THE CONTRIBUTION TO THE KNOWLEDGE OF HOVERFLY (DIPTERA, SYRPHIDAE) OF THE CANYON OF MRTVICA RIVER, MONTENEGRO

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Synopsis

The paper presents the results of investigations on the fauna of hoverfly from the Mrtvica canyon. 36 species from 19 genera are registred. Review of registred species, ecological and zoogeographical characteristics are given, as well as analysis of presents of species according to recent range and type of larval development.

Keywords: Syrphidae, canyon of Mrtvica river, Crna Gora, Montenegro

Sinopsis

PRILOG POZNAVANJU FAUNE OSOLIKIH MUVA (DIPTERA, SYRPHIDAE) KANJONA MRTVICE, CRNA GORA

U radu su dati rezultati istraživanja faune osolikih muva u kanjonu rijeke Mrtvice. Registrovano je 36 vrsta osolikih muva iz 19 rodova, dat je pregled zabilježeni vrsta, ekološke i zoogeografske odlike ove faune, kao i prikaz procentualne zastupljenosti vrsta zavisno od tipa rasprostranjenja i tipa larvalnog razvića.

Ključne riječi: Syrphidae, kanjon rijeke Mrtvice, Crna Gora, Montenegro

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INTRODUCTION

The Syrphidae, known as hoverflies, comprise one large family of Diptera with over 5000 described species. This group of insects spreads in various types of ecosystems and in almost all zoogeographical regions. Morphologically, they are characterized by a great diversity, especially adults, which are feeding with pollen and nectar of various plant species. In relation to the larval development, they can be zoophagous, phytophagous and various types of saprophagous ones.

About 300 species are registered for the Montenegro so far. From the 1950's has been started with more intensive and systematic investigations of sirfids in this region. The most investigated areas were the regions of mountain Durmitor and Adria coast (Glumac, 1972; monographies Šimić, 1987 and Vujić, 1996. references: Šimić and Vujić, 1984; Šimić and Vujić, 1990; Vujić and Milankov, 1990; Vujić and Radović, 1990; Radenković and Vujić, 1993/94; Vujić, 1994; Vujić and Šimić, 1995/98; Milankov and ass., 1995; Radenković and ass., 1995; Vujić, 1997; Vujić, 1999a; Vujić, 1999b; Vujić, and Milankov, 1999; Vujić and ass., 1999; Vujić and Claussen, 1994; Claussen and Doczkal, 1998; Vujić and Claussen, 2000; Milankov and ass. 2001; Vujić i Radišić, in press).

However, there are no or there are very poor data about sirfids fauna of continental, central part of Montenegro. Hoverfly fauna of the Mrtvica canyon has been unknown so far, and because of that I decided to start with the researching. This paper presents the first results of this work.

INVESTIGATED AREA

Mrtvica is Morača's right tributary. It is a mountain river which has its headwaters (rises, comes forth, originates) under mountain Rogode (1840m), flows from the village Velje Duboko (800m) and 18km far (away) flows into Morača river by the village Međurečje (180m). Canyon spreads in NW-SE direction and diagonally cuts a way through the highest range of Morača mountains. Canyon is the deepest (600m) and most narrow (even 1-3m) 2,5 km far (away) from the beginning. Downstream, sides of canyon lose the height and, from the village Mrtvo Duboko, Mrtvica canyon become more quiet and wide.

Mrtvica canyon belongs to the region of temperate continental climate with colder, mountains climate in the upper region and with the influences of the submediterranean climate in lower parts of the canyon. This type of climate (transitional) characterized with lower average annual temperatures and precipitations, as changing the distribution of precipitations. Almost all canyon areas are characterized with microclimate conditions, which are more hospitable then that are in surroundings.

Literatural informations and data about flora and vegetation of this area are very poor. Vertical zonation is distinct as in other canyons, presence numerous of rare, endangered, relict and endemic species is evidently.
MATERIAL AND METHODS

Material was collected in the period 1998-2001 on several localities in lower part of Mrvica canyon: Međurječje, Smolice, Luke, Mrvlo Duboko. It was collected 150 specimens of hoverflies. Specimens collected with ecological nest, were prepared, etiketed, analyzed, determined (except female of several species) and deposited in the Natural history Museum of Montenegro Collection in Podgorica. For determination used the keys: Sack (1932), Barkalov and Stahls (1997), Stubs and Falck (1983), Coe (1953) and numerous references.

