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CONTRIBUTION TO THE BUTTERFLY FAUNA (HESPERIOIDEA & PAPILIONOIDEA) OF THE VELEBIT MOUNTAIN, CROATIA

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During the years 2005 and 2006, 106 butterfly species were identified on Mt. Velebit. The estimated distribution, diversity and biogeographical characteristics of each species are presented in this paper as well as a comparison between recently estimated butterfly fauna and that identified in the past century. Current check-list of 137 butterflies from Mt. Velebit is contained in the Appendix.

Key words: butterflies, fauna, distribution, diversity, protection, Mt. Velebit

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U dvogodišnjem razdoblju (2005. i 2006.) na prostoru Velebita zabilježeno je 106 vrsta danjih leptira. U radu se navodi njihovo rasprostranjenje, raznolikost kao i biogeografska karakteristika za svaku utvrđenu vrstu. Isto tako uspoređuje se fauna danjih leptira toga prostora utvrđena u prošlom stoljeću s recentnim podacima, te se na temelju toga daje popis 137 vrsta danjih leptira Velebita.

Ključne riječi: leptiri, fauna, rasprostranjenost, raznolikost, zaštita, Velebit

INTRODUCTION

With a length of 145 km, Mt. Velebit is the longest mountain of the Dinaric Alps. It spreads from the Vratnik pass above Senj in the north-west to the Zrmanja River in the south-east. Average distance from the coastal area to the Lika continental bed is 14 kilometres. The coastal slope of the mountain is much steeper, distinctly craggy and bare with two distinct longitudinal terraces. The continental slope is much gentler but can be abrupt, mostly forested and overgrown in vegetation, mostly without terraces, but with deeply truncated valleys (FORENBACHER, 2001). Of an area of 2274 km^2 only 41 km^2 refers to the vertical zone above 1600 m a.s.l. (POLJAK, 1974).

In all, the important characteristics of Mt. Velebit are its low indentedness, abrupt slopes, significant daily temperature variations, and mixed continental, Mediter-

ranean and mountainous climate regimes and a combination of central European and Mediterranean vegetation. On Mt. Velebit different ecological and climatic characteristics have conditioned high biotope diversity which has, respectively, ensured high faunistic, and hence butterfly diversity.

According to KUČINIĆ *et al.* (1995) the butterfly fauna of the Mt. Velebit comprises 115 species. This number is based on the analysis of entomological collections from the Croatian National History Museum (CNHM) in Zagreb and all the existing literature referring to the butterfly fauna of Mt. Velebit.

The goal of this paper is to contribute to the knowledge about the butterfly diversity of Mt. Velebit and to supply a new butterfly check-list for Mt. Velebit.

MATERIAL AND METHODS

Butterflies were collected with an entomological net, observed and photographed in the years 2005 and 2006 at 70 localities on Mt. Velebit (Fig. 1). All collected

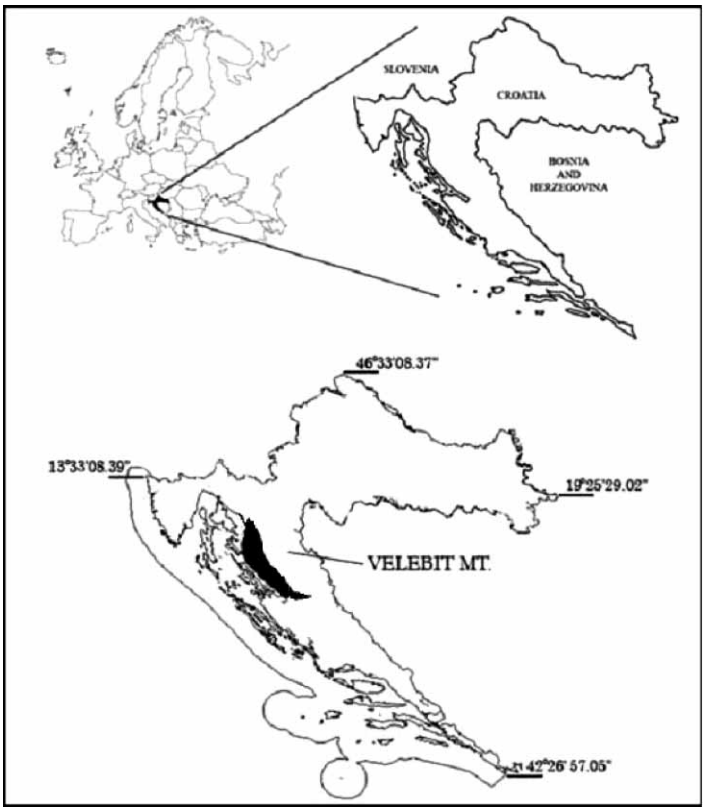

Fig. 1. Researched area – Mt Velebit, Croatia

Tab. 1. Alphabetical list of researched locations, belonging to the Sjeverni Velebit National Park (*), the Velebit Nature Park (**) and the Paklenica National Park (***), altitude of each locality and number of found species on each locality (coordinates are given for unprecisely defined localities).

Ordinal number	Location	Number of found species	Altitude (m a.s.l.)
1.	above Borisov dom mt. hut ***	**7**	513
2.	above Dundović Padež* (5504095/4953163)	**14**	1328
3.	after Brušane (direction B. Oštarije)**	**1**	718
4.	Anića Luka***	**13**	50
5.	Apatišan**	**23**	1273
6.	Babić Siča*	**31**	1264
7.	Babino jezero***	**1**	1680
8.	Babrovača*	**12**	918
9.	Bačić Duliba**	**24**	856
10.	Bakovac**	**20**	927
11.	Baške Oštarije**	**9**	935
12.	Borisov dom mt. hut***	**8**	480
13.	Brušane**	**6**	589
14.	Borovački Padež**	**12**	1059
15.	Buljma (pass)***	**1**	1394
16.	Bunovac***	**17**	1169
17.	Bužim**	**19**	589
18.	Čačić Draga**	**3**	600
19.	Ciganište*	**16**	1211
20.	Dabarska kosa**	**46**	907
21.	Duplje*	**13**	1080
22.	forest hut Paklenica NP***	**5**	400
23.	from Begovača to Krasno**	**6**	1098
24.	Glamočeva Duliba*	**26**	1300
25.	Gornja Klada**	**4**	505
26.	Jadovno**	**45**	834
27.	Jazmakuša**	**1**	1158
28.	Jezera**	**13**	1411
29.	Konjsko**	**6**	602
30.	Kosinjski Bakovac**	**24**	623
31.	Krasno**	**1**	807
32.	Krivača*	**13**	1310
33.	Križići*	**14**	1438

Ordinal number	Location	Number of found species	Altitude (m a.s.l.)
34.	Kubus**	**5**	942
35.	Ljubica creek (near Baške Oštarije)**	**43**	938
36.	Mala Močila***	**20**	745
37.	Malovan (M. stanovi)***	**20**	1491
38.	Malovansko jezero***	**5**	1617
39.	Modrić dolac*	**4**	1480
40.	Oltari**	**13**	949
41.	Parići***	**22**	525
42.	Petrašica**	**15**	1083
43.	Položine**	**7**	1081
44.	Raduč**	**6**	601
45.	Ramići***	**11**	564
46.	Struge***	**6**	1400
47.	Šarinac*	**15**	1136
48.	Šprenga**	**10**	946
49.	Štirovača*	**21**	1103
50.	Sunđerac**	**23**	1146
51.	Švica	**22**	438
52.	Težakovačko vrelo**	**19**	1161
53.	to Bakovac** (5512086 / 4947771)	**19**	732
54.	to Bužim** (5523605 / 4934126)	**8**	573
55.	to Dabarska kosa** (5510043 / 4934381)	**17**	895
56.	to Klementa** (5508949 / 4946193)	**3**	1164
57.	to Kugina kuća mt. hut* (5507427 / 4939824)	**15**	1144
58.	to Mala Močila*** (5539584 / 4910035)	**2**	700
59.	to Malovan (M. stanovi) *** (5542584 / 4913056)	**4**	1311
60.	to Oltari** (5500070 / 4966717)	**13**	933
61.	to Sijasetska draga **	**7**	400
62.	Trnovac**	**18**	617
63.	Tudorevo*	**19**	1355
64.	turn to Pandore** (5498757 / 4970426)	**18**	849
65.	turn to Zavižan mt. hut* (5500070 / 4966717)	**17**	999
66.	Velika Močila***	**14**	826
67.	Veliki Javornik***	**3**	1350
68.	Veliki Lubenovac*	**12**	1302
69.	Vučjak*	**7**	1594
70.	Žive Vodice*	**41**	1254

specimens are deposited in the butterfly collection of the Department of Zoology, CNHM, in Zagreb. Systematics follows KARSHOLT & RAZOWSKI (1996) and taxonomic determination regarding wing morphology was done according to TOLMAN & LEWINGTON (1997). Biogeographical analysis follows HRUBY (1964) and for species that were not listed there, it follows SIJARIĆ *et al.* (1984) and HIGGINS & RILEY (1993). The analysis of the morphological characteristics of the genitals of specimens from the *Leptidea* genus was done according to LORKOVIĆ (1993), JAKŠIĆ (1998), LELO (2002) and LELO (2003).

Altitudes were approximately determined using the GPS device Garmin eTrex Summit and geographical sheet maps of Mt. Velebit (1:25000).

RESULTS

In the two year period we counted 106 species belonging to five butterfly families at 70 localities (Tab. 1). Species are listed according to the systematics by KARSHOLT & RAZOWSKI (1996) and the list of localities for each species is given in chronological order of the finding species at a particular finding site.

In parentheses beside the species name, the number of stars indicates the presence of the species in the: * – Northern Velebit National Park, ** – Velebit Nature Park and *** – Paklenica National Park. We have recorded 69 species for the Northern Velebit National Park, 96 species for the Velebit Nature Park and 55 species for the Paklenica National Park.

Hesperioidea
Hesperiidae (6 species)
Pyrginae
Erynnis tages (Linnaeus, 1758) (**):
to Oltari, June 17th, 2005.

Carcharodus floccifera (Zeller, 1847) (*):
Tudorevo, July 19th, 2006.

Hesperiinae
Thymelicus lineola (Ochsenheimer, 1808) (* / **):
Bužim, July 7th, 2006; Kosinjski Bakovac, July 19th, 2006; Žive Vodice, July 20th, 2006; Jadovno, July 21st, 2006.

Thymelicus sylvestris (Poda, 1761) (* / ** / ***):
Babić Siča, July 25th, 2005; Dabarska kosa, July 25th, 2005; turn to Zavižan mt. hut, July 26th, 2005; Jadovno, July 6th, 2006; Bužim, July 6th, 2006; Ljubica, July 6th, 2006; Bakovac, July 7th, 2006; Žive Vodice, July 20th, 2006; Šarinac, July 20th, 2006; Dabarska kosa, July 21st, 2006; Bunovac, July 26th, 2006.

Hesperia comma (Linnaeus, 1758) (* / **):
Žive Vodice, July 20th, 2006; Dabarska kosa July, 21st, 2006; Bačić Duliba, July 21st, 2006; Težakovačko vrelo, July 21st, 2006.

Ochlodes venata (Bremer & Grey, 1853) (* / ** / ***):
Dabarska kosa, June 18th, 2005; Babić Siča, July 25th, 2005; turn to Zavižan mt. hut, July 26th, 2005; Oltari, July 26th, 2005; turn to Pandore, July 26th, 2005; Apatišan, July 26th, 2005; Štirovača, July 27th, 2005; Šprenga, July 27th, 2005; Ljubica, July 27th, 2005; Sunđerac, July 27th, 2005; Mala Močila, August 2nd, 2005; Velika Močila, August 2nd, 2005; above Borisov dom mt. hut, August 26th, 2005; Trnovac, June 20th, 2006; Jadovno, June 23rd, 2006; Ljubica, July 6th, 2006; Bužim, July 7th, 2006; to Bakovac, July 7th, 2006; from Begovača to Krasno, July 7th, 2006; above Dundović Padež, July 19th, 2006; Križići, July 20th, 2006; Ciganište, July 20th, 2006; Babrovača, July 20th, 2006; to Kugina kuća mt. hut, July 21st, 2006; Težakovačko vrelo, July 21st, 2006; Jadovno, July 21st, 2006; Parići, July 27th, 2006.

