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IZVORNI ZNANSTVENI ČLANCI **ORIGINAL SCIENTIFIC PAPERS**

HOVERFLIES (Diptera: Syrphidae) OF KOPAČKI RIT NATURE PARK, NE CROATIA

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The first entomological study of hoverflies (Diptera: Syrphidae) from Kopački rit Nature Park was carried out during 2007 and 2008. This research was carried out in different habitats (inundated, forest, agricultural, open ground) in wetlands. The specimens were sampled with an entomological net. A total of 347 specimens were collected. From collected specimens, 39 species of hoverflies were identified, among them six species recorded for the first time in Croatia: *Callicera spinolae* (Rondani, 1844) (first record on the Balkan Peninsula), *Xanthogramma laetum* (Fabricius, 1794), *Eupeodes lapponicus* (Zetterstedt, 1838), *Paragus pecchiolii* (Rondani, 1857), *Syrphus torvus* (Osten Sacken, 1875), *Chrysotoxum verralli* (Collin, 1940). Because of specific ecological conditions of Kopački rit, which provide for the development of numerous and diverse forms plant and animal life, it is realistic to expect that this is not the final number of species.

Hoverflies, new recorded species, Kopački rit

Ž. JELIČIĆ, A. VUJIĆ, G. VIGNJEVIĆ, E. MERDIĆ - Fauna osolikih muha (Diptera: Syrphidae) Parka prirode Kopački rit, sjeveroistočna Hrvatska. Entomol. Croat. 2010, Vol. 14. Num. 3-4: 7-18.

Tijekom 2007. i 2008. obavljena su entomološka istraživanja osolikih muha (Diptera: Syrphidae) na području Parka prirode Kopački rit. Istraživano područje jedno je od najvećih fluvijalno-močvarnih nizina u središnjoj Europi, uključujući teritorij koja pripada Mađarskoj, Hrvatskoj i Srbiji. Uzorkovanje je obavljeno entomološkom mrežicom na različitim tipovima staništa (poplavnom, šumskom, otvorenom i poljoprivrednom). Determinirano je 39 vrsta od kojih je šest prvi put zabilježeno na području Hrvatske: *Callicera*

spinolae (Rondani, 1844), koja je osim u Hrvatskoj prvi put zabilježena i na Balkanskom poluotoku, *Xanthogramma laetum* (Fabricius, 1794), *Eupeodes lapponicus* (Zetterstedt, 1838), *Paragus pecchiolii* (Rondani, 1857), *Syrphus torvus* (Osten Sacken, 1875), *Chrysotoxum verralli* (Collin, 1940). Zbog specifičnog ekološkog izgleda Kopačkoga rita, koji omogućava razvoj brojnog i raznolikog biljnog i životinjskog svijeta, realno je za očekivati da ovo nije konačan broj vrsta.

Osolike muhe, nove zabilježene vrste, Kopački rit

Introduction

The family Syrphidae is divided into 2 subfamilies and contains more than 6,000 described species It is absent only in Antarctica and some remote islands in the Pacific. The main zoogeographical regions are rich in species: 1,590 species have been identified in the Palaearctic area (Peck, 1988), 870 in the Nearctic (Vockeroth and Thompson, 1987), about 400 species in the Australia and Oceania area (Thompson and Vockeroth, 1989), 528 in the Afrotropical region (Smith and Vockeroth, 1980) and 771 in the Orient (Knutson et al 1975). In Europe, there are more than 500 species.

The most important authors who have studied hoverflies in Croatia are: Strobl (1898, 1900, 1902), Langhoffer (1919), Marcuzzi (1941), Coe (1956, 1960), Glumac (1956a, 1956b) and Leclercq (1961). The presence of 230 species of hoverflies has been confirmed in Croatia (Nedeljković, 2007; Radenković, 2008), mostly related to the fauna of the Dalmatian coast, and very few species from other parts of the Croatia.

Within the framework of the Entomofauna of Kopački rit Project, research into hoverflies (Diptera:Syrphidae) was carried out. The hoverflies of Kopački rit have not been studied so far and this is the first paper on this subject. Kopački rit Nature Park is a wetland with a suitable climate and diverse flora, which means that more diverse fauna can be expected in this area.

