BIOLOGICA NYSSANA
10 (1) September 2019: 35-41
DOI: 10.5281/zenodo.3464002

Lacewings (Insecta: Neuropterida: Raphidioptera, Megaloptera, Neuroptera) collected in Montenegro

with checklist of species

Original Article

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Received: April 26, 2019
Revised: July 1, 2019
Accepted: August 13, 2019

Abstract:

Seventeen species of Neuropterida (Raphidioptera, Megaloptera, Neuroptera) collected in Montenegro during 2017-2018 are reported. An updated checklist of all known species from this country is presented. The list contains 75 species occurring in Montenegro. Of these, two species were reported for the first time for the country. One was a green lacewing *Chrysoperla lucasina*, which has already been expected for the area. The second species new to Montenegro, an owlfly *Libelloides longicornis*, is particularly noteworthy, because its finding in the Balkan Peninsula was unexpected.

Key words:

lacewings, Neuropterida, Neuroptera, Montenegro, owlfly, Libelloides longicornis, checklist

Apstract:

Mrežokrilci (Insecta: Neuropterida: Raphidioptera, Megaloptera, Neuroptera) sakupljeni u Crnoj Gori, sa ček-listom vrsta

Dat je prikaz sedamnaest vrsta mrežokrilaca (Raphidioptera, Megaloptera, Neuroptera) utvrđenih u Crnoj Gori tokom 2017. i 2018. godine. Priložena je i inovirana ček-lista svih do sada utvrđenih vrsta u ovoj zemlji. Tom listom potvrđeno je prisustvo 75 vrsta mrežokrilaca u Crnoj Gori. Među njima dve vrste su po prvi put prikazane za Crnu Goru. Jedna od njih je vrsta zlatooke *Chrysoperla lucasina*, koja je i očekivana za to područje. Druga nova vrsta za Crnu Goru je *Libelloides longicornis*, čiji je nalaz značajan jer je prisustvo ove vrste na Balkanskom poluostrvu neočekivano.

Ključne reči:

mrežokrilci, Neuropterida, Neuroptera, Crna gora, askalafide, Libelloides longicornis, ček-lista

Introduction

Montenegro is a mountainous Mediterranean country in the south-west part of the Balkan Peninsula, bordering the Adriatic Sea. Despite the fact that Montenegro is the second smallest country in the Balkan Peninsula, the diversity of the landscape, climate and soil created the conditions for high biodiversity.

The research has been conducted in pre-selected areas – so-called Key Biodiversity Areas (KBAs) – during the field seasons 2017 and 2018 within the frame of the IPA Project 'Establishment of Natura 2000 network, Montenegro'.

The oldest known Montenegrin record of lacewings (Neuropterida: Raphidioptera, Megaloptera, Neuroptera) dates back to 1908, when an owlfly, *Libelloides lacteus* was mentioned in the country (Van Der Weele, 1908). Up to the second half of the 20th century, lacewings in the country have been insufficiently investigated, and based mainly on sporadic records (**Appendix 1**). Before the WWII, Táborský in his studies of owlflies (Ascalaphidae) presented the distribution for two ascalaphid species in the Balkan countries, also in Montenegro (Táborský, 1936, 1939). In the sixties, a snakefly *Raphidia durmitorica* was described as a new species (Steinmann, 1964), but later this species name was recognized as a synonym of *Dichrostigma flavipes* (Aspöck & Aspöck, 1966). In the second half of the 20th century, Saure (1989) collected twelve lacewing species in Montenegro.

At the end of the 20th century, in the period from 1985 to 1988, Slovenian and Serbian entomologists collected lacewings in the Durmitor National Park, the results of their study is a faunal list that includes data for lacewings of the national park (Devetak, 1991). Later, a series of papers was published, containing very scattered information on the occurrence of these insects in the country (Devetak, 1992, 1995, 1996, 1997; Letardi and Pantaleoni, 1996; Devetak and Devetak, 2004, Popov, 2004; Sziráki, 2014; Devetak et al., 2015; Devetak et al., 2016; Devetak and Zeqiri, 2018; Appendix 1).

Until recently, 73 lacewing species were known for Montenegro. However, in the preparation for a review of the fauna in selected areas in Montenegro, efforts were made to determine whether other species of lacewings might be present in the country.

The aim of the paper is to improve the knowledge on the occurrence of lacewings in Montenegro.

