

PRELIMINARY RESEARCH ON THE LADYBIRDS COMMUNITY (COLEOPTERA: COCCINELLIDAE) OF THE NATIONAL PARK ĐERDAP

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Abstract

A study of coccinellid beetles (Coleoptera: Coccinellidae) was conducted at five sites, representing different ecosystems and altitudes ranging between 50 to 800 m within the National Park Đerdap territory, Serbia. During the season (from April to October 2009), a total of 17 species belonging to 12 genera, representing four tribes and three subfamilies were collected. Preliminary results show that composition of coccinellid communities in the study area varied both in absolute numbers and in relative abundance of species. Subfamily Coccinellinae is the richest and dominant subfamily, with 15 species corresponding to about 88% of registered species.

KEY WORDS: Coccinellid community, National Park Đerdap, Serbian fauna

Introduction

Coccinellids live in all terrestrial ecosystems: tundra, forest, grassland, agroecosystems as well as from plains to mountains. Species present in different geographic zones can be used as bioindicator insects due to their climatic and trophic characteristic.

The coccinellid fauna in Europe and the surrounding countries is quite sufficiently known; however, our knowledge about coccinellid fauna in Serbia is still far from complete. More generally, the status and distribution of the family Coccinellidae in Serbia is poorly understood. However, ŽIVOJINOVIĆ (1950) listed 26 coccinellid species in an initial work among the earliest research on insect fauna of the forestry domain of Majdanpek in eastern Serbia. ŠIMIĆ & PAVKOV (1988), as a result of many years' investigations, registered a

list of fifteen species of coccinellids in the natural environment and agricultural crops in Vojvodina. On the other hand, THALJI (1981, 1988, 1994, 1997, 2006) made a valuable contribution with his studies on the occurrence and composition of coccinellid species. In spite of the published data on coccinellids distribution in agricultural crops, the coverage of coccinellids in Serbia is clearly generally still too poor overall. In the last ten years, research of coccinellid communities has been expanded to cover other types of habitats such as orchards, arboreal and woody lands. In these studies, two national park areas were included: the National Park Fruška Gora and the National Park Đerdap (THALJI & STOJANOVIĆ, 2007, 2009a,b; THALJI *et al.*, 2009).

This paper continues the previous studies that dealt with coccinellid communities in agroecosystems and other habitats in Serbia. Results are likewise based on the rich material collected by the authors during long-term investigations. Finally, a great deal of work remains to be done in the faunistic study of this most important family of beneficial insects in Serbia.

Material and Methods

The National Park Đerdap in eastern Serbia stretches from the Golubac fortress to the dam near Sip at the Serbian-Romanian border. The park forms a belt, 100 kilometers in length and 2-8 kilometers in width, along the right bank of the Danube River. It spreads over 636 square kilometers. Over 64% of the hilly-mountain area (50-800 m above sea level) is covered by a vast wooded area of mixed forests that has been protected as nature reservation since 1974. The territory of the national park is filled with abundant and diversified animal and plant life. In other words, the study area is characterized by many vegetation types, among which mixed deciduous forests and shrub formations are dominant. Low vegetation and meadows form patches in many places (www.discoverserbia.org/en/east-serbia/national-park-djerdap).

Coccinellids were collected by light traps and by a modified type of Malaise trap at the following localities in the study area: Oreškovića (1), Oman (2), Kurmatara (3), Kanjon Boljetinske reke (4) and Kazan - Ploče (5) (Fig.1). Traps were located in places with sparse vegetation inside the forest. Generally, light traps (400 W mercury bulbs) were located and operated in places where the electric current was available. However, in some places traps were operated by alternating-current generator. Composition of coccinellid communities has been analyzed according to samples collected by occasional catches during the period of May - October 2009.

Insect material was collected by Dejan STOJANOVIĆ, and the specimens were mounted, labeled and deposited in his own collections.