Material and Methods

Adult Syrphids were sampled by an entomological net. The net is 30 cm in diameter and in all the rules can be two times deeper than wide. The collected

specimens were identified by the identification key (Van Veen, 2004). During 2007 and 2008 entomological (investigations) samples were carried out into the hoverflies of Kopački rit Nature Park, from early March to November, every 14 days, at five stations with different plant compositions. Two stations were in the general area of the Nature Park (Zlatna greda and Tikveš), and three stations were in the Special Zoology Reserve (Čonakut, Hordovanj and Kopačko lake). At all stations a transect of about 200 m was selected and regularly checked. At Zlatna Greda station specimens were collected alongside bushes in which the prevailing species were hawthorn (*Crataegus sp*.), blackthorn or sloe (*Prunus spinosa*), dogberry (*Cornus sanguinea*), wild rose (*Rosa spp*.), privet (*Ligustrum vulgare*), buckthorn (*Rhamnus sp*.), guelder rose (*Viburnum opulus*), elder (*Sambucus nigra and S. ebulus*), lower ash trees (*Fraxinus sp*), common oak (*Quercus robur*), hornbeam (*Carpinus sp*.), crab apple (*Malus sp)*, willows (*Salix spp*.) and poplars (*Populus sp*.). Tikveš station was dealt with in the centre of a forest of common oak (*Quercus robur*) over a transect of 200m. Tikveš station was a borderline area of the Tikveš common oak forest, overgrown with the previously described bushes and meadows on the one hand, and with forest clearings on the other.

The following three stations are inside the Special Zoology Reserve, the basic feature of which is that it is a region greatly subjected to flooding. The stations are very similar to each other in terms of plant composition. Čonakut station with the plant community *Galio-Salicetum albae* is monotypic with white willow trees only. No bush layer exists (Rauš, 1976). Hordovanj station is on a somewhat higher ridge, and the poplar appears together with willow. Low willows in conjunction with a lot of open ground dominated by *Rorippa amphibia* are characteristic of Kopačko Lake station.

Results and Discussion

Selective sampling through two seasons caught a total of 347 specimens. A total of 39 species belonging to 21 genera and 2 subfamilies were collected from the wetland of Kopački rit and around grasslands. The genus with the most species is *Chrysotoxum* with 4, followed by *Eristalis, Eupeodes, Scaeva* and *Syrphus* with 3. Other genera have fewer species (1 or 2). The sample included six species identified for the first time in Croatia: *Callicera spinolae* (Rondani,

1844), *Chrysotoxum verralli* (Collin, 1940), *Eupeodes lapponicus* (Zetterstedt, 1838), *Paragus pecchiolii* (Rondani, 1857), *Syrphus torvus* (Osten Sacken, 1875) and *Xanthogramma laetum* (Fabricius, 1794).

The identified species are:

Family SYRPHIDAE

Subfamily ERISTALINAE

Tribe Eristalini

Genus *Eristalis* Latreille, 1804

Eristalis arbustorum (Linnaeus, 1758)

Eristalis pertinax (Scopoli, 1763)

Eristalis tenax (Linnaeus, 1758)

Genus *Helophilus* Meigen, 1805

Helophilus pendulus (Linnaeus, 1758)

Helophilus trivittatus (Fabricius, 1805)

Tribe Callicerini

Genus *Callicera* Panzer, 1809

Callicera spinolae (Rondani, 1844)

Tribe Cheilosiini

Genus *Ferdinandea* Rondani, 1844

Ferdinandea cuprea (Scopoli, 1763)

Ferdinandea ruficornis (Fabricius, 1775)

Tribe Chrysogasterini

Genus *Myolepta* Newman, 1838

Myathropa florea (Linnaeus, 1758)

Tribe Milesiini

Genus *Syritta* Le Peletier et Serville, 1828

Syritta pipiens (Linnaeus, 1758)

Genus *Temnostoma* Le Peletier et Serville, 1828

Temnostoma vespiforme (Linnaeus, 1758)

Tribe Volucellini

Genus *Volucella* Geoffroy, 1762

Volucella pellucens (Linnaeus, 1758)