Papilionoidea
Papilionidae (4 species)
Parnassiinae
Parnassiini
Parnassius mnemosyne (Linnaeus, 1758) (* / **): Ljubica, June 18th, 2005; to Dabarska kosa, June 18th, 2005; Dabarska kosa, June 18th, 2005; Štirovača, June 18th, 2005; Jezera, July 26th, 2005; Tudorevo, July 19th, 2006; Vučjak, July 20th, 2006.

Parnassius apollo (Linnaeus, 1758) (** / ***): Položine, July 27th, 2005; Dabarska kosa, July 27th, 2005; from Begovača to Krasno, July 7th, 2006; Dabarska kosa, July 21st, 2006; to Kugina kuća mt. hut, July 21st, 2006; Jadovno, July 21st, 2006; Struge, July 27th, 2006.

Papilioninae
Iphiclides podalirius (Linnaeus, 1758) (* / ** / ***): to Oltari, June 17th, 2005; turn to Pandore, June 17th, 2005; Ljubica, June 18th, 2005; to Dabarska kosa, June 18th, 2005; Dabarska kosa, June 18th, 2005; Konjsko, June 18th, 2005; Švica, July 25th, 2005; Dabarska kosa, July 27th, 2005; Kubus, July 28th, 2005; Anića Luka, August 1st, 2005; Babrovača, July 20th, 2006; forest hut Paklenica NP, July 27th, 2006.

Papilio machaon Linnaeus, 1758 (** / ***):
Švica, July 25th, 2005; Jezera, July 26th, 2005; Ljubica, July 27th, 2005; Mala Močila, August 2nd, 2005; to Bužim, July 6th, 2006; to Malovan (M. stanovi), July 26th, 2006; Malovan (M. stanovi), July 26th, 2006.

Pieridae (11 species)
Dismorphiinae
Leptidea sinapis (Linnaeus, 1758) (* / ** / ***):
Borovački Padež, June 18th, 2005; Štirovača, June 19th, 2005; Švica, July 25th, 2005; Oltari, July 26th, 2005; turn to Pandore, July 26th, 2005; Apatišan, July 26th, 2005; Ljubica, July 27th, 2005; to Bužim, July 6th, 2006; Brušane, July 6th, 2006; Bužim, July 7th, 2006; to Bakovac, July 7th, 2006; Kosinjski Bakovac, July 19th, 2006; above Dundović Padež, July 19th, 2006; Veliki Lubenovac, July 19th, 2006; Žive Vodice, July 20th, 2006; Ciganište, July 20th, 2006; Duplje, July 20th, 2006; Dabarska kosa, July 21st, 2006; Jadovno, July 21st, 2006; Malovan (M. stanovi), July 26th, 2006; Parići, July 27th, 2006; Jadovno, July 28th, 2006; Raduč, July 28th, 2006; Bunovac, July 28th, 2006.

Pierinae
Antocharini
Antocharis cardamines (Linnaeus, 1758) (* / **):
Borovački Padež, June 18th, 2005; Babić Siča, June 17th, 2005; to Dabarska kosa, June 18th, 2005.

Pierini
Aporia crataegi (Linnaeus, 1758) (* / **):
Švica, June 16th, 2005; turn to Pandore, June 17th, 2005; to Oltari, June 17th, 2005; Ljubica, June 18th, 2005; to Dabarska kosa, June 18th, 2005; Dabarska kosa, June 18th, 2005; Apatišan, July 26th, 2005; Sunđerac, July 28th, 2005; Trnovac, June 20th, 2006; Trnovac, June 23rd, 2006; Jadovno, June 23rd, 2006; Jadovno, July 6th, 2006; to Bužim, July 6th, 2006; Bužim, July 6th, 2006; Ljubica, July 6th, 2006; Bužim, July 7th, 2006; to Bakovac, July 7th, 2006; Bakovac, July 7th, 2006; to Klementa, July 7th, 2006; Petrašica, July 7th, 2006; Štirovača, July 7th, 2006; Veliki Lubenovac, July 19th, 2006; Glamočeva Duliba, July 20th, 2006; Žive Vodice, July 20th, 2006; Ciganište, July 20th, 2006; Bačić Duliba, July 20th, 2006.

Pieris brassicae (Linnaeus, 1758) (* / ** / ***):
to Oltari, June 17th, 2005; Ljubica, June 18th, 2005; Sunđerac, July 28th, 2005; to Bakovac, July 7th, 2006; Bakovac, July 7th, 2006; Veliki Lubenovac, July 19th, 2006; Glamočeva Duliba, July 20th, 2006; to Sijasetska draga, July 26th, 2006; Malovan (M. stanovi), July 26th, 2006.

Pieris mannii (Mayer, 1851) (* / ** / ***):
Ljubica, June 18th, 2005; to Dabarska kosa, June 18th, 2005; Konjsko, June 18th, 2005; Švica, July 25th, 2005; Babić Siča, July 25th, 2005; Oltari, July 26th, 2005; Apatišan, July 26th, 2005; Štirovača, July 27th, 2005; Mala Močila, August 2nd, 2005; Velika Močila, August 2nd, 2005; above Borisov dom mt. hut, August 26th, 2005; Parići, August 26th, 2005; Ramići, August 26th, 2005; to Bakovac, July 7th, 2006; Bakovac, July 7th, 2006; Petrašica, July 7th, 2006; Kosinjski Bakovac, July 19th, 2006; above Dundović Padež, July 19th, 2006; Veliki Lubenovac, July 19th, 2006; Vučjak, July 20th, 2006; Križići, July 20th, 2006; Krivača, July 20th, 2006; Glamočeva Duliba, July 20th, 2006; Žive Vodice, July 20th, 2006; Duplje, July 20th, 2006; Šarinac, July 20th, 2006; Babrovača, July 20th, 2006; Bačić Duliba, July 21st, 2006; to Kugina kuća mt. hut, July 21st, 2006; Težakovačko vrelo, July 21st, 2006; to Malovan (M. stanovi), July 26th, 2006; Malovan (M. stanovi), July 26th, 2006; Anića Luka, July 27th, 2006; forest hut Paklenica NP, July 27th, 2006; Borisov dom mt. hut, July 27th, 2006; Jadovno, July 28th, 2006; Bunovac, July 28th, 2006.

Pieris rapae (Linnaeus, 1758) (* / ** / ***):
Babić Siča, July 25th, 2005; Oltari, July 26th, 2005; Apatišan, July 26th, 2005; Položine, July 27th, 2005; Dabarska kosa, July 27th, 2005; Anića Luka, August 1st, 2005; Mala Močila, August 2nd, 2005; Dabarska kosa, July 21st, 2006; Borisov dom mt. hut, July 27th, 2006.

Pieris ergane (Geyer, 1828) (* / ** / ***):
Babić Siča, July 17th, 2005; Dabarska kosa, June 18th, 2005; Anića Luka, August 1st,

2005; Mala Močila, August 2nd, 2005; Ramići, August 26th, 2005, Trnovac, June 20th, 2006; above Dundović Padež, July 19th, 2006; Žive Vodice, July 20th, 2006.

Pieris napi (Linnaeus, 1758) (* / ** / ***):
Babić Siča, June 17th, 2005; to Dabarska kosa, June 18th, 2005; Štirovača, July 27th, 2005; Ljubica, July 27th, 2005; Velika Močila, August 2nd, 2005; Parići, August 26th, 2005; Bužim, July 7th, 2006; Štirovača, July 7th, 2006; from Begovača to Krasno, July 7th, 2006; Žive Vodice, July 20th, 2006; Ciganište, July 20th, 2006.

Coliadinae
Colias croceus (Fourcroy 1785) (* / ** / ***):
Dabarska kosa, June 18th, 2005; Švica, July 25th, 2005; turn to Pandore, July 26th, 2005; Sunđerac, July 28th, 2005; Parići, August 26th, 2005; Petrašica, July 7th, 2006; above Dundović Padež, July 19th, 2006; Tudorevo, July 19th, 2006; Glamočeva Duliba, July 20th, 2006; Žive Vodice, July 20th, 2006; Šarinac, July 20th, 2006; to Sijasetska draga, July 26th, 2006; Bunovac, July 26th, 2006; Malovan (M. stanovi), July 26th, 2006; Bunovac, July 28th, 2006.

Gonepteryx rhamni (Linnaeus, 1758) (* / ** / ***):
Babić Siča, June 17th, 2005; Gornja Klada, June 17th, 2005; Dabarska kosa, June 18th, 2005; Švica, July 25th, 2005; Babić Siča, July 25th, 2005; turn to Zavižan mt. hut, July 26th, 2005; Apatišan, July 26th, 2005; Štirovača, July 27th, 2005; Ljubica, July 27th, 2005; Sunđerac, July 28th, 2005; Mala Močila, August 2nd, 2005; Parići, August 26th, 2005; Ramići, August 26th, 2005; Jadovno, July 6th, 2006; Brušane, July 6th, 2006; Kosinjski Bakovac, July 19th, 2006; Žive Vodice, July 20th, 2006; Ciganište, July 20th, 2006; Dabarska kosa, July 21st, 2006; Bačić Duliba, July 21st, 2006; to Kugina kuća mt. hut, July 21st, 2006; Težakovačko vrelo, July 21st, 2006: to Malovan (M. stanovi), July 26th, 2006; Malovan (M. stanovi), July 26th, 2006; Raduč, July 28th, 2006.

Gonepteryx cleopatra (Linnaeus, 1767) (**):
Dabarska kosa, June 18th, 2005; Jezera, July 26th, 2005.

Lycaenidae (25 species)
Riodininae
Hamearis lucina (Linnaeus, 1758) (* / **):
Babić Siča, June 17th, 2005; to Oltari, June 17th, 2005; Dabarska kosa, June 18th, 2005.

Lycaeninae
Lycaenini
Lycaena virgaureae (Linnaeus, 1758) (* / **):
Borovački Padež, June 18th, 2005; Babić Siča, July 25th, 2005; turn to Zavižan mt. hut, July 26th, 2005; turn to Pandore, July 26th, 2005; Apatišan, July 26th, 2005; Štirovača, July 27th, 2005; Dabarska kosa, July 27th, 2005; Ljubica, July 27th, 2005; Sunđerac, July 28th, 2005; Jadovno, July 6th, 2006; Čačić Draga, July 6th, 2006; to Bakovac, July 7th, 2006; Bakovac, July 7th, 2006; Petrašica, July 7th, 2006; Kosinjski Bakovac, July 19th, 2006; Glamočeva Duliba, July 20th, 2006; Žive Vodice, July 20th, 2006; Dabarska kosa, July 21st, 2006; Bačić Duliba, July 21st, 2006; Jadovno, July 21st, 2006; Jadovno, July 28th, 2006.

Lycaena alciphron (Rottemburg, 1775) (**):
Ljubica, July 6th, 2006.

Lycaena candens (Herrich-Schäffer, 1844) (* / **):
Jadovno, June 23rd, 2006; Veliki Lubenovac, July 19th, 2006.

Eumaeini
Satyrium w-album (Knoch, 1782) (*):
Glamočeva Duliba, July 20th, 2006.

Satyrium pruni (Linnaeus, 1758) (**):
Trnovac, June 20th, 2006.

Satyrium spini (Denis & Schiffermüller, 1775) (* / **):
to Dabarska kosa, June 18th, 2005; Babić Siča, July 25th, 2005; Kosinjski Bakovac, July 19th, 2006; Tudorevo, July 19th, 2006; Križići, July 20th, 2006; Krivača, July 20th, 2006; Glamočeva Duliba, July 20th, 2006; Žive Vodice, July 20th, 2006; Ciganište, July 20th, 2006; Šarinac, July 20th, 2006; Dabarska kosa, July 21st, 2006; Bačić Duliba, July 21st, 2006; to Kugina kuća mt. hut, July 21st, 2006; Težakovačko vrelo, July 21st, 2006.

Satyrium ilicis (Esper, 1779) (**):
Baške Oštarije, July 7th, 2006.

Polyommatini
Cupido minimus (Fuessly 1775) (* / **):
Križići, July 20th, 2006; Glamočeva Duliba, July 20th, 2006; Šarinac, July 20th, 2006; Bačić Duliba, July 21st, 2006; Jadovno, July 21st, 2006.

Cupido alcetas (Hoffmannsegg, 1804) (**):
Bužim, July 7th, 2006.

