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CONTRIBUTION TO THE KNOWLEDGE OF THE BUTTERFLY FAUNA OF MONTENEGRO (LEPIDOPTERA: RHOPALOCERA)

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Abstract - During the years 2009 to 2013, three visits to Montenegro were made to study the spring and early summer butterfly fauna. The focus of our study was on the south-western part of the country, especially the coastal region. A total of 31 localities were visited and some interesting observations were made. Altogether 112 species were recorded, confirming high diversity of the butterfly fauna of this country. Among the observed species, the following are rare or local in Montenegro: *Papilio alexanor*, *Gonepteryx cleopatra*, *Brenthis ino*, *Apatura metis*, *Coenonympha orientalis*, *Pyrgus sidae*, while *Cupido osiris* is reported for the first time for the country. Based on available literature information the butterfly fauna of Montenegro now includes 168 species.

KEY WORDS: butterflies, distribution, conservation, rare species, *Cupido osiris*

Izvleček – PRISPEVEK K POZNAVANJU FAVNE METULJEV ČRNE GORE (LEPIDOPTERA: RHOPALOCERA)

V letih 2009 do 2013 smo opravili tri raziskave dnevnih metuljev v Črni gori predvsem v pomladanskem in zgodnjem poletnem času. Glavni del raziskav je bil usmerjen v jugozahodni obalni del države. Skupno smo obiskali 31 lokacij in zabeležili 112 vrst metuljev, med njimi je tudi nekaj zanimivih najdb. Med opaženimi vrstami se naslednje redko ali lokalno pojavljajo v Črni gori: *Papilio alexanor*, *Gonepteryx cleopatra*, *Brenthis ino*, *Apatura metis*, *Coenonympha orientalis*, *Pyrgus sidae*. Prvič sploh pa smo za Črno goro zabeležili modrina *Cupido osiris*. Na osnovi pregledane literature vključuje favna dnevnih metuljev Črne gore sedaj 168 vrst.

KLJUČNE BESEDE: dnevni metulji, razširjenost, varstvo, redke vrste, *Cupido osiris*

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Introduction

Butterflies are one of the most attractive and recognisable groups of insects, therefore their distribution is usually well known. In Montenegro, first reports of butterfly fauna were made at the end of 19th century (Nicholl 1899 – 1902), followed by the more comprehensive studies published by Rebel (1913) and Rebel & Zerny (1931). After a long gap without surveys caused by political instability and war the next contribution dealing with the fauna of the south-western part of the country was published in 1958 (Carnelutti & Michieli 1958). The authors list 79 species of butterflies, most notably *Papilio alexanor* (Esper, 1800) for Stari Bar. Also the next study was centred on the butterfly fauna of the coastal part of Montenegro (Sijarić & Mihljević 1972). However, in 1984 the butterfly fauna of the Durmitor Mts. was published (Sijarić et al. 1984), providing by far the most detailed study of butterflies in Montenegro. Even now we can say that Durmitor is the best studied part of the country. Last overview of the butterfly fauna of Montenegro followed in the same year (Sijarić, 1984) with a total of 160 species listed. Since then no additional faunistic papers were published, but the provisional distribution maps published by Jakšić (1988) indicate presence of several additional species for Montenegro, however without traceable background information.

Given the size of the country, relatively large number of butterfly species is known from Montenegro, owing mainly to very diverse and highly structured landscape, large altitudinal span and variable climate. These factors provide a multitude of different habitats important for both habitat generalist and specialist species. Additionally most parts of the country are little affected by human activity and extensive farming is still prevailing. Besides intensively cultivated areas around Podgorica and Skadar Lake, the habitats of coastal area are most disturbed due to large scale building of tourist infrastructure.

In recent years, no new data about fauna of butterflies were published for Montenegro. The main goal of our overview is therefore to contribute new and more detailed data about distribution of Montenegrin butterflies, especially species flying in spring, with the spring aspect of fauna being commonly neglected in previous butterfly studies.