All photos are taken from photodocumentation of Natural history museum of Montenegro.
RESULTS AND DISCUSSION

In the Mrtvica canyon are registered 36 species of hoverflies from 19 genera. Here is presented review of these species, ecological and zoogeographical characteristics, as well as analysis of presence of species according to range and type of larval development for each of this taxa:

1. *Brachypalpus valgus* (Panzer), 1798

**Records:** canyon of Mrtvica (Ivanove Lazine, 19.02.1998, 1 male, Brajović S.2).

**Adult:** Preferred environment: Old *Fagus* and *Quercus* forest with overmature trees; also in old cherry (*Prunus*) orchards with overmature trees. **Flowers visited:** umbellifers; *Anemone nemorosa*, *Crataegus*, *Prunus spinosa*, *Ranunculus*, male *Salix*, *Sorbus*, *Tussilago*; most frequently visits flowers at some height above ground (long-handled net advised!). **Flight period:** beginning of April to the beginning of June. Larva: saprophagous (collected from a wet fissure in the trunk of *Alnus glutinosa*).

**Range:** central Europe. Localised and decreasing, although probably not yet threatened at European level. (Speight, 2000). **Balkan Peninsula:** Croatia, Bosnia and Herzegovina, Montenegro, Serbia, Macedonia, Bulgaria, Greece. **Montenegro:** Rumija (Vujić i Milanov, 1999b).

2. *Cheilosia gagatea* Loew, 1857

*Nigrocheilosia gagatea* Vujić, 1996

**Records:** canyon of Mrtvica (Mrvo Duboko, 1.06.2000, 1 male, leg. Brajović S.).

**Adult:** Preferred environment: open ground; unimproved, calcareous montane and alpine grassland to above 2000m in the Alps and open areas within *Fagus/Picea* forest; adults fast flying, up to 2m from the ground. **Flowers visited:** white umbellifers, *Ranunculus*. **Flight period:** May/July. Larva: undescribed (Speight, 2000).

2 Brajović = Malidžan
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**Range:** central Europe (mostly mountains species). **Balkan peninsula:** Slovenia, Bosnia and Herzegovina, Montenegro, Serbia, Bulgaria. **Montenegro:** Durmitor (Šimić, 1987; Vujić, 1996), Prokletije (Vujić, 1996).

3. **Cheilosia impressa** Loew, 1840  
_Cheilosia honesta_ Šimić, 1987 (part)

**Records:** canyon of Mrtvica (Rupe, 1.06.2000, 1 female, leg. Brajović S.).

**Adult: Preferred environment:** deciduous forest/wetland: open areas in deciduous forest, plus unimproved grassland up to the alpine zone; males hover at 2 - 5 metres. **Flowers visited:** wide range of white Umbelliferae; Compositae; _Cirsium, Euphorbia, Filipendula, Geranium, Mentha, Prunus, Ranunculus, Rubus_. **Flight period:** May/July and August/September (with peak in July), but the second generation may be limited or missing. Larva: found feeding externally on the root-stock and underground stem-bases of _Arctium_. (Speight, 2000).

**Range:** Europe, Sibir, Far East. **Balkan Peninsula:** Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Serbia, Macedonia, Bulgaria, Greece. **Montenegro:** Durmitor (Šimić, 1987; Vujić, 1996) i Prokletije (Vujić, 1996).

4. **Cheilosia ranunculi** Doczkal, 2000  
_Cheilosia aff. albitarsis_ Vujić, 1996

**Records:** canyon of Mrtvica (Mrtvo Duboko, 1.06.2000, 1 male, leg. Brajović S.).

**Adult: Preferred environment:** open, grassy areas within forests to above 1500m within zone _Abies_ on the mountains Jura and Alpi; flies up to 1m from the ground, and settles on low growing vegetation (flowers and foliage). **Flowers visited:** _Caltha, Ranunculus_. **Flight period:** end April/beginning June. **Larva:** not described. (Speight, 2000).

**Range:** central Europe. **Balkan Peninsula:** Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Bulgaria. **Montenegro:** Cetinje (Vujić, 1996).
5. *Episyrphus balteatus* (de Geer), 1776


**Adult:** Preferred environment: highly anthropophilic and almost ubiquitous; highly migratory. **Flowers visited:** visits a wide range of white and yellow flowers, from trees to low-growing plants and including nectarless flowers. **Flight period:** February/November, with a number of overlapping generations; overwinters as an adult and may be found hibernating among ivy, or in caves etc. Larva aphidophagous on a wide range of low-growing plants including various crops (Speight, 2000).

