

ENDANGERED SPECIES OF HOVERFLIES (DIPTERA: SYRPHIDAE) ON THE BALKAN PENINSULA

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This paper distinguishes endangered hoverflies species on the Balkan Peninsula. The list of species with the type of habitats, range and degree of threat is given. Five species are recorded on the Balkan Peninsula for the first time: *Brachyopa obscura* Thompson and Torp, 1982, *Chamaesyrrhus caledonicus* Collin, 1940; *Paragus finitimus* Goeldlin, 1971; *Sphaerophoria virgata* Goeldlin, 1974 and *Trichopsomyia lucida* (Meigen, 1822). Adriatic bay Boka Kotorska (Morinjski zaliv) and some localities on mountains in Bosnia-Herzegovina (Jahorina, Sutjeska); Montenegro (Durmitor, Prokletije and Biogradska gora); Serbia (Fruška gora, Malinik, Dubašnica, Kopaonik and Šar planina), FRY Macedonia (Dojran lake) and Greece (Pindos mountains, Olympos) are important for their conservation and are proposed for additional protection.

KEY WORDS: Syrphidae, Balkan Peninsula, conservation, threat

INTRODUCTION

Up to date, more than 450 species have been registered on the Balkan Peninsula. The hoverflies diversity of this region is one of the largest in number in Europe with many endemic and relict species. The aim of this paper is to distinguish extremely rare species on the Balkan Peninsula and to emphasize the need for conservation and protection of their habitats. Although, many of them appear at the localities that are already protected, as in National Parks, they can disappear very soon because of human activity (forestry, tourism, ski paths, hotels, roads, pasture, etc). The list of species with the type of habitats, range and degree of threat is given. The paper contains short review of localities important for their survival with proposal for additional protection.

MATERIAL AND METHODS

The analysis of hoverflies species was based on the published and unpublished collections from the Balkan Peninsula and long terms monitoring of endangered species in this area. The results include data for Slovenia, Croatia, Bosnia-Herzegovina, Montenegro, Serbia, Bulgaria, FRY Macedonia and Greece.

Type of habitats and distribution data are based on European species account (SPEIGHT, 2001) and additional publications (GLUMAC, 1956; BANKOWSKA, 1967; HURKMANS, 1993; DIRICKX, 1994; VUJIĆ, 1996). Habitats and distribution data are presented only for species not included in European species account (SPEIGHT, 2001) and species recorded on the Balkan Peninsula for the first time, deposited at the collections of Department of Biology and Ecology, Novi Sad (IBENS) and Bosnia-Herzegovina Museum, Sarajevo (BHMS).

Degree of threat follows the classification of SPEIGHT & CASTELLA (2001) which contains only three categories: threatened, decreasing and unthreatened. Apart from that, few taxa are designated as probably extinct. SPEIGHT & CASTELLA (2001) mentioned that IUCN categories has been deliberately avoided at this point of time for the heterogeneous nature of existing syrphid data, while still enabled a usable categorization of the species. Estimates of threat status are based on the best available expert judgement.

Category of threatened species includes endangered taxa with extinction in the (parts of) geographical area concerned. Decreasing category shows that although not yet recognizably threatened, it exhibits a noticeable decrease in numbers of populations and/or range within the Balkan Peninsula, during 20th century. Apparently, the species neither threatened nor decreasing in either number of populations or range within the geographical area concerned belong to unthreatened taxa.

RESULTS AND DISCUSSION

SPEIGHT & CASTELLA (2001) present range and status data for 584 European species with degree of threat in Europe generally, in Alpine, Atlantic, Continental zone and in particular countries (Atlantic, Continental and Northern parts of Europe). Balkan Peninsula is not covered in this database. Based on data presented in SPEIGHT & CASTELLA (2001) five groups of threatened species can be distinguished on the Balkans. The first two groups include taxa threatened in Europe generally (after SPEIGHT & CASTELLA, 2001): species not threatened on the Balkans and threatened species in this area, too. The third group includes threatened species not present in other parts of Europe. The fourth and the fifth group

cover species unthreatened in Europe generally, but decreasing or threatened in the Balkans: species present on few localities besides Balkan Peninsula and species with wider ranges.