Materials and Methods

Butterflies were observed during three surveys in Montenegro. The first survey took place from 26.4.2009 until 2.5.2009 covering the south-western part of the country. The second visit was between 29.6.2011 and 3.7.2011 in Durmitor Mts. and Skadar Lake. The final visit was carried out from 28.4.2013 until 4.5.2013 in the coastal part including Podgorica region. In total, 31 localities were visited. The selection of localities with potential interesting habitats was based on investigation of Google Earth satellite images. Adult butterflies were netted using entomological nets and released after identification. Butterflies were identified in the field by field guide Butterflies of Britain and Europe (Tolman & Lewington, 1997).

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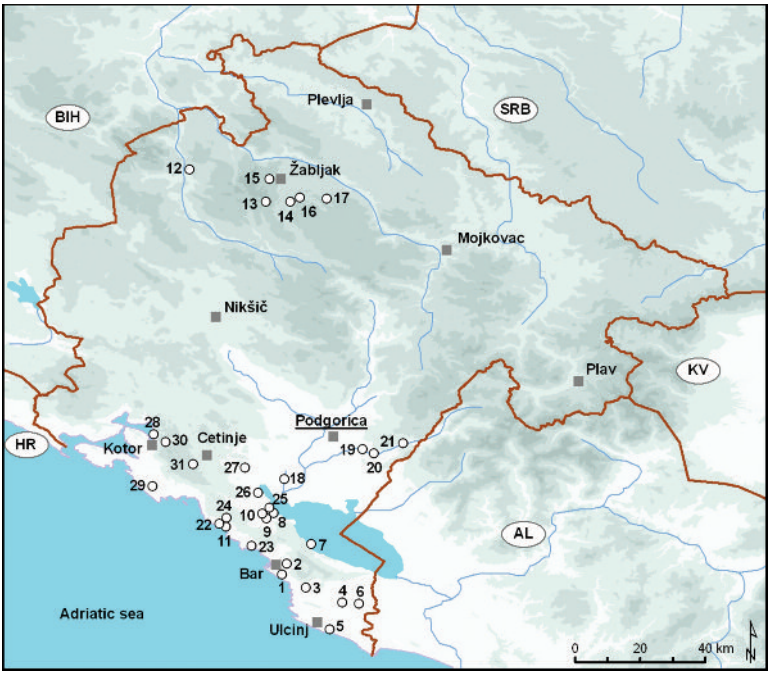

Fig. 1: Map of sampling sites for butterflies during the surveys in Montenegro. The numbers correspond to the list of localities in the Materials and Methods section.

Sl. 1: Zemljevid lokacij s podatki o dnevnih metuljih v Črni gori. Številke lokacij ustrezajo seznamu lokacij v Materialih in metodah.

List of localities

The list of localities contains the relevant toponyms, a short description of the habitat, altitude, coordinates and date of the visit. The localities are arranged in chronological order.

1. Bar, Tomba, meadows and bushes 12 km S of Bar, 45m, 42° 3’54.02”; 19° 7’35.75”; 26.4.2009
2. Bar, Stari Bar, rocky slopes bellow the fortress, 95 m, 42° 5’26.24”; 19° 7’56.47”; 26.4.2009, 29.4.2013
3. Bar, Pečurice, Mrkovsko polje, meadows and pastures SE of the village, 230 m, 42° 1’27.46”; 19°11’30.03”: 27.4.2009
4. Ulcinj, Donja Klezna, Briško polje, bushes and pastures SE of the village, 10 m, 41°59’0.64”; 19°17’33.48”; 27.4.2009
5. Ulcinj, Velika plaža, pastures by the beach, 5 m, 41°54’32.60”; 19°15’28.01”; 25.4.2009 and 27.4.2009
6. Ulcinj, Šas, Šaško Lake, meadows and bushes N of the lake, 5 m, 41°58’48.15”; 19°20’18.36”; 25.4.2009 and 29.4.2009
7. Virpazar, Donji Murići, Skadarsko Lake, rocky slopes by the road to Virpazar, 250 m, 42° 9’15.34”; 19°12’46.92”; 30.4.2009
8. Virpazar, Godinje, Skadarsko lake, rocky slopes and bushes by the road to Virpazar, 90 m, 42°13’51.77”; 19° 6’11.50”; 30.4.2009
9. Virpazar, Boljevici, meadows E of the village; 15 m, 42°13’26.01”; 19° 5’2.39”; 30.4.2009, 30.4.2013

