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NOTES ON SOME SUMMER BUTTERFLIES (LEPIDOPTERA: HESPERIOIDEA & PAPILIONOIDEA) OF EASTERN SERBIA

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ABSTRACT: A faunistic account of 117 recorded species of butterflies is given for the territory of Eastern Serbia during the third week of July. The distribution of recorded species is given per habitat. One species was recorded for the first time for the Serbian fauna. Numerous important records are analysed, contributing to knowledge of certain species distribution.

KEY WORDS: Butterflies, Eastern Serbia

INTRODUCTION

The publication of the Provisional Distribution Maps of the Butterflies of Yugoslavia (Jakšić, 1988) gave a basic picture of the butterfly distribution in this area on the Balkan peninsula. Faunistic research performed in the meantime (JAKŠIĆ and PEŠIĆ, 1995; JAKŠIĆ and RISTIĆ, 1999) proved the existence of six new species for the Serbian fauna: *Spialia phlomidis* (Herrich-Schaffer), *Leptidea reali* Reissinger, *Erebia alberganus* de Prunner, *E. orientalis* Elwes, *E. manto* D. und S. and *E. rhodopensis sharsta* Higgins. That brought the recorded butterfly taxa in the Serbian fauna up to 192 species. In a recently published study on taxa of the genus *Hipparchia* (WAKEHAM-DAWSON *et al*., 2004) it was proved that species *H. semele* L. is absent in central and southern part of the Balkan Peninsula, including territory of Serbia. That reduced the number of established taxa to 191 species.

The territory of Central and Eastern Serbia (from Stara planina on the east to Mt. Kopaonik on the west) is extremely interesting in biogeographic sense. It is meeting point of several tectonic units with different forming history. Karst abundance enabled formation of numerous gorges and canyons with relict and polydominant vegetation. Data on butterfly fauna for this territory are summed in the following papers: GRADOJEVIĆ (1930-31), Parker and JAKŠIĆ (1996), JAKŠIĆ (1999), ZEČEVIĆ (2002). Starting from these results, we organised field research in certain areas not exam-

ined previously. Results of that research are presented in this paper.

MATERIAL AND METHODS

The collecting of butterfly material was done by digital camera, but also in a conventional way by entomological net. Taken samples were mounted and conserved in authors' collections. The production of genitals slides was done in a standard procedure: maceration in potash, washing to remove potash, dissecting and cleaning, staining dehydrating and hardening and clearing and mounting in Canada balsam. UTM codes are given for localities where the specimens were collected. The field examination was done in the period of July 17 to July 22, 2005 at 25 collecting sites. Those 25 sites were grouped into 9 major localities, following ecological principles. Taxonomical order and nomenclature was given according to KARSHOLT and RAZOWSKY (1996).

Localities

Grza, 380-420 m, UTM: EP 46, July 17, 2005.
Relict forest Ass. *Juglando – Fagetum submontanum* (Mišić, 1966) Jov., 1969
Polydominant forest Ass. *Fago – Coryletum colurnae mixtum* Mišić, 1967
Relict polydominant forest Ass. *Fagetum submontanum mixtum* Mišić, (1963) 1972
Polydominant forest Ass. *Querco – coryletum colurnae mixtum* Mišić, 1967
Ass. *Syringo – Carpinetum orientalis* (Greb., 1950) Mišić, 1967
Polydominant forest Ass. *Carpino orientalis – Quercetum mixtum* Mišić, 1967
Ass. *Cephalario-Seseletum rigidae* Tatić et Atanack, 1973

Rtanj Mt, 400–420 m, UTM: EP 75, July 17, 2005.
Forest Ass. *Fagetum submontanum luzuletozum* Raj., 1956
Forest Ass. *Carpino orientalis – Poliquercetum* E. Vuk., 1987
Relict forest Ass. *Corylo colurnae – Fagetum* B. Jov., (1955) 1979
Ass. *Artemisio – Prunetum tenellae* B. Jov., 1954
Ass. *Stipo – Rosetum spinosissimae* B. Jov., 1955