Species generally endangered in Europe, not threatened on the Balkans

This group includes species which are not critically endangered on the Balkan Peninsula at this moment, but some of them can be facing a high risk of threat in the future: *Brachypalpus chrysites* Egger, 1859; *Brachypalpus valgus* (Panzer, 1798); *Cheilosia cynocephala* Loew, 1840; *Cheilosia pascuorum* Becker, 1894; *Eristalis piceus* (Fallen, 1817); *Eumerus clavatus* Becker, 1923; *Hammerschmidtia ferruginea* (Fallen, 1817); *Ferdinandea ruficornis* (Fabricius, 1775); *Mallota fuciformis* (Fabricius, 1794); *Merodon constans* (Rossi, 1794); *Merodon crymensis* Paramonov, 1925; *Myolepta obscura* Becher, 1882; *Myolepta potens* (Harris, 1780); *Pipizella bispina* Šimić, 1987; *Psarus abdominalis* (Fabricius, 1794); *Rhingia rostrata* (Linnaeus, 1758); *Spilomyia manicata* (Rondani, 1865); *Spilomyia saltuum* (Fabricius, 1794); *Spilomyia triangulata* van Steenis, 2000; *Temnostoma meridionale* Krivosheina & Mamayev, 1962.

Species threatened in Europe generally, and on the Balkans

Brachyopa maculipennis Thompson, 1980
Balkan Peninsula: VUJIĆ (1991): Serbia, Stara planina mountain.
Degree of threat: decreasing.

Ceriana vespiformis (Latreille, 1804)
Balkan Peninsula: GLUMAC (1956): Montenegro: Adriatic coast.
Degree of threat: decreasing.

Chalcosyrphus piger (Fabricius, 1794)
Balkan Peninsula: MILANKOV *et al.* (1995): FRY Macedonia, Kožuf mountain.
Degree of threat: decreasing; threatened at the European level and approaching extinction in Western Europe (SPEIGHT, 2001).

Chalcosyrphus valgus (Gmelin, 1790)
Balkan Peninsula: VUJIĆ & MILANKOV (1999): Serbia, mountain Dubašnica.
Degree of threat: threatened; now threatened with extinction at European level - there are few published 20th century European records (SPEIGHT, 2001).

Chamaesyrphus caledonicus Collin, 1940
Habitats: coastal dune systems, in the grey dunes/fixed dune grassland, where some shelter is provided by scrub or planted conifers and in humid *Pinus sylvestris* forest (SPEIGHT, 2001). Range: northern and central Norway, Britain (northern

Scotland), European Russia (St. Petersburg region), Germany (Bavaria) (SPEIGHT, 2001).

Balkan Peninsula: Greece, mountain Olympos, Prionia, 18.07.1998, 4 females, leg. Vujić A, IBENS.

Degree of threat: threatened.

Cheilosia faucis Becker, 1894

Balkan Peninsula: STROBL (1902): Bosnia-Herzegovina, Troglav; VUJIĆ (1996): Montenegro, mountain Durmitor.

Degree of threat: threatened.

Cheilosia insignis Loew, 1857

Balkan Peninsula: VUJIĆ (1996): Bosnia-Herzegovina, mountain Grmeč; Montenegro, mountain Durmitor.

Degree of threat: decreasing.

Cheilosia morio (Zetterstedt, 1838)

Balkan Peninsula: BANKOWSKA (1967): Bulgaria; VUJIĆ (1996): Slovenia, Julijske Alpe; Bosnia-Herzegovina, Jahorina mountain, Pale; Serbia, mountain Kopaonik.

Degree of threat: decreasing.

Chrysotoxum lineare (Zetterstedt, 1819)

Balkan Peninsula: DIRICKX (1994): Bulgaria; VUJIĆ *et al.* (1998): Serbia, Voivodina.

Degree of threat: threatened; in western Europe, this species exhibits a relictual distribution pattern, with very few populations, which are widely separated (SPEIGHT, 2001).

Criorhina pachymera Egger, 1858

Balkan Peninsula: VUJIĆ & MILANKOV (1990): Bosnia-Herzegovina, Tjentište; LANGHOFFER (1919): Croatia, Osijek.

DEGREE OF THREAT: THREATENED.

Heringia larusi Vujić, 1999

Habitats: forest; along streams in open, montane *Picea/Abies/Fagus* forest, up to 1800m (VUJIĆ, 1999a). Range: Italy and Serbia.

Balkan Peninsula: VUJIĆ (1999a): Serbia, Kopaonik.

Degree of threat: threatened.

Eumerus sinuatus Loew, 1855

Balkan Peninsula: VUJIĆ & GLUMAC (1994): Serbia, mountain Fruška gora; VUJIĆ & ŠIMIĆ (1994): Serbia, mountain Vršачke planine.

Degree of threat: threatened.

Melanogaster curvistylus Vujić & Stuke, 1998

Balkan Peninsula: VUJIĆ & STUKE (1998): Serbia, mountain Malinik (type-locali-

ty).

