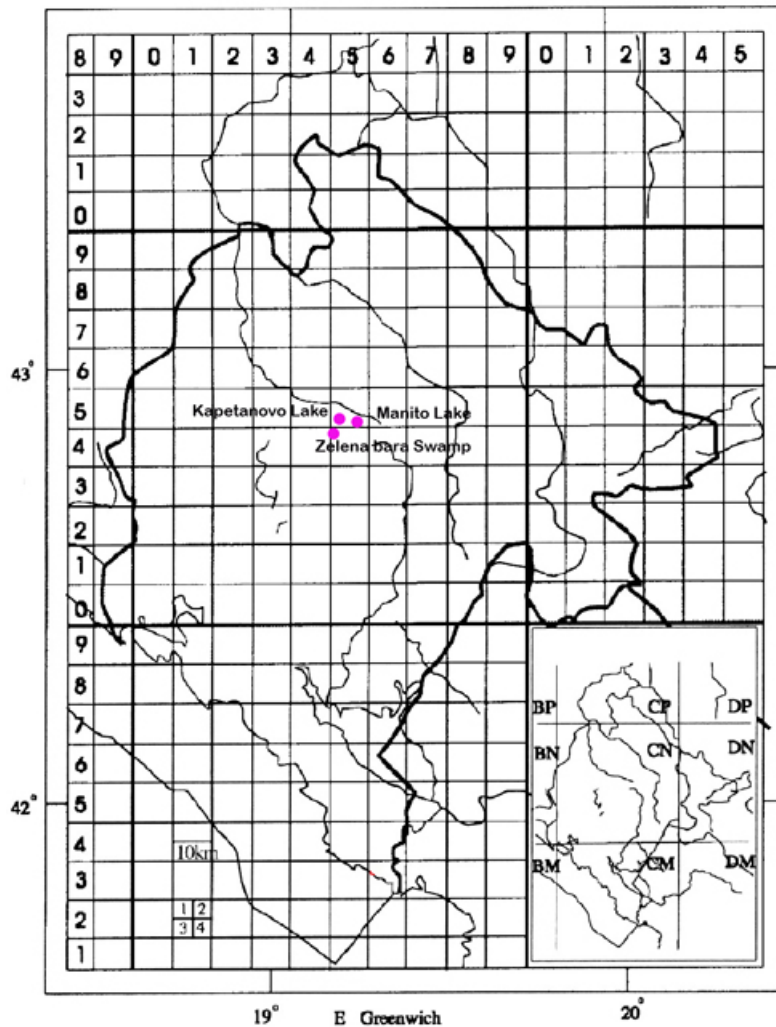


Figure 1. Map of the study area with the sampling sites.

Odonata specimens were collected by aerial nets. Specimens were put into envelopes and transported to the lab. All the specimens were deposited in the collection of the first author. DIJKASTRA & LEWINGTON (2006) and BESCHOVSKI (1994), were used for identification of the specimens. Unless stated otherwise, all material has been collected by the first author. The composition of the material is given as: (males/females/larvae).

## RESULTS

### Subordo ZYGOPTERA

#### Family Lestidae

1. *Lestes sponsa* (Hensemman, 1823)

Distribution: Palaearctic.

Material: Zelena bara Swamp, 29 June 2007, (1/1/0), leg. Zeković; 13 July 2007, (1/1/0), leg. Gligorović.

#### Family Coenagrionidae

2. *Pyrhosoma nymphula* (Sulzer, 1776)

Distribution: Euro-Mediterranean.

Material: Zelena bara Swamp, 29 June 2007, (2/1/0); Kapetanovo jezero Lake, 13 July 2007, (2/2/0), leg. Gligorović.

3. *Ischnura elegans* (Vander Linden, 1820)

Distribution: Palaearctic.

Material: Zelena bara Swamp, 29.06. 2007, (2/2/0); 13.07.2007, (2/1/0), leg. Gligorović.

4. *Coenagrion hastulatum* (Charpentier, 1840)

Distribution: Euro-Siberian.

Material: Kapetanovo jezero Lake, 29 June 2007, (3/2/0); Manito jezero Lake, 13 July 2007, (6/4/0) leg. Gligorović.