**Areal:** Palearctic, Oriental region, Australia. **Balkan Peninsula:** Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Serbia, Bulgaria. **Montenegro:** this species is registered on all investigated localities in Montenegro. (Šimić, 1987).

6. *Eristalis arbustorum* (L.), 1758


**Adult:** Preferred environment: an anthropophilic species, ubiquitous in farmland, urban parks and gardens; also found in a wide range of wetlands and in alluvial softwood forest. **Flowers visited:** visits the flowers of a wide range of low-growing plants and shrubs. **Flight period:** April/October (plus March in southern Europe). Larva: saprophagous (aquatic/subaquatic).

**Range:** Holarctic, Oriental region. In western Europe, there has been a noticeable decrease in the abundance of this species during the 1990s, which may be due to the widespread use of Ivermectins and similar compounds as systemic helminthicides. (Speight, 2000). **Balkan Peninsula:** Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Serbia, Macedonia, Bulgaria, Greece. **Montenegro:** recorded from the Adriatic coast (Glumac, 1956) to the mountain Durmitora (Šimić, 1987).
7. *Eristalis similis* (Fallen), 1817
syn. *Eristalis pratorum* Meigen, 1822
*Eristalis pratorum* u Šimić, 1987

**Records:** canyon of Mrtvica (Mrtvo Duboko, 3.08.2001, 3 female, leg. Brajović S.).

**Adult: Preferred environment:** forest; mature/overmature deciduous (*Fagus* and *Quercus*) forest and mediterranean evergreen forest (*Quercus ilex/Q.suber*); also in conifer forests (*Pinus*). **Flowers visited:** *Angelica, Buxus, Chaerophyllum, Convolvulus, Crataegus, Euonymus, Hypericum, Mentha aquatica, Parnassia, Ranunculus, Salix, Sambucus ebulus, Sorbus aria*. **Flight period:** mid March/August and February/November in southern Europe. **Larva:** undescribed (Špeight, 2000). **Range:** west Palearctic. *E.similis* has become more frequent within the last few years, in north-west Germany. (Špeight, 2000). **Balkan Peninsula:** Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Serbia, Macedonia, Bulgaria. **Montenegro:** canyon of Morača (Manastir Morača), canyon of Tara, Durmitor (Šimić, 1987).

8. *Eristalis tenax* (L.), 1758


**Adult: Preferred environment:** anthropophilic and almost ubiquitous. **Flowers visited:** visits a wide range of flowers, including white, yellow, pink and blue blooms. **Flight period:** February to November, the extremely long flight period being due to the fact that this species hibernates as an adult. Larva: saprophagous (aquatic). **Range:** highly migratory; cosmopolitan; the most widely distributed syrphid species in the world. **Balkan Peninsula:** Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Serbia, Macedonia, Bulgaria, Greece. **Montenegro:** all investigated localities (Šimić, 1987).

9. *Eupeodes corollae* (Fabricius), 1794
*Metasyrphus corollae* u Šimić, 1987

Adult: Preferred environment: open ground; grassland, dune systems, dry river beds, garrigue, largely anthropophilic, occurring in most sorts of farmland (including arable crops), suburban gardens, orchards and parks. Flowers visited: umbellifers; Achillea millefolium, Campanula rapunculoides, Chrysanthemum, Cirsium, Eschscholzia californica, Galeopsis, Hypericum, Leontodon, Origanum vulgare, Potentilla erecta, Ranunculus, Rubus fruticosus, Salix, Senecio, Tripleurospermum inodoratum, Tussilago. Flight period: May/September. Larva: aphid feeding.


10. Eupeodes lapponicus (Zetterstedt), 1838
Scaeva lapponica u Š i m i č, 1987

Records: canyon of Mrtvice (Mrtno Duboko, 1.06.2000, 2 male, leg. Brajović S.).

Adult: Preferred environment: forest, both coniferous (Picea/Abies) and deciduous (Betula, mesophilous and humid Fagus); also in conifer (Picea/Abies) plantations; clearings, tracksides etc. Flowers visited: Caltha, Chaerophyllum, Chelidonium, Crataegus, Euphorbia, Knautia, Ligustrum, Prunus spinosa, Ranunculus, Rubus, Salix, Sorbus, Tussilago. Flight period: March/November, but most frequent in the period June/August. This is a highly migratory species. Larva: aphids feeding. (Špeight, 2000).


