

A contribution to the knowledge of the butterfly fauna (Lepidoptera: Rhopalocera) of the Cerkljansko-Idrijsko region, west Slovenia, with notes on their vertical distribution

Rudi Verovnik

Dept. of Biology, Biotechnical Faculty, University of Ljubljana, Večna pot 111, SI-1000 Ljubljana, Slovenia. E-mail: rudi.verovnik@uni-lj.si

Abstract: Results of the fieldwork carried out by a lepidopterology group at the Student Research Camp Cerčno '00 are presented. Altogether, 77 butterfly species were recorded between June 26th and July 3rd 2000 at 38 localities, including individual observations. The most interesting discovery was the presence of *Maculinea telejus* Bergstr. in the Bača valley just south of the Julian Alps. Among typically alpine species, *Aricia artaxerxes* F. was recorded exclusively at lower altitudes, whereas its colline sister species *A. agestis* Schiff. was found near the top of Mt. Črna prst at an altitude around 1800 m. The highest diversity of butterfly species and habitat types was observed between 500 and 750 m. Despite the geographical heterogeneity, only few parts of the region have escaped intensive exploration and could be considered important habitats for the threatened butterfly species in Slovenia. The highest conservation value should be acknowledged to the presence of the relatively large and probably interconnected subpopulations of *Maculinea arion* L. in the eastern part of the region.

Key words: Rhopalocera, vertical distribution, endangerment, habitat

Izvešček: PRISPEVEK K POZNAVANJU FAVNE DNEVNIH METULJEV (LEPIDOPTERA: RHOPALOCERA) CERKLJANSKO-IDRIJSKE REGIJE (ZAHODNA SLOVENIJA) S PODATKI O NJIHOVI VERTIKALNI RAZŠIRJENOSTI - Prispevek predstavlja rezultate dela lepidopterološke skupine na Raziskovalnem taboru študentov biologije Cerčno '00. Na 38 lokalitetah, v številni tudi posamična opazovanja, je bilo med 26. julijem in 3. avgustom 2000 opaženih 77 vrst dnevnih metuljev (Rhopalocera). Najpomembnejše je zagotovo odkritje dveh populacij *Maculinea telejus* Bergstr. v dolini Bače tik pod južnim delom Julijskih Alp. Med metulji z značilno alpinsko raširjenostjo je bila vrsta *Aricia artaxerxes* F. najdena le v nižjih predelih, njena sestrška nižinska vrsta *A. agestis* Schiff. pa le na Črni prsti na višini okoli 1800 m. Največja pestrost vrst metuljev in habitatnih tipov je bila zabeležena v višinskem pasu med 500 in 750 m. Kljub geografsko zelo razčlenjeni konfiguraciji so se nekateri deli tega območja izognili intenzivnemu kmetijstvu in gozdarstvu in jih lahko štejemo za pomembne za ohranitev ogroženih vrst metuljev v Sloveniji. Največji naravovarstveni pomen pa imajo dokaj velike in verjetno med seboj povezane subpopulacije vrste *Maculinea arion* L. v vzhodnem delu regije.

Ključne besede: Rhopalocera, vertikalna razširjenost, ogroženost, habitat

Introduction

The Idrijsko-Cerkljansko region has long been neglected by Slovenian and foreign lepidopterists, despite a number of descriptions by Scopoli (1763) of new insect species originating from the surroundings of Idrija. The butterfly fauna of the bordering regions, especially the Julian Alps to the north, has been repeatedly surveyed by numerous authors (Hornig 1854, Rebel 1905, 1906, 1907, 1910, Hafner 1909, Carnelutti & Michieli 1966). The Trnovski gozd plateau to the south and the Soča valley to the west have been less explored, but some records have been published (Mann 1854, Hafner 1910, Carnelutti 1955, Verovnik 2000a). A short presentation of the local butterfly fauna by Carnelutti (1980) is included in the book about Mt. Blegoš, which is situated to the east of the Cerkljansko region. Due to the obvious lack of published information about the butterfly fauna of the Cerkljansko-Idrijsko region, the major task of the butterfly research group at the Student Research Camp Cerkno 2000 was to gather as much information as possible about the distribution of Rhopalocera in this remarkably diverse region.