Materials and methods

Lacewings were collected in selected sites during lepidopterological field work of the second author in 2017 and 2018. Insects are preserved in the first author's collection. We followed the nomenclature and taxonomy proposed by Aspöck et al. (1980, 2001) and Lacewing Digital Library (Oswald, 2017).

Results

In the period from 2017 to 2018, seventeen lacewing species were collected. Two species – green lacewing *Chrysoperla lucasina* and owlfly *Libelloides longicornis* - are new in Montenegro. Of these, the finding of the owlfly *Libelloides longicornis* is particularly noteworthy. Its finding represents the first documented record for the Balkan Peninsula. Additionally, a checklist of Neuropterida (Raphidioptera, Megaloptera, Neuroptera) in Montenegro is presented (**Appendix 1**).

List of species recorded in Montenegro

RAPHIDIOPTERA, snakeflies
RAPHIDIIDAE

Dichrostigma flavipes (Stein, 1863)
Durmitor. Sušica, Vidikovac; 13/07/2018; P. Jakšić leg.; 1 ♀.

MEGALOPTERA
SIALIDAE, alderflies

Sialis lutaria (Linnaeus, 1758)
Durmitor. Zminičko jezero, 1295 m; 43°06'02.9"N, 19°14'54.9"E; 05/06/2017; P. Jakšić leg.; 2 ♂ 5 ♀.
Durmitor. Komarnica, Nevidio; 05/08/2017; P. Jakšić leg.; 1 ♂ 1 ♀.

NEUROPTERA
OSMYLIDAE

Osmylus fulvicephalus (Scopoli, 1763)
Bijelo Polje, Bistrica, Đalovića klisura; 43°04'14.9"N, 19°54'04.6"E; 01/06/2017; P. Jakšić leg.; 1 ♂ 1 ♀.

CHRYSOPIDAE, green lacewings

Nothochrysa fulviceps (Stephens, 1836)
Durmitor Mt., Žabljak; 21/07/2017; P. Jakšić leg.; 1 ♂ 1 ♀.

Chrysopa perla (Linnaeus, 1758)
Bijelo Polje, Đalovića klisura, Manastir Sv. Nikole; 780 m; 43°04'14.1"N, 19°54'12.3"E; 20/07/2014; P. Jakšić leg.; 2 ♂.
Durmitor. Bukovica, 999 m; 06/06/2017; P. Jakšić leg.; 2 ♂.
Durmitor. Kanjon Sušice; 1180 m; 03/06/2017; P. Jakšić leg.; 2 ♂ 2 ♀.
Durmitor. Tepca; 880-920 m; 05/06/2017; P. Jakšić leg.; 1 ♂.
Durmitor. Zminičko jezero, 1322 m; 06/06/2017; P. Jakšić leg.; 1 ♂.
Ljubišnja Planina; 1068 m; 43°21'33"N, 19°06'39"E; P. Jakšić leg.; 1 ♀.

Chrysopa walkeri McLachlan, 1893
Komovi. Šljivovički vis. 23/06/2018; P. Jakšić leg.; 1 ♀.

Pseudomallada ventralis (Curtis, 1834)
Komovi. Šljivovički vis; 23/06/2018; P. Jakšić leg.; 1 ♂.

Chrysoperla cf. carnea (Stephens, 1836)
Bijelo Polje, Đalovića klisura, Manastir Sv. Nikole; 780 m; 43°04'14.1"N 19°54'12.3"E; 20/07/2014; P. Jakšić leg.; 1 ♀.
Komovi. Šljivovički vis; 23/06/2018; P. Jakšić leg.; 2 ♀.
Morača; 42°49'57"N 19°21'14"E; 507 m; 12/VI/2018; P. Jakšić leg.; 1 ♀.
Prokletije, Gusinje: Grbaja, 1143 m; 42°31'20"N, 19°47'12"E; 26/06/2018; P. Jakšić leg.; 1 ♀.