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10. Virpazar, Gluhi Do, Crmničko polje, meadows S of the village, 10 m, 42°13'46.91"; 19° 4'19.06"; 30.4.2009
11. Petrovac, Buljarica, meadows and bushes S of the village; 5 m, 42°11'34.57"; 18°58'16.46"; 2.5.2009, 28.4.2013
12. Pivska Planina, Unač, grassy slopes along the road from Piva to Durmitor S of the village, 1110 m, 43°10'48.03"; 18°52'12.49"; 29.6.2011
13. Durmitor, Mt. Stožina, southern slopes above the road at Suva lokva, 1700 m, 43° 5'29.22"; 19° 4'53.36"; 29.6.2011
14. Durmitor, Žugića Bara, rocky slopes S of the bogs, 1400 m;43° 6'11.81"; 19°10'33.39"; 29.6.2011
15. Durmitor, Žabljak, meadows at Barno Lake, 1500 m, 43° 9'18.08"; 19° 5'28.77"; 30.6.2011
16. Durmitor, Žabljak, meadows W of Riblje Lake; 1410 m; 43° 5'32.89"; 19° 8'55.87"; 30.6.2011
17. Durmitor, Njegovuđa, meadows SE of the Zminičko Lake; 1310 m; 43° 5'59.66"; 19°14'57.36"; 30.6.2011
18. Skadar, Dodoši, along the river S of the village; 5 m; 42°19'30.51"; 19° 8'1.22"; 1.7.2011
19. Podgorica, Dinoša, rocky slopes along the Cijevna River E of the village; 90 m; 42°24'28.01"; 19°20'55.83"; 3.7.2011, 1.5.2013
20. Podgorica, Dinoša, pastures on the N side of Cijevna River at the first bridge E of the village; 95 m; 42°23'47.67"; 19°22'49.70"; 3.7.2011, 1.5.2013
21. Podgorica, Cijevna, above the gorge of the Cijevna River W of the village; 170 m; 42°25'26.85"; 19°27'40.03"; 3.7.2011
22. Petrovac, Lučice, meadows and bushes in the village, forest pathway, 10 m, 42°12'4.67"; 18°57'9.29"; 28.4.2013
23. Bar, Sutomore, grassy slopes and bushes SE from town; 60 m, 42° 8'27.01"; 19° 2'33.96"; 29.4.2013
24. Petrovac, Novoselje, meadows by the road to Petrovac; 660 m, 42°13'4.04"; 18°58'22.88"; 30.4.2013
25. Virpazar, rocky slopes and forest pathway SE from town; 40 m, 42°14'43.69"; 19° 5'30.78"; 30.4.2013
26. Komarno, meadows around village; 240 m, 42°17'16.10"; 19° 3'37.02"; 30.4.2013
27. Rijeka Crnojevića, meadows E from village; 25m, 42°21'20.86"; 19° 1'26.75"; 30.4.2013
28. Kotor, grassy slopes on the W of the town ; 220 m, 42°25'29.03"; 18°46'19.63"; 3.5.2013
29. Lastva Grbaljska, Glavati, meadows around the village; 210m, 42°18'19.61"; 18°46'7.23"; 3.5.2013
30. Kotor, Njeguši, rocky slopes and meadows S of the village; 915 m, 42°25'40.88"; 18°48'19.40"; 4.5.2013
31. Cetinje, Bjeloši, meadows by the road to Cetinje; 990 m, 42°21'56.66"; 18°52'48.95"; 4.5.2013

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Results

Table 1: The distribution of recorded butterfly species in Montenegro. The numbering of localities corresponds to the list of localities in Materials and Methods section. Nomenclature follows Van Swaay et al. 2010, and Fauna Europaea (2014).