Celastrina argiolus (Linnaeus, 1758) (* / ** / ***):
Vučjak, July 25th, 2005; Dabarska kosa, July 27th, 2005; Ljubica, July 27th, 2005; Sunđerac, July 28th, 2005; Mala Močila, August 2nd, 2005; above Borisov dom mt. hut, August 26th, 2005; Parići, August 26th, 2005; Dabarska kosa, July 21st, 2006; Težakovačko vrelo, July 21st, 2006; Parići, July 27th, 2006.

Scolitantides orion (Pallas, 1771) (** / ***):
to Dabarska kosa, June 18th, 2005; Parići, August 2nd, 2005.

Glaucopsyche alexis (Poda, 1761) (**):
Ljubica, June 18th, 2005.

Maculinea arion (Linnaeus, 1758) (* / **):
Švica, July 25th, 2005; Štirovača, July 27th, 2005; to Bakovac, July 7th, 2006; Bakovac, July 7th, 2006; Jadovno, July 21st, 2006.

Maculinea rebeli (Hirschke, 1904) (**):
Jadovno, July 6th, 2006; Bakovac, July 7th, 2006.

Plebeius argus (Linnaeus, 1758) (** / ***):
Švica, June 16th, 2005; Ljubica, June 18th, 2005; to Dabarska kosa, June 18th, 2005; Dabarska kosa, June 18th, 2005; Švica, July 25th, 2005; Velika Močila, August 2nd, 2005; Ljubica, July 6th, 2006; Bužim, July 7th, 2006; Bačić Duliba, July 21st, 2006; Jadovno, July 21st, 2006; Bunovac, July 28th, 2006.

Plebeius idas (Linnaeus, 1761) (***):
Švica, June 16th, 2005; Švica, July 25th, 2006; Velika Močila, August 2nd, 2005.

Aricia agestis (Denis & Schiffermüller, 1775) (* / ** / ***):
Babić Siča, July 25th, 2005; turn to Zavižan mt. hut, July 26th, 2005; Oltari, July 26th, 2005; Mala Močila, August 2nd, 2005; Velika Močila, August 2nd, 2005; Trnovac, June 23rd, 2006; Jadovno, June 23rd, 2006; to Bakovac, July 7th, 2006; Petrašica, July 7th, 2006; Kosinjski Bakovac, July 19th, 2006; Križići, July 20th, 2006; Žive Vodice, July 20th, 2006; Šarinac, July 20th, 2006; Babrovača, July 20th, 2006; Duplje, July 20th, 2006; Dabarska kosa, July 21st, 2006; Bačić Duliba, July 21st, 2006; Bunovac, July 26th, 2006; Parići, July 26th, 2006; Bunovac, July 28th, 2006.

Polyommatus semiargus (Rottemburg, 1775) (* / ** / ***):
Apatišan, July 27th, 2005; Trnovac, June 23rd, 2006; Jadovno, June 23rd, 2006; Jadovno, July 6th, 2006; Ljubica, July 6th, 2006; Bakovac, July 7th, 2006; Petrašica, July 7th, 2006; Tudorevo, July 19th, 2006; Žive Vodice, July 20th, 2006; Težakovačko vrelo, July 21st, 2006; Malovan (M. stanovi), July 26th, 2006.

Polyommatus dorylas (Denis & Schiffermüller, 1775) (** / ***):
Jezera, July 26th, 2005; Bačić Duliba, July 21st, 2006; to Sijasetska draga, July 26th, 2006; Malovan (M. stanovi), July 26th, 2006; Veliki Javornik, July 27th, 2006; Struge, July 27th, 2006; Anića Luka, July 27th, 2006.

Polyommatus amandus (Schneider, 1792) (* / ** / ***):
Dabarska kosa, June 18th, 2005; Jezera, July 26th, 2005; Jadovno, July 6th, 2006; Ljubica, July 6th, 2006; Petrašica, July 7th, 2006; Štirovača, July 7th, 2006; Tudorevo, July 19th, 2006; Veliki Lubenovac, July 19th, 2006; Glamočeva Duliba, July 20th, 2006; Žive Vodice, July 20th, 2006; Šarinac, July 20th, 2006; Bačić Duliba, July 21st, 2006; Malovan (M. stanovi), July 26th, 2006; Malovansko jezero, July 26th, 2006; Bunovac, July 28th, 2006.

Polyommatus icarus (Rottemburg, 1775) (* / ** / ***):
Švica, June 16th, 2005; to Oltari, June 17th, 2005; turn to Pandore, June 17th, 2005; Ljubica, June 18th, 2005; to Dabarska kosa, June 18th, 2005; Borovački Padež, June 18th, 2005; Babić Siča, July 25th, 2005; Štirovača, July 27th, 2005: Ljubica, July 27th, 2005; Bužim, July 7th, 2006; to Bakovac, July 7th, 2006; Bakovac, July 7th, 2006; Petrašica, July 7th, 2006; Kosinjski Bakovac, July 19th, 2006; Tudorevo, July 19th, 2006; Žive Vodice, July 20th, 2006; Babrovača, July 20th, 2006; Dabarska kosa, July 21st, 2006; Jadovno, July 21st, 2006; Malovan (M. stanovi), July 26th, 2006; Borisov dom mt. hut, July 27th, 2006; Parići, July 27th, 2006; Raduč, July 28th, 2006; Bunovac, July 28th, 2006.

Polyommatus daphnis (Denis & Schiffermüller, 1775) (* / ** / ***):
Mala Močila, August 2nd, 2005; above Dundović Padež, July 19th, 2006; Žive Vodice, July 20th, 2006; Ciganište, July 20th, 2006; Šarinac, July 20th, 2006; Babrovača, July 20th, 2006; Duplje, July 20th, 2006; Dabarska kosa, July 21st, 2006; Bačić Duliba, July 21st, 2006; to Kugina kuća mt. hut, July 21st, 2006; Anića Luka, July 27th, 2006; Parići, July 27th, 2006.

Polyommatus bellargus (Rottemburg, 1775) (* / ** / ***):
to Oltari, June 17th, 2005; turn to Pandore, June 17th, 2005; Jezera, July 26th, 2005; Apatišan, July 26th, 2005; Parići, August 26th, 2005; Žive Vodice, July 20th, 2006; Parići, July 27th, 2006.

Polyommatus coridon (Poda, 1761) (* / ** / ***):
Dabarska kosa, July 27th, 2005; Ljubica, July 27th, 2005; Anića Luka, August 1st, 2005; Mala Močila, August 26th, 2005; Parići, August 26th, 2005; Ramići, August 26th, 2005; Tudorevo, July 19th, 2006; Žive Vodice, July 20th, 2006; Šarinac, July 20th, 2006; Babrovača, July 20th, 2006; Duplje, July 20th, 2006; Jadovno, July 21st, 2006; Malovan (M. stanovi), July 26th, 2006; Veliki Javornik, July 27th, 2006; Buljma (pass), July 27th, 2006; Anića Luka, July 27th, 2006; Jadovno, July 28th, 2006; Raduč, July 28th, 2006; Bunovac, July 28th, 2006.

Nymphalidae (60 species)
Libytheinae
Libythea celtis (Laicharting, 1782) (** / ***):
Konjsko, June 18th, 2005; Ramići, August 26th, 2005; Težakovačko vrelo, July 21st, 2006.

Heliconiinae
Argynnis paphia (Linnaeus, 1758) (* / ** / ***):
Gornja Klada, June 17th, 2005; Švica, July 25th, 2005; Babić Siča, July 25th, 2005; turn to Zavižan mt. hut, July 26th, 2005; Oltari, July 26th, 2005; Apatišan, July 26th, 2005; Jezera, July 26th, 2005; Štirovača, July 27th, 2005; Položine, July 27th, 2005; Šprenga, July 27th, 2005; Ljubica, July 27th, 2005; Sunđerac, July 28th, 2005; Anića Luka, August 1st, 2005; Borisov dom mt. hut, August 2nd, 2005; Mala Močila, August 2nd, 2005; Velika Močila, August 2nd, 2005; above Borisov dom mt. hut, August 26th, 2005; Parići, August 26th, 2005; Ramići, August 26th, 2005; Brušane, July 6th, 2006; Baške Oštarije, July 7th, 2006; Bužim, July 7th, 2006; Kosinjski Bakovac, July 19th, 2006; Križići, July 20th, 2006; Krivača, July 20th, 2006; Glamočeva Duliba, July 20th, 2006; Žive Vodice, July 20th, 2006; Ciganište, July 20th, 2006; Duplje, July 20th, 2006; Baške Oštarije, July 21st, 2006; Dabarska kosa, July 21st, 2006; Bačić Duliba, July 21st, 2006; to Kugina kuća mt. hut, July 21st, 2006; Težakovačko vrelo, July 21st, 2006; Jadovno, July 21st, 2006; to Sijasetska draga, July 26th, 2006; forest hut Paklenica NP, July 27th, 2006; Borisov dom mt. hut, July 27th, 2006; Jadovno, July 28th, 2006; Raduč, July 28th, 2006.

Argynnis pandora (Denis & Schiffermüller, 1775) (**):
turn to Pandore, June 17th, 2005; Šprenga, July 27th, 2005; Jadovno, July 6th, 2006.

Argynnis aglaja (Linnaeus, 1758) (* / ** / ***):
Ljubica, June 18th, 2005; to Dabarska kosa, June 18th, 2005; Konjsko, June 18th, 2005; Babić Siča, July 25th, 2005; Modrić dolac, July 25th, 2005; turn to Zavižan mt. hut, July 26th, 2005; Oltari, July 26th, 2005; Apatišan, July 26th, 2005; Sunđerac, July 28th, 2005; Trnovac, June 23rd, 2006; Jadovno, July 6th, 2006; Bužim, July 6th, 2006; Ljubica, July 6th, 2006; to Bakovac, July 7th, 2006; Bakovac, July 7th, 2006; Petrašica, July 7th, 2006; Kosinjski Bakovac, July 19th, 2006; above Dundović Padež, July 19th, 2006; Tudorevo, July 19th, 2006; Veliki Lubenovac, July 19th, 2006; Vučjak, July 20th, 2006; Križići, July 20th, 2006; Krivača, July 20th, 2006; Glamočeva Duliba, July 20th, 2006; Žive Vodice, July 20th, 2006; Ciganište, July 20th, 2006; Duplje, July 20th, 2006; Dabarska kosa, July 21st, 2006; Bačić Duliba, July 21st, 2006; Težakovačko vrelo, July 21st, 2006; Jadovno, July 21st, 2006; Malovan (M. stanovi), July 26th, 2006; Struge, July 27th, 2006; Jadovno, July 28th, 2006; Raduč, July 28th, 2006; Bunovac, July 28th, 2006.

Argynnis adippe (Denis & Schiffermüller, 1775) (* / ** / ***):
Babić Siča, July 25th, 2005; Apatišan, July 26th, 2005; Jezera, July 26th, 2005; Štirovača, July 27th, 2005; Dabarska kosa, July 27th, 2005; Sunđerac, July 28th, 2005; Mala Močila, August 2nd, 2005; Jadovno, July 6th, 2006; Bakovac, July 7th, 2006; Kosinjski Bakovac, July 19th, 2006; Tudorevo, July 19th, 2006; Veliki Lubenovac, July 19th, 2006; Glamočeva Duliba, July 20th, 2006; Žive Vodice, July 20th, 2006; Ciganište, July 20th, 2006; Šarinac, July 20th, 2006; Dabarska kosa, July 21st, 2006; Bačić Duliba, July 21st, 2006; Jadovno, July 21st, 2006.

Issoria lathonia (Linnaeus, 1758) (* / ** / ***):
Ljubica, June 18th, 2005; Konjsko, June 18th, 2005; Štirovača, June 18th, 2005; Borovački Padež, June 18th, 2005; Švica, July 25th, 2005; Babić Siča, July 25th, 2005; turn to Zavižan mt. hut, July 26th, 2005; Apatišan, July 26th, 2005; Jezera, July 26th, 2005; Štirovača, July 27th, 2005; Položine, July 27th, 2005; Borisov dom mt. hut, August 2nd, 2005; to Bužim, July 6th, 2006; Kosinjski Bakovac, July 19th, 2006; Glamočeva Duliba, July 20th, 2006; Bunovac, July 26th, 2006; Bunovac, July 28th, 2006.

Brenthis ino (Rottemburg, 1775) (* / **):
Sunđerac, July 28th, 2005; Trnovac, June 20th, 2006; Kosinjski Bakovac, July 19th, 2006; Glamočeva Duliba, July 20th, 2006; Žive Vodice, July 20th, 2006.