11. Eupeodes luniger (Meigen), 1822
Posthosyrphus luniger u Š i m i č, 1987

Records: canyon of Mrtvice (Mrtno Duboko, 1.06.2000, 2 female, leg. Brajović S.; Međurječje, 1.10.1999, 1 male 1 female, leg. Brajović S.)

Adult: Preferred environment: open ground/forest, dune grassland, grassland and woodland clearings and tracks, strongly anthropophilic, occurring also in many sorts of farmland and orchards, suburban gardens and parks. Flowers visited: white Umbelliferae; Calluna, Leontodon, Malus sylvestris, Polygonum cuspidatum, Prunus spinosa, Ranunculus, Rosa rugosa, Senecio, Taraxacum. Flight period: April/November.

12. *Eupodes nitens* (Zetterstedt), 1843

*Posthosyrphus nitens* Šimić, 1987


**Adult:** Preferred environment: mature deciduous forest (*Fagus*); also in unimproved, non-calcareous alpine grassland, from 1700m to 2000m. **Flowers visited:** yellow composites; umbellifers; *Cirsium arvense, Euphorbia, Galium, Geranium, Inula, Potentilla, Pyrus, Ranunculus, Sambucus, Taraxacum*. **Flight period:** May/beginning August. **Larva:** undescribed (Šimić, 2000)

**Range:** Europe and Siberia. **Balkan Peninsula:** Slovenia, Croatia, Montenegro, Serbia. **Montenegro:** Durmitor (Šimić, 1987).

13. *Melanostoma mellinum* (L.) 1758


**Adult:** open country, grassland and heathland, plus grassy clearings and tracksides in woodland, predominantly anthropophilic. **Flowers visited:** Graminaceae; Cyperaceae; white Umbelliferae; *Allium ursinum, Bellis perennis, Caltha, Eschscholzia californica, Euphorbia, Leontodon, Luzula, Plantago, Ranunculus, Salix repens, Stellaria holostea, Succisa, Taraxacum*. **Flight period:** April/October. **Larva:** aphid-feeding (Šimić, 2000).

**Range:** Holarctic. **Balkan Peninsula:** Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Serbia, Macedonia, Bulgaria, Greece. **Montenegro:** Ulcinj, Bar (Glumac, 1956), Kolašin (Coe, 1960), Skadar Lake and Durmitor (Šimić, 1987).


**Adult:** Preferred environment: unimproved, calcareous montane grassland and patchily-vegetated, herb-rich open areas within the *Abies* forest zone. **Flowers visited:** Umbelliferae. **Flight period:** May/July and August at higher altitudes. **Larva:** not described. (Šimić, 2000).
**Range:** Mediterranean (senso lato). **Balkan Peninsula:** Croatia, Bosnia and Herzegovina, Montenegro, Serbia, Macedonia, Bulgaria, Greece, Albania. **Montenegro:** Kotor (Gluća, 1956), Kolašin (Co e, 1960), Durmitor (Šimić, 1987).

15. **Merodon aeneus** Megerle in Meigen, 1822

**Records:** canyon of Mrtvica (Mrтов Duboko, 1.06.2000, 1 male, leg. Brajović S.).

**Adult:** Preferred environment: open ground; unimproved, dry grassland and open areas in thermophilous Quercus forest and Q. ilex forest, maquis and matorral. **Flowers visited:** umbellifers; Anthericum ramosum, Chrysanthemum leucanthemum, Mentha, Ranunculus, Solidago, Taraxacum. **Flight period:** end May/beginning October, with peaks in June and September. At higher altitudes the peak is in July/August and there is probably only one generation per annum. **Larva:** not described. (Speight, 2000).

**Range:** Mediterranean (senso lato). **Balkan Peninsula:** Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Serbia, Macedonia, Bulgaria, Greece. **Montenegro:** Kolašin (Co e, 1960), Skadar Lake, Durmitor (Šimica, 1987).


**Records:** canyon of Mrtvica (Međurečje, 17.07.1998, 1 male, leg. Brajović S.).

This species is very similar with related Merodon avidus (Rossi), 1790. Milankov and ass. (2001) presented a combination of morphological characteristics for the distinguishing these species (from each other). The most reliable condition for distinguishing is analyzing the Idh-2 locus. This is a mountain species with the largest number collected in the Sušica river. The species were found in the canyons of Tara, Komarnica, Morača and Mrtvica (on the lower altitudes) rivers too. Merodon avidus B is the Mediterranean species.