Volucella zonaria (Poda, 1761)

Subfamily SYRPHINAE

Tribe Chrysotoxini

Genus *Chrysotoxum* Meigen, 1803

Chrysotoxum bicinctum (Linnaeus, 1758)

Chrysotoxum elegans (Loew, 1841)

Chrysotoxum vernale (Loew, 1841)

Chrysotoxum verralli (Collin, 1940) *

Tribe Syrphini

Genus *Eupeodes* (Matsumura, 1917)

Eupeodes corollae (Fabricius, 1794)

Eupeodes lapponicus (Zetterstedt, 1838) *

Eupeodes luniger (Meigen, 1822)

Genus *Epistrophe* Walker, 1852

Epistrophe eligans (Harris, 1780)

Epistrophe melanostoma (Zetterstedt, 1843)

Genus *Epysyrphus* Matsumura-Adachi, 1917

Episyrphus balteatus (de Geer, 1776)

Genus *Melangyna* Verrall, 1901

Meliscaeva auricollis (Meigen, 1822)

Genus *Eriozona* Schiner, 1860

Eriozona erratica(Linnaeus, 1758)

Genus *Scaeva* Fabricius, 1805

Scaeva dignota (Rondani, 1857)

Scaeva pyrastri (Linnaeus, 1758)

Scaeva selenitica (Meigen, 1822)

Genus *Sphaerophoria* Peletier-Serville, 1828
Sphaerophoria scripta (Linnaeus, 1758)
Genus *Syrphus* Fabricius, 1775
Syrphus ribesii (Linnaeus, 1758)
Syrphus torvus (Osten Sacken, 1875) *
Syrphus vitripennis (Meigen, 1822)
Genus *Xanthogramma* Schiner, 1860
Xanthogramma laetum (Fabricius, 1794) *
Xanthogramma pedissequum (Harris, 1780)

Tribe Melanostomatini

Genus *Melanostoma* Schiner, 1860
Melanostoma mellinum (Linnaeus, 1758)
Melanostoma scalare (Fabricius, 1794)
Genus *Platycherius* Peletier-Serville, 1828
Platycheirus clypeatus (Meigen, 1822)
Platycheirus fulviventris (Macquart, 1829)

Tribe Paragini

Genus *Paragus* Latreille, 1804
Paragus pecchiolii (Rondani, 1857) *

*new recorded species

***Callicera spinolae* (Rondani, 1844)**

New record: Croatia, Kopački rit, 17.06.2008, 1 ♀, leg. Jeličić,Vignjević, det. Vujić

Remarks: Indicator species whose presence indicates high habitat quality. This species is considered threatened at the European level (Speight, 2008). Larvae of this species have been reared from root holes in living *Populus* and *Fagus*, and from a small trunk cavity in live *Betula*. Range of this species are Britain (eastern England) and northern France south to the Pyrenees, central

Spain and the Mediterranean; Germany; Italy; Romania; Tajikistan. This is the first record of this species in Croatia, the neighbouring countries and the whole Balkan Peninsula.

***Chrysotoxum verralli* (Collin, 1940)**

New record: Kopački rit, Tikveš, 11.07.2007. 1♂, leg. Jeličić,Vignjević, det. Vujić.

Remarks: Adult habitats are usually in deciduous forests, including alluvial forest and bush communities. Visiting flowers are from the family *Apiacea*, genus *Caltha* and *Ligustrum*, and species *Galium boreale*. Ranges of this species are Denmark, south to central France, Britain (Wales and central/southern England), eastwards through central Europe into European parts of Russia to the Caucasus and on into eastern Siberia. Outside Croatia this species has been recorded in Slovenia (Lambeck, 1968), Bulgaria (Bankowska, 1967) and Macedonia (Krpač et al., 2001).

***Eupeodes lapponicus* (Zetterstedt, 1838)**

New record: Kopački rit, 17.06.2007, 1♂, leg. Jeličić,Vignjević, det. Vujić.