Stara Planina Mt, 980–1600 m, UTM: FP 30 and FP 20, July 18 and 19, 2005.
Ass. *Cardamino – Rumici – Calthetum* R. Jov., 1971
Ass. *Fagetum submontanum luzuletosum* Raj., 1956
Ass. *Vaccinio – Juniperetum nanae* Mišić, 1964
Ass. *Luzulo albidae-Fagetum* (Raj., 1956) B. Jov., 1979

Knjaževac - Kalna, 320–520 m, UTM: FP 02 and FP 10, July 17 and 19, 2005.
Forest Ass. *Querco petraeae-Quercetum frainetto-cerris* B. Jov., (1953) 1988

River Toplodolska Reka, 450–460 m, UTM: FN 39, July 19, 2005.
Relict polydominant forest Ass. *Querco – Aceri intermedii – Coryletum colurnae* Mišić et Dinić, 1971
Ass. *Syringetum deli-jovanensis* Knapp, 1944

Dimitrovgrad, 500–560 m, UTM: FN 46, July 20, 2005.
Ass. *Querco-Aceri intermediae-colurnetum* Mišić et Dinić, 1972

River Jerma, 550-600 m, UTM: FN 35, July 20, 2005.
Polydominant forest Ass. *Fago – Coryletum colurnae mixtum* Mišić, 1967
Relict polydominant forest Ass. *Querco – Aceri intermedii – Coryletum colurnae* Mišić et Dinić, 1971

Polydominant forest Ass. *Fraxino – Aceri intermedii – Coryletum colurnae* Mišić et Dinić, 1972

Kopaonik Mt, 960–1770 m, UTM: DN 89 and DN 88, July 21, 2005.
Ass. Piceetum excelsae montanum Greb., 1950
Ass. *Piceetum excelsae subalpinum* Rudski, 1947
Ass. *Piceetum excelsae serbicum oxalidetosum* Miš. et Pop., (1954) 1960
Vegetation on serpentine rocky grounds on eastern parts of the Kopaonik Mt.:
Ass. Artemisio-Achnatheretum calamogrostis R. Jov., 1971
Ass. *Euphorbio glabriflorae-Pinetum nigrae* B. Jov., 1972
Ass. *Erico-Pinetum nigrae* (Z. Pavlovic) B. Jov., 1972

Resava, 260-710 m, UTM: EP 36, EP 46, EP 47 and EP 48, July 22, 2005.
Polydominant forest Ass. *Carpino orientalis – Quercetum mixtum* Mišić, 1967
Relict Ass. *Juglando-Fagetum submontanum* (Mišić, 1966) Jov., 1969
Ass. *Syringo – Prunetum mahalebi* (B. Jov., 1949) Mišić, 1978
Ass. *Abieti-Fagenion moesiacae* B. Jov., 1976.

RESULTS

Table 1. The list of recorded species at each locality.

No.	SPECIES	LOCALITY								
		Grza	Rtanj Mt.	Stara planina Mt.	Knjaževac - Kalna	R. Toplodolska R.	Dimitrovgrad	R. Jerma	Kopaonik Mt.	Resava
	LEPIDOPTERA									
	HESPERIOIDEA									
	HESPERIIDAE									
1	*Erynnis tages* (Linnaeus, 1758)				+	+	+	+		+
2	*Carcharodus alceae* (Esper, 1780)				+					+
3	*Carcharodus lavatherae* (Esper, 1783)							+		
4	*Spialia orbifer* (Hübner, 1823)						+			
5	*Pyrgus malvae* (*Linnaeus*, 1758)			+						
6	*Pyrgus alveus* (Hübner, 1803)			+					+	
7	*Heteropterus morpheus* (Pallas, 1771)									+
8	*Carterocephalus palaemon* (Pallas, 1771)			+						
9	*Thymelicus lineola* (Ochsenheimer, 1808)	+	+	+	+	+	+	+	+	+

Table 1. Continued.