Results and Discussion

The objective of this study is to provide better overall coverage of coccinellids and to give additional faunistic data on ladybirds of the National Park Đerdap. The present study provides both faunistic and bio-ecological data for the family Coccinellidae and estimates distribution and biodiversity of 17 species of ladybird beetles belonging to 12 genera and representing four tribes and three subfamilies.

Although coccinellid beetles are not regular nocturnal fliers, the following species were captured by light traps and registered in the study area:

Family Coccinellidae Latreille, 1807

Subfamily: Chilocorinae Mulsant, 1846

Tribe: Chilocorini Leach, 1815

Genus: *Exochomus* Redthenbacher, 1843
E. quadripustulatus (Linnaeus, 1758)

Subfamily: Coccinellinae Latreille, 1807

Tribe: Coccinellini Latreille, 1807

Genus: *Adalia* Mulsant, 1850
A. bipunctata (Linnaeus, 1758)
A. decempunctata (Linnaeus, 1758)

Genus: *Calvia* Mulsant, 1850
C. decemguttata (Linnaeus, 1758)
C. quatuordecimguttata (Linnaeus, 1758)

Genus: *Coccinella* Linnaeus, 1758
C. quinquepunctata (Linnaeus, 1758)

Genus: *Coccinula* Dobzhanski, 1925
C. quatuordecimpustulata (Weise, 1889)

Genus: *Harmonia* Mulsant, 1850
H. axyridis (Pallas, 1773)

Genus: *Oenopia* Mulsant, 1850
O. conglobata (Linnaeus, 1758)

Genus: *Hippodamia* Dejean, 1833
H. variegata (Goeze, 1777)
H. tredecimpunctata (Linnaeus, 1758)

Genus: *Halyzia* Mulsant, 1846
H. sedecimguttata (Linnaeus, 1758)

Genus: *Psyllobora* Chevrolat, 1837
P. vigintiduopunctata (Linnaeus, 1758)

Genus: *Vibidia* Mulsant, 1846
V. duadecimguttata (Poda, 1761)

Subfamily: Epilachninae Mulsant, 1846

Tribe: Epilachnini Mulsant, 1846

Genus: *Subcoccinella* Huber, 1842
S. vigintiquatuorpunctata (Linnaeus, 1758)

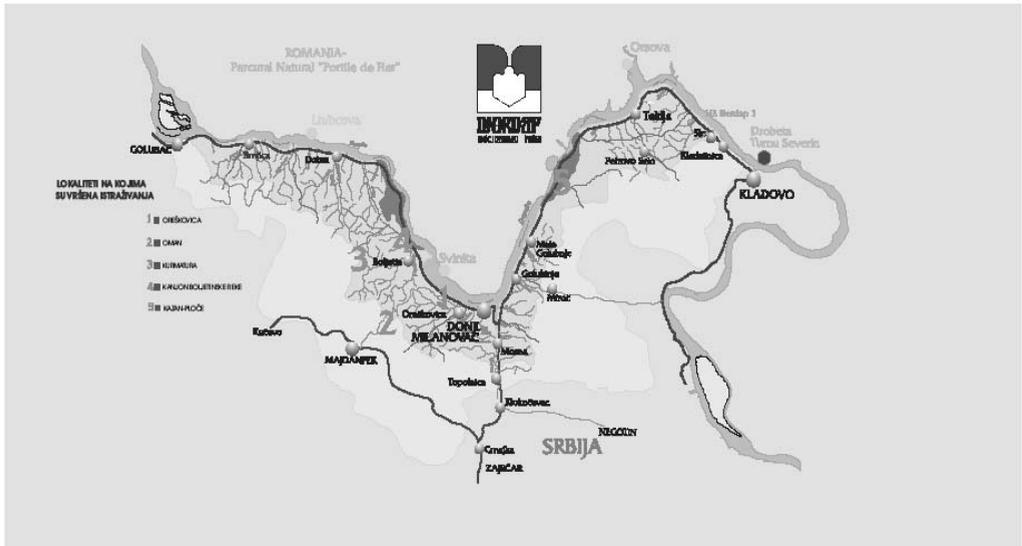


Figure 1. Map of the NP Đerdap showing its geographic position and study area.