Species	**Localities**
Papillionidae	
Papillio machaon Linnaeus, 1758	2, 5, 7, 8, 11, 19, 21, 22, 23, 25, 26, 28, 30
Papillio alexanor Esper, 1800	2
Iphiclides podalirius (Linnaeus, 1758)	2, 3, 6, 8, 9, 11, 19, 20, 21, 22, 23, 24, 26, 27, 19, 30
Zerynthia polyxena (Dennis & Schiffermuller, 1775)	1, 3, 9, 10, 11, 19, 20 23, 26, 30, 31
Parnassius apollo (Linnaeus, 1758)	13
Parnassius mnemosyne (Linnaeus, 1758)	12
Pieridae	
Aporia crategi (Linnaeus, 1758)	12
Pieris brassicae (Linnaeus, 1758)	4, 11, 24, 25, 30
Pieris balcana Lorković, 1968	12
Pieris rapae (Linnaeus, 1758)	2, 11, 18, 23, 27, 28
Pieris mannii (Mayer, 1851)	1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 13, 19, 20, 21, 24, 26, 27, 30
Pieris napi (Linnaeus, 1758)	9, 11, 18, 30
Pieris ergane (Geyer, 1828)	13, 20, 21
Pontia edusa (Fabricius, 1777)	1, 23
Euchloe ausonia (Hübner, 1804)	2, 5, 23, 26, 27, 29, 30
Antocharis cardamines (Linnaeus, 1758)	2, 3, 7, 8, 9, 11, 19, 24, 25, 26, 27, 28, 29, 30
Colias alfacariensis Ribbe, 1905	16
Colias croceus (Geoffroy, 1785)	1, 2, 3, 5, 9, 10, 11, 12, 13, 18, 20, 23, 24, 25, 26, 27, 29
Gonepteryx rhamni (Linnaeus, 1758)	2, 3, 8, 19, 20, 21, 24, 26, 29, 30
Gonepteryx cleopatra (Linnaeus, 1767)	11
Leptidaea sinapis/juvernica	1, 2, 3, 4, 7, 8, 10, 11, 19, 20, 21, 23, 24, 28, 29, 30
Lycaenidae	
Satyrium ilicis (Esper, 1779)	12
Callophrys rubi (Linnaeus, 1758)	1, 2, 3, 8, 9, 11, 20, 22, 23, 24, 26, 31
Lycaena phleas (Linnaeus, 1761)	1, 2, 3, 11, 20, 24, 27, 30
Lycaena ottomana (Lefebvre, 1830)	3, 9, 11, 19, 22, 26, 37, 29
Lycaena tytirus (Poda, 1761)	12
Lycaena candens (Herrich-Schaffer, 1844)	13, 15
Tarucus balkanicus (Freyer, 1844)	19, 20
Celestrina argiolus (Linnaeus, 1758)	1, 3, 5, 11, 18, 22, 23
Cupido argiades (Pallas, 1771)	22
Cupido minimus (Fuessly, 1775)	12, 17, 20
Cupido osiris (Meigen, 1829)	29
Glaucopsyche alexis (Poda, 1761)	1, 2, 3, 5, 6, 9, 11, 20, 22, 23, 24, 29, 30, 31
Phengaris alcon (Dennis & Schiffermuller, 1775)	12, 17
Phengaris arion (Linnaeus, 1758)	12
Iolana iolas (Ochsenheimer, 1816)	21
Scolitantides orion (Pallas, 1771)	6, 8, 19, 20, 22, 24, 27, 29, 30
Pseudophilotes vicrama (Moore, 1865)	11, 24
Plebejus argus (Linnaeus, 1758)	12, 13, 14, 17
Plebejus idas (Linnaeus, 1761)	12, 13
Aricia eumedon (Esper, 1780)	12, 15
Aricia agestis (Dennis & Schiffermuller, 1775)	1, 2, 3, 5, 7, 9, 10, 11, 19, 20, 21, 22, 23, 25, 27, 28, 30
Aricia artaxerxes (Fabricius, 1793)	12, 15, 17
Aricia anteros (Freyer, 1838)	12, 15
Cyaniris semiargus (Rottemburg, 1775)	12, 13, 14, 15, 17
Polyommatus amandus (Schneider, 1792)	12, 13, 17