Chrysoperla lucasina (Lacroix, 1912)
Durmitor. Žabljak; 21/07/2017; P. Jakšić leg.; 3 ♀. New species for Durmitor!
Komovi. Šljivovički vis; 23/06/2018; P. Jakšić leg.; 2 ♀.
Plužine, Bioč. 43°11'02"N, 18°43'51"E; 10/07/2018; P. Jakšić leg.; 2 ♀.
Prokletije, Gusinje: Grbaja, 1143 m; 42°31'20"N 19°47'12"E; 26/06/2018; P. Jakšić leg.; 1 ♀.
In the Durmitor National Park, individuals of a *Chrysoperla carnea* (Stephens)-complex of spe-

Fig. 1. 1) Antlion *Palpares libelluloides* (Linnaeus, 1764), male, Ostrog. Forewing length 52 mm. **2)** Antlion *Myrmecaelurus trigrammus* (Pallas, 1771), male. Forewing length 35 mm. **3)** Antlion *Myrmeleon (Myrmeleon) inconspicuus* Rambur, 1842, female, Ulcinj. Forewing length 29 mm. **4)** Antlion *Creoleon plumbeus* (Olivier, 1811), female. Podgorica. Forewing length 30 mm. **5)** Owlfly *Libelloides longicornis* (Linnaeus, 1764), female. Đalovića klisura. Forewing length 22 mm. **6)** Owlfly *Libelloides macaronius* (Scopoli, 1763), female. Kom Vasojevićki, Trešnjevik. Photo: 1-5: D. Devetak; 6: P. Jakšić.

cies were found in eighties (Devetak, 1991), but at that time it was not possible to separate different species within the complex. Today, we are able to distinguish several species in Europe (Henry et al., 2013), and at least five in the Balkan Peninsula (e.g. Henry et al., 1996, 1999, 2002, 2003; Thierry and Canard, 2015; Devetak and Rausch 2016).

First record in Montenegro!

Cunctochrysa albolineata (Killington, 1935)
Durmitor. Žabljak; 21/07/2017; P. Jakšić leg.; 2 ♀.

HEMEROBIIDAE, brown lacewings
Megalomus tortricoides Rambur, 1842
Durmitor. Žabljak; 21/07/2017; P. Jakšić leg.; 1 ♂ 1 ♀.

MYRMELEONTIDAE, antlions
Palpares libelluloides (Linnaeus, 1764)
Ostrog. 10/07/2018; P. Jakšić leg.; 1 ♂ (**Fig. 1-1**).

Myrmecaelurus trigrammus (Pallas, 1771)
Podgorica, Cijevna, 38 m; 42°22'50.8"N 19°16'28.6"E; 02/06/2017; P. Jakšić leg.; 6 larvae

(L3). Adult is shown in **Fig. 1-2**.

Myrmeleon (Myrmeleon) inconspicuus Rambur, 1842
Podgorica, Cijevna, 38 m; 42°22'50.8"N 19°16'28.6"E; 02/06/2017; P. Jakšić leg.; 1 larva (L3).
An adult from Ulcinj is shown in **Fig. 1-3**.

Creoleon plumbeus (Olivier, 1811)
Podgorica, Cijevna; 21/07/2017; P. Jakšić leg.; 1 ♀ (**Fig. 1-4**).

ASCALAPHIDAE, owlflies

Libelloides longicornis (Linnaeus, 1764)
Bijelo Polje, Đalovića klisura, Manastir Sv. Nikole; 780 m; 43°04'14.1"N, 19°54'12.3"E; 20/07/2014; P. Jakšić leg.; 1 ♀. (**Fig. 1-5**).

Black spots on the wings of female are typical for *L. longicornis* (**Fig. 1-1**). It is an extremely interesting finding – the first record in the Balkan Peninsula! This species occurs in Central and Western Europe and Italy (Aspöck et al., 1980, 2001) and the finding in Montenegro enlarges the knowledge on its occurrence in Europe.

Libelloides macaronius (Scopoli, 1763)
Podgorica, Cijevna, 38 m; 42°22'50.8"N 19°16'28.6"E; 09/05/2017; P. Jakšić leg.; 1 ♀.

Observations:

Bijelo Polje, Đalovića klisura, Manastir Sv. Nikole; 780 m; 43°04'08.7"N, 19°54'09.4"E; 20/07/2017; 1 ♀ observed by P. Jakšić.

Pivska planina,43°02'23.7"N, 18°48'12.4"E; 1451 m; 12/07/2018; 1 ♂observed by P. Jakšić.

Kom Vasojevićki, Trešnjevik, 42°44'11.4"N, 19°41'04.2"E; 1303 m, 23/06/2018; 1 ♀ (**Fig. 1-6**), observed and photographed by P. Jakšić.

