

FAUNISTICS AND DISTRIBUTION OF AQUATIC NEUROPTERA IN CROATIA

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Aquatic Neuroptera in Europe are represented with 17 species in 3 families; Osmylidae, Sisyriidae and Nevrothidae. Four species are known from Croatia, *Osmylus fulvicephalus*, *Sisyra bureschi*, *Sisyra nigra* and *Sisyra terminalis*. Their faunistics and distribution in Croatia are given in this paper.

Key words: aquatic Neuroptera, faunistics, distribution, Croatia

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Vodeni Neuroptera su u Europi zastupljeni sa 17 vrsta u 3 porodice: Osmylidae, Sisyriidae i Nevrothidae. U Hrvatskoj su do sada zabilježene 4 vrste: *Osmylus fulvicephalus*, *Sisyra bureschi*, *Sisyra nigra* and *Sisyra terminalis*. Faunistički podaci o vrstama i njihova rasprostranjenost su dani u ovom radu.

Ključne riječi: vodeni Neuroptera, fauna, rasprostranjenost, Hrvatska

INTRODUCTION

Aquatic Neuroptera belong to the families Osmylidae, Sisyriidae and Nevrothidae in the Palaearctic region of the world (ASPÖCK *et al.*, 2001). In Europe there are 17 species of aquatic Neuroptera. Four species belong to the family Osmylidae, four to the family Nevrothidae and nine to the family Sisyriidae (ASPÖCK *et al.*, 2001; RAUSCH & WEIßMAIR, 2007). Most Neuroptera, including aquatic species from the families Osmylidae, Nevrothidae and Sisyriidae, are predators as both larvae and adults (HÖLZEL & WEIßMAIR, 2002). The larvae of the genus *Sisyra* (Sisyriidae) are aquatic predators/parasites on sponges and bryozoans (WEIßMAIR, 1999; WEIßMAIR, 2005). Larvae of the genus *Nevrothus* (Nevrothidae) and of the genus *Osmylus* (Osmylidae) feed on various different aquatic insect larvae (HÖLZEL & WEIßMAIR, 2002).

Although some species of aquatic Neuroptera are known from Croatia, no detailed systematic studies concerning faunistics and distribution have been made be-

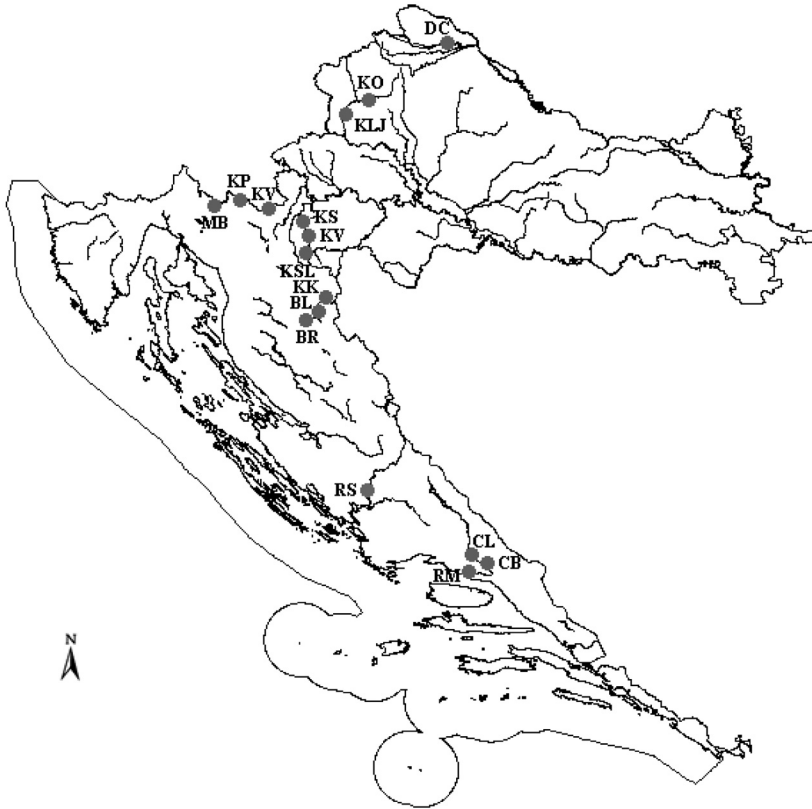


Fig. 1. Map of the sampling sites. Abbreviations of the sites are given in Tab. 1.

fore (ASPÖCK *et al.*, 2001; RAUSCH & WEIßMAIR, 2007). On the basis of several collecting trips a more detailed overview of the Croatian aquatic Neuroptera fauna and its distribution is presented in this paper.

MATERIAL AND METHODS

In total 132 adult Neuroptera (74♂♂, 58♀♀) and 4 larvae were examined. The specimens are preserved in alcohol (75%). Collecting took place between 2007 and 2010 at 15 different localities. The studied sites are presented in Fig. 1, and their geographic coordination is given in Tab. 1. The samples of adults were collected using an entomological net and the samples of larvae using an Eckman grab sampler. The identification of the specimens was done with a Stereomicroscope Zeiss Semi 2000-C using HÖLZEL & WEIßMAIR (2002) and RAUSCH & WEIßMAIR (2007).

