Acta entomologica serbica, 2007, 12 (2): 63-72 UDC 595.78(497.11)

CONTRIBUTION TO KNOWLEDGE OF THE BUTTERFLIES OF MT. RTANJ, SERBIA (LEPIDOPTERA: HESPERIOIDEA AND PAPILIONOIDEA)

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This paper presents a summary of all available data on the butterflies of Mt. Rtanj. The number of recorded species is 93. The paper gives the altitude distribution of butterflies, as their ranges on Mt. Rtanj, and a list of localities and established species. The rare species and species of interest from the standpoint protection (IUCN categories) are further analyzed.

Key words: butterflies, fauna, Mt. Rtanj

INTRODUCTION

In the geotectonic sense, Mt. Rtanj is situated on the Kučaj terrain in the area of the Serbian–Macedonian mass on the boundary between the Carpathian and Rhodopian systems. With respect to geomorphological (morphostructural) characteristics, Mt. Rtanj is a horst cone of the Inner Carpatho–Balkanides (ZEREMSKI, 1990). The general geomorphological map of Serbia (1: 100000) shows that the most common rocks on Mt. Rtanj are Devonian conglomerates and sandstones, Jurassic dolomites and dolomitic limestones, and various forms of Cretaceous limestones. In the foothills of Mt. Rtanj, there are some occasional

Tertiary sediments. On this kind of geological substrate, a soil seriesis developed that ranges from mountain black earths through ruddy forest earths to secondarily podzolized earths on schists and sandstones.

Due to its geographic position, Mt. Rtanj predominantly has the continental climatic features characteristic of the entire Balkan Peninsula. The Bioclimatic map of Europe (RIVAS–MARTINEZ *et al.*, 2004) shows a continental–steppe climate for this area. Precipitation ranges from 600–700 mm in the foothills of Mt. Rtanj to 1351 mm recorded at the station at an altitude of 1560 m a.s.l. (Fig. 1). The climate of Rtanj is partly transitional between steppe and Mediterranean climate, with some characteristics of Central European climate and mountain climate in the highest parts. Due to the relatively mild winters, thermophilous Mediterranean and sub Mediterranean elements have managed to survive on Mt. Rtanj.

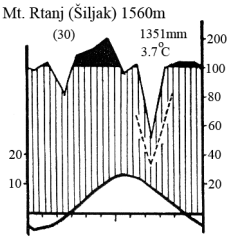

Figure 1. Climatic diagram of Mt. Rtanj (1560 m) according to Walter.

The flora and vegetation of Mt. Rtanj have been described in great detail (DIKLIĆ & MILOJEVIĆ, 1976; JOVANOVIĆ, 1954; JOVANOVIĆ, 1955; JOVANOVIĆ–DUNJIĆ, 1956). According to the data of ZLATKOVIĆ (2007), 599 plant taxa on the species lavel and 45 taxa on the subspecies level have been recorded on Mt. Rtanj, and they belong to 72 families of vascular plants. In the syntaxonomic sense, the flora of Mt. Rtanj is divided into seven classes, 10 orders, 19 alliances, and 26 associations. The most important habitats for the butterfly fauna are those with forest vegetation, vegetation on rocks and screes, and vegetation of pastures and meadows.

As Mt. Rtanj is surrounded by the Suva Planina Mountains, the Stara Planina Mountains and Mt. Kopaonik, it has remained on the sidelines of entomological studies. Data on the butterfly fauna are scarce, as only partial and improptu field studies have been performed. We therefore decided to devote more attention to this mountain in order to form as complex a picture of its faunistic richness as possible.

MATERIAL AND METHODS

Field studies were performed in 2005, 2006, and 2007. JAKŠIĆ (2005) covered the area from the village of Ilino to Sokobanja. GROZDANOVIĆ (2005) collected material in the foothills of Mt. Rtanj. Tab. I lists the studied localities.

Table I

List of studied localities on Mt. Rtanj, with altitudes and UTM codes.

Locality	Altitude (a.s.l.)	UTM square
Ilino	350 m	EP 74
Kostadinovica	800 m	EP 74
Kusi Skok	1000 m	EP 74
Ledenička Strana	1300 m	EP 74
Mirovske Kolibe	400 m	EP 74
Rtanj (village)	650 m	EP 74
Rujinski Kamen	904 m	EP 74

Species were identified and recorded in the field without collecting. Dubious taxa were caught in the net, determined according to wing characteristics, and then released back into nature. The taxonomic order and nomenclature were according to KARSHOLT & RAZOWSKI (1996).