Brenthis daphne (Denis & Schiffermüller, 1775) (* / ** / ***):
Babić Siča, July 25th, 2005; Apatišan, July 26th, 2005; Štirovača, July 27th, 2005; Šprenga, July 27th, 2005; Sunđerac, July 28th, 2005; Trnovac, June 23rd, 2006; Bužim, July 6th, 2006; Brušane, July 6th, 2006; Bužim, July 7th, 2006; Bakovac, July 7th, 2006; above Dundović Padež, July 19th, 2006; Krivača, July 20th, 2006; Glamočeva Duliba, July 20th, 2006; Žive Vodice, July 20th, 2006; Šarinac, July 20th, 2005; Težakovačko vrelo, July 21st, 2006; Bunovac, July 28th, 2006.

Brenthis hecate (Denis & Schiffermüller, 1775) (* / **):
Vučjak, July 25th, 2005; Modrić dolac, July 25th, 2005; turn to Zavižan mt. hut, July 26th, 2005; Apatišan, July 26th, 2005; Bužim, July 7th, 2006; Žive Vodice, July 20th, 2006; Šarinac, July 20th, 2006; Dabarska kosa, July 21st, 2006; Bačić Duliba, July 21st, 2006.

Boloria euphrosyne (Linnaeus, 1758) (* / **):
Babić Siča, June 17th, 2005; to Oltari, June 17th, 2005; Ljubica, June 18th, 2005; Dabarska kosa, June 18th, 2005; Sunđerac, July 28th, 2005; Žive Vodice, July 20th, 2006.

Boloria dia (Linnaeus, 1767) (**):
Jadovno, July 21st, 2006.

Nymphalinae
Nymphalini
Vanessa atalanta (Linnaeus, 1758) (* / ** / ***):
Ljubica, June 18th, 2005; Babić Siča, July 25th, 2005; turn to Zavižan mt. hut, July 26th, 2005; Jezera, July 26th, 2005; Sunđerac, July 28th, 2005; Anića Luka, August 1st, 2005; Ramići, August 26th, 2005; Kosinjski Bakovac, July 19th, 2006; Krivača, July 20th, 2006; Žive Vodice, July 20th, 2006; to Kugina kuća mt. hut, July 21st, 2006; to Sijasetska draga, July 26th, 2006; Malovan (M. stanovi), July 26th, 2006; Jadovno, July 28th, 2006.

Vanessa cardui (Linnaeus, 1758) (* / ** / ***):
Dabarska kosa, June 18th, 2005; Borovački Padež, June 18th, 2005; Štirovača, July 27th, 2005; Kubus, July 28th, 2005; Jadovno, July 6th, 2006; to Bužim, July 6th, 2006; Bužim, July 6th, 2006; Brušane, July 6th, 2006; Ljubica, July 6th, 2006; Baške Oštarije, July 7th, 2006; Bužim, July 7th, 2006; to Bakovac, July 7th, 2006; Bakovac, July 7th, 2006; to Klementa, July 7th, 2006; Petrašica, July 7th, 2006; Štirovača, July 7th, 2006; from Begovača to Krasno, July 7th, 2006; Kosinjski Bakovac, July 19th, 2006; above Dundović Padež, July 19th, 2006; Tudorevo, July 19th, 2006; Vučjak, July 20th, 2006; Križići, July 20th, 2006; Krivača, July 20th, 2006; Glamočeva Duliba, July 20th, 2006; Žive Vodice, July 20th, 2006; Šarinac, July 20th, 2006; Baške Oštarije, July 21st, 2006; Dabarska kosa, July 21st, 2006; Bačić Duliba, July 21st, 2006; to Kugina kuća mt. hut, July 21st, 2006; to Sijasetska draga, July 26th, 2006; Bunovac, July 26th, 2006; Malovan (M. stanovi), July 26th, 2006; Malovansko jezero, July 26th, 2006; forest hut Paklenica NP, July 27th, 2006; Jadovno, July 28th, 2006; Bunovac, July 28th, 2006.

Inachis io (Linnaeus, 1758) (* / ** / ***):
Babić Siča, July 25th, 2005; turn to Zavižan mt. hut, July 26th, 2005; Apatišan, July 26th, 2005; Štirovača, July 27th, 2005; Šprenga, July 27th, 2005; Ljubica, July 27th, 2005; Sunđerac, July 28th, 2005; Mala Močila, August 2nd, 2005; Ljubica, July 6th, 2006; Kosinjski Bakovac, July 19th, 2006; above Dundović Padež, July 19th, 2006; Tudorevo, July 19th, 2006; Veliki Lubenovac, July 19th, 2006; Križići, July 20th, 2006; Krivača, July 20th, 2006; Glamočeva Duliba, July 20th, 2006; Žive Vodice, July 20th, 2006; Ciganište, July 20th, 2006; Duplje, July 20th, 2006; Dabarska kosa, July 21st, 2006; to Kugina kuća mt. hut, July 21st, 2006; Težakovačko vrelo, July 21st, 2006; Jadovno, July 21st, 2006; to Sijasetska draga, July 26th, 2006; Bunovac, July 26th, 2006; Malovansko jezero, July 26th, 2006.

Aglais urticae (Linnaeus, 1758) (* / **):
Babić Siča, June 17th, 2005; turn to Pandore, June 17th, 2005; Vučjak, June 17th, 2005; Štirovača, June 18th, 2005; Vučjak, July 25th, 2005; Apatišan, July 26th, 2005; to Kugina

kuća mt. hut, July 28th, 2005; Tudorevo, July 19th, 2006; Vučjak, July 20th, 2006; Križići, July 20th, 2006; Krivača, July 20th, 2006; Glamočeva Duliba, July 20th, 2006; Baške Oštarije, July 21st, 2006.

Polygonia c-album (Linnaeus, 1758) (* / ** / ***):
Dabarska kosa, June 18th, 2005; Mala Močila, August 2nd, 2005; Kosinjski Bakovac, July 19th, 2006; Veliki Lubenovac, July 19th, 2006; Žive Vodice, July 20th, 2006; Jadovno, July 21st, 2006; Jadovno, July 28th, 2006.

Polygonia egea (Cramer, 1775) (* / ** / ***):
turn to Zavižan mt. hut, July 26th, 2005; Apatišan, July 26th, 2005; Sunđerac, July 28th, 2005; Anića Luka, August 1st, 2005; above Borisov dom mt. hut, August 26th, 2005; Žive Vodice, July 20th, 2006; Jadovno, July 21st, 2006.

Araschnia levana (Linnaeus, 1758) (**):
Jadovno, July 21st, 2006.

Nymphalis antiopa (Linnaeus, 1758) (**):
Apatišan, July 26th, 2005.

Nymphalis polychloros (Linnaeus, 1758) (**):
Ljubica, June 18th, 2005; Dabarska kosa, June 18th, 2005; Konjsko, June 18th, 2005.

Melitaeini
Euphydryas aurinia (Rottemburg, 1775) (**):
Ljubica, June 18th, 2005; Trnovac, June 20th, 2006.

Melitaea cinxia (Linnaeus, 1758) (**):
Švica, June 16th, 2005; Ljubica, June 18th, 2005.

Melitaea phoebe (Denis & Schiffermüller, 1775) (**):
Trnovac, June 23rd, 2006; Jadovno, July 6th, 2006; Ljubica, July 6th, 2006; Jadovno, July 21st, 2006.

Melitaea trivia (Denis & Schiffermüller, 1775) (**):
to Bakovac, July 7th, 2006; Bakovac, July 7th, 2006.

Melitaea didyma (Esper, 1778) (**):
Švica, June 16th, 2005; turn to Pandore, June 17th, 2005; Ljubica, June 18th, 2005; Jadovno, July 6th, 2006; to Bakovac, July 7th, 2006.

Melitaea diamina (Lang, 1789) (**):
Trnovac, June 20th, 2006; Jadovno, July 6th, 2006.

Melitaea aurelia Nickerl, 1850 (**):
Švica, June 16th, 2005; Ljubica, June 18th, 2005; Borovački Padež, June 18th, 2005; Trnovac, June 23rd, 2006; Jadovno, June 23rd, 2006; Jadovno, July 6th, 2006; Petrašica, July 7th, 2006.

Melitaea britomartis Assmann, 1847:
Švica, June 16th, 2005.

Melitaea athalia (Rottemburg, 1775) (* / **):
turn to Pandore, June 17th, 2005; Trnovac, June 23rd, 2006; Jadovno, July 6th, 2006; to Bužim, July 6th, 2006; Bužim, July 6th, 2006; Ljubica, July 6th, 2006; Bužim, July 7th, 2006; to Bakovac, July 7th, 2006; Bakovac, July 7th, 2006; Kosinjski Bakovac, July 19th, 2006; above Dundović Padež, July 19th, 2006; Tudorevo, July 19th, 2006; Veliki Lubenovac, July 19th, 2006; Krivača, July 20th, 2006; Glamočeva Duliba, July 20th, 2006; Žive Vodice, July 20th, 2006; Bačić Duliba, July 21st, 2006; Težakovačko vrelo, July 21st, 2006; Jadovno, July 21st, 2006; Jadovno, July 28th, 2006.

Limenitinae
Limenitis populi (Linnaeus, 1758) (**):
Kosinjski Bakovac, July 19th, 2006.

Limenitis reducta Staudinger, 1901 (* / ** / ***):
Gornja Klada, June 17th, 2005; to Dabarska kosa, June 18th, 2005; Dabarska kosa, June 18th, 2005; Oltari, July 26th, 2005; Ljubica, July 27th, 2005; Borisov dom mt. hut, August 2nd, 2005; Mala Močila, August 2nd, 2005; Ramići, August 26th, 2005; Kosinjski Bakovac, July 19th, 2006; Žive Vodice, July 20th, 2006; Ciganište, July 20th, 2006; Dabarska kosa, July 21st, 2006; to Kugina kuća mt. hut, July 21st, 2006; Težakovačko vrelo, July 21st, 2006; Jadovno, July 21st, 2006; Anića Luka, July 27th, 2006; forest hut Paklenica NP, July 27th, 2006; Borisov dom mt. hut, July 27th, 2006.

Neptis sappho (Pallas, 1771) (**):
to Dabarska kosa, June 18th, 2005.

Apaturinae
Apatura iris (Linnaeus, 1758) (** / ***):
Jazmakuša, July 21st, 2006; Struge, July 27th, 2006.

Satyrinae
Elymniini
Pararge aegeria (Linnaeus, 1758) (* / ***):
Anića Luka, August 2nd, 2005; Anića Luka, August 27th, 2005; Glamočeva Duliba, July 20th, 2006; Parići, July 27th, 2006.

Lasiommata megera (Linnaeus, 1767) (** / ***):
Šprenga, July 27th, 2005; to Mala Močila, August 2nd, 2005; above Borisov dom mt. hut, August 26th, 2005; Parići, August 26th, 2005; Baške Oštarije, July 21st, 2006; Dabarska kosa, July 21st, 2006; to Kugina kuća mt. hut, July 21st, 2006; Težakovačko vrelo, July 21st, 2006; Jadovno, July 21st, 2006.

Lasiommata maera (Linnaeus, 1758) (* / **):
to Oltari, June 17th, 2005; to Dabarska kosa, June 18th, 2005; Položine, July 27th, 2005; Kubus, July 28th, 2005; Bužim, July 7th, 2006; Bakovac, July 7th, 2006; from Begovača to Krasno, July 7th, 2006; above Dundović Padež, July 19th, 2006; Tudorevo,

July 19th, 2006; Glamočeva Duliba, July 20th, 2006; Žive Vodice, July 20th, 2006; Dabarska kosa, July 21st, 2006; Bačić Duliba, July 21st, 2006.

Coenonymphini
Coenonympha rhodopensis Elwes, 1900 (* / **):
Babić Siča, June 17th, 2005; Dabarska kosa, June 18th, 2005; Borovački Padež, June 18th, 2005.

Coenonympha arcania (Linnaeus, 1761) (* / ** / ***):
to Oltari, June 17th, 2005; turn to Pandore, June 17th, 2005; Ljubica, June 18th, 2005; to Dabarska kosa, June 18th, 2005; Dabarska kosa, June 18th, 2005; Borovački Padež, June 18th, 2005; Babić Siča, July 25th, 2005; turn to Zavižan mt. hut, July 26th, 2005; Apatišan, July 26th, 2005; Šprenga, July 27th, 2005; Sunđerac, July 28th, 2005; Mala Močila, August 2nd, 2005; Velika Močila, August 2nd, 2005; Trnovac, June 20th, 2006; Jadovno, June 20th, 2006; Jadovno, June 23rd, 2006; Čačić Draga, July 6th, 2006; Brušane, July 6th, 2006; Baške Oštarije, July 7th, 2006; Kosinjski Bakovac, July 19th, 2006; Ciganište, July 20th, 2006; Dabarska kosa, July 21st, 2006; Jadovno, July 21st, 2006.