Due to the mountainous configuration of the entire surveyed region, special attention was given to the altitude distribution of the butterfly species encountered. Vertical distribution types have been designated for Slovenian Lepidoptera by Carnelutti (1981). According to his findings, most of the butterflies in Slovenia are ubiquitous regarding their vertical distribution, and consequently the availability of suitable larval and adult feeding habitats are more important for their distribution.

Geographical characteristics of the region

The Cerkljansko region comprises mostly mountainous countryside with few peaks or ridges higher than 1000 m and therefore mostly covered by forest or cultivated land. The highest peak is Mt. Porezen with its 1630 m where alpine pastures predominate. Despite its height, only the very top and parts of southern slopes are stony, and the vegetation is typically alpine. For comparison of the alpine Rhopalocera diversity, Mt. Kobilja glava (1475) at the foot of the Julian Alps and Mt. Črna prst (1844) in the Julian Alps were included in the survey. Predominant habitat type in the Cerkljansko region is deciduous forest with beech (*Fagus sylvatica* L.), which is in the higher region replaced by coniferous forest with spruce (*Picea abies* (L.) Karsten.). Association Ostryo-Fagetum covers mostly the warmer sunny slopes.

The Idrijsko region has even steeper slopes and deep valleys, although most of the area spreads beneath 1000 m. In some of these valleys, vertical stone walls are present. West of Idrija is a high plateau, Vojsko, with some peaks reaching 1100 m. Parts of this plateau, which is an area of protected landscape, still have small mires and wet meadows. The lower part of the Idrijca river valley and the Bača valley have almost submediterranean climate with pronounced thermophilous vegetation. Other parts have similar predominant forest vegetation as in the Cerkljansko region.

The Idrijsko-Cerkljansko region consists of mostly dolomite substratum with small areas of sandstone and clay. Carbonate ground is limited to the surroundings of Idrija and the area around Mt. Porezen north of Cerkno. The climate is mostly temperate and alpine around Mt. Porezen with a very high level of precipitation reaching up to 3000 mm per year around Idrija and in the Bača valley. There is no distinct dry or wet period (Fridl et al. 1998).

Results

List and description of localities

Exact locality and details regarding coordinates (degrees), UTM square, altitude, habitat and date of each observation are given.

1. Above the village of Huda Južna, Bača valley, coordinates: 13°55'04", 46°10'29", UTM square: VM 11, 390-440 m, partly dry and humid cultivated meadows, 29.07.00
2. Above the village of Ljubinj, Poljubinj, coordinates: 13°46'44", 46°10'15", UTM square: VM 01, 440-480 m, cultivated dry meadows, 31.07.00
3. Above the village of Modrej, Most na Soči, coordinates: 13°45'21", 46°09'32", UTM square: VM 01, 180-250 m, scree interrupted by deciduous forest, 31.07.00
4. Above the village of Rut, Koritnica valley, coordinates: 13°53'56", 46°12'40", UTM square: VM 11, 750-800 m, partly dry cultivated meadow, forest road, 29.07.00
5. Above the village of Trebija, Poljanščica valley, coordinates: 14°06'34", 46°05'51", UTM square: VM 30, 440-500 m, dry meadows, 02.08.00
6. Along the Davča stream, S of Mt. Jemčev Kovk, coordinates: 14°01'52", 46°10'46", UTM square: VM 21, 940-960 m, forest road, small stony scree and dry meadow, 27.07.00
7. At the end of the Pasica stream gorge, Cerkno, coordinates: 14°01'52", 46°09'04", UTM square: VM 21, 480-550 m, dry cultivated meadows, deciduous forest and stone wall at abandoned quarry, 27.07.00
8. At Jezeršek farm, E of Mt. Štor, Cerkno, coordinates: 14°04'05", 46°06'46", UTM square: VM 20, 880-920 m, dry pastures and forest edge, 28.07.00
9. At Maganija farm, Vojsko plateau, coordinates: 13°53'41", 46°02'17", UTM square: VL 19, 950 m, cultivated dry meadows and forest edge, 02.08.00
10. At the Church of St. Ivan, Šebrelje above the Idrijca river, coordinates: 13°55'16", 46°06'37", UTM square: VM 10, 560-590 m, cultivated dry meadows, 30.07.00
11. Along a stream NE of the village of Sovodenj, coordinates: 14°02'56", 46°05'44", UTM square: VM 20, 640-650 m, forest edge and cultivated meadow, 26.07.00