5. *Coenagrion puella* (Linneus, 1758)

Distribution: Euro-Mediterranean.

Material: Kapetanovo jezero Lake, 29 June 2007, (5/4/0); Manito jezero Lake, 13 July 2007, (4/3/0) leg. Zeković.

**Subordo ANISOPTERA**

**Family Aeshnidae**

**6. *Aeshna juncea* (Linneus, 1758) (Figs.3, 4)**

Distribution: Holarctic.

Material: Kapetanovo jezero Lake, 29 June 2007, (2/3/2), leg. Zeković; Manito jezero Lake, 13 July 2007, (3/3/1), Zelena bara Swamp, 29 June 2007, (2/1/2).



**Figure 3. *Aeshna juncea* (Linneus, 1758), ♂**  
Photo: B. Gligorović



**Figure 4. *Aeshna juncea* (Linneus, 1758), ♀**  
Photo: B. Gligorović



**Figure 5. *Cordulia aenea* (Linnaeus, 1758), ♂**  
Photo: B. Gligorović



**Figure 6. *Aeshna cyanea* (Müller, 1764), ♀**  
Photo: A. Zeković

**7. *Aeshna cyanea* (Müller, 1764) (Fig.6)**

Distribution: Europe.

Material: Manito jezero Lake, 29 June 2007, (1/0/1), leg. Zeković; Zelena bara swamp, 29 June 2007, (1/1/0), 13 July 2007, (0/1/0), leg. Gligorović.

### Family Cordulidae

#### 8. *Cordulia aenea* (Linnaeus, 1758) (Fig.5)

Distribution: Euro-Siberian

Material: Kapetanovo jezero Lake, 29 Jun 2007, (4/2/2), leg. Zeković; 13 July 2007, Manito jezero Lake, 14 July 2007 (3/1/0); Zelena bara Swamp, 29 June 2007, (2/2/2) leg. Gligorović.

### Family Libellulidae

#### 9. *Crocothemis erythraea* (Brullé, 1823)

Distribution: Mediterranean - afro tropic

Material: Zelena bara Swamp, 29 June 2007, (1/1/1), leg. Zeković; 13 July 2007, (1/1/0), leg. Gligorović.

#### 10. *Libellula depressa* (Linnaeus, 1758) (Fig.7)

Distribution: Europe.

Material: Manito jezero Lake, 29 June 2007, (1/1/2), leg. Zeković; Zelena bara Swamp, 13 July 2007, (2/1/0), leg. Gligorović.

#### 11. *Sympetrum flaveolum* (Linnaeus, 1758)

Distribution: Palaearctic.

Material: Zelena bara Swamp, 13 July 2007, (1/1/2), leg. Zeković; 13 July 2007, (3/1/0), leg. Gligorović.

#### 12. *Libelula quadrimaculata* Linneus, 1758 (Fig.8)

Distribution: Europe.

Material: Manito jezero Lake, 29 June 2007, (1/1/0); Zelena bara Swamp, 13 July 2007, (0/1/0), 14 July 2007, (1/0/0) leg. Gligorović.



Figure 7. *Libellula depressa* Linnaeus, 1758), ♀  
Photo: A. Zeković



Figure 8. *Libelula quadrimaculata* Linneus, 1758, ♀  
Photo: B. Gligorović

## DISCUSSION

In the water habitats of mountainous area Lukavica 12 species of dragonflies (Odonata) belonging to 9 genera and 5 families were recorded at 3 sites.

The total number of specimens of dragonflies collected in mountainous area Lukavica amounts to 114. Four species are dominant (>10% total abundance): *Coenagrion hastulatum* (Charpentier), *Coenagrion puella* (Linneus), *Aeshna juncea* (Linneus), *Cordulia aenea* (Linnaeus). Four species are subdominant (abundance 5-10%): *Pyrrhosoma nymphula* (Sulzer), *Ischnura elegans* (Vander Linden), *Libellula depressa* (Linnaeus), *Sympetrum flaveolum* (Linnaeus), and four species are rare (abundance <5%). (Tab.I, Fig 3).