Coenonympha glycerion (Borkhausen, 1788) (* / **):
Apatišan, July 26th, 2005; Sunđerac, July 28th, 2005; Trnovac, June 23rd, 2006; Jadovno, June 23rd, 2006; Jadovno, July 6th, 2006; to Bužim, July 6th, 2006; Ljubica, July 6th, 2006; Baške Oštarije, July 7th, 2006; Bužim, July 7th, 2006; to Bakovac, July 7th, 2006; Bakovac, July 7th, 2006; Petrašica, July 7th, 2006.

Coenonympha pamphilus (Linnaeus, 1758) (* / ** / ***):
Švica, June 16th, 2005; Babić Siča, June 17th, 2005; to Oltari, June 17th, 2005; turn to Pandore, June 17th, 2005; Gornja Klada, June 17th, 2005; Ljubica, June 18th, 2005; Dabarska kosa, June 18th, 2005; Borovački Padež, June 18th, 2005; Parići, August 26th, 2005; Trnovac, June 20th, 2006; Bakovac, July 7th, 2006; Križići, July 20th, 2006; Ciganište, July 20th, 2006; Duplje, July 20th, 2006; Dabarska kosa, July 21st, 2006; Malovan (M. stanovi), July 26th, 2006.

Maniolini
Aphantopus hyperantus (Linnaeus, 1758) (**):
Kosinjski Bakovac, July 19th, 2006.

Maniola jurtina (Linnaeus, 1758) (* / ** / ***):
Švica, June 16th, 2005; turn to Pandore, June 17th, 2005; Dabarska kosa, June 18th, 2005; Švica, July 25th, 2005; Babić Siča, July 25th, 2005; turn to Pandore, July 26th, 2005; Dabarska kosa, July 27th, 2005; Kubus, July 28th, 2005; Mala Močila, August 2nd, 2005; Velika Močila, August 2nd, 2005; above Borisov dom mt. hut, August 26th, 2005; Parići, August 26th, 2005; Trnovac, June 20th, 2006; Jadovno, June 23rd, 2006; Bužim, July 6th, 2006; Čačić Draga, July 6th, 2006; Ljubica, July 6th, 2006; Baške Oštarije, July 7th, 2006; Bužim, July 7th, 2006; to Bakovac, July 7th, 2006; Kosinjski Bakovac, July 19th, 2006; Bačić Duliba, July 21st, 2006; Jadovno, July 21st, 2006; Jadovno, July 21st, 2006; Veliki Javornik, July 27th, 2006.

Hyponephele lycaon (Rottemburg, 1775) (*):
Šarinac, July 20th, 2006; Babrovača, July 20th, 2006.

Hyponephele lupinus (O. Costa, 1836) (**):
Oltari, July 26th, 2005.

Erebiini
Erebia ligea (Linnaeus, 1758) (* / ** / ***):
Babić Siča, July 25th, 2005; turn to Zavižan mt. hut, July 26th, 2005; Apatišan, July 26th, 2005; Položine, July 27th, 2005; Sunđerac, July 28th, 2005; to Bakovac, July 7th, 2006; Bakovac, July 7th, 2006; to Klementa, July 7th, 2006; from Begovača to Krasno, July 7th, 2006; above Dundović Padež, July 19th, 2006; Veliki Lubenovac, July 29th, 2006; Križići, July 20th, 2006; Krivača, July 20th, 2006; Glamočeva Duliba, July 20th, 2006; Žive Vodice, July 20th, 2006; Ciganište, July 20th, 2006; Duplje, July 20th, 2006; to Kugina kuća mt. hut, July 21st, 2006; Težakovačko vrelo, July 21st, 2006; Malovan (M. stanovi), July 26th, 2006; Bunovac, July 28th, 2006.

Erebia euryale (Esper, 1805) (* / **):
Babić Siča, July 25th, 2005; Tudorevo, July 19th, 2006; Bačić Duliba, July 21st, 2006; Jadovno, July 21st, 2006; Jadovno, July 28th, 2006.

Erebia epiphron (Knoch, 1783) (* / **):
Modrić dolac, July 25th, 2005; Jezera, July 26th, 2005; Tudorevo, July 19th, 2006; Križići, July 20th, 2006.

Erebia aethiops (Esper, 1777) (** / ***):
Položine, July 27th, 2005; Šprenga, July 27th, 2005; Velika Močila, August 2nd, 2005; after Brušane, July 6th, 2006.

Erebia medusa (Denis & Schiffermüller, 1775) (* / ** / ***):
Švica, June 16th, 2005; Babić Siča, June 17th, 2005; to Oltari, June 17th, 2005; turn to Pandore, June 17th, 2005; Ljubica, June 18th, 2005; Dabarska kosa, June 18th, 2005; Borovački Padež, June 18th, 2005; Ljubica, July 6th, 2006; Petrašica, July 7th, 2006; Štirovača, July 7th, 2006; Tudorevo, July 19th, 2006; Krivača, July 20th, 2006; Malovan (M. stanovi), July 26th, 2006.

Erebia ottomana Herrich-Schäffer, 1847 (***):
Bunovac, July 26th, 2006; to Malovan (M. stanovi), July 26th, 2006; Malovan (M. stanovi), July 26th, 2006; Malovansko jezero, July 26th, 2006; Struge, July 27th, 2006; Bunovac, July 28th, 2006.

Erebia melas (Herbst, 1796) (* / ***):
above Dundović Padež, July 19th, 2006; Glamočeva Duliba, July 20th, 2006; Žive Vodice, July 20th, 2006; Malovan (M. stanovi), July 26th, 2006; Malovansko jezero, July 26th, 2006; Babino jezero, July 28th, 2006.

Erebia oeme (Hübner, 1804) (* / ** / ***):
Jezera, July 26th, 2005; Štirovača, July 27th, 2005; Sunđerac, July 28th, 2005; Ljubica,

July 6th, 2006; Petrašica, July 7th, 2006; Štirovača, July 7th, 2006; Malovan (M. stanovi), July 26th, 2006.

Melanargiini
Melanargia galathea (Linnaeus, 1758) (* / ** / ***):
to Dabarska kosa, June 18th, 2005; Švica, July 25th, 2005; Babić Siča, July 25th, 2005; Modrić dolac, July 25th, 2005; turn to Zavižan mt. hut, July 26th, 2005; Oltari, July 26th, 2005; turn to Pandore, July 26th, 2005; Jezera, July 26th, 2005; Apatišan, July 26th, 2005; Šprenga, July 27th, 2005; Dabarska kosa, July 27th, 2005; Ljubica, July 27th, 2005; Sunđerac, July 28th, 2005; Kubus, July 28th, 2005; Mala Močila, August 2nd, 2005; Velika Močila, August 2nd, 2005; Jadovno, July 6th, 2006; to Bužim, July 6th, 2006; Bužim, July 6th, 2006; Ljubica, July 6th, 2006; Bužim, July 7th, 2006; to Bakovac, July 7th, 2006; Bakovac, July 7th, 2006; Petrašica, July 7th, 2006; Krasno, July 7th, 2006; Kosinjski Bakovac, July 19th, 2006; Križići, July 20th, 2006; Krivača, July 20th, 2006; Glamočeva Duliba, July 20th, 2006; Žive Vodice, July 20th, 2006; Ciganište, July 20th, 2006; Šarinac, July 20th, 2006; Babrovača, July 20th, 2006; Duplje, July 20th, 2006; Dabarska kosa, July 21st, 2006; Bačić Duliba, July 21st, 2006; to Kugina kuća mt. hut, July 21st, 2006; Težakovačko vrelo, July 21st, 2006; Jadovno, July 21st, 2006; Bunovac, July 26th, 2006; Jadovno, July 28th, 2006; Bunovac, July 28th, 2006.

Satyrini
Satyrus ferula (Fabricius, 1793) (*):
Tudorevo, July 19th, 2006; Glamočeva Duliba, July 20th, 2006.

Hipparchia fagi (Scopoli, 1763) (* / ** / ***):
Sunđerac, July 28th, 2005; Borisov dom mt. hut, August 2nd, 2005; Velika Močila, August 2nd, 2005; Glamočeva Duliba, July 20th, 2006; Žive Vodice, July 20th, 2006; Duplje, July 20th, 2006; Dabarska kosa, July 21st, 2006; Težakovačko vrelo, July 21st, 2006; Jadovno, July 21st, 2006; Parići, July 27th, 2006.

Hipparchia syriaca (Staudinger, 1871) (* / ** / ***):
Švica, July 25th, 2005; turn to Zavižan mt. hut, July 26th, 2005; Oltari, July 26th, 2005; to Mala Močila, August 2nd, 2005; Mala Močila, August 2nd, 2005; Velika Močila, August 2nd, 2005; Parići, August 26th, 2005; Ramići, August 26th, 2005; to Bakovac, July 7th, 2006; Babrovača, July 20th, 2006; Dabarska kosa, July 21st, 2006; Borisov dom mt. hut, July 27th, 2006.

Hipparchia semele (Linnaeus, 1758) (* / ** / ***):
to Oltari, June 17th, 2005; Ljubica, June 18th, 2005; to Dabarska kosa, June 18th, 2005; Dabarska kosa, June 18th, 2005; Štirovača, June 18th, 2005; Borovački Padež, June 18th, 2005; turn to Zavižan mt. hut, July 26th, 2005; Oltari, July 26th, 2005; Šprenga, July 27th, 2005; Dabarska kosa, July 27th, 2005; Sunđerac, July 28th, 2005; Anića Luka, August 1st, 2005; Mala Močila, August 2nd, 2005; Velika Močila, August 2nd, 2005; Parići, August 26th, 2005; Ramići, August 26th, 2005; Jadovno, July 6th, 2006; Žive Vodice, July 20th, 2006; Babrovača, July 20th, 2006; Duplje, July 20th, 2006; Dabarska kosa, July 21st, 2006; Bačić Duliba, July 21st, 2006; Težakovačko vrelo, July 21st, 2006; Jadovno, July 21st, 2006.

Arethusana arethusa (Denis & Schiffermüller, 1775) (***):
Parići, August 2nd, 2005; Ramići, August 26th, 2005.

Brintesia circe (Fabricius, 1775) (* / ** / ***):
Babić Siča, July 25th, 2005; Oltari, July 26th, 2005; turn to Pandore, July 26th, 2005; Dabarska kosa, July 27th, 2005; Žive Vodice, July 20th, 2006; Baške Oštarije, July 21st, 2006; Dabarska kosa, July 21st, 2006; Bačić Duliba, July 21st, 2006; Struge, July 27th, 2006; Jadovno, July 28th, 2006.

Chazara briseis (Linnaeus, 1764) (* / **):
Dabarska kosa, July 27th, 2005; Žive Vodice, July 20th, 2006; Babrovača, July 20th, 2006.

Biogeographical characteristics of species determined on Mt. Velebit are given in Table 2 and Table 3. Biogeographical anaysis has revealed the dominance of the Eurosibirean (62.26%), Oriental (14.15%) and Mediterranean (13.21%) biogeographical elements.

DISCUSSION

Faunistic analysis

The total of 106 butterfly species found on Mt. Velebit in 2005 and 2006 represents 55.80% of the Croatian butterfly fauna, which has altogether 190 species (MIHOCI *et al*., 2005, 2006; PERKOVIĆ, 2006) or 72.10% of all detected species in the Velebit area until now (Appendix 1, KUČINIĆ *et al*., 1995; JUTZELER *et al*., 2001, 2002).

According to the KUČINIĆ *et al*. (1995) only *Zerynthia polyxena* from the Papilionidae family found in Krasno in the past century was not detected in our research, probably because our first fieldtrip was done in June and the species had already emerged.