Degree of threat: probably extinct; after the first discovery of the species further investigations did not result in the confirmation of the recent presence of the species on the type-locality.

Melanogaster parumplicata (Loew, 1840)

Balkan Peninsula: VUJIĆ (1999): Bosnia-Herzegovina, mountain Konjuh, Pale; Montenegro, mountain Durmitor.

Degree of threat: threatened.

Merodon natans (Fabricius, 1794)

Balkan Peninsula: GLUMAC (1956a): Croatia, Adriatic coast, Umag.

New data: Montenegro, Boka Kotorska bay, Morinj, 7.05.1994, 1male, leg. Radišić P; 25.-27.04.1998, 1male 1female, leg. Vujić A; Kostanjica, 2.05.2000, 1male, leg. Vujić A, IBENS.

Degree of threat: decreasing.

Paragus absidatus Goeldlin, 1971

Balkan Peninsula: VUJIĆ *et al.* (1993-1994): Serbia, mountain Kopaonik.

Degree of threat: threatened.

Paragus finitimus Goeldlin, 1971

Habitats: dune grassland and dry, unimproved, permanent pasture (SPEIGHT, 2001). Range: to date recorded from southern Norway, Denmark, Netherlands, Belgium, France (Paris basin, Rhine valley), southern Germany, Switzerland and Spain (SPEIGHT, 2001).

Balkan Peninsula: Serbia, Mokra gora, 05.1921., 1male 1female, leg. Apfelbeck, BHMS; mountain Dubašnica, Dubašnica lunga, 1000m, 22.08.1997., 1male, 19.09.1997., 1male, leg. Vujić A., IBENS.

Degree of threat: decreasing; very probably endangered in western Europe (SPEIGHT, 2001).

Spilomyia diophthalma (Linneus, 1758)

Balkan Peninsula: STEENIS (2000): Bosnia-Herzegovina.

Degree of threat: threatened; the European range of this species is apparently discontinuous; it is endangered at the European level (SPEIGHT, 2001).

Trichopsomyia lucida (Meigen, 1822)

Habitats: forest; open areas with tall mature herbs, thermophilous *Quercus* forest and sandy, alluvial hardwood forest; also around patchy stands of *Arundo* (SPEIGHT, 2001). Range: Germany, Belgium, the Netherlands, France, central Spain, Switzerland and Turkey (SPEIGHT, 2001).

Balkan Peninsula: Serbia, Deliblatska peščara, 21.04.1989, 3 females, leg. Vujić A., IBENS.

Degree of threat: threatened.

Threatened species on the Balkan Peninsula, not present in other parts of Europe

Anasimyia femorata Šimić, 1987

Range: ŠIMIĆ (1987): Montenegro, Skadar lake (type-locality).

Degree of threat: threatened; known only from type-locality with recently established small population.

Cheilosia katara Claussen & Vujić, 1993

Range: VUJIĆ (1996): northern Greece (Pindos mountains, Katara pas, type-locality).

Degree of threat: threatened; relict known only from type-locality.

Merodon albonigrum Vujić, Radenković & Šimić, 1996

Range: VUJIĆ *et al.* (1996): Croatia, Krka; Macedonia, Dojran lake; Mavrovo lake; Serbia, Dubašnica mountain, gorge of the Lazareva reka (type-locality).

Degree of threat: threatened; probably extinct from the type-locality.

Merodon desuturinus Vujić, Šimić, & Radenković, 1995

Range: VUJIĆ *et al.* (1995): Serbia, mountain Kopaonik (type-locality).

Degree of threat: decreasing.

Merodon manicatus (Sack, 1938)

Range: HURKMANS (1993): FRY Macedonia, Štip (type-locality).

Degree of threat: probably extinct; the species currently known only from the types.

Merodon testaceoides Hurkmans, 1993

Range: HURKMANS (1993): FRY Macedonia, 30km ZW Gradsko (type-locality)

Degree of threat: threatened; the species known only from the type-locality.

Paragus glumaci Vujić, Šimić & Radenković, 1999

Range: VUJIĆ *et al.* (1999): Montenegro, Skadar lake; Macedonia, Dojran lake (type-locality).

Degree of threat: threatened; last record of species is from 1982 (VUJIĆ *et al.*, 1999).

Riponnensia morini Vujić, 1999

Range: VUJIĆ (1999): Montenegro, Boka Kotorska bay, Morinj (type-locality); Serbia, Nerodimlje.

Degree of threat: threatened; probably extinct from the type-locality, further investigations did not confirm the recent presence of the species.