No.	SPECIES	LOCALITY								
		Grza	Rtanj Mt.	Stara planina Mt.	Knjaževac - Kalna	R. Toplodolska R.	Dimitrovgrad	R. Jerma	Kopaonik Mt.	Resava
10	*Thymelicus sylvestris* (Poda, 1761)	+	+						+	+
11	*Thymelicus acteon* (Rottemburg, 1775)									+
12	*Ochlodes venata* (Bremer & Grey, 1853)	+		+	+	+	+	+	+	+
	PAPILIONOIDEA									
	PAPILIONIDAE									
13	*Iphiclides podalirius* (Linnaeus, 1758)	+			+	+	+	+		+
14	*Papilio machaon* Linnaeus, 1758								+	
	PIERIDAE									
15	*Leptidea sinapis* (Linnaeus, 1758)	+	+	+	+	+	+	+	+	+
16	*Aporia crataegi* (Linnaeus, 1758)			+				+		
17	*Pieris brassicae* (Linnaeus, 1758)						+			
18	*Pieris mannii* (Masyer, 1851)					+				
19	*Pieris rapae (*Linnaeus, 1758)	+		+	+		+	+	+	
20	*Pieris napi* (Linnaeus, 1758)	+	+	+	+	+	+	+	+	+
21	*Colias croceus* (Fourcroy, 1785)	+	+		+		+		+	
22	*Colias caucasica* Staudinger, 1871								+	
23	*Colias hyale* (Linnaeus, 1758)				+				+	+
24	*Colias alfacariensis* (Ribbe, 1905)		+		+		+	+		
25	*Gonepteryx rhamni* (Linnaeus, 1758)	+	+	+			+		+	+
	LYCAENIDAE									
26	*Hamearis lucina* (Linnaeus, 1758)		+							+
27	*Lycaena phlaeas* (Linnaeus, 1761)								+	
28	*Lycaena dispar* (Haworth, 1802)							+		
29	*Lycaena virgaureae* (Linnaeus, 1758)	+		+	+	+		+	+	+
30	*Lycaena tityrus* (Poda, 1761)		+							+
31	*Lycaena alciphron* (Rottemburg, 1775)	+		+	+	+			+	
32	*Lycaena candens* (Herrich-Schäffer, 1844)			+					+	
33	*Callophrys rubi* (Linnaeus, 1758)			+						
34	*Satyrium spini* (Denis & Schiffermüller, 1775)									+
35	*Satyrium ilicis* (Esper, 1779)						+			
36	*Satyrium acaciae* (Fabricius, 1788)			+	+	+	+	+	+	+
37	*Cupido minimus (*Fuessly, 1775)			+	+				+	

Table 1. Continued.