Remarks: This species prefers wetland/open ground; fen, humid, seasonally-flooded/poorly grassland. Flowers visited are *Caltha, Chaerophyllum, Chelidonium, Crataegus, Euphorbia, Knautia, Ligustrum, Prunus spinosa, Ranunculus, Rubus, Salix, Sorbus, Tussilago*. The range of this species is from Iceland to *Fennoscandia*; from Ireland eastwards through most of Europe into the European parts of Russia; through Siberia from the Urals to the Pacific coast (Sakhalin and Kuril Isles); India; in N America from Alaska south to California and Texas. Outside Croatia this species has been recorded in Slovenia (Coe, 1960), Bosnia and Herzegovina (Kula, 1985), Montenegro (Šimić, 1987), Bulgaria (Drensky, 1934), Serbia (Kula, 1985; Šimić & Vujić, 1996). This species also appears in the literature under the name *Syrphus lapponicus* (Coe, 1960; Šimić, 1987; Drensky, 1934) and *Metasyrphus lapponicus* (Šimić & Vujić, 1996).

***Paragus pecchiolii* (Rondani, 1857)**

New record: Kopački rit, Tikveš, 27.06.2008, 1♂, leg. Jeličić,Vignjević, det.Vujić.

Remarks: This species is most frequently in deciduous woodland; it occurs

also in overgrown dune, the edges of marshes and *Quercus ilex* forest and dry grassland. Outside Croatia this species has been recorded in Montenegro **(**Šimić, 1987), Serbia (Šimić & Vujić, 1996) and **Greece (**Vujić et al., 2000).

***Syrphus torvus* (Osten-Sacken, 1875)**

New records: Kopački rit, Hordovanj, 25.05.2007, 1♂, leg. Jeličić, Vignjević, det. Vujić; Kopački rit, 17.06.2008. 3♂♂♂ leg. Jeličić, det. Vujić.

Remarks: The species *Syrphus torvus* prefers humid conifer forest (*Albies, Picea* and humid *Pinus*) and deciduous forest (*Betula*, *Fagus* and acidophilous *Quercus*). Larvae are aphid'feeding; occurr on trees, bushes and shrubs. Range from Greenland, Iceland and Fennoscandia south to Iberia and the Mediterranean; through most of Europe into Turkey and European parts of Russia; from the Urals through Siberia to the Pacific coast (Kuril Isles); Japan; Formosa; northern India, Nepal, Thailand; in N America from Alaska south to New Mexico. Outside Croatia this species has been recorded in Macedonia **(**Glumac, 1968, 1972), Serbia **(**Glumac, 1956c, 1959, 1972; Kula, 1985), Montenegro **(**Šimić, 1987), Bulgaria **(**Drensky, 1934) and Greece **(**Vujić et al., 2000).

***Xanthogramma laetum* (Fabricius, 1794)**

New records: Kopački rit, Tikveš, 11.07.2007. 1♂, leg. Jeličić, Vignjević, det. Vujić

Remarks: This species prefers to be close to brooks in conifer forests (*Abies/Picea* and *Pinus* including dry *Pinus*). Flowers visited are *Allium ursinum, Crataegus, Glecoma, Phyteuma spicatum, Ranunculus.* Ranges of this species are from northern Germany southwards to south-west France; from Belgium eastwards through central and southern Europe to Romania and European parts of Russia. This species was previously known under the name *Olbiosyrphus laetus* (Glumac, 1955a, 1959, 1972; Kula, 1985). The species *Xanthogramma laetum* (Fabricius, 1794) for the Balkan Peninsula was registered only in Serbia. It occurs sporadically in a few sites with a small number of specimens.

Research of hoverflies was carried out for the first time in the Kopački rit Nature Park. In totoal, 230 hoverfly species reside in Croatia. In the Kopački rit NP only 39 species were collected, which is a relatively small number. However, it is realistic to expect that the number of species that lives here could be considerably larger. Because of the specific ecological conditions of the Kopački rit NP, which

provide for the development of numerous and diverse forms of plant and animal life we can say that this is not likely to be a final number of species. Therefore, future research into hoverflies including the use of a complementary methodology for sampling, such as Malaise traps in the Kopački rit NP would have a great importance for research into the Syrphidae fauna in Croatia.

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