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Polyommatus dorylas (Dennis & Schiffermuller, 1775)	14
Polyommatus icarus (Rottemburg, 1775)	2, 3, 5, 7, 8, 9, 10, 11, 13, 15, 16, 19, 20, 21, 22, 23, 24, 25, 26, 28, 29
Polyommatus eros (Ochsenheimer, 1808)	13
Libytheidae	
Libythea celtis (Laicharting, 1782)	11, 19, 26, 33
Nymphalidae	
Apatura metis Freyer, 1829	18
Limenitis reducta (Staudinger, 1901)	12, 19, 20, 21
Limenitis camilla (Linnaeus, 1764)	12
Nymphalis antiopa (Linnaeus, 1758)	9, 19, 25, 27
Aglais io (Linnaeus, 1758)	6, 9, 16,
Aglais urticae (Linnaeus, 1758)	9, 15, 16, 27
Nymphalis polychloros (Linnaeus, 1758)	31
Vanessa atalanta (Linnaeus, 1758)	2, 15, 19, 24, 25, 28, 31
Vanessa cardui (Linnaeus, 1758)	5, 11, 15, 29, 31
Issoria lathonia (Linnaeus, 1758)	2, 19, 20, 26, 30
Polygonia c-album (Linnaeus, 1758)	17
Polygonia egea (Cramer, 1775)	18
Argynnis paphia (Linnaeus, 1758)	21
Argynnis aglaja (Linnaeus, 1758)	15
Argynnis niobe (Linnaeus, 1758)	21
Brenthis hecate (Dennis & Schiffermuller, 1775)	12
Brenthis daphne (Bergstrasser, 1780)	12, 15
Brenthis ino (Rottemburg, 1775)	12, 15
Boloria titania (Esper, 1793)	15
Boloria euphrosyne (Linnaeus, 1758)	15
Melitaea cinxia (Linnaeus, 1758)	1, 3, 9, 12, 14, 17, 25, 29
Melitaea phoebe (Dennis & Schiffermuller, 1775)	12
Melitaea diamina (Lang, 1789)	15
Melitaea didyma (Esper, 1778)	12, 17, 21
Melitaea athalia (Rottemburg, 1775)	12, 15, 17
Melitaea aurelia Nickerl, 1850	12
Euphydryas maturna (Linnaeus, 1758)	12
Euphydryas aurinia (Rottemburg, 1775)	2, 12, 15, 19, 29
Melanargia galathea (Linnaeus, 1758)	12
Melanargia larissa (Geyer, 1828)	19, 20
Hypparchia syriaca (Staudinger, 1871)	18, 20
Hypparchia fagi (Scopoli, 1763)	12
Satyrus ferula (Fabricius, 1793)	21
Brintesia circe (Fabricius, 1775)	20
Erebia medusa (Dennis & Schiffermuller, 1775)	13
Erebia ottomana Herrich-Schaffer, 1847	13, 16
Erebia oeme (Hübner, 1804)	13, 14
Maniola jurtina (Linnaeus, 1758)	12
Coenonympha rhodophensis Elwes, 1900	13, 14
Coenonympha pamphilus (Linnaeus, 1758)	1, 2, 3, 5, 8, 11, 19, 20, 22, 23, 24, 28, 29
Coenonympha arcania (Linnaeus, 1761)	15, 17, 21
Coenonympha orientalis Rebel, 1910	17
Coenonympha glycerion (Borkhausen, 1788)	12,14,16
Pararge aegeria (Linnaeus, 1758)	1, 2, 3, 4, 11, 18, 22
Lasiommata megera (Linnaeus, 1767)	1, 2, 5, 7, 8, 10, 11, 19, 20, 22, 24, 27, 28, 29, 30
Lasiommata maera (Linnaeus, 1758)	11, 12, 15, 28
Hesperiidae	
Pyrgus malvae (Linnaeus, 1758)	3, 12, 30
Pyrgus alveus (Hubner, 1803)	14
Pyrgus armoricanus (Oberthur, 1910)	16
Pyrgus serratulae (Rambur, 1839)	14

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Pyrgus sidae (Esper, 1784)	2, 12
Spialia orbifer (Hubner, 1823)	12, 16, 20
Carcharodus alcae (Esper, 1780)	18, 24
Carcharodus floccifera (Zeller, 1847)	15
Carcharodus orientalis Reverdin, 1913	2
Erynnis tages (Linnaeus, 1758)	3, 17, 20, 24
Carterocephalus palaemon (Pallas, 1771)	17
Heteropterus morpheus (Pallas, 1771)	12
Thymelicus acteon (Rottemburg, 1775)	21
Thymelicus lineola (Ochsenheimer, 1808)	12
Thymelicus sylvestris (Poda, 1761)	12
Ochlodes sylvanus (Esper, 1777)	12