38	*Cupido osiris* (Meigen, 1829)		+	+		+		+	+	
39	*Cupido decolorata* (Staudinger, 1886)		+	+	+	+				
40	*Cupido alcetas* (Hoffmannsegg, 1804)							+	+	
41	*Celastrina argiolus* (Linnaeus, 1758)	+		+		+				+
42	*Pseudophilotes vicrama* (Hemming, 1929)						+	+		
43	*Scolitantides orion* (Pallas, 1771)				+			+		+
44	*Maculinea arion* (Linnaeus, 1758)					+		+	+	+
45	*Plebeius argus* (Linnaeus, 1758)			+	+		+		+	
46	*Plebeius idas* (Linnaeus, 1761)			+	+			+		+
47	*Plebeius argyrognomon* (Bergsträsser, 1779)							+		
48	*Aricia eumedon* (Esper, 1780)			+						
49	*Aricia agestis* (Denis & Schiffermüller, 1775)			+	+					
50	*Aricia artaxerxes* (Fabricius, 1793)								+	
51	*Polyommatus semiargus* (Rottemburg, 1775)			+					+	
52	*Polyommatus escheri* (Hübner, 1823)			+						
53	*Polyommatus dorylas* (Denis & Schiffermüller, 1775)								+	
54	*Polyommatus thersites* (Cantener, 1835)						+			
55	*Polyommatus icarus* (Rottemburg, 1775)		+	+	+		+		+	+
56	*Polyommatus eroides* (Frivaldszky, 1835)			+					+	
57	*Polyommatus daphnis* (Denis & Schiffermüller, 1775)				+		+	+		+
58	*Polyommatus coridon* (Poda, 1761)				+	+		+		+
59	*Polyommatus admetus* (Esper, 1783)			+	+		+			
60	*Polyommatus ripartii* (Freyer, 1830)				+					
	NYMPHALIDAE									
61	*Argynnis paphia* (Linnaeus, 1758)	+		+	+	+		+		+
62	*Argynnis pandora* (Denis & Schiffermüller, 1775)			+						
63	*Argynnis aglaja* (Linnaeus, 1758)		+	+	+				+	
64	*Argynnis adippe* (Denis & Schiffermüller, 1775)	+	+	+	+				+	+
65	*Argynnis niobe* (Linnaeus, 1758)				+					+
66	*Issoria lathonia* (Linnaeus, 1758)		+	+	+		+		+	+
67	*Brenthis daphne* (Denis & Schiffermüller, 1775)	+	+	+	+	+		+		+
68	*Brenthis hecate* (Denis & Schiffermüller, 1775)	+	+	+	+	+				+
69	*Boloria eunomia* (Esper, 1799)			+						
70	*Boloria euphrosyne* (Linnaeus, 1758)								+	
71	*Boloria titania* (Esper, 1793)								+	
72	*Boloria dia* (Linnaeus, 1767)							+		+
73	*Vanessa atalanta* (Linnaeus, 1758)	+		+	+					+
74	*Inachis io* (Linnaeus, 1758)	+		+	+	+		+	+	+
75	*Aglais urticae* (Linnaeus, 1758)	+		+	+				+	
76	*Polygonia c-album* (Linnaeus, 1758)	+		+	+	+				+
77	*Polygonia egea* (Cramer, 1775)				+					

Table 1. Continued.

No.	SPECIES	LOCALITY								
		Grza	Rtanj Mt.	Stara planina Mt.	Knjaževac - Kalna	R. Toplodolska R.	Dimitrovgrad	R. Jerma	Kopaonik Mt.	Resava
78	*Araschnia levana* (Linnaeus, 1758)	+		+	+	+		+		+
79	*Nymphalis antiopa* (Linnaeus, 1758)		+							+
80	*Euphydryas aurinia* (Rottemburg, 1775)								+	
81	*Melitaea cinxia* (Linnaeus, 1758)			+						
82	*Melitaea phoebe* (Denis & Schiffermüller, 1775)			+	+			+		
83	*Melitaea trivia* (Denis & Schiffermüller, 1775)								+	
84	*Melitaea didyma* (Esper, 1778)		+		+			+		+
85	*Melitaea diamina* (Lang, 1789)								+	
86	*Melitaea aurelia* (Nickerl, 1850)	+		+					+	
87	*Melitaea athalia* (Rottemburg, 1775)	+	+	+		+	+	+	+	+
88	*Limenitis populi* (Linnaeus, 1758)			+						
89	*Neptis sappho* (Pallas, 1771)					+				
90	*Neptis rivularis* (Scopoli, 1763)			+		+				+
91	*Apatura ilia* (Denis & Schiffermüller, 1775)	+			+	+		+		
92	*Apatura iris* (Linnaeus, 1758)			+				+		+
93	*Pararge aegeria* (Linnaeus, 1758)					+	+			
94	*Lasiommata megera* (Linnaeus, 1767)						+			
95	*Lasiommata petropolitana* (Fabricius, 1787)			+					+	
96	*Lasiommata maera* (Linnaeus, 1758)			+					+	
97	*Coenonympha rhodopensis* (Elwes, 1900)			+						
98	*Coenonympha arcania* (Linnaeus, 1761)	+	+	+	+	+	+		+	+
99	*Coenonympha glycerion* (Borkhausen, 1788)			+					+	
100	*Coenonympha gardetta* (Prunner, 1798)								+	
101	*Coenonympha pamphilus* (Linnaeus, 1758)		+	+	+	+	+	+	+	+
102	*Pyronia tithonus* (Linnaeus, 1767)									+
103	*Aphantopus hyperantus* (Linnaeus, 1758)	+			+	+		+		+
104	*Maniola jurtina* (Linnaeus, 1758)	+	+	+	+	+		+	+	+
105	*Erebia ligea* (Linnaeus, 1758)			+					+	
106	*Erebia euryale* (Esper, 1805)			+					+	
107	*Erebia orientalis* Elwes, 1909			+						
108	*Erebia aethiops* (Esper, 1777)			+						
109	*Erebia alberganus* (Prunner, 1798)			+						