Discussion

The paper presents lacewings collected in selected areas in Montenegro during the years 2017 and 2018. With the new findings, the number of known Neuropterida in Montenegro has now raised to 75. The most spectacular was the finding of an owlfly, *Libelloides longicornis*, which has not yet been recorded in the Balkan Peninsula. Studies in future should confirm whether there is a stable population in Montenegro. Its known occurrence has ranged from Western Europe to Italy and Central Europe (Aspöck et al., 1980, 2001); in the light of the discovery of this species in Montenegro, therefore we can expect more findings in the Balkan Peninsula in the future.

Acknowledgements The authors are grateful for helpful suggestions made by two anonymous reviewers on an earlier version of the manuscript. They have greatly helped to improve the manuscript.

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Appendix 1.

Checklist of lacewings (Neuropterida) in Montenegro

Species / Taxon	Literature records	Comments
Order R A P H I D I O P T E R A		
Family Raphidiidae		
Raphidia (Raphidia) ophiopsis ophiopsis Linnaeus, 1758	Devetak, 1991, 1992	
Dichrostigma flavipes (Stein, 1863)	Steinmann, 1964; Devetak, 1991, 1992; Sziráki, 2014	This paper. Steinmann (1964) described this species as *Raphidia durmitorica*.
Phaeostigma (Phaeostigma) galloitalicum (H. Aspöck & U. Aspöck, 1976)	Devetak, 1991, 1992; Sziráki, 2014	

Species / Taxon	Literature records	Comment
Order M E G A L O P T E R A		
Family Sialidae		
Sialis lutaria (Linnaeus, 1758)	Devetak, 1991, 1992; Devetak et al., 2016;	This paper
Sialis fuliginosa Pictet, 1836	Devetak, 1991, 1992; Devetak et al., 2016	
Order N E U R O P T E R A		
Family Osmylidae		
Osmylus fulvicephalus (Scopoli, 1763)	Saure, 1989; Devetak, 1991;	This paper
Family Chrysopidae		
Nothochrysa fulviceps (Stephens, 1836)	Devetak, 1991, 1992	This paper
Nothochrysa capitata (Fabricius, 1793)	Devetak, 1991, 1992	
Italochrysa italica (Rossi, 1790)	Devetak, 1992	
Nineta flava (Scopoli, 1763)	Devetak, 1991, 1992	
Chrysopidia (Chrysotropia) ciliata (Wesmael, 1841)	Devetak, 1991, 1992	
Chrysopa perla (Linnaeus, 1758)	Devetak, 1991, 1992	This paper
Chrysopa walkeri McLachlan, 1893	Devetak, 1991, 1992	This paper
Chrysopa dorsalis Burmeister, 1839	Devetak, 1991, 1992	
Chrysopa formosa Brauer, 1851	Devetak, 1991, 1992	
Chrysopa viridana Schneider, 1845	Devetak, 1991, 1992	
Chrysopa pallens (Rambur, 1838)	Devetak et al., 2015	
Pseudomallada flavifrons flavifrons (Brauer, 1851)	Saure, 1989; Devetak, 1991, 1992	
Pseudomallada prasinus (Burmeister, 1839)	Saure, 1989; Devetak, 1991, 1992	
Pseudomallada ventralis (Curtis, 1834)	Devetak, 1991, 1992	This paper
Pseudomallada clathratus (Schneider, 1845)	Saure, 1989; Devetak, 1992	
Chrysoperla cf. *carnea* (Stephens, 1836)	Devetak, 1991, 1992	This paper
Chrysoperla lucasina (Lacroix, 1912)		This paper. First record in Montenegro.
Cunctochrysa albolineata (Killington, 1935)	Saure, 1989; Devetak, 1991, 1992	This paper
Peyerimhoffina gracilis (Schneider, 1851)	Devetak, 1991, 1992	
Family Hemerobiidae		
Hemerobius humulinus Linnaeus, 1758	Devetak, 1991, 1992	
Hemerobius stigma Stephens, 1836	Devetak, 1991, 1992	
Hemerobius pini Stephens, 1836	Devetak, 1991, 1992	
*Hemerobius contumax*Tjeder, 1932	Devetak, 1991, 1992	
*Hemerobius handschini*Tjeder, 1957	Devetak, 1991, 1992	
Hemerobius micans Olivier, 1793	Devetak, 1991, 1992	
Hemerobius lutescens Fabricius, 1793	Devetak, 1991, 1992	
Hemerobius gilvus Stein, 1863	Devetak, 1991, 1992	
Hemerobius marginatus Stephens, 1836	Saure, 1989; Devetak, 1991, 1992	
Wesmaelius concinnus (Stephens, 1836)	Devetak, 1991, 1992	
Wesmaelius quadrifasciatus (Reuter, 1894)	Devetak, 1991, 1992	
Wesmaelius nervosus (Fabricius, 1793)	Devetak, 1991, 1992	
Wesmaelius malladai (Navás, 1925)	Devetak, 1991, 1992	
Wesmaelius tjederi (Kimmins, 1963)	Devetak, 1991, 1992	
Wesmaelius subnebulosus (Stephens, 1836)	Devetak, 1991, 1992	
Sympherobius elegans (Stephens, 1836)	Devetak, 1991, 1992	
Sympherobius fuscescens (Wallengren, 1863)	Devetak, 1991, 1992	
Sympherobius pellucidus (Walker, 1853)	Devetak, 1991, 1992	
Megalomus tortricoides Rambur, 1842	Devetak, 1991, 1992	This paper
Drepanepteryx phalaenoides (Linnaeus, 1758)	Devetak, 1991, 1992	
Micromus variegatus (Fabricius, 1793)	Devetak, 1991, 1992	
Micromus paganus (Linnaeus, 1767)	Devetak, 1991, 1992	
Micromus lanosus (Zelený, 1962)	Saure, 1989; Devetak, 1991, 1992	
Family Sisyridae		
Sisyra nigra (Retzius, 1783)	Devetak, 1991, 1992	