The larger number of the species were recorded at the sampling sites Zelena bara Swamp (10 spp), followed by the sampling sites – Manito jezero Lake (8 spp.), Kapetanovo jezero Lake (5 spp).

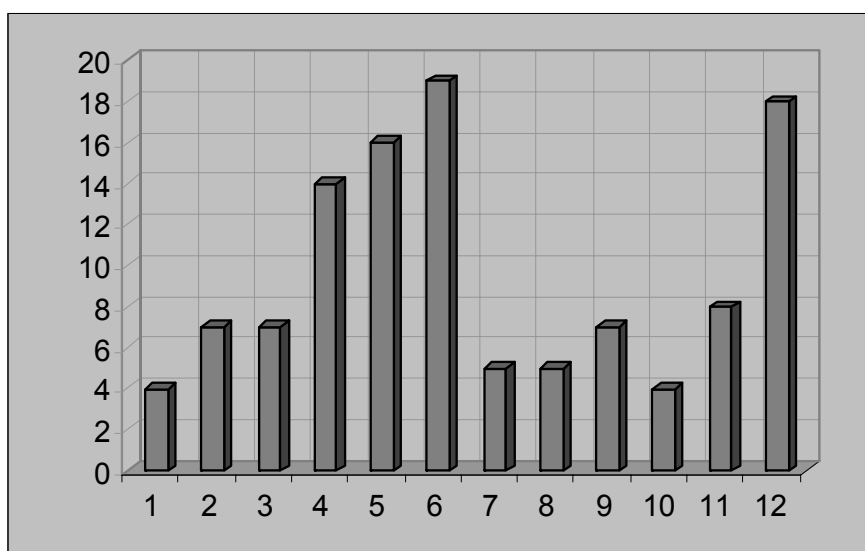


**Figure 9.**  
**Mountainous**  
**area Lukavica**

Photo:  
A. Zeković

**Table 1. Abundance of the collected species in the mountainous area Lukavica: D = dominant (> 10% total abundance), SD = subdominant (5-10% total abundance), R = rare (< 5% total abundance).**

Species	Number of collected specimens	Relative abundance%	Dominancy
<i>Lestes sponsa</i>	4	3,5	R
<i>Pyrrhosoma nymphula</i>	7	6,1	SD
<i>Ischnura elegans</i>	7	6,1	SD
<i>Coenagrion hastulatum</i>	14	12,6	D
<i>Coenagrion puella</i>	16	14	D
<i>Aeshna juncea</i>	19	16,6	D
<i>Aeshna cyanea</i>	5	4,3	R
<i>Crocothemis erythraea</i>	5	4,3	R
<i>Libelula depressa</i>	7	6,1	SD
<i>Libelula quadrimaculata</i>	4	3,5	R
<i>Sympetrum flaveolum</i>	8	7	SD
<i>Cordulia aenea</i>	18	15,7	D



**Figure 2. Abundance of the collected species in the mountainous area Lukavica: D = dominant (> 10% total abundance), SD = subdominant (5-10% total abundance), R = rare (< 5% total abundance). Numbers of columns correspond with the ordinal numbers of species**

During this study it was noticed that species *Aeshna cyanea* and *A. juncea* appear on joint habitats. According to analyses of the presence of these two species on Balkan Peninsula it is concluded that this situation is common for mentioned two species on Balkan Peninsula MICEVSKI *et al.*,(2008), but abundance of *Aeshna cyanea* decrease with increasing the altitude ADAMOVIĆ *et al.*, (1996), which has been proven with our study, too. *Aeshna juncea* as Holarctic species is present on Balkan Peninsula only in high-mountain lakes and springs, and mountain pools. *Aeshna cyanea* is present in all types of static freshwaters. It can be found also in very eutrophic waters. It is highly spread in Balkan Peninsula, but its abundance is small. On the territory of Montenegro, we detected a presence of this species in altitude from 0 – 1 764 meters.



Further studies aiming at improvement of our knowledge on Montenegrin dragonflies should focus on collecting in unexplored areas.

**Figure 10. Kapetanovo jezero Lake**  
Photo: B. Gligorović



**Figure 11. Zelena bara swamp**  
Photo: B. Gligorović



**Figure 12. Manito jezero Lake**  
Photo: A. Zeković

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