Table 1. Continued.

110	*Erebia ottomana* Herrich-Schäffer, 1847								+	
111	*Melanargia galathea* (Linnaeus, 1758)	+	+	+	+	+	+	+	+	+
112	*Melanargia larissa* (Geyer, 1828)								+	
113	*Satyrus ferula* (Fabricius, 1793)						+			
114	*Minois dryas* (Scopoli, 1763)				+					+
115	*Hipparchia syriaca* (Staudinger, 1871)								+	
116	*Hipparchia delattini* Kudma, 1975					+				
117	*Brintesia circe* (Fabricius, 1775)	+	+		+	+		+		+
	TOTAL	29	25	61	48	33	28	37	52	48

Table 2. Presence of certain typical fauna elements on the high Balkan peninsula mountains. AA = Arctic Alpine, B = Boreal, EM = European Mountain, G = Glacial, I-T = Irano-Turanian, O-M = (Oro)Mediterranean, P-M = Pontic-Mediterranean, S-A =Sub-Alpin, SS = Subpontic (Sarmat), W-M = West-Mediterranean.

	CHELMOS	ŠAR-PLANINA	DURMITOR	KOPAONIK	STARA PLANINA
Erynnis marloyi	P-M				
Colias aurorina	I-T				
Colias caucasica	O-M	O-M	O-M	O-M	
Turanana panagaea	I-T				
Pseudophilotes bavius	W-M	W-M			
Vacciniina optilete		G			
Melitaea diamina				SS	
Boloria pales		S-A	S-A		
Boloria graeca		O-M	O-M		
Boloria eunomia					SS
Boloria titania		B	B	B	
Coenonympha gardetta			EM	EM	
Coenonympha rhodopensis		O-M	O-M	O-M	O-M
Erebia manto					
Erebia epiphron		S-A	S-A		
Erebia orientalis					O-M
Erebia alberganus					O-M
Erebia triaria					
Erebia rhodopensis		O-M			
Erebia cassioides		S-A	S-A		
Erebia pandrose		AA	AA		

DISCUSSION

The total of 117 species were recorded, as shown in the Table 1. Summed by families, the following numbers of species were recorded: Hesperiidae – 12 species, Papilionidae – 2 vrste, Pieridae – 11 species, Lycaenidae – 35 species i Nymphalidae – 57 species. Summed by localities, Stara

Planina Mt. (61 species) and Kopaonik Mt. (52 species) showed the highest faunistic richness, while the smallest number of species was recorded on Rtanj Mt. (25 species) and near Dimitrovgrad (28 species). Those facts are related to habitat diversity, specially the floristic richness of the studied localities, as can be seen from the descriptions of the listed plant communities.

Obtained results contributed to more complete knowledge of the distribution of certain butterfly species in Serbia. Compared to "Provisional Distribution Maps of the Butterflies of Yugoslavia" (JAKŠIĆ, 1988) more comprehensive knowledge of distribution was established for the following species:

Cupido alcetas – Jerma Canyon (Poganovo) and Kopaonik are the southernmost and the easternmost points of distribution in Serbia, respectively.