This article was financially supported by Butterfly Conservation Europe under the project "Prime Butterfly Areas in Serbia".

RESULTS AND DISCUSSION

Combined list of butterfly species recorded at Mt. Rtanj (A – JAKŠIĆ, 2005; B – GROZDANOVIĆ, 2005; C – JAKŠIĆ & GROZDANOVIĆ, 2007; D – VAN SWAAY *et al.* 2007; E – ZEČEVIĆ, 2002).

Superfamily HESPERIOIDEA

Family Hesperiidae
Spialia orbifer (Hübner, 1823) A, C
Pyrgus carthami (Hübner, 1813) C
P. malvae (Linnaeus, 1758) C
Thymelicus lineola (Ochsenheimer, 1808) C, D

T. sylvestris (Poda, 1761)	C, D
T.s. acteon (Rottemburg, 1775)	C
Hesperia comma (Linnaeus, 1758)	B
Ochlodes venata (Bremer & Grey, 1853)	C

Superfamily PAPILIONOIDEA

Family Papilionidae

Zerynthia (*Allancastria*) *cerisy* (Godart, 1824)	A
Parnassius mnemosyne (Linnaeus, 1758)	E
P. apollo (Linnaeus, 1758)	E
Iphiclides podalirius (Linnaeus, 1758)	A, B, C
Papilio machaon Linnaeus, 1758	C

Family Pieridae

Leptidea sinapis (Linnaeus, 1758)	B, C, D
Anthocharis cardamines (Linnaeus, 1758)	E
Aporia crataegi (Linnaeus, 1758)	A, C
Pieris rapae (Linnaeus, 1758)	C
P. napi (Linnaeus, 1758)	C, D
Colias croceus (Fourcroy, 1785)	B, C, D
C. alfacariensis Ribbe, 1905	C, D
Gonepteryx rhamni (Linnaeus, 1758)	C, D

Family Lycaenidae

Hamearis lucina (Linnaeus, 1758)	B
Lycaena virgaureae (Linnaeus, 1758)	C
Lycaena tityrus (Poda, 1761)	C, D
L. alciphron (Rottemburg, 1775)	C
Callophrys rubi (Linnaeus, 1758)	A, C
Satyrium spini (Denis & Schiffermüller, 1775)	C
S. ilicis (Esper, 1779)	C
Cupido minimus (Fuessly, 1775)	C
C. osiris (Meigen, 1829)	D
C. argiades (Pallas, 1771)	B, C
C. decolorata (Staudinger, 1886)	D
Celastrina argiolus (Linnaeus, 1758)	C
Maculinea arion (Linnaeus, 1758)	C
M. alcon Denis & Schiffermüller, 1775	C
Plebeius argus (Linnaeus, 1758)	A, C
P. idas (Linnaeus, 1761)	B, C
P. argyrognomon (Bergsträsser, 1779)	C
Aricia artaxerxes (Fabricius, 1793)	C
Polyommatus (*Cyaniris*) *semiargus* (Rottemburg, 1775)	C
Polyommatus dorylas (Denis & Schiffermüller, 1775)	B, C
P. amandus (Schneider, 1792)	B, C