RESULTS AND DISCUSSION

The four identified species belong to the families Osmylidae and Sisyridae.

Tab. 1. List of sampling sites with abbreviations (locality code) and their geographic data.

Locality code	Sampling sites	Geographic coordinates	Altitude a.s.l. (m)
DC	Drava near biological minimum Čakovec	N 46° 19' 11", E 16° 34' 22"	153
KO	Krapina Stream, Oroslavje	N 46° 01' 02", E 15° 55' 53"	141
KLJ	Krapina Stream between Luka and Jakovlje	N 45° 57' 29", E 15° 49' 36"	135
MB	Bridge on Mala Belica, tributary of Kupa River	N 45° 27' 67", E 14° 48' 90"	237
KP	Kupa, near Prelesje	N 55° 04' 98", E 15° 03' 78"	186
KV	Kupa, Vinica	N 45° 27' 30", E 15° 15' 14"	175
KS	Korana, Koranska Strana	N 45° 18' 34", E 15° 29' 58"	140
KVE	Korana, Veljun	N 45° 15' 05", E 15° 32' 49"	150
KSL	Korana, near Slunj	N 45° 07' 14", E 15° 35' 37"	235
KK	Korana, Kamp Korana	N 44° 56' 44", E 15° 38' 25"	360
BL	Plitvice lakes, Tufa barrier Labudovac	N 44° 52' 17", E 15° 35' 59"	630
BR	Plitvice lakes, Spring of Bijela rijeka	N 44° 50' 05", E 15° 33' 43"	720
RS	Krka, Roški slap	N 43° 54' 36", E 15° 58' 42"	70
CL	Cetina, Čikotina lađa	N 43° 31' 59", E 16° 44' 42"	250
CB	Cetina, Blato na Cetini	N 43° 29' 16", E 16° 49' 00"	200
RM	Cetina, Radmanove Mlinice	N 43° 26' 16", E 16° 45' 11"	15

Faunal checklist:

Family Osmylidae

Genus *Osmylus* Latreille, 1802

Osmylus fulvicephalus (Scopoli, 1763)

Material examined: site BR (leg. M. Ivković), 28.VI.2007, 1♂, 25.VII.2007, 1♂; site KV (leg. W. Weißmair), 2.VII. 2010, 1♂; site MB (leg. A. Popijač), 19.VI.2009, 2♀.

Family Sisyridae

Genus *Sisyra* Burmeister, 1839

1. *Sisyra bureschi* Rausch & Weißmair, 2007

Material examined: site BL (leg. M. Ivković), 28.VI.2008, 1♀, 29.VI.2009, 1♂, 1♀; site CB (leg. W. Weißmair), 4.VII.2010, 7♂♂, 12♀♀; site CL (leg. W. Weißmair), 4.VII.2010, 9♂♂, 8♀♀; site KK (leg. W. Weißmair), 4.VII.2010, 1♂; site RM (leg. M. Ivković), 6.VI.2007, 2♂♂, 2♀♀, 11.IX.2010, 1♂.

2. *Sisyra nigra* (Retzius, 1783)

Material examined: site KLJ (leg. W. Weißmair), 1.IX.2010, 6♂♂, 5♀♀; site KO (leg. W. Weißmair), 1.IX.2010, 1♂, 2♀♀; site KS (leg. W. Weißmair), 3.VII.2010, 2♂♂, 1♀; site KSL (leg. W. Weißmair), 2.IX.2010, 2♂♂, 1♀; site KV (leg. W. Weißmair), 2.VII. 2010, 1♂, 1♀; site KVE (leg. W. Weißmair), 2.IX.2010, 2♂♂, 1♀; site RS (leg. M. Ivković), 17.XI.2010, 4 larvae.

3. *Sisyra terminalis* Curtis, 1854

Material examined: site DC (leg. M. Ivković), 21.VII.2009, 1♀; site KLJ (leg. W. Weißmair), 1.IX.2010, 1♀; site KP (leg. A. Popijač), 19.VI.2009, 1♂; site KS (leg. W.