According to the preliminary results, the composition of the coccinellid community in the study area varied both in absolute numbers and in relative abundance of species. The subfamily Coccinellinae is the richest and dominant subfamily with 15 species corresponding to about 88.2% of registered species. About 47% of the recorded species are typical inhabitants of fields and low herbaceous vegetation, while 53% are specific for tree and shrub hosts. 76.2% of all registered species are carnivorous, 17.9% are mycophagous, while 5.9% of captured specimens are phytophagous (Tab. I).

From the obtained results, it is evident that a great deal of work remains to be done in the faunistic study of this most important family of beneficial insects in Serbia.

Table I. Relative abundance and food preference of collected coccinellid species.

	Relative abundance according to								
	Food type			Habitat type		Number of species		Number of individuals	
	CAR	MYC	PHY	FCLHS	TDS	Σ	%	Σ	%
Coccinellinae	70.3	17.9	-	39.6	49.3	15	88.2	48	88.9
Chilocorinae	5.9	-	-	-	3.7	1	5.9	2	3.7
Epilachninae	-	-	5.9	7.4	-	1	5.9	4	7.4
Coccinellidae	76.2	17.9	5.9	47	53	17	100	54	100

Abbreviations: CAR – Carnivorous, MYC – Mycophagous, PHY – Phytophagous, FCLHS – Field crops and low herbaceous species, TDS – Tree dwelling species.

Conclusion

The results of this study suggest that the coccinellid community structure in different sites with different ecosystems and altitudes differs greatly. From preliminary results, no clear and firm conclusion can be drawn with respect to either altitude or ecosystem type upon coccinellid biodiversity, species distribution and abundance. Rather, these interesting trends set the field for further study. Nevertheless, this study does establish that the minimal level of biodiversity of coccinellids in the National Park Đerdap is much higher than expected. The total of 17 species caught represents approximately half the total number of Serbian coccinellid species.

Considering that the National Park Đerdap is far from industrialization, the chance of disturbances in the coccinellids community and loss of natural habitats in this area are minimal. Further surveys are clearly needed of those areas that were not covered in this study to fully evaluate the predatory coccinellid fauna in Serbia.

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ПРЕЛИМИНАРНО ПРОУЧАВАЊЕ ЗАЈЕДНИЦА БУБАМАРА (COLEOPTERA: COCCINELLIDAE) НАЦИОНАЛНОГ ПАРКА “ЂЕРДАП” (ИСТОЧНА СРБИЈА)

РАГХЕБ ТХАЉИ, ДЕЈАН СТОЈАНОВИЋ и САША НЕСТОРОВИЋ

Извод

На подручју Националног парка Ђердап доминирају термофилне травне заједнице које чине саставни део његових ливада. Захваљујући богатој флори, ова област обилује и веома богатом фауном, која нажалост још увек није довољно истражена.

Први корак у циљу упознавања фауне, односно заједнице бубамара овог богатог и разноврсног екосистема је управо учињен, током сезоне у периоду мај - октобар 2009. године. Наиме, на ловној светлосној лампи (живина, 400 W) као и на Малезовој клопки, регистровано је 17 врста бубамара. Регистровани инсекатски материјал је типичан за шумско-дрвенасти али и ливадски, односно травнати екосистем.

На основу прегледа уловљеног материјала, најдоминантније су врсте бубамара које насељавају шуме, у чијем саставу доминира листопадно дрвеће. Из ове групе, највећи број ухваћених јединки припада врсти *Calvia deccimguttata* L.. Из групе које насељавају ниске зелјасте, односно биљке које расту на влажним теренима, поред водених површина и у коритима потока, регистроване су врсте *Subcoccinella vigintiquatuor punctata* L. и *Coccinella quinquepunctata* L.

Received January 18th, 2010
Accepted May 25th, 2010