P. thersites (Cantener, 1835)	C
P. icarus (Rottemburg, 1775)	B, C, D
P. eroides (Frivaldszky, 1835)	C, E
Polyommatus (*Meleageria*) *daphnis* (Denis & Schiffermüller, 1775)	C
Family Nymphalidae	
Argynnis paphia (Linnaeus, 1758)	B, C
A. pandora (Denis & Schiffermüller, 1775)	B
A. aglaja (Linnaeus, 1758)	B, C, D
A. adippe (Denis & Schiffermüller, 1775)	C, D
A. niobe (Linnaeus, 1758)	B, C
Issoria lathonia (Linnaeus, 1758)	B, C, D
Brenthis ino (Rottemburg, 1775)	C
B. daphne (Denis & Schiffermüller, 1775)	C, D
B. hecate (Denis & Schiffermüller, 1775)	C, D
Vanessa atalanta (Linnaeus, 1758)	A
Inachis io (Linnaeus, 1758)	C
Aglais urticae (Linnaeus, 1758)	B, C
Polygonia c–album (Linnaeus, 1758)	C
Araschnia levana (Linnaeus, 1758)	B, C
Nymphalis antiopa (Linnaeus, 1758)	C, D
Melitaea cinxia (Linnaeus, 1758)	A, C
M. arduinna (Esper, 1784)	C
M. phoebe (Denis & Schiffermüller, 1775)	C
M. didyma (Esper, 1778)	B,C, D
M. aurelia (Nickerl, 1850)	C
M. athalia (Rottemburg, 1775)	B, C, D
Limenitis populi (Linnaeus, 1758)	C
L. camilla (Linnaeus, 1764)	C
Neptis sappho (Pallas, 1771)	B, C
N. rivularis (Scopoli, 1763)	C
Apatura ilia (Denis & Schiffermüller, 1775)	C
A. iris (Linnaeus, 1758)	E
Kirinia roxelana (Cramer, 1777)	B
Esperarge climene (Esper, 1783)	C
Pararge aegeria (Linnaeus, 1758)	C
Lasiommata maera (Linnaeus, 1758)	C
Coenonympha arcania (Linnaeus, 1761)	A, C, D
C. glycerion (Borkhausen, 1788)	C
C. leander (Esper, 1784)	A, C
C. pamphilus (Linnaeus, 1758)	A, B, C, D
Aphantopus hyperantus (Linnaeus, 1758)	C
Maniola jurtina (Linnaeus, 1758)	B, C, D
Erebia ligea (Linnaeus, 1758)	C, E
E. aethiops (Esper, 1777)	C
E. medusa (Denis & Schiffermüller, 1775)	C

E. melas (Herbst, 1796)	E
Melanargia galathea (Linnaeus, 1758)	C, D, E
Satyrus ferula (Fabricius, 1793)	C, E
Hipparchia delattini Kudrna, 1975	E
Arethusana arethusa (Denis & Schiffermüller, 1775)	B, E
Brintesia circe (Fabricius, 1775)	B, C, D, E
Chazara briseis (Linnaeus, 1764)	E

As the main quantitative indicator, the number of recorded species shows that the level of faunistic study is still not appropriate if we consider the potential of this area as suggested by the number of plant associations, number of habitats, and preservation of the area. Such study is in the initial phase, as in the case of two ecologically similar neighboring mountains – Mt. Stol to the north and the Suva Planina Mountains to the south. Tab. II shows similarities in the butterfly faunas of these areas and the relatively identical levels of present knowledge about them.

Table II

Comparative list of present knowledge of butterfly fauna of Mt. Stol, Mt. Rtanj and the Suva Planina Mountains.

	Mt. Stol	Mt. Rtanj	Suva Planina Mts.
Hesperiidae	10	8	6
Papilionidae	4	5	4
Pieridae	8	8	10
Lycaenidae	26	25	15
Nymphalidae	50	47	31
Species Nos.	98	93	66

The fact that the Suva Planina Mountains have one third fewer species is primarily a consequence of habitat degradation. As these mountains were an important livestock raising area for a long time, this contributed to devastation of the primarily meadow associations which are the most important butterfly habitats.

During our studies, we recorded 36 species new for Rtanj: *P. carthami*, *P. malvae*, *T. acteon*, *O. venata* (Hesperiidae); *P. machaon* (Papilionidae); *L. virgaureae*, *L. alciphron*, *S. spini*, *S. ilicis*, *C. minimus*, *C. argiolus*, *M. arion*, *M. alcon*, *P. argyrognomon*, *A. artaxerxes*, *C. semiargus*, *P. thersites*, *P. daphnis* (Lycaenidae); *B. ino*, *I. io*, *P. c–album*, *M. arduina*, *M. phoebe*, *M. aurelia*, *L. populi*, *L. camilla*, *N. rivularis*, *A. ilia*, *E. climene*, *P. aegeria*, *L. maera*, *C. glycerion*, *A. hyperantus*, *E. aethiops* and *E. medusa* (Nymphalidae). The species *Melitaea arduinna* (Esper, 1784) or Freyer's fritillary is a species new for the butterfly fauna of Serbia, although it was previously recorded in Bulgaria and Macedonia. It was recorded

in mesophilous meadows of the beech belt in the association *Fagetum montanum serbicum* Rudski 1949 Jovanović 1967, as well as in mesophilous meadows of the oak belt in the association *Quercetum frainetto–cerris* Rudski (1940) 1949. In later studies, it was also recorded in similar habitats of the Zlotska Gorge (I. Dodok leg.), Mt. Stol (P. Jakšić leg., I. Dodok leg.) and Mt. Deli Jovan (?. Đurić, leg.). There are two other exceptionally important recorded species: *Brenthis ino* (Rottemburg, 1775) (lesser marbled fritillary) and *Esperarge climene* (Esper, 1783) (lesser lattice brown). Both species are extremely rare; for example, the species *E. climene* was previously known only from one locality on Mt. Stol. We recorded it in the upper forest belt in the association *Fagetum montanum serbicum* Rudski 1949 Jovanović 1967, subassociation *colurnetosum* Jovanović 1955. Individuals of this species fly actively in the canopy of beech and whitebeam [*Sorbus aria* (L.) Cr.]