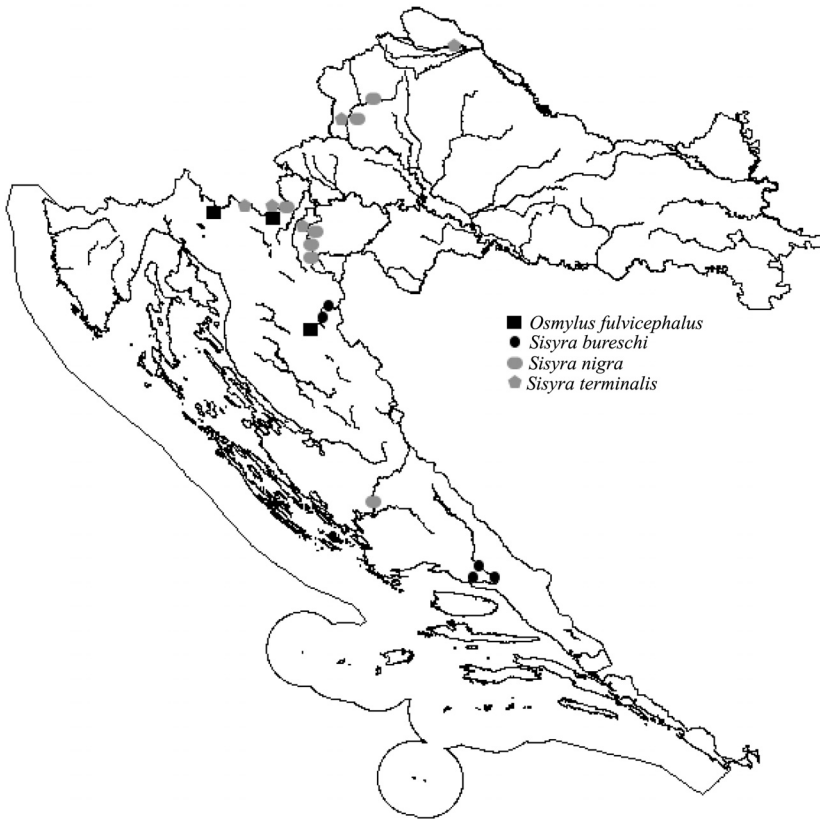


Fig. 2. Distribution map of aquatic Neuroptera in Croatia.

Weißmair), 3.VII.2010, 28♂♂, 15♀♀; site KV (leg. W. Weißmair), 2.VII.2010, 8♂♂, 5♀♀;

Detailed distribution of the species is presented in Fig. 2. All species are already known to occur in Croatia (ASPÖCK *et al.*, 2001; RAUSCH & WEIßMAIR, 2007). *Osmylus fulvicephalus*, *Sisyra nigra* and *Sisyra terminalis* are widely distributed through Europe (ASPÖCK *et al.*, 2001), and their occurrence in Croatia is not surprising. *Osmylus fulvicephalus* was only found in continental parts of Croatia and occurs in relatively colder areas, such as the spring of Bijela rijeka. There are no records in the Mediterranean area, perhaps for seasonal considerations. Besides the Balkan Peninsula and Turkey *Sisyra bureschi* is known also from Germany (RAUSCH & WEIßMAIR, 2007; WEIßMAIR, 2010). No species of the family Nevrothidae was observed during our survey but *Nevrothus apatelios* Aspöck, Aspöck & Hölzel, 1977 does occur in the surrounding countries (ASPÖCK *et al.*, 2001). Nevrothidae prefer small streams and emergence is in early spring but we focused on larger water bodies in the summer-time, which could well explain the lack of these species in our collection.

Larvae of all the above species are known, except from *Sisyra bureschi* which is still not described and additional efforts should be made in that direction.

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SAŽETAK

Faunističke značajke i rasprostranjenost vodenih Neuroptera u Hrvatskoj

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Istraživanje vodenih Neuroptera trajalo je od 2007. do 2010. godine na 15 različitih postaja u Hrvatskoj. Postaje su bile: Kupa kod Prelesja (KP), Kupa kod Vinica (KV), Izvor Bijele rijeke (BR), Barijera Labudovac (Plitvička jezera) (BL), Korana kod autokampa Korana (KK), Korana kod Slunja (KSL), Korana kod Veljuna (KVE), Korana kod Koranske Strane (KS), Potok Krapina kod Oroslavja (KO), Potok Krapina između Luke i Jakovlja (KLJ), Drava kod biološkog minimuma Čakovec (DC), Cetina kod Čikotine lađe (CL), Blato na Cetini (CB), Cetina kod Radmanovih mlinica (RM), Roški slap na Krki (RS). Odrasle jedinke prikupljane su entomološkom mrežicom na 14 lokaliteta, a ličinke Eckmanovim grabilom na samo jednom lokalitetu. Ukupno su zabilježene 4 vrste Neuroptera: *Osmylus fulvicephalus* (Scopoli, 1763), *Sisyra bureschi* Rausch & Weißmair, 2007, *Sisyra nigra* (Retzius, 1783) and *Sisyra terminalis* Curtis, 1854. Ukupno su prikupljene 132 jedinke odraslih kukaca, 74 mužjaka i 58 ženki, te 4 ličinke. Sve zabilježene vrste su široko rasprostranjene u

Europi, osim vrste *Sisyra bureschi* koja dolazi samo na Balkanskom poluotoku, Turskoj i južnoj Njemačkoj. Niti jedna vrsta iz porodice Nevrothidae nije zabilježena, a to se može pripisati nedovoljnom uzorkovanju malih potoka, gdje dolaze vrste iz te porodice te uzorkovanju u ljetnom razdoblju, a ne u rano proljeće kada te vrste izlijeću.