Threatened species present on few localities beside Balkan Peninsula

Cheilosia alba Vujić & Claussen, 2000

Range: as yet uncertain, but confirmed from Germany (Baden-Württemberg), Montenegro and Serbia (SPEIGHT, 2001).

Balkan Peninsula: VUJIĆ & CLAUSSEN (2000): Montenegro, mountain Durmitor (type-locality); Serbia, Fruška gora.

Degree of threat: threatened; probably extinct from the Fruška gora mountain.

Cheilosia clama Claussen & Vujić, 1995

Range: uncertain, due to confusion with other species until recently, but confirmed from France, Germany, Switzerland, Serbia and Bosnia-Herzegovina (SPEIGHT, 2001).

Balkan Peninsula: CLAUSSEN & VUJIĆ, 1995: Bosnia-Herzegovina, Jahorina mountain; Serbia, Kopaonik (type-locality).

Degree of threat: threatened; small population recently observed on the type-locality.

Cheilosia griseifacies Vujić, 1994

Range: uncertain, but confirmed from: Germany (Bavaria), Hungary, Bosnia-Herzegovina, Serbia (SPEIGHT, 2001).

Balkan Peninsula: VUJIĆ (1994): Bosnia-Herzegovina, Javor mountain; Serbia, Fruška gora mountain (type-locality), Vršачke planine mountain, Obedska bara.

Degree of threat: threatened; the population from type-locality critically decreasing in past 5 years.

Cheilosia pini Becker, 1894

Range: Austria, Bosnia-Herzegovina, Montenegro (SPEIGHT, 2001).

Balkan Peninsula: VUJIĆ & CLAUSSEN (2000): Bosnia-Herzegovina, Sutjeska, Zelengora mountain; Montenegro, Durmitor mountain.

Degree of threat: threatened; the population from Durmitor mountain stable.

Epistrophella coronata (Rondani, 1857)

Habitats: only few specimens are known from mountain slopes covered with relict Tertiary polydominant forest communities; it can be supposed that the species is a European relict (DOCZKAL & VUJIĆ, 1998).

Range: Italy (region of Parma), Serbia (DOCZKAL & VUJIĆ, 1998)

Balkan Peninsula: DOCZKAL & VUJIĆ, 1998: Serbia, Dubašnica mountain; Delijovan mountain.

Degree of threat: threatened; not observed after 1996.

Merodon rufipes Sack, 1913

Range: Bulgaria, Ukraine (PECK, 1988)

BALKAN PENINSULA: BANKOWSKA (1967): BULGARIA, SLIVEN.

Degree of threat: threatened; only one record of the species in Europe is known.

Triglyphus escalerae Gil Collado, 1929

Range: Croatia, Montenegro and North Africa (Morocco) (VUJIĆ, 1994).

Balkan Peninsula: VUJIĆ (1994): Croatia, Adriatic coast, Slano; Montenegro, Boka Kotorska bay, Morinj.

Degree of threat: decreasing; the population from Boka Kotorska bay

(Montenegro) is stable.

Species with wider range, threatened on the Balkan Peninsula

Brachyopa obscura Thompson and Torp, 1982

Habitats: forest, mature/overmature deciduous forest (SPEIGHT, 2001). Range: Sweden, southern Norway, northern parts of European Russia (SPEIGHT, 2001).

Balkan Peninsula: Montenegro, Durmitor, Kanjon Sušice, 16-17.05.2001, 2 males leg. Vujić A, IBENS.

Remark: This species is recently discovered on Durmitor mountain (Montenegro), very far from known range in north Europe.

Degree of threat: threatened; population on Durmitor mountain (locality Kanjon Sušice) found on small restricted area.

Chalcosyrphus rufipes (Loew, 1873)

Balkan Peninsula: MILANKOV *et al.* (1995): Serbia, Fruška gora mountain, Kopaonik mountain.

Degree of threat: threatened.

Cheilosia hercyniae Loew, 1857

Balkan Peninsula: VUJIĆ (1996): Montenegro, Durmitor mountain, Prokletije mountain.

Degree of threat: threatened; population on Durmitor mountain stable.

Cheilosia laeviseta Claussen, 1987

Balkan Peninsula: VUJIĆ (1996): Montenegro, Durmitor mountain

Degree of threat: threatened; population on Durmitor mountain decreasing.

Cheilosia velutina Loew, 1840

Balkan Peninsula: VUJIĆ (1996): Bosnia-Herzegovina, Kijevo (1912).

Degree of threat: probably extinct; the only and last record of species dated from 1912.