12. Along a stream NW of the village of Trebija, Žiri, coordinates: 14°06'07", 46°05'56", UTM square: VM 20, 420-480 m, forest road and dry meadow, 28.07.00
13. Along stream S of Hladnik farm, Srednja Kanomlja, coordinates: 13°59'21", 46°01'12", UTM square: VL 29, 350 m, forest edge and cultivated meadows, 30.07.00
14. Along the Žirovnica stream W of Demšar farm, coordinates: 14°05'57", 46°00'45", UTM square: VL 39 520 m 560 m, cultivated dry meadows, 02.08.00
15. At Zanjivič farm, NW of the G. Novaki village, coordinates: 14°01'40", 46°09'49", UTM square: VM 21, 800 m, cultivated dry meadows and forest edge, 27.07.00
16. Below the farm Pod gozdom, on the Prvič hill, Mt. Porezen, coordinates: 14°01'32", 46°10'15", UTM square: VM 21, 1050 m, cultivated meadow, 02.08.00
17. E of the village of Brdo, Bača valley, coordinates: 13°51'31", 46°09'19", UTM square: VM 11, 270-300 m, cultivated dry meadows and forest edge, 29.07.00
18. E slope of Mt. Brezov Grič, Idrijske Krnice, coordinates: 13°57'59" 46°02'47", UTM square: VM 10, 1020-1050 m, cultivated meadows and pastures, forest edge, 30.07.00
19. N of the village of Govejk, above Spodnja Idrija, coordinates: 14°04'30", 46°01'51", UTM square: VL 29, 750-800 m cultivated and dry meadows 28.07.00
20. N of the village of Selo, Žiri, coordinates: 14°06'02", 46°03'58", UTM square: VM 30, 480 m, cultivated and wet meadows, 28.07.00
21. NE of the village of Jagršče, above the Idrija river, coordinates: 13°56'53", 46°05'23", UTM square: VM 10, 630-680 m, steep dry meadows, 30.07.00
22. NW of the village of Lokve, above Čepovan valley, coordinates: 13°47'32", 46°01'03", UTM square: VL 09, 950 m, cultivated dry meadows, 02.08.00
23. S slopes above the upper Idrija valley, below Hudo polje pastures, coordinates: 13°55'06" 45°59'29", UTM square: VL 19, 800-850 m, stony slope, 02.08.00
24. S slopes and ridge at the top of Mt Porezen, coordinates: 13°58'46", 46°10'33", UTM square: VM 21, 1400-1630 m, mountain meadows with stony ridges, 27.07.00
25. S slopes and top of Mt. Črna prst, coordinates: 13°55'57", 46°13'50", UTM square: VM 12, 1750-1840 m, mountain meadows, stone walls, 03.08.00
26. S slopes and top of Mt. Kobilja glava-Jalovnik, coordinates: 13°47'20", 46°11'14", UTM square: VM 01, 1050-1475 m, mountain meadows and pastures, 31.07.00
27. S slopes of Hum, Mt. Porezen, coordinates: 13°59'50", 46°09'45", UTM square: VM 21, 1300-1400 m, mountain meadows on acid soil, 27.07.00
28. SE slopes of Cimprovka, Mt. Porezen, coordinates: 14°00'50", 46°10'12", UTM square: VM 21, 1180-1250 m, dry mountain meadow, 27.07.00
29. Stone walls in the Koritnica valley, Koritnica ob Bači, coordinates: 13°52'45", 46°10'47", UTM square: VM 11, 350-400 m, forest edge and stone walls along the road, 29.07.00
30. SW slopes and top of Mt. Škofje, Cerkno, coordinates: 14°01'09", 46°07'43", UTM square: VM 20, 800-970 m, dry meadows and forest road, 28.07.00
31. Top of Mt. Erzej, at Idrijske Krnice, coordinates: 13°56'24" 46°03'17", UTM square: VM 10, 1000-1018 m cultivated meadows, 30.07.00
32. Upper part of the Belca valley, Idrija, coordinates: 13°56'01" 45°58'33", UTM square: VL 19, 540-600 m, stony slopes and forest road, 02.08.00
33. W of the hamlet of Kneške Ravne, Kneža valley, coordinates: 13°49'50" 46°12'59", UTM square: VM 01, 680-730 m, cultivated meadows and forest edge, 29.07.00
34. W of Kotlar farm, Vojsko plateau, coordinates: 13°53'17" 46°01'24", UTM square: VL 19, 1050-1080 m, cultivated dry meadows and forest edge, 02.08.00
35. W of Močnik farm, Srednja Kanomlja, coordinates: 13°58'16" 46°01'29", UTM square: VL 29, 350 m, partly wet cultivated meadow, 30.07.00
36. W of the village of Jagršče, above the Idrija river, coordinates: 13°56'30" 46°05'15", UTM square: VM 10, 540-600 m cultivated dry meadows, stony slope, 30.07.00
37. **37.**W of the village of Spodnje Bukovo, Bača valley, coordinates: 13°52'48" 46°09'25", UTM square: VM 11, 320-350 m, cultivated wet meadow, 29.07.00
38. W of the village of Zakriž, Cerkno, coordinates: 13°57'51" 46°08'05", UTM square: VM 11, 580-620 m, cultivated meadows and forest edge, 29.07.00