17. **Merodon constans** (Rossi), 1794

**Records:** canyon of Mrtvica (Međurečje, 3.08.2001, 1 female, leg. Brajović S.).

**Adult:** Preferred environment: forest/open ground; open grassy areas in/adjacent to alluvial hardwood forest or Quercus/Carpinus forest and grassy open areas within humid Fagus/Abies forest. **Flowers visited:** white umbellifers; Eryngium, Scabiosa. **Flight period:** July/August. **Larva:** undescribed (Speight, 2000).

**Range:** Mediterranean (senso lato). **Balkan Peninsula:** Slovenia, Croatia, Montenegro, Serbia, Bulgaria, Greece. **Montenegro:** Kotor (Gluća, 1956).
18. *Merodon equestris* (Fabricius), 1794

**Records:** canyon of Mrtvo (Mrtvo Duboko, 1.06.2000, 1 male, leg. Brajović S.).

**Adult:** deciduous forest, significantly anthropophilic, occurring also in suburban gardens and on horticultural land; in the Alps abundant in unimproved, montane and alpine pasture. **Flowers visited:** umbellifers; *Ajuga, Aster, Cirsium, Crepis, Eschscholzia californica, Hieracium, Knautia arvensis, Meconopsis cambrica, Papaver, Ranunculus, Rubus idaeus, Senecio*. **Flight period:** May/July (plus April in southern Europe and August at higher altitudes). Larva: internal feeder in tissues of bulbs of Liliaceae. Sigle, 2000).


19. *Merodon ruficornis* Meigen, 1822

**Records:** canyon of Mrtvo (Mrtvo Duboko, 1.06.2000, 1 female, leg. Brajović S.).

**Adult:** Preferred environment: forest; alluvial hardwood forest; thermophilous *Quercus* forest; small open areas with dense ground vegetation, within forest. **Flowers visited:** *Allium ursinum, Ranunculus*. **Flight period:** end April/mid June. Larva: not described. Sigle, 2000).


20. *Microdon devius* (L.), 1761

**Records:** canyon of Mrtvo (Rupe, 1.06.2000, 1 female, leg. Brajović S.).

**Adult:** Preferred environment: open ground; ancient pasture and other forms of unimproved grassland on well-insolated, freely-draining sites, including sandy river floodplains. **Flowers visited:** there are no definite sightings of this species feeding at flowers. **Flight period:** end May/beginning July. Larva: collected from nests of the ant *Lasius flavus*. Sigle, 2000).


21. *Microdon mutabilis* (Linnaeus, 1758)

**Records:** canyon of Mrtvo (Rupe, 1.06.2000, 1 female, leg. Brajović S.).

**Adult:** Preferred environment: open ground; sparsely-vegetated, dry, rocky ground with loose stones appropriate for ants nests; heathland; ancient, unimproved pasture and grassy clearings in forest, where long-established ants' nests are present; also in ancient scrub woodland (*Betula* etc.) on bogland. **Flowers visited:** there are no definite records of this
insect visiting flowers for feeding purposes (flowers of the orchid *Ophrys fuciflora* are known to be visited by this species). **Flight period:** May/July. Larva: lives as a predator of ant larvae in nests of ants of the genera *Formica, Lasius* and *Myrmica*. (Speight, 2000).

**Range:** Europe, Siberia and Far East. **Balkan Peninsula:** Croatia, Bosnia and Herzegovina, Montenegro, Serbia, Macedonia, Bulgaria. **Montenegro:** Kolašin (Čoč, 1960), canyon of Tara, Durmitor (Šimić, 1987).

### 22. *Milesia crabroniformis* (Fabricius), 1775

**Records:** canyon of Mrtvica (Mrtvo Duboko, 3.08.2001, 1 female, leg. Brajović S., 1 female, leg. Vuksanović S.).

**Adult:** **Preferred environment:** evergreen oak (*Quercus ilex/Quercus suber*) and deciduous forest (mesophilous *Fagus*, acidophilous *Quercus*, thermophilous *Quercus*) with over-mature trees. **Flowers visited:** white umbellifers; *Cirsium* spp., *Hedera*, *Lythrum salicaria*, *Mentha aquatica*, *Sambucus ebulus*, *Scabiosa*. **Flight period:** July/October, peak at end August/beginning September. Larva: collected from debris in an old *Fagus*. (Speight, 2000).

**Range:** Mediterranean (senso lato). **Balkan Peninsula:** Croatia, Bosnia and Herzegovina, Montenegro, Bulgaria, Greece. **Montenegro:** Ulcinj (Glumac, 1956).