From the Pieridae family we have not detected *Pontia daplidice* and *Colias hyale*. Specimens of the species *Leptidea morsei* ssp. *major* from the Central Butterfly Collection (CNHM) mentioned in KUČINIĆ *et al.* (1995) was misidentified with the species *Leptidea sinapis*, as confirmed by analysis of the following genitalia parameters: length of the aedeagus, saccus, uncus and tegumen (LELO, 2003) (redet. M. Kučinić). According to LELO (2003), data on the metrical values of tegument are best in proving the existence of the explicit differences in genitalia of the *L. sinapis* and *L. morsei* ssp. *major* taxa. It is supposed that the main limiting factor for distribution of *L. morsei* in Europe is a cooler and rainier summer climate (LORKOVIĆ, 1975). Also, *L. morsei* inhabits oak forests with the food plants spring vetch *Lathyrus verna* or black pea *L. niger* (LORKOVIĆ, 1975). Although both plants are known from Mt. Velebit (FORENBACHER, 2001), *verna* from Vratnik, Oštarije, Medačka staza, Malovan, Debeli kuk and Crnopac and *niger* from Vratnik, Budakovo brdo, Kiza and Takalice they were not noticed during our fieldtrips.

Tab. 2. Biogeographical characteristics of species identified on Mt. Velebit, according to HRUBY (1964), SIJARIĆ *et al*. (1984) and HIGGINS & RILEY (1993).

Ord. No.	Species and author	Biogeog. character.
1.	*Erynnis tages* (Linnaeus, 1758)	**ES**
2.	*Carcharodus floccifera* (Zeller, 1847)	**ME**
3.	*Thymelicus lineola* (Ochsenheimer, 1808)	**ES**
4.	*Thymelicus sylvestris* (Poda, 1761)	**ES**
5.	*Hesperia comma* (Linnaeus, 1758)	**ES**
6.	*Ochlodes venata* (Bremer & Grey, 1853)	**ES**
7.	*Parnassius mnemosyne* (Linnaeus, 1758)	**OR**
8.	*Parnassius apollo* (Linnaeus, 1758)	**ES**
9.	*Iphiclides podalirius* (Linnaeus, 1758)	**ES**
10.	*Papilio machaon* Linnaeus, 1758	**ES**
11.	*Leptidea sinapis* (Linnaeus, 1758)	**ES**
12.	*Antocharis cardamines* (Linnaeus, 1758)	**ES**
13.	*Aporia crataegi* (Linnaeus, 1758)	**ES**
14.	*Pieris brassicae* (Linnaeus, 1758)	**ES**
15.	*Pieris mannii* (Mayer, 1851)	**OR**
16.	*Pieris rapae* (Linnaeus, 1758)	**ES**
17.	*Pieris ergane* (Geyer, 1828)	**OR**
18.	*Pieris napi* (Linnaeus, 1758)	**HA**
19.	*Colias croceus* (Fourcroy, 1785)	**TR**
20.	*Gonepteryx rhamni* (Linnaeus, 1758)	**ES**
21.	*Gonepteryx cleopatra* (Linnaeus, 1767)	**ME**
22.	*Hamearis lucina* (Linnaeus, 1758)	**ME**
23.	*Lycaena virgaureae* (Linnaeus, 1758)	**ES**
24.	*Lycaena alciphron* (Rottemburg, 1775)	**ES**
25.	*Lycaena candens* (Herrich-Schäffer, 1844)	**OR**
26.	*Satyrium w-album* (Knoch, 1782)	**ME**
27.	*Satyrium pruni* (Linnaeus, 1758)	**ME**
28.	*Satyrium spini* (Denis & Schiffermüller, 1775)	**ES**
29.	*Satyrium ilicis* (Esper, 1779)	**ME**
30.	*Cupido minimus* (Fuessly, 1775)	**ES**
31.	*Cupido alcetas* (Hoffmannsegg, 1804)	**ES**
32.	*Celastrina argiolus* (Linnaeus, 1758)	**ES**
33.	*Scolitantides orion* (Pallas, 1771)	**ES**
34.	*Glaucopsyche alexis* (Poda, 1761)	**ES**
35.	*Maculinea arion* (Linnaeus, 1758)	**ES**

Ord. No.	Species and author	Biogeog. character.
36.	*Maculinea rebeli* (Hirschke, 1904)	**ES**
37.	*Plebeius argus* (Linnaeus, 1758)	**ES**
38.	*Plebeius idas* (Linnaeus, 1761)	**EU**
39.	*Aricia agestis* (Denis & Schiffermüller, 1775)	**ES**
40.	*Polyommatus semiargus* (Rottemburg, 1775)	**ES**
41.	*Polyommatus dorylas* (Denis & Schiffermüller, 1775)	**OR**
42.	*Polyommatus amandus* (Schneider, 1792)	**ES**
43.	*Polyommatus icarus* (Rottemburg, 1775)	**ES**
44.	*Polyommatus daphnis* (Denis & Schiffermüller, 1775)	**OR**
45.	*Polyommatus bellargus* (Rottemburg, 1775)	**OR**
46.	*Polyommatus coridon* (Poda, 1761)	**OR**
47.	*Libythea celtis* (Laicharting, 1782)	**ME**
48.	*Argynnis paphia* (Linnaeus, 1758)	**ES**
49.	*Argynnis pandora* (Denis & Schiffermüller, 1775)	**ME**
50.	*Argynnis aglaja* (Linnaeus, 1758)	**ES**
51.	*Argynnis adippe* (Denis & Schiffermüller, 1775)	**ES**
52.	*Issoria lathonia* (Linnaeus, 1758)	**ES**
53.	*Brenthis ino* (Rottemburg, 1775)	**ES**
54.	*Brenthis daphne* (Denis & Schiffermüller, 1775)	**ES**
55.	*Brenthis hecate* (Denis & Schiffermüller, 1775)	**ME**
56.	*Boloria euphrosyne* (Linnaeus, 1758)	**ES**
57.	*Boloria dia* (Linnaeus, 1767)	**ES**
58.	*Vanessa atalanta* (Linnaeus, 1758)	**ES**
59.	*Vanessa cardui* (Linnaeus, 1758)	**KO**
60.	*Inachis io* (Linnaeus, 1758)	**ES**
61.	*Aglais urticae* (Linnaeus, 1758)	**ES**
62.	*Polygonia c-album* (Linnaeus, 1758)	**ES**
63.	*Polygonia egea* (Cramer, 1775)	**OR**
64.	*Araschnia levana* (Linnaeus, 1758)	**ES**
65.	*Nymphalis antiopa* (Linnaeus, 1758)	**HA**
66.	*Nymphalis polychloros* (Linnaeus, 1758)	**ES**
67.	*Euphydryas aurinia* (Rottemburg, 1775)	**ES**
68.	*Melitaea cinxia* (Linnaeus, 1758)	**ES**
69.	*Melitaea phoebe* (Denis & Schiffermüller, 1775)	**ES**
70.	*Melitaea trivia* (Denis & Schiffermüller, 1775)	**ES**
71.	*Melitaea didyma* (Esper, 1778)	**ES**
72.	*Melitaea diamina* (Lang, 1789)	**ES**

Ord. No.	Species and author	Biogeog. character.
73.	*Melitaea aurelia* Nickerl, 1850	**ES**
74.	*Melitaea britomartis* Assmann, 1847	**ES**
75.	*Melitaea athalia* (Rottemburg, 1775)	**ES**
76.	*Limenitis populi* (Linnaeus, 1758)	**ES**
77.	*Limenitis reducta* Staudinger, 1901	**ES**
78.	*Neptis sappho* (Pallas, 1771)	**OR**
79.	*Apatura iris* (Linnaeus, 1758)	**ES**
80.	*Pararge aegeria* (Linnaeus, 1758)	**EU**
81.	*Lasiommata megera* (Linnaeus, 1767)	**OR**
82.	*Lasiommata maera* (Linnaeus, 1758)	**OR**
83.	*Coenonympha rhodopensis* Elwes, 1900	**ES**
84.	*Coenonympha arcania* (Linnaeus, 1761)	**ME**
85.	*Coenonympha glycerion* (Borkhausen, 1788)	**ES**
86.	*Coenonympha pamphilus* (Linnaeus, 1758)	**ES**
87.	*Aphantopus hyperantus* (Linnaeus, 1758)	**ES**
88.	*Maniola jurtina* (Linnaeus, 1758)	**OR**
89.	*Hyponephele lycaon* (Rottemburg, 1775)	**ES**
90.	*Hyponephele lupinus* (O. Costa, 1836)	**ES**
91.	*Erebia ligea* (Linnaeus, 1758)	**ES**
92.	*Erebia euryale* (Esper, 1805)	**BA**
93.	*Erebia epiphron* (Knoch, 1783)	**AL**
94.	*Erebia aethiops* (Esper, 1777)	**ES**
95.	*Erebia medusa* (Denis & Schiffermüller, 1775)	**ES**
96.	*Erebia ottomana* Herrich-Schäffer, 1847	**ES**
97.	*Erebia melas* (Herbst, 1796)	**EU**
98.	*Erebia oeme* (Hübner, 1804)	**AL**
99.	*Melanargia galathea* (Linnaeus, 1758)	**OR**
100.	*Satyrus ferula* (Fabricius, 1793)	**OR**
101.	*Hipparchia fagi* (Scopoli, 1763)	**EU**
102.	*Hipparchia syriaca* (Staudinger, 1871)	**ME**
103.	*Hipparchia semele* (Linnaeus, 1758)	**ME**
104.	*Arethusana arethusa* (Denis & Schiffermüller, 1775)	**ES**
105.	*Brintesia circe* (Fabricius, 1775)	**ME**
106.	*Chazara briseis* (Linnaeus, 1764)	**ME**

Explanations: AL, Alpine species; BA, Boreo-alpine species; KO, Cosmopolitic species; ES, Eurosibirean species; EU, European species; HA, Holartic species; ME, Mediterranean species; OR, Oriental species; TR, Tropic species.

Tab. 3. Percentage portions of the particular biogeographical characteristic.

Biogeographical characteristic	Percentage portion (%)
Alpine	1.87
Boreo-alpine	0.94
Cosmopolitic	0.94
Eurosibirean	62.26
European	3.77
Holartic	1.87
Mediterranean	13.21
Oriental	14.15
Tropic	0.94
TOTAL	100

For Mt. Velebit from the Lycaenidae family we have recorded for the first time the following species: *Lycaena alciphron, Satyrium w-album, Satyrium pruni, Cupido alcetas, Celastrina argiolus, Polyommatus dorylas* and *Polyommatus amandus*; on the other hand *Lycaena phleas, Lampides boeticus, Leptotes pirithous, Iolana iolas, Tarucus balkanica, Plebeius argyrognomon, Aricia eumedon, Aricia anteros, Aricia artaxerxes* and *Polyommatus eros* were not confirmed during the field trips in the years 2005 and 2006. Failures to record some characteristic Mediterranean species like *Leptotes pirithous, Iolana iolas* or *Tarucus balkanicus* are due to the fact that the probable finding localities of these species were not examined during 2005 and 2006. These species, with a few exceptions, are usually restricted to the narrow coastal area.

Several species from the Lycaenidae family should be discussed here. The species *Lycaena candens* was just mistyped from MLADINOV & LORKOVIĆ (1985) in KUČINIĆ *et al*. (1995) as *Lycaena hippothoe.* In 2006 *L. candens* was found in Jadovno and Veliki Lubenovac, but in very low numbers. In Croatia both species are present and widely distributed, the paleartic *L. hippothoe* in the lowlands, and the oriental *L. candens* in the mountainous part. *L. candens* and *L. hippothoe* are sibling species that are most closely related. On the Balkan Peninsula, according to LORKOVIĆ & MIHLJEVIĆ (1988), *L. candens* and *L. hippothoe* populations can be easily divided according to the altitude of the finding site. *L. hippothoe* is usually found from 100 to the 500 meters above sea level and *L. candens* usually above 900 m a.s.l. Apart from the altitudinal difference there is no significant ecological distinctions between them, although *L. hippothoe* inhabits somewhat wetter meadows and *L. candens* dry and sloping glades (LORKOVIĆ & MIHLJEVIĆ, 1988).