A total of 112 species were observed during our surveys, representing approximately 70% of all known species for the country (Sijarić, 1984). As no specimens were collected we could not examine the genitalia of *Leptidea* sp., and have therefore listed them as *L. sinapis/juvernica,* the first being much more likely widespread in Montenegro. The most common species was *P. icarus*, which occurred at 21 sites, followed by *I. podalirius*, *P. mannii*, *A. cardamines*, *C. croceus*, *L. sinapis/juvernica*, *G. alexis*, *A. agestis*, *L. megera*, all observed at 14 or more localities. Mostly due to single short summer visit to the mountainous interior part of Montenegro 48 species were observed only at a single location.

Discussion

Due to lack of recent publications we can compare our results only to historical records published thirty or more years ago. Based on these published records we selected some of the rare and local species in Montenegro and for them we provide a more detailed discussion:

Papilio alexanor - the species was reported from Montenegro for the first time by Nicholl (1899) for surroundings of Cetinje. Interestingly Rebel quotes Nicholl, but mentions village Boljevići as the location where she observed *P. alexanor*. One additional observation is reported by Carnelutti & Michieli (1958) for Stari Bar. Since then, there was one additional record from Montenegro for Kotor (Bollino & Sala 2004), however without any additional information on location and date of observation. A photograph of an adult specimen from Njeguši village just above Kotor in May 2008 corroborates this record (Chirs Dowson, pers. comm.). The species was considered extinct in Yugoslavia (Collins & Morris, 1985). We have observed several specimens flying on steep slopes below the Stari Bar fortress confirming its presence at one of the historical sites after more than half a century. The larval host plant *Opopanax chironium* was also observed on the site. *P. alexanor* is protected in Montenegro (Službeni list RCG, 2006) and we hope this possibly extremely isolated population will not be targeted by collectors.

Gonepteryx cleopatra – the species was reported from Montenegro only in 1950's from the vicinity of Sutorman (Carnelutti & Michieli 1958). It is widespread along the Adriatic coast in Dalmatia (Jakšić 1988, Withrington & Verovnik 2008) and also in Greece (Pamperis 2009), but there is an evident gap in the distribution in

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Fig. 2: Habitat (a) and adult (b) photo of *Papilio alexanor* from Stari Bar in Montenegro (photo Vid Švara).

Sl. 2: Habitat (a) in odrasli osebek (b) *Papilio alexanor* iz okolice Starega Bara v Črni gori (foto Vid Švara).

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Montenegro and possibly northern Albania. During our surveys only a single male was observed patrolling over bushy vegetation near Buljarica village.

Cupido osiris – this species is not mentioned in any of the historical publications, therefore we consider it as a new species record for Montenegro. It is known from all neighbouring countries (Rebel 1913, Lelo 2000, Popović & Đurić 2011), therefore its discovery was anticipated. A single male was observed flying over rough grassy terrain near Glavati village.

Brenthis ino – no previous published records, but indicated as present in Montenegro in the bordering area to Bosnia and Hercegovina in distribution maps by Jakšić (1988). This species has been found in low numbers below Pivska planina in dry grasslands and more commonly on wet meadows at Barno Lake near Žabljak, both in Durmitor Mts. The species possibly expanded its range recently, as it was not observed during the detailed surveys in the past century (Sijarić et al. 1984).

Apatura metis – another species with no published records, but indicated as present in Montenegro at Skadar Lake according to distribution maps by Jakšić (1988). Indeed, this species has been found at several sites around Skadar Lake by Filip Franeta (pers. comm.). We observed several males imbibing minerals on muddy shores of Biševina River near Dodoši village (Skadar Lake area), while females were perching on trees.

Coenonympha orientalis – the species was first mentioned for Montenegro by Nicholl (1902) for Durmitor Mts. however it has not been found there again during

Fig. 3: *Cupido osiris* male from vicinity of Glavati village in Montenegro (photo Vid Švara).