### 23. *Myathropa florea* (L.), 1758


**Adult:** **Preferred environment:** most types of deciduous forest; also in fen carr; to some extent anthropophilic, occurring in humid pasturage and suburban gardens. **Flowers visited:** white umbellifers; *Castanea, Convolvulus, Crataegus, Chaerophyllum, Euonymus, Filipendula, Hedera, Rhododendron, Rubus, Sambucus, Solidago, Sorbus, Viburnum opulus*. **Flight period:** May/October, with peaks in June and August. Larva: saprophagous (aquatic)

**Range:** Palearctic. **Balkan Peninsula:** Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Serbia, Macedonia Bulgaria, Greece. **Montenegro:** Adria coast, region of Skadar Lake, Durmitor (Šimić, 1987).
24. Paragus bicolor (Fabricius), 1794
Paragus romanicus Stanescu, 1992 in S p e i g h t, 2000


Adult: Preferred environment: open ground; dry, unimproved, sparsely-vegetated grassland and thermophilous forest fringes. There is no information about adult habits. Flowers visited: no data. Flight period: May/June and July at higher altitudes. Larva: not described. (S p e i g h t, 2000).


25. Paragus haemorrhous Meigen, 1822


Adult: Preferred environment: forest/open ground/wetland; unimproved grassland (calcareous and non-calcareous), heathland, garrigue, dune grassland, open areas and pathsides in forest, fen meadow. Flowers visited: umbellifers; Calluna, Jasione montana, Matricaria, Origanum, Polygonum, Potentilla anserina, P. erecta, P. fruticosa, Solidago, Stellaria. Flight period: May/September, with peaks in June and August (plus March/April and October in southern Europe). Larva: aphid feeding on various herbaceous plants, including some crops (S p e i g h t, 2000).

Range: Afrotropic and Holarctic except North Africa. Balkan Peninsula: Slovenia, Croatia, Montenegro, Serbia, Macedonia, Bulgaria, Greece. Montenegro: Kotor, Ulcinj, Budva, Petrovac (G l u m a c, 1956), Sutomore, region of SkadarskoLake, canyon of Morača, canyon of Tara, Durmitor (Š i m i č, 1987).

26. Paragus pecchiolii Rondani, 1857
Paragus majoranae sensu Goeldlin de Tiefenau (1976)


Adult: Preferred environment: occurs in a wide range of biotopes; most frequently in deciduous woodland; occurs also in overgrown dune slacks, the edges of marshes and, further south, in garrigue, Quercus ilex forest and dry grassland; may also occur in vegetable gardens. Flowers visited: umbellifers; Euphorbia, Galium, Matricaria, Potentilla erecta, Stellaria, Thymus, Trientalis, Veronica. Flight period: May to September and end March/October in southern Europe. Larva: afidophagous. (S p e i g h t, 2000).

Range: west Palearctic. Balkan Peninsula: Croatia, Bosnia and Herzegovina, Montenegro, Serbia, Macedonia, Greece. Montenegro: Ulcinj (G l u m a c, 1956), region of Skadarsko Lake (Š i m i č, 1987).
27. Paragus tibialis (Fallen), 1817


Adult: Preferred environment: open ground; unimproved dry pasturage, dry heathland, garrigue, glades in dry P. sylvestris forest and dune grassland. Flowers visited: Jasione montana, Potentilla, Salix repens. Flight period: early May/August, and from April to the end of September in southern Europe. Larva: not described. (Speight, 2000).


28. Platycheirus albimanus (Fabricius), 1781


Adult: Preferred environment: deciduous forest, but this is an extremely anthropophilic species occurring in most sorts of farmland, suburban gardens and parks. Flowers visited: visits a wide range of mostly yellow or white flowers: see list in de Buck (1990). Flight period: April/October (March/November in southern Europe). Larva: afids feeding. (Speight, 2000).


29. Rhingia rostrata (L.), 1758

Rhingia campestris  Šimić, 1987


Adult: Preferred environment: forest; deciduous forest (Quercus, Fraxinus/Fagus) and scrub. with a rich, tall-herb ground flora. Flies within woodland, visiting flowers in small glades and dappled sunlight. Flowers visited: Geranium robertianum, Veronica. Flight period: beginning May/July and mid August/beginning October. Larva: saprophagous (can be reared on human dung) (Speight, 2000).