Also, the presence of two myrmecophilous species from the genus *Maculinea* on Mt. Velebit is very interesting: *Maculinea arion* and *Maculinea rebeli*. Imago phase of *M. arion* was found at five localities (Švica, Štirovača, to Bakovac, Bakovac and Jadovno). The larval host plant of *M. rebeli*, *Gentiana cruciata* was found at Jadovno, on the meadows along the road to Bakovac and near Bakovac with eggs and larvae, which undoubtedly confirms the presence of the species, and the imago was also

found in Jadovno and Bakovac. KUČINIĆ *et al*. (1995) mentions a specimen of *M. alcon* from the past century, from the Gušić collection, at the locality above Kozjak. In the paper, Kučinić states that according to the foodplant *G. cruciata*, which is common on Mt. Velebit, this specimen could be the species *M. rebeli*. In addition, *G. pneumonanthe*, the larval host plant of *M. alcon*, has never been found on Mt. Velebit (KUČINIĆ *et al.,* 1995; FORENBACHER, 2001; TOPIĆ & PALKOVIĆ, 2005). In all studied localities, we also did not find *Gentiana pneumonanthe. G. pneumonanthe* prefers marshy and humid meadows, while *M. rebeli* and *G. cruciata* prefer dry swards and mountain pastures (BERECZKI *et al*., 2005), which dominate the investigated area. The former subspecies *Maculinea alcon alcon* and *Maculinea alcon rebeli* were separated in two sibling species (LEPIDOPTEROLOGEN-ARBEITSGRUPPE, 1987) whose differences are based on different foodplants and host ant species (THOMAS *et al.,* 1989). The present taxonomic status of both is quite confusing, even if accepted as separate species, for genetic differentiation has shown little or no difference (ALS *et al*. 2004; PECH *et al.,* 2004; BERECZKI *et al*., 2005), so in the current literature they are considered differently, as one species, two species or even ecological forms.

Specimens determined as *Pseudophilotes baton* (Bergsträsser, 1779) (KUČINIĆ *et al.,* 1995) due to acceptance of systematics according to HIGGINS & RILEY (1993) have to be redetermined as *Pseudophilotes vicrama.* Both sexes of *P. vicrama* resemble *P. baton*, but their area of distribution in Europe differs. *P. baton* spreads from northern Portugal to south-western Poland and western Austria, and *P. vicrama* from southern Finland, north-eastern Italy to Greece and the European part of Turkey (TOLMAN & LEWINGTON, 1997).

For the first time for Mt. Velebit, in the research in 2005 and 2006 we found species from the Nymphalidae family, *Araschnia levana, Euphydryas aurinia, Melitaea diamina, Melitaea aurelia, Melitaea britomartis, Neptis sappho, Apatura iris, Limenitis populi, Pararge aegeria, Aphantopus hyperantus* and *Arethusana arethusa.* On the other hand, some previously recorded species (KUČINIĆ *et al*., 1995; JUTZELER *et al*., 2001, 2002) were not found at any recently studied localities, like *Argynnis niobe, Limenitis camilla, Nymphalis vaualbum, Melanargia larissa, Pyronia tithonus, Erebia stirius, Erebia pronoe, Erebia gorge, Minois dryas* and *Hipparchia statilinus.*

Several nymphalid species are hereafter emphasized. For *Araschnia levana* the finding locality in Jadovno is the most southern finding site of the species in Croatia (JAKŠIĆ, 1988).

From the most interesting and for the mountainous area the most specific genus *Erebia* we have recorded eight species (*E. ligea, E. euryale, E. epiphron, E. aethiops, E. medusa, E. ottomana, E. oeme* and *E. melas*). The most interesting *Erebia gorge vagana* has not been found recently, but was found in the past century. It inhabits only the north-eastern slopes of Mt. Velebit at an altitude from 1600 to 1660 m a.s.l. in the area between Babin vrh and Vaganski vrh (southern Velebit – Paklenica NP). These exact microlocalities have not been visited in this research. Imago flight period dates from July 14th to August 14th. According to LORKOVIĆ (1955) Mt. Velebit is the area with the lowest altitude at which *gorge* is still preserved/maintained. This one and only finding locality of *gorge* in Croatia is even 400 meters lower than that on Mt. Prenj (2155 m a.s.l., Herzegovina, BH) which is the second lowest in the entire

area of the species distributional range. As a result of altitudinal presence LORKOVIĆ (1955) concluded that from the end of the last glacial period there were no warmer climatic periods than the present one, because otherwise *gorge* would have withdrawn to higher altitudes and these do not exist on Mt Velebit.

During our field trips on Mt. Velebit in the last two years the Styrian Ringlet *Erebia stirius* (GODART, 1824) was not detected. WARREN (1936) mentioned the presence of the Styrian Ringlet (*Erebia stirius* f. *nerine* (Freyer, 1831) on Mt. Velika Kapela and Mt. Velebit. Also according to WARREN (1936), in the mentioned area the form of the nominal species (typical race) is very abundant and it is possible that it may even be found in the Dinaric Alps. Therefore and according to specimens collected by M. Hilf in 1906, for many years Lorković tried to confirm the species in the southern part of Gorski Kotar, on Bjelolasica peak and on the Bijele Stijene peak (Mt. Velika Kapela), near Baške Oštarije (Mt. Velebit) as well as in the entire area of Mt. Velebit, but did not succeed (LORKOVIĆ, 1952; 1955). On the other hand, according to JUTZELER *et al.* (2001, 2002), in 1983 and never after, Ortner succeeded in finding one male specimen of *E. stirius* near Baške Oštarije at 1000 m a.s.l. Without a clear documentation or re-finding, we believe the presence of *E. stirius* on Mt. Velebit is highly questionable.

From the *Hipparchia* genus we have detected three species out of four known in Croatian fauna: *Hipparchia semele, H. syriaca* and *H. fagi.* According to LORKOVIĆ (1976) the ranges of two similar species *H. fagi* and *H. syriaca* in south-eastern Europe overlap in the coastal region but are usually isolated in the near vicinity in spite of their ecological similarity. Conspecific *H. fagi* and *H. syriaca* are easily distinguished by the Jullien organ in males and by the sculpture of sclerotized postvaginal and antevaginal lamella in females (LORKOVIĆ, 1976). *H. fagi* has 2–4 hair-like scales in the Jullien organ and *H. syriaca* has 9 or more hair-like scales in the Jullien organ. Difference in the postvaginal lamella structure between *H. fagi* and *H. syriaca* is reflected in the scaly cover of lobes vaginales so each specimen of *H. fagi* or *H. syriaca* can be easily distinguished in the field, even without genitalia preparation. According to LORKOVIĆ (1976) in the investigated area there are no intermediar genitalia between these two taxa, hence no hibridization. This means that *H. fagi* and *H. syriaca* are completely reproductively separate species.

From the *Coenonympha* genus two species must be additionally discussed: *Coenonympha rhodopensis* found at Babić Siča, Dabarska kosa and Borovački Padež in 2005 and 2006 and *Coenonympha tullia* mentioned in KUČINIĆ *et al*. (1995). The presence of the species *Coenonympha tullia* has so far never been recorded for Croatia. All specimens mentioned in KUČINIĆ *et al*. (1995) cited from the Central Butterfly Collection of the CNHM and Coll. Gušić refer to the original description of this species as a variety, and later as a mountain subspecies of the *C. tullia* syn. *tiphon* (SIJARIĆ, 1984). Those taxonomic statuses were accepted in the scientific and review literature for more than 75 years (SIJARIĆ, 1984). The nominal form of the species *Coenonympha rhodopensis* is linked to the eastern part of the Balkan Peninsula and its subspecies *occupata* Rebel to the western part (SIJARIĆ, 1979; 1984). Subspecies *occupata* is typical of the Dinaric Alps while border areas (habitats close to the Adriatic Sea) are characterized by a higher percentage of intermediate forms if compared to the nominal

forms. On Mt. Velebit *Coenonympha rhodopensis* was found at localities above 1000 m a.s.l., usually on dry and sunny mountainous meadows.

Localities with the highest number of the registered species are Žive Vodice* (41 species), Ljubica** (43), Jadovno** (45) and Dabarska kosa** (46). Of the mentioned localities only the Žive Vodice locality was visited just once. At all the mentioned localities habitat types are very diverse (FORENBACHER, 2001), contributing to the highest number of established species.

In addition, the highest number of species was established for the area of the Velebit Nature Park (96) because of the frequency of field trips and diversity of habitat types.

From 106 species detected on Mt. Velebit, 13 (out of 38) are listed in the Red List of butterflies of Croatia (ŠAŠIĆ & KUČINIĆ, 2004). These are *Maculinea rebeli* (VU), *Parnassius apollo* (VU), *Apatura iris* (NT), *Glaucopsyche alexis* (NT), *Limenitis populi* (NT), *Parnassius mnemosyne* (NT), *Scolitantides orion* (NT), *Erebia medusa* (DD), *Euphydryas aurinia* (DD), *Maculinea arion* (DD), *Melitaea aurelia* (DD), *Melitaea britomartis* (DD) and *Pseudophilotes vicrama* (DD).

Maculinea arion is an endangered European butterfly (EN-SPEC 3) (VAN SWAAY & WARREN, 1999) listed in the Appendix II of the Bern Convention (ANON., 1996), Annex IV of the Habitats Directive (ANON., 1992) and the IUCN Red List of the Threatened Species (IUCN, 2006). It was found on sunny and flowery grasslands at Švica, Štirovača, Bakovac and Jadovno localities. Conservation measures that should be carried out for this species maintenance, as well for others like *M. rebeli*, *G. alexis*, *P. vicrama* and *S. orion* on Mt. Velebit are extensive grazing and mowing of grasslands and regular future monitoring.

Moreover, *Parnassius apollo* is protected in many European countries and listed in the Appendix II of the Bern Convention (ANON., 1996), the Annex IV of the Habitats Directive (ANON., 1992), IUCN Red List of the Threatened Species (IUCN, 2006) and the Red Data Book of European Butterflies (VU-SPEC 3) (VAN SWAAY & WARREN, 1999). The species was found in several localities in 2005 and 2006: Položine, Dabarska kosa, from Begovača to Krasno, along the road to Kugina kuća mt. hut, in Jadovno and Struge. The species was also observed at the localities Sadikovac, Jadičevac, pool to Kiza peak and Alaginac (pers. comm. V. Prpić), above Vlaški grad to the Sveto brdo peak (pers. comm. G. Lukač) and on Struge near the Buljma pass (pers. comm. Z. Marasović). The major threats to species maintenance in the researched localities are the loss, fragmentation and isolation of Velebit's grassland habitats (especially those with its larval host plant *Sedum album*) as well as uncontrolled collecting because of the species attractiveness.

Further, *Melitaea aurelia* and *Melitaea britomartis* have vulnerable threat status in Europe (VU-SPEC 3) (VAN SWAAY & WARREN, 1999) due to habitat fragmentation and loss. They were found on moist, grassy and flowery meadows in several localities (Švica, Ljubica, Trnovac, Jadovno, Petrašica and Borovački Padež). The preservation of those meadows should also be priority.

Euphydryas aurinia is present in the Red Data Book of European Butterflies (VU-SPEC 3), in Appendix II of the Bern Convention (ANON., 1996) and Annex II of the Habitats Directive (ANON., 1992). It was found in two localities: the wetland habitat

Baške Oštarije (near Ljubica creek) and marshy parts of the meadows in Trnovac. The major threats could occur at the Trnovac locality due to agricultural improvements, chemical pollution and land drainage. Locality in Baške Oštarije is endangered by possible urbanisation.

Furthermore, the protection of meadows, humid woodland clearings as well as grassy alpine slopes amongst sparse coniferous trees is necessary in preservation of habitats of the Woodland Ringlet. *Erebia medusa* is a generally widespread but locally very rare butterfly.

We should mention that the main factors influencing butterfly diversity on Mt. Velebit include habitat structure, quality, fragmentation as well as habitat suitability. Altogether, grasslands maintained by traditional means of grazing or mowing as well as the prevention of habitat destruction are necessary as butterflies have very specific habitat requirements and occupy very specific and narrow ecological niches.

Biogeographical analysis

Biogeographical analysis shows the dominance of Eurosibirean (62.26%), Oriental (14.15%) and Mediterranean (13.21%) species. According to geographical position, climatic characteristics and the size of Velebit, this can be easily explained. Climatic characteristics greatly depend on the geographical position, length, the lie of the mountain and on relief which causes microclimatic features (POLJAK, 1974; FORENBACHER, 2001). Dominance of the Eurosibirean species is due to the expressed influence of the continental and mountainous climate, and the high percentage of the Oriental and Mediterranean species to the high Mediterranean influence affecting Velebit.

In all, this paper is a contribution to the knowledge of butterfly fauna of Mt. Velebit. No further considerable increase in species number can be expected. Future activities should be continued with more detailed study of the butterfly vertical (altitudinal) and horizontal distribution and confirmation of the past data.