Species / Taxon	Literature records	Comment
Family Coniopterygidae		
Aleuropteryx juniperi Ohm, 1968	Devetak, 1991, 1992	
Helicoconis (Ohmopteryx) pseudolutea Ohm, 1965	Devetak, 1991, 1992	
Coniopteryx (C.) borealis Tjeder, 1930	Devetak, 1991, 1992	
Coniopteryx (C.) pygmaea Enderlein, 1906	Devetak, 1991, 1992	
Coniopteryx (C.) tineiformis Curtis, 1834	Devetak, 1991, 1992	
Coniopteryx (Metaconiopteryx) esbenpeterseni Tjeder, 1930	Saure, 1989; Devetak, 1991, 1992	
Coniopteryx (Metaconiopteryx) arcuata Kis, 1965	Devetak, 1991, 1992	
Parasemidalis (Parasemidalis) fuscipennis (Reuter, 1894)	Devetak, 1991, 1992	
Semidalis aleyrodiformis (Stephens, 1836)	Saure, 1989; Devetak, 1991, 1992	
Conwentzia pineticola Enderlein, 1905	Devetak, 1991, 1992	
Family Dilaridae		
Dilar turcicus Hagen, 1858	Devetak, 1991, 1992	
Family MANTISPIDAE		
Mantispa styriaca (Poda, 1761)	Devetak, 1991, 1992	
Family Myrmeleontidae		
Palpares libelluloides (Linnaeus, 1764)	Devetak, 1992, 1996	This paper
Myrmecaelurus trigrammus (Pallas, 1771)	Devetak, 1992	This paper
Myrmeleon formicarius Linnaeus, 1767	Devetak, 1991, 1992	
Myrmeleon inconspicuus Rambur, 1842	Devetak, 1992	This paper
Euroleon nostras (Geoffroy in Fourcroy, 1785)	Devetak, 1991, 1992	
Macronemurus bilineatus Brauer, 1868	Devetak, 1992, 1997	
Neuroleon (Neuroleon) microstenus (McLachlan, 1898)	Devetak, 1992; Devetak and Devetak, 2004	
Distoleon tetragrammicus (Fabricius, 1798)	Devetak, 1991, 1992	
Creoleon plumbeus (Olivier, 1811)	Devetak, 1992	This paper
Gymnocnemia variegata (Schneider, 1845)	Letardi and Pantaleoni, 1996	
Family Ascalaphidae		
Deleproctophylla australis (Fabricius, 1787)	Devetak, 1992, 1995; Popov, 2004	
Libelloides lacteus (Brullé, 1832)	Van der Weele, 1908;Táborský, 1936; Devetak, 1992; Popov, 2004	
Libelloides longicornis (Linnaeus, 1764)		This paper. First record in Montenegro and in the Balkan Peninsula.
Libelloides macaronius (Scopoli, 1763)	Táborský,, 1939; Saure, 1989; Devetak, 1991, 1992; Popov, 2004; Devetak and Zeqiri, 2018	This paper