30. Scaeva pyrastrae (L.), 1758
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Adult: Preferred environment: it is not possible to define preferences for this highly mobile species, which seems to exploit concentrations of aphids wherever it finds them. It is to a significant extent anthropophilic, occurring in arable crops, hedgerows, orchards, gardens and conifer plantations. Flowers visited: Umbelliferae; Calluna, Campanula rapunculoides, Cirsium, Convolvulus, Eschscholzia californica, Euphorbia, Hamamelis, Leontodon, Ligustrum, Lycium chinense, Parnassia, Pulicaria disenterica, Rubus fruticosus, R.idaeus, Senecio, Solidago virgaurea, Tripleurospermum inodorum, Ulmus. Flight period: February/November. Larva: feeding on a wide range of aphids. (Speight, 2000).

Range: Holarctic. Balkan Peninsula: Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Serbia, Macedonia, Bulgaria. Montenegro: Ulcinj, Kotor (G l u m a c, 1956), Skadar Lake region (Š i m i č, 1987), Durmitor, (Š i m i č, 1987; Radenkić i ass., 1995).

31. Scaeva selenitica (Meigen), 1822


Adult: Preferred environment: most types of deciduous forest, including scrub woodland and orchards, plus evergreen Quercus ilex forest in southern Europe; clearings, tracksides etc. Flowers visited: white umbellifers; Buxus, Erica, Hamamelis, Leontodon, Ligustrum, Origanum, Polygonum, Ranunculus, Salix, Sarrothamnus, Taraxacum, Tussilago, Viburnum opulus. Flight period: March/September. Larva: afidophagous. (Speight, 2000).

Range: Palearctic. Balkan Peninsula: Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Serbia, Macedonia, Bulgaria. Montenegro: canyon of Tara (R a d e n k o v i ć i ass., 1995), Durmitor (Š i m i č, 1987; R a d e n k o v i ć i ass., 1995).

32. Sphaerophoria scripta (L.), 1758

Adult: Preferred environment: open ground; grassland up to and including the alpine grassland zone; grassy clearings in dry woodland; heath, garrigue and suburban gardens; salt-marsh; predominantly coastal at the northern edge of its range; further south distinctly anthropophilic. Flowers visited: white umbellifers; *Achillea, Campanula rapunculoides, Cirsium arvense, Crataegus, Erigeron, Eschscholzia californica, Euphorbia, Leontodon, Origanum vulgare, Prunus spinosa, Ranunculus, Tripleurospermum inodoratum, Tussilago*. Flight period: April to beginning November (May/September in more northerly latitudes/higher altitudes and probably all the year round in southern Europe). Larva: afids feeding (Speight, 2000).


33. *Syritta pipiens* (L.), 1758


Adult: Preferred environment: wetland; fen, edges of bogs and along the margin of almost any freshwater body, including lakes, ponds, ditches, canals, brooks and rivers; anthropophilic, occurring in most sorts of farmland, suburban gardens and urban parks. Flowers visited: white umbellifers; *Achillea, Allium, Aster, Calluna, Cardamine, Cirsium palustre, Convulvulus, Crataegus, Epilobium, Euphorbia, Galium, Jasione montana, Leontodon, Polygonum cuspidatum, Potentilla erecta, Prunus laurocerasus, Ranunculus, Rosa canina, Senecia jacobaea, Sorbus aucuparia, Tussilago*. Flight period: March/November, and in southern Europe probably all the year round. Larva: saprophagous (an inhabitant of various types of moist, decaying, vegetable matter, including cow dung and garden compost heaps). (Speight, 2000).


34. *Syrphus ribesii* (L.), 1758


Adult: Preferred environment: anthropophilic, occurring in farmland, orchards, horticultural land, suburban gardens and parks, conifer plantations; also in most types of deciduous and coniferous forest. Flowers visited: visits a wide range of yellow, white, pink and blue flowers, including composites and umbellifers and the flowers of many trees and shrubs. Flight period: April/mid November (plus March in southern Europe), with peaks in May and August. Larva: aphid feeding on various herbaceous plants (Speight, 2000).
MALIDŽAN S: The Contribution to the Knowledge of Hoverfly (Diptera, Syrphidae).

Range: Holarctic except North Africa. Balkan Peninsula: Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Serbia, Macedonia, Bulgaria. Montenegro: Kotor (G l u m a c, 1956), Kolašin (C o e, 1960), Durmitor (Š i m i č i V u j i č, 1984; Š i m i č, 1987).