Epistrophe leiophthalma (Schiner & Egger, 1853)

Balkan Peninsula: ŠIMIĆ (1987): Montenegro, Durmitor mountain.

Degree of threat: threatened; population on Durmitor mountain stable.

Eriozona syrphoides (Fallen, 1817)

Balkan Peninsula: DRENSKY (1934): Bulgaria, Rodopi mountains; ŠIMIĆ (1987): Montenegro, Durmitor mountain.

Degree of threat: decreasing.

Melanogaster aerosa (Loew, 1843)

Balkan Peninsula: VUJIĆ (1999): Montenegro, Durmitor mountain.

Degree of threat: threatened; population from Durmitor mountain decreasing.

Pipizella pennina (Goeldlin, 1974)

Balkan Peninsula: VUJIĆ (1997): Serbia, Kopaonik.

Degree of threat: threatened.

Portevinia maculata (Fallen, 1817)

Balkan Peninsula: VUJIĆ (1996): Montenegro: Durmitor mountain.

Degree of threat: threatened; population on Durmitor mountain stable.

Sphaerophoria virgata Goeldlin, 1974

Habitats: open ground, *Molinia*-heath and moorland, plus heathy open areas within humid forest (*Fagus/Picea* and *Pinus*) (SPEIGHT, 2001). Range: Norway south to Spain; from Britain eastwards through most of central Europe (including Germany, the Czech Republic, Slovakia, Switzerland, Liechtenstein, Austria) to Roumania (SPEIGHT, 2001).

Balkan Peninsula: Slovenia, Julian Alps, Kranjska gora, 23.05.1989. 1 male, leg. Vujić A; Serbia, Kopaonik mountain, Samokovska reka, 21.06.1991, 2 males, leg. Vujić A, IBENS.

Degree of threat: threatened.

In the group of hoverflies generally endangered in Europe (SPEIGHT & CASTELLA, 2001) 20 species are not threatened on the Balkans. These species have large populations or an important number of detected habitats on different parts of Peninsula.

Among 44 highly endangered species presented in this paper 10 belong to category of decreasing taxa, 31 are threatened and 3 species can be supposed as extinct from the geographical area concerned.

Five species are recorded for the first time on the Balkan Peninsula: *Brachyopa obscura*; *Chamaesyphus caledonicus*; *Paragus finitimus*; *Sphaerophoria virgata* and *Trichopsomyia lucida*.

Based on long-term investigations and 5 years monitoring of endemic, relicts, rare and endangered taxa on the Balkan Peninsula few localities are detected as extremely important for their conservation. Part of them is previously protected as National Parks (Bosnia-Herzegovina - Sutjeska; Montenegro - Durmitor and Biogradska gora; Serbia - Fruška gora, Kopaonik and Šar planina; Greece - Olympos). Despite this formal protection, many localities are seriously damaged because of recent human activity (forestry, tourism, ski paths, hotels, roads, pastures, etc). The rest of the hoverflies diversity hot-spots is still unprotected (Bosnia-Herzegovina - Jahorina mountain; Montenegro - Adriatic bay Boka Kotorska with locality Morinjski zaliv and mountain Prokletije; Serbia - Malinik and Dubašnica mountains; FRY Macedonia - Dojran lake; Greece - Pindos moun-

tains). For the survival of mentioned endangered species it is very important to protect these areas.

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УГРОЖЕНЕ ВРСТЕ ОСОЛИКИХ МУВА (DIPTERA: SYRPHIDAE) НА БАЛКАНСКОМ ПОЛУОСТРВУ

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И з в о д

У раду су изложени подаци о угроженим врстама осоликих мува на Балканском полуострву. Дата је листа ових врста са типовима станишта, распрострањењем и степеном угрожености. Пет врста је забележено по први пут на Балкану: *Brachyopa obscura* Thompson et Torr, 1982, *Chamaesyrrhus caledonicus* Collin, 1940; *Paragus finitimus* Goeldlin, 1971; *Sphaerophoria virgata* Goeldlin, 1974 и *Trichopsomyia lucida* (Meigen, 1822). Издвојени су Бока Которска (Морињски залив) и поједини локалитети на планинама Босне и Херцеговине (Јахорина, Сутјеска); Црне горе (Дурмитор, Проклетије и Биоградска гора); Србије (Фрушка гора, Малиник, Дубашница, Копаоник и Шар планина), Македоније (Дојранско језеро) и Грчке (Пинди, Олимп) као подручја од изузетне важности за очување и заштиту угрожених врста осоликих мува.

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