List of species

The nomenclature and taxonomy are according to Tolman & Lewington 1997.

Table 1: Distribution of butterflies in the Cerkljansko-Idrijsko region. The localities are indicated by numbers from 1 to 38 as in the list and description of localities. The altitude interval shows the vertical distribution of each species.

Tabela 1: Razširjenost vrst dnevnih metuljev v Cerkljansko-Idrijski regiji. Lokalitete so oštevilčene od 1 do 38 kot v seznamu in opisu lokalitet. Višinski interval podaja vertikalno razširjenost posamezne vrste.

| Family and species/ Družina in vrsta | Altitude interval/ Višinski interval | Locality/ Zaporedna št. lokalitete |
|---|---|--|
| PAPILIONIDAE | | |
| 1. <i>Papilio machaon</i> L. | 390-1630 m | 1, 7, 10, 21, 24, 26, 30, 36 |
| PIERIDAE | | |
| 2. <i>Artogeia manni</i> Mayer | 180-250 m | 3 |
| 3. <i>Artogeia rapae</i> L. | 390-1400 m | 1, 5, 6, 27, 32, 36 |
| 4. <i>Artogeia napi</i> L. | 180-1630 m | 1, 3, 5, 6, 7, 10, 11, 14, 17, 20, 24, 29, 30, 33, 36 |
| 5. <i>Artogeia bryoniae</i> Hübn.* | 1300-1400 m | 25, 27 |
| 6. <i>Gonepteryx rhamni</i> L. | 180-1630 m | 3, 4, 6, 7, 8, 9, 11, 12, 14, 19, 21, 23, 24, 27, 32, 34 |
| 7. <i>Colias alfacariensis</i> Ribbe | 350-1050 m | 7, 10, 14, 18, 20, 35, 36 |
| 8. <i>Colias crocea</i> Geoff. | 270-1475 m | 2, 4, 5, 7, 8, 12, 13, 14, 17, 19, 20, 21, 26, 27, 30, 33, 35, 36 |
| 9. <i>Leptidea sinapis</i> sp. complex | 270-1630 m | 1, 2, 4, 5, 7, 8, 9, 10, 12, 13, 14, 17, 18, 19, 21, 23, 24, 26, 28, 30, 31, 32, 33, 34, 35, 36 |
| SATYRIDAE | | |
| 10. <i>Erebia ligea</i> L.* | 940-960 m | 6 |
| 11. <i>Erebia euryale</i> Esp.* | 1475 m | 26 |
| 12. <i>Erebia manto</i> Schiff.* | 1500-1840 m | 25 |
| 13. <i>Erebia pharte</i> Hübn.* | 1650-1840 m | 25 |
| 14. <i>Erebia aethiops</i> Esp.* | 180-1630 m | 3, 4, 7, 8, 9, 10, 12, 13, 14, 17, 18, 21, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36 |
| 15. <i>Erebia gorge</i> Hübn.* | 1820 m | 25 |
| 16. <i>Erebia calcaria</i> Lork.* | 1500-1840 m | 25 |
| 17. <i>Erebia pronoe</i> Esp.* | 1400-1840 m | 24, 25 |
| 18. <i>Erebia stirijs</i> Godt.* | 480-850 m | 7, 23, 32, 36 |
| 19. <i>Melanargia galathea</i> L. | 270-1630 m | 1, 2, 4, 5, 6, 8, 9, 10, 12, 14, 17, 18, 19, 24, 26, 27, 28, 29, 30, 31, 33, 34, 36, 37, 38 |
| 20. <i>Hipparchia fagi</i> Scop. | 480-680 m | 7, 21 |
| 21. <i>Kanetisa circe</i> L. | 180-1080 m | 3, 6, 31, 34 |
| 22. <i>Minois dryas</i> Scop. | 270-600 m | 1, 2, 5, 12, 14, 17, 21, 36 |
| 23. <i>Aphantopus hyperantus</i> L. | 520 m | 14 |
| 24. <i>Pararge aegeria</i> L. | 420-970 m | 7, 12, 14, 30, 32, 36 |
| 25. <i>Lasiommata megera</i> L. | 560-970 m | 10, 30 |
| 26. <i>Lasiommata maera</i> L. | 540-1630 m | 18, 24, 26, 27, 32 |
| 27. <i>Maniola jurtina</i> L. | 180-1400 m | 1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 17, 19, 20, 21, 27, 28, 30, 31, 33, 34, 35, 36, 37, 38 |
| 28. <i>Coenonympha arcania</i> L. | 560 m | 32 |
| 29. <i>Coenonympha pamphilus</i> L. | 270-1200 m | 1, 2, 5, 7, 8, 12, 14, 17, 18, 20, 21, 26, 30, 31, 33, 35, 38 |
| NYMPHALIDAE | | |
| 30. <i>Apatura iris</i> L. | 540-1200 m | 15, 23, 26 |
| 31. <i>Limnitis camilla</i> L. | 540-650 m | 11, 32 |