In spite of the wealth of collected data, these studies can only be considered preliminary. They indicate the important biodiversity potential of the area. The complex formed by the mountains Stol, Veliki and Mali Krš, Rtanj, and Suva Planina, along with some smaller units, definitively forms a distinct biogeographical unit of limestone massifs, with flora and vegetation of relict and polydominant character. As a bridge between the Carpathians and the Balkanides, the geographic position of this unit accounts for similarities of their biodiversity.

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ПРИЛОГ ПОЗНАВАЊУ ДНЕВНИХ ЛЕПТИРА ПЛАНИНЕ РТАЊ, СРБИЈА (LEPIDOPTERA: HESPERIOIDEA И PAPILIONOIDEA)

ПРЕДРАГ ЈАКШИЋ И АЛЕКСАНДРА ГРОЗДАНОВИЋ

ИЗВОД

Током наших истраживања по први пут смо на Ртњу утврдили чак 36 врста: *P. carthami*, *P. malvae*, *T. acteon*, *O. venata* (Hesperiidae); *P. machaon* (Papilionidae); *L. virgaureae*, *L. alciphron*, *S. spini*, *S. ilicis*, *C. minimus*, *C. argiolus*, *M. arion*, *M. alcon*, *P. argyrognomon*, *A. artaxerxes*, *C. semiargus*, *P. thersites*, *P. daphnis* (Lycaenidae); *B. ino*, *I. io*, *P. c-album*, *M. arduina*, *M. phoebe*, *M. aurelia*, *L. populi*, *L. camilla*, *N. rivularis*, *A. ilia*, *E. climene*, *P. aegeria*, *L. maera*, *C. glycerion*, *A. hyperantus*, *E. aethiops* и *E. medusa* (Nymphalidae). Врста *Melitaea arduinna* (Esper, 1784) - Фрејеров шаренац је нова за фауну дневних лептира Србије. До сада је била позната са неколико локалитета из Бугарске и Македоније. Утврдили смо је на мезофилним ливадама буковог појаса, у заједници *Fagetum montanum serbicum* Rudski 1949 Jovanović 1967, и мезофилним ливадама храстовог појаса у заједници *Quercetum frainetto-cerris* Rudski (1940) 1949. Каснијим истраживањима је утврђена на сличним стаништима Злотске клисуре (Додок И. лег.), Стола (Јакшић П. лег., Додок И. лег.) и Дели Јована (Ђурић, М. лег.). Поред налаза ове врсте изузетно су значајни и налази још две врсте: *Brenthis ino* (Rottemburg, 1775) - Инова седефица, и *Esperarge climene* (Esper, 1783) – Тимочки решеткар. Обе врсте су изузетно ретке, врста *E. climene* је била позната само са једног локалитета на Столу. Ми смо је утврдили у горњем шумском појасу заједнице *Fagetum montanum serbicum* Rudski 1949 Jovanović 1967, у субасоцијацији *colurnetosum* Jovanović 1955. Примерци активно лете у крошњама букве и обичне мукиње - *Sorbus aria* (L.) Cr.

Број утврђених врста као основни квантитативни показатељ, указује да ниво фаунистичких истраживања још увек није задовољавајући с обзиром на потенцијале простора исказан бројем биљних заједница, бројем станишта и очуваношћу простора. Истраживања су практично у иницијалној фази, као и на две суседне еколошки блиске планине - на Столу који је северније од Ртња и на Сувој планини која је јужније од Ртња. На Сувој планини имамо за трећину мање врста, што је узроковано првенствено деградацијом простора услед прекомерне испаше.

Комплекс Стола, Великог и Малог крша, Ртња и Суве планине, са још неким мањим јединицама, географски позициониран попут моста на трансферзали Карпато-Балканида, свакако чини једну биогеографску целину кречњачких масива са флором и вегетацијом реликтног и полидоминантног карактера. Зато је извесно да ће даља фаунистичка истраживања допринети у знатној мери и бољем биогеографском рашчлањењу источне Србије.

Received September 29th, 2007
Accepted December 5th, 2007