Sl. 3: Samec *Cupido osiris* iz okolice vasi Glavati v Črni gori (foto Vid Švara).

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intensive surveys in the past century (Sijarić et al. 1984). Unexpectedly, it was found at much lower altitude (800 m) in Tara River canyon near Gornje Dobrilovine. Authors also mention its presence on Mt. Goleš and Mt. Sjekirica further eastwards (Sijarić et al. 1984). We found the species at Zminičko Lake, where it was flying together with its much more abundant close relative *C. arcania*. Their behaviour was markedly different with *C. orientalis* almost exclusively staying among juniper bushes, while *C. arcania* commonly ventured into glades visiting flowers.

Pyrgus sidae – so far only reported for Lovćen (Sijarić, 1984) and Cetinje area (Rebel, 1913). The species is possibly more widespread as it was found in Durmitor region at Pivska planina (several specimens) and near Sutomore at the coast (single fresh specimen).

In the absence of any recent checklists of Montenegrin butterflies Sijarić's list (Sijarić 1984) could be considered as baseline source for a comparison. He lists 160 species, but omitted three previously published records by Rebel & Zerny (1931): *Gonepteryx farinosa* (Zeller, 1847) mentioned for Bar and *Erebia triaria* (De Pruner, 1798) from Volujak and Rikavac, and possibly by mistake also very common *Glaucopsyche alexis* first recorded from Cetinje. He also does not include *Pieris balcana*, which he recorded in Durmitor (Sijarić et al. 1984). The only subsequent published addition is *Danaus chrysippus* recorded from Budva, Boka Kotorska and Risan by Jakšić & Ristić (1999). The species count becomes more complicated when taking into account distribution maps of Jakšić (1988) who indicates the presence of several additional species: *Leptidea duponcheli* (Staudinger, 1871), *Satyrium w-album* (Knoch, 1782), *Lycaena thersamon* (Esper, 1784), *Polyommatus escheri* (Hübner, 1923), *Charaxes jasius* (Linnaeus, 1767), *Apatura ilia* (Dennis & Schiffermüller, 1775), *Apatura metis*, *Brenthis ino*, and *Hipparchia fatua* (Freyer, 1884). Although these records are not entirely unlikely, they remain anonymous as no additional literature source indicating the presence of these species could be found. We have, however, confirmed the presence of *Apatura metis* and *Brenthis ino*, and together with *Cupido osiris*, bring the total number of observed species in Montenegro to 168. The list is by far not complete, as several records remain unpublished (Filip Franeta, pers. comm.) and the north-eastern mountainous part of the country has hardly been surveyed.

Based on our surveys and incomplete geographic coverage it is hard to judge the endangerment of particular species. However some of the EC Habitat directive species are still widespread in Montenegro and should be taken into consideration for establishment of Emerald network of protected sites in this country. In particularly *Zerynthia polyxena* is widespread in coastal part of the country and possibly threatened by habitat degradation caused by building of tourist infrastructure. *Apatura metis* is another species with an important stronghold around Skadar Lake which is of high conservation importance in general. In addition *Parnassius apollo, P. mnemosyne*, *Phengaris arion*, *Euphydryas maturna* could have important strongholds in the Montenegro mountains, but further studies are required. European Red List of Butterflies (Van Swaay et al. 2010) includes some additional species of conservation importance among which *Coenonympha orientalis* is considered vulnerable (VU).

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The legislative part of butterfly conservation in Montenegro is at present almost non-existent, as only four species from family Papilionidae are protected. Interestingly, the possibly threatened *Zerynthia polyxena* is not included, while common and widespread *Papilio machaon* and *Iphiclides podalirius* are. *Papilio alexanor*, included also in Annex IV of the EC Habitat directive, is probably the most threatened butterfly species in Montenegro due to general habitat degradation along the coast and possible isolation of the single known population.

In many respects Montenegro is still an uncharted territory and certainly holds many important new discoveries. We hope that our publication will contribute to the beginning of a more systematic research of butterflies in Montenegro and hopefully also to conservation of its rich flora and fauna.

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