| Family and species/ Družina in vrsta | Altitude interval/ Višinski interval | Locality/ Zaporedna št. lokalitete |
|--|---|---|
| 32. <i>Neptis rivularis</i> Scop. | 540 m | 36 |
| 33. <i>Vanessa atalanta</i> L. | 540-1630 m | 4, 8, 24, 36 |
| 34. <i>Vanessa cardui</i> L. | 1400-1630 m | 24 |
| 35. <i>Aglais urticae</i> L. | 1400-1630 m | 24 |
| 36. <i>Inachis io</i> L. | 480-1630 m | 7, 8, 24, 30 |
| 37. <i>Nymphalis polychloros</i> L. | 1050 m | 16 |
| 38. <i>Nymphalis antiopa</i> L. | 640 m | 11 |
| 39. <i>Polygonia c-album</i> L. | 440-1630 m | 2, 4, 11, 18, 24, 36 |
| 40. <i>Araschnia levana</i> L. | 640-920 m | 8, 11 |
| 41. <i>Mellicta athalia</i> Rott. | 440-1050 m | 5, 18 |
| 42. <i>Mellicta aurelia</i> Nick. | 270-300 m | 17 |
| 43. <i>Melitaea didyma</i> Esp.* | 1180-1250 m | 28 |
| 44. <i>Argynnis aglaja</i> L.* | 350-1630 m | 4, 6, 11, 12, 13, 18, 24, 28, 31, 34 |
| 45. <i>Argynnis adippe</i> Schiff. | 270-1250 m | 13, 14, 17, 18, 28, 36 |
| 46. <i>Argynnis niobe</i> L.* | 390-440 m | 1 |
| 47. <i>Argynnis paphia</i> L. | 270-970 m | 3, 4, 6, 12, 14, 17, 30, 32 |
| 48. <i>Clossiana dia</i> L. | 180-1300 m | 2, 3, 5, 12, 13, 14, 17, 21, 25, 35 |
| 49. <i>Issoria lathonia</i> L. | 420-960 m | 6, 8, 9, 12, 14 |
| LYCAENIDAE | | |
| 50. <i>Satyrrium spini</i> Schiff. | 420-1250 m | 7, 12, 14, 26 |
| 51. <i>Lycaena virgaureae</i> L. | 420-1630 m | 7, 8, 11, 12, 14, 24, 28 |
| 52. <i>Lycaena tityrus</i> Poda | 320-1300 m | 2, 5, 7, 8, 10, 12, 14, 20, 25, 31, 33, 35, 36, 37 |
| 53. <i>Lycaena phlaeas</i> L. | 880-1080 m | 8, 31, 34 |
| 54. <i>Lycaena hippothoe</i> L. | 440-560 m | 5, 14, 20 |