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SAŽETAK

Prilog poznavanju danjih leptira (Hesperioidea & Papilionoidea) Velebita, Hrvatska

I. Mihoci, M. Šašić & M. Vuković

Istraživanjima danjih leptira Velebita 2005. i 2006. godine zabilježeno je 106 vrsta na 70 lokaliteta. Uzimajući u obzir podatke prijašnjih istraživanja danjih leptira Velebita (KUČINIĆ *et al*., 1995; JUTZELER *et al*., 2001; 2002) i podatke iz ovoga rada, ukupni broj dosad potvrđenih vrsta iznosi 137 vrsta ili 72,10% faune danjih leptira Hrvatske (MIHOCI *et al*., 2005; 2006; PERKOVIĆ, 2006). Na prostoru Nacionalnog parka »Sjeverni Velebit« zabilježili smo 69 vrsta, na prostoru Parka prirode »Velebit« 96 vrsta, a na području Nacionalnog parka »Paklenica« 55 vrsta.

Istraživanjima u 2005. i 2006. godini po prvi puta su u fauni danjih leptira Velebita zabilježene vrste: *Lycaena alciphron, Satyrium w-album, Satyrium pruni, Cupido alcetas, Celastrina argiolus, Polyommatus dorylas, Polyommatus amandus, Hamearis lucina, Araschnia levana, Euphydryas aurinia, Melitaea diamina, Melitaea aurelia, Melitaea britomartis, Nepthis sappho, Apatura iris, Limenitis populi, Pararge aegeria, Aphantopus hyperanthus, Arethusana arethusa, Thymelicus lineola, Thymelicus sylvestris* i *Hesperia comma.* S druge strane, neke vrste koje su bile zabilježene prethodnim istraživanjima faune Velebita (KUČINIĆ *et al*., 1995; JUTZELER *et al*., 2001; 2002) našim istraživanjima nisu potvrđene. To su vrste: *Zerynthia polyxena, Pontia daplidice, Colias hyale, Lycaena phleas, Leptotes pirithous, Lampides boeticus, Iolana iolas, Tarucus balkanica, Pseudophilotes vicrama, Plebeius argyrognomon, Aricia anteros, Aricia artaxerxes, Aricia eumedon, Polyommatus eros, Limenitis camilla, Nymphalis vaualbum, Argynnis niobe, Melanargia larissa, Hipparchia statilinus, Minois dryas, Erebia stirius, Erebia pronoe, Erebia gorge, Pyronia tithonus, Pyrgus malvae, Pyrgus alveus, Pyrgis carthami, Pyrgus serratulae, Carcharodus alceae* i *Thymelicus sylvestris.*

Na lokalitetima Žive Vodice (41), Ljubica (43), Jadovno (45) i Dabarska kosa (46) zabilježen je najveći broj vrsta čemu u velikoj mjeri pridonosi različitost stanišnih tipova na navedenim lokacijama.

Zoogeografska analiza utvrđenih vrsta ukazuje na dominaciju eurosibirskih, orijentalnih i mediteranskih vrsta, što se može objasniti geografskim položajem, smjerom pružanja, mikroreljefom i klimatskim obilježjima Velebita.

S obzirom na objavljene podatke u KUČINIĆ *et al*. (1995), navode se ispravci za vrste *Leptidea morsei, Lycaena hippothoe, Pseudophilotes baton, Maculinea alcon* i *Coenonympha tullia* u fauni Velebita.

Ovaj rad prilog je poznavanju faune danjih leptira Velebita. Daljnjim faunističkim istraživanjima ne očekuje se značajan porast broja vrsta na Velebitu. Buduća faunistička istraživanja danjih leptira Velebita trebalo bi usmjeriti na proučavanje horizontalne i vertikalne distribucije vrsta, visinskog raspona koji pojedina vrsta zauzima, kao i na potvrdu nalaza vrsta zabilježenih u prošlom stoljeću.

APPENDIX

Check-list of butterflies (Hesperioidea & Papilionoidea) from Mt. Velebit

1. *Erynnis tages* (Linnaeus, 1758)
2. *Carcharodus alceae* (Esper, 1780)
3. *Carcharodus lavatherae* (Esper, 1783)
4. *Carcharodus floccifera* (Zeller, 1847)
5. *Pyrgus carthami* (Hübner, 1813)
6. *Pyrgus malvae* (Linnaeus, 1758)
7. *Pyrgus serratulae* (Rambur, 1839)
8. *Pyrgus alveus* (Hübner, 1803)
9. *Thymelicus lineola* (Ochsenheimer, 1808)
10. *Thymelicus sylvestris* (Poda, 1761)
11. *Thymelicus acteon* (Rottemburg, 1775)
12. *Hesperia comma* (Linnaeus, 1758)
13. *Ochlodes venata* (Bremer & Grey, 1853)
14. *Zerynthia polyxena* (Denis & Schiffermüller, 1775)
15. *Parnassius mnemosyne* (Linnaeus, 1758)
16. *Parnassius apollo* (Linnaeus, 1758)
17. *Iphiclides podalirius* (Linnaeus, 1758)
18. *Papilio machaon* Linnaeus, 1758
19. *Leptidea sinapis* (Linnaeus, 1758)
20. *Antocharis cardamines* (Linnaeus, 1758)
21. *Aporia crataegi* (Linnaeus, 1758)
22. *Pieris brassicae* (Linnaeus, 1758)
23. *Pieris mannii* (Mayer, 1851)
24. *Pieris rapae* (Linnaeus, 1758)
25. *Pieris ergane* (Geyer, 1828)
26. *Pieris napi* (Linnaeus, 1758)
27. *Pontia daplidice* (Linnaeus, 1758)
28. *Colias croceus* (Fourcroy, 1785)
29. *Colias hyale* (Linnaeus, 1758)
30. *Gonepteryx rhamni* (Linnaeus, 1758)
31. *Gonepteryx cleopatra* (Linnaeus, 1767)
32. *Hamearis lucina* (Linnaeus, 1758)
33. *Lycaena phleas* Linnaeus, 1761)
34. *Lycaena virgaureae* (Linnaeus, 1758)
35. *Lycaena alciphron* (Rottemburg, 1775)
36. *Lycaena candens* (Herrich-Schäffer, 1844)

37. *Satyrium w-album* (Knoch, 1782)
38. *Satyrium pruni* (Linnaeus, 1758)
39. *Satyrium spini* (Denis & Schiffermüller, 1775)
40. *Satyrium ilicis* (Esper, 1779)
41. *Lampides boeticus* (Linnaeus, 1767)
42. *Leptotes pirithous* (Linnaeus, 1767)
43. *Tarucus balkanica* (Freyer, 1844)
44. *Cupido minimus* (Fuessly, 1775)
45. *Cupido alcetas* (Hoffmannsegg, 1804)
46. *Celastrina argiolus* (Linnaeus, 1758)
47. *Pseudophilotes vicrama* (Moore, 1865)
48. *Scolitantides orion* (Pallas, 1771)
49. *Glaucopsyche alexis* (Poda, 1761)
50. *Iolana iolas* (Ochsenheimer, 1816)
51. *Maculinea arion* (Linnaeus, 1758)
52. *Maculinea rebeli* (Hirschke, 1904)
53. *Plebeius argus* (Linnaeus, 1758)
54. *Plebeius idas* (Linnaeus, 1761)
55. *Plebeius argyrognomon* (Bergsträsser, 1779)
56. *Aricia eumedon* (Esper, 1780)
57. *Aricia agestis* (Denis & Schiffermüller, 1775)
58. *Aricia artaxerxes* (Fabricius, 1793)
59. *Aricia anteros* (Freyer, 1838)
60. *Polyommatus semiargus* (Rottemburg, 1775)
61. *Polyommatus dorylas* (Denis & Schiffermüller, 1775)
62. *Polyommatus amandus* (Schneider, 1792)
63. *Polyommatus icarus* (Rottemburg, 1775)
64. *Polyommatus eros* (Ochsenheimer, 1808)
65. *Polyommatus daphnis* (Denis & Schiffermüller, 1775)
66. *Polyommatus bellargus* (Rottemburg, 1775)
67. *Polyommatus coridon* (Poda, 1761)
68. *Libythea celtis* (Laicharting, 1782)
69. *Argynnis paphia* (Linnaeus, 1758)
70. *Argynnis pandora* (Denis & Schiffermüller, 1775)
71. *Argynnis aglaja* (Linnaeus, 1758)
72. *Argynnis adippe* (Denis & Schiffermüller, 1775)
73. *Argynnis niobe* (Linnaeus, 1758)
74. *Issoria lathonia* (Linnaeus, 1758)
75. *Brenthis ino* (Rottemburg, 1775)

76. *Brenthis daphne* (Denis & Schiffermüller, 1775)
77. *Brenthis hecate* (Denis & Schiffermüller, 1775)
78. *Boloria euphrosyne (*Linnaeus, 1758)
79. *Boloria dia* (Linnaeus, 1767)
80. *Vanessa atalanta* (Linnaeus, 1758)
81. *Vanessa cardui* (Linnaeus, 1758)
82. *Inachis io* (Linnaeus, 1758)
83. *Aglais urticae* (Linnaeus, 1758)
84. *Polygonia c-album* (Linnaeus, 1758)
85. *Polygonia egea* (Cramer, 1775)
86. *Araschnia levana* (Linnaeus, 1758)
87. *Nymphalis antiopa* (Linnaeus, 1758)
88. *Nymphalis polychloros* (Linnaeus, 1758)
89. *Nymphalis vaualbum* (Denis & Schiffermüller, 1775)
90. *Euphydryas aurinia* (Rottemburg, 1775)
91. *Melitaea cinxia* (Linnaeus, 1758)
92. *Melitaea phoebe* (Denis & Schiffermüller, 1775)
93. *Melitaea trivia* (Denis & Schiffermüller, 1775)
94. *Melitaea didyma* (Esper, 1778)
95. *Melitaea diamina* (Lang, 1789)
96. *Melitaea aurelia* Nickerl, 1850
97. *Melitaea britomartis* Assmann, 1847
98. *Melitaea athalia* (Rottemburg, 1775)
99. *Limenitis populi* (Linnaeus, 1758)
100. *Limenitis camilla* (Linnaeus, 1964)
101. *Limenitis reducta* Staudinger, 1901
102. *Neptis sappho* (Pallas, 1771)
103. *Apatura iris* (Linnaeus, 1758)
104. *Pararge aegeria* (Linnaeus, 1758)
105. *Lasiommata megera* (Linnaeus, 1767)
106. *Lasiommata maera* (Linnaeus, 1758)
107. *Coenonympha rhodopensis* Elwes, 1900
108. *Coenonympha arcania* (Linnaeus, 1761)
109. *Coenonympha glycerion* (Borkhausen, 1788)
110. *Coenonympha pamphilus* (Linnaeus, 1758)
111. *Pyronia tithonus* (Linnaeus, 1767)
112. *Aphantopus hyperantus* (Linnaeus, 1758)
113. *Maniola jurtina* (Linnaeus, 1758)
114. *Hyponephele lycaon* (Rottemburg, 1775)

115. *Hyponephele lupinus* (O. Costa, 1836)
116. *Erebia ligea* (Linnaeus, 1758)
117. *Erebia stirius* (Godart, 1824)
118. *Erebia euryale* (Esper, 1805)
119. *Erebia epiphron* (Knoch, 1783)
120. *Erebia aethiops* (Esper, 1777)
121. *Erebia medusa* (Denis & Schiffermüller, 1775)
122. *Erebia gorge* (Hübner, 1804)
123. *Erebia ottomana* Herrich-Schäffer, 1847
124. *Erebia pronoe* (Esper, 1780)
125. *Erebia melas* (Herbst, 1796)
126. *Erebia oeme* (Hübner, 1804)
127. *Melanargia galathea* (Linnaeus, 1758)
128. *Melanargia larissa* (Geyer, 1828)
129. *Satyrus ferula* (Fabricius, 1793)
130. *Minois dryas* (Scopoli, 1763)
131. *Hipparchia fagi* (Scopoli, 1763)
132. *Hipparchia syriaca* (Staudinger, 1871)
133. *Hipparchia semele* (Linnaeus, 1758)
134. *Hipparchia statilinus* (Hufnagel, 1766)
135. *Arethusana arethusa* (Denis & Schiffermüller, 1775)
136. *Brintesia circe* (Fabricius, 1775)
137. *Chazara briseis* (Linnaeus, 1764)