35. Volucella pellucens (L.), 1758


Adult: Preferred environment: deciduous forest; mesophilous Fagus, acidophilous and thermophilous Quercus; scrub and hedgerows; clearings, tracksides etc. Flowers visited: visits the flowers of a wide range of low-growing plants, bushes and trees. De Buck (1990) provides a comprehensive list of flowers visited. Flight period: May/October. Larva: scavengers/larval predators in nests of wasps (Vespula). (S p e i g h t, 2000).

Range: Palearctic, Oriental region. Balkan Peninsula: Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Serbia, Macedonia, Bulgaria. Montenegro: Kotor (G l u m a c, 1956), Durmitor (Š i m i č, 1987).

36. Volucella zonaria (Poda), 1761


Adult: Preferred environment: forest/open ground; mesophilous Fagus and thermophilous Quercus forest, scrub, suburban gardens and parks; open areas in forest and scrub. Flowers visited: umbellifers; Buddleja, Carduus, Eryngium campestre, Eupatorium, Hedera, Knautia, Ligustrum, Ranunculus, Rubus, Sambucus, Scabiosa, Solidago, Thymus. Flight period: mid June/November. Larva: scavenger (and larval predator) in the nests of these wasps. (S p e i g h t, 2000).

Range: Mediterranean (senso lato). Balkan Peninsula: Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Serbia, Macedonia, Bulgaria. Greece. Montenegro: Budva, Bar,
THE PRESENCE OF SPECIES DEPENDING ON DIFFERENT TYPES OF LARVAL DEVELOPMENT

<table>
<thead>
<tr>
<th></th>
<th>zoophagous</th>
<th>phytophagous</th>
<th>terrestrial saprophagous</th>
<th>aquatic saprophagous</th>
<th>unprecised larval type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Montenegro</td>
<td>36,85%</td>
<td>32,86%</td>
<td>13,43%</td>
<td>10,85%</td>
<td>6%</td>
</tr>
<tr>
<td>Mrtvica canyon</td>
<td>55,55%</td>
<td>25%</td>
<td>5,55%</td>
<td>13,9%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 1. The percentage presence of species with different types of larval development in Montenegro and Mrtvica canyon

According to the type of larval development, the most numerous in the investigated areas are the zoophagous species (over 50%). This percentage is higher than the average montenegrin one. (Comparing with the data for the whole territory of Montenegro, this percentage is unexpectedly high.). The number of phytophagous species is twice smaller than zoophagous. It is probably because material was collected mainly on open, grasy ecosystems, while most phytophagous species prefer forest ecosystems. Also, the percentage of aquatic saprophagous species is higher in the investigated area than one in Montenegro, and quite higher than terrestrial saprophagous species percentage.
THE PRESENCE OF SPECIES WITH DIFFERENT RANGE TYPES

<table>
<thead>
<tr>
<th>TYPE OF RANGE</th>
<th>W</th>
<th>E</th>
<th>NE</th>
<th>CE</th>
<th>SE</th>
<th>M(s.l)</th>
<th>M(s.s)</th>
<th>D</th>
<th>NP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canyon of Mrtvica</td>
<td>69,44%</td>
<td>0%</td>
<td>0%</td>
<td>11,11%</td>
<td>2,77%</td>
<td>16,67%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 2. The percentage presence of species with different range types in Mrtvica canyon

The zoogeographical analysis of investigated species shows that (from the total number of 36 species) the most numerous are species with wider distribution than European, even 25 species. Among the ones with narrower range types, are registered: four central European species (Brachypalpus valgus, Cheilosia gagata, C. ranunculi i Rhingia rostrata), one south European (Merodon constans) and six Mediterranean (Merodon aberans, M. aeneus, M. ruficornis, Milesia crabroniformis, Paragus bicolor i Volucella zonaria). There are no registered species with northern and disjunct type of range.

CONCLUSION

In Mrtvica canyon were registered 36 hoverflies species from 19 genera, which presents the first records for this investigated area. All of these species were already registered in some of the localities of Montenegro region, except species Merodon ruficornis Meigen, which was the first record in the territory of Montenegro. It is possible that the closeness of settlements to the investigated localities reflected in structure of hoverflies fauna. The most numerous are the species with wide distribution. It was registered only 11 species with narrower range types, which the syrphids fauna of certain region makes interesting. Also, it was registered over 50% species with zoophagous larval type. This is a quite high percentage. The selection of similar types of ecosystems (open, grassy), and uneven collecting dynamic can be one of the reasons of that.

REFERENCES


MALIDŽAN S: The Contribution to the Knowledge of Hoverfly (Diptera, Syrphidae).