Heteropterus morpheus – Upper Resava (3 sites) are the southernmost and the easternmost findings in Serbia, respectively.

Carterocephalus palaemon – Stara Planina Mt, the easternmost finding in Serbia.

Cupido osiris – Rtanj is the northernmost point of distribution in Serbia.

Polyommatus escheri – Stara Planina Mt, Golema Reka is the northernmost and easternmost point of distribution in Serbia.

Polyommatus ripartii – Kalna is the northernmost point of distribution in Serbia.

Melanargia larissa – was so far known in the Ibar River Valley, app. 300 m a.s.l., and has been found on Kopaonik Mt, above the village of Šipačina, at app. 1000 m a.s.l.

Satyrus ferula – Dimitrovgrad is the easternmost point of distribution in Serbia.

Boloria eunomia Esper, 1799 has been recorded for the first time on Stara Planina Mt, as a new species for Serbian fauna. This is also the westernmost point of distribution of this species in the Balkan Peninsula, so far this species was known only from Bulgaria.

We can as well bring forward certain zoogeographic observations based on comparison of typical fauna elements for certain high mountains of the Balkan Peninsula. Through the analysis of distributions for 21 species chosen as typical fauna elements (Tab. 2) we can establish certain zoogeographical features. Mt. Chelmos in Greece obviously singles out by the presence of Irano-Turanian fauna elements, such as *C. aurorina* i *T. panagaea*. Of species distributed on larger mountains appear *C. caucasica* and *C. rhodopensis* as (Oro)Mediterranean fauna elements, while species *B. titania* is Boreal fauna element. Great similarity between Durmitor and Šar-planina fauna can be explained by small distance between Dinaric and Šar-Pindus system and common glacial history. Kopaonik Mt. as an intermediate mountain is closer to Šar-planina Mt. and Durmitor Mt, but glacial species are absent because of its lower height. Stara Planina Mt. has significantly different fauna in comparison with the other mountains and belongs to the group of Bulgarian mountains.

As for the aspect of butterfly protection, we can emphasise that because of their reachness and diversity of butterfly fauna both Stara Planina and Kopaonik are included in the List of Prime Butterfly Areas in Europe (VAN SWAAY and WARREN, 2003).

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БЕЛЕШКЕ О ДНЕВНИМ ЛЕПТИРИМА (LEPIDOPTERA: HESPERIOIDEA И PAPILIONOIDEA) САКУПЉЕНИМ У ЛЕТЊЕМ ПЕРИОДУ У ИСТОЧНОЈ СРБИЈИ

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И З В О Д

Током једнонедељног теренског рада на подручју Источне Србије посећено је 9 локалитета. На њима је идентификовано око 30 типова станишта са одговарајућим биљним заједницама. Укупно је сакупљено 117 врста дневних лептира (табла 1). Према локалитетима највећи број врста је утврђен на Старој планини (61 врста) а најмањи на Ртњу (25 врста).

Као нова врста за фауну дневних лептира Србије по први пут је утврђена *Proclossiana eunomia* (Esper, 1799) (fam. Nymphalidae). Поред овог значајног налаза и за читав низ врста је регистровано значајно померање граница ареала изван до сада познатих граница (Јакшић, 1988). То се односи на врсте *Everes alcetas*, *Heteropterus morpheus, Carterocephalus palaemon*, *Cupido osiris*, *Pseudophilotes bavius*, *Agrodiaetus escheri*, *A. ripartii*, *Melanargia larissa* и *Satyrus ferula*.

Разматрани су и биогеографски односи неких типичних високопланинских врста (табла 2). Показана је значајна блискост фауна ове компоненте са простора Дурмитора и Шар-планине. Копаоник се јавља као прелазно подручје које показује сличност са претходне две планине. На грчкој планини Хелмос, са друге стране, доминирају Ирано-Турански фаунистички елементи. У односу на њих Стара планина показује специфичност у присуству (Оро)Медитеранских и бореалних врста.

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