| 55. <i>Evers alcatas</i> Hffmegg. | 390-600 m | 1, 36 |
| 56. <i>Cupido minimus</i> Fuessly | 540-920 m | 8, 10, 36 |
| 57. <i>Celastrina argiolus</i> L. | 350 m | 13 |
| 58. <i>Scolitantides orion</i> Pall.* | 180-250 m | 3 |
| 59. <i>Maculinea rebeli</i> Hirscke | 950-1250 m | 18, 22, 26, 34 |
| 60. <i>Maculinea arion</i> L.* | 270-970 m | 2, 5, 8, 12, 17, 21, 30, 36 |
| 61. <i>Maculinea telejus</i> Bergstr. | 320-440 m | 1, 37 |
| 62. <i>Aricia agestis</i> Schiff. | 1800 m | 25 |
| 63. <i>Aricia artaxerxes</i> F.* | 420-920 m | 5, 8, 12, 14 |
| 64. <i>Plebejus idas</i> L. | 520-560 m | 14 |
| 65. <i>Plebejus argus</i> L. | 560-590 m | 10 |
| 66. <i>Polyommatus icarus</i> Rott. | 180-1400 m | 1, 2, 3, 5, 6, 7, 8, 10, 11, 12, 13, 14, 17, 18, 20, 21, 26, 27, 30, 31, 35, 36, 38 |
| 67. <i>Agrodiaetus dorylas</i> Schiff. | 440-600 m | 5, 10, 36 |
| 68. <i>Lysandra bellargus</i> Rott. | 440-600 m | 2, 5, 7, 36 |
| 69. <i>Lysandra coridon</i> Poda | 440-1200 m | 4, 5, 8, 10, 14, 19, 26, 33, 36, 38 |
| HESPERIIDAE | | |
| 70. <i>Erynnis tages</i> L. | 270-680 m | 1, 5, 17, 20, 21, 36, 37 |
| 71. <i>Pyrgus armoricanus</i> Obth. | 350 m | 35 |
| 72. <i>Spialia sertorius</i> Hffmegg. | 440-500 m | 5 |
| 73. <i>Heteropterus morpheus</i> Pall. | 320-350 m | 37 |
| 74. <i>Thymelicus lineola</i> O. | 540-1250 m | 4, 26, 36 |
| 75. <i>Thymelicus sylvestris</i> Poda | 750-1250 m | 4, 6, 9, 26 |
| 76. <i>Ochlodes venatus</i> Brem et Gray | 270-1250 m | 1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 14, 17, 18, 21, 28, 29, 30, 32, 36, 37 |
| 77. <i>Hesperia comma</i> L. | 270-1200 m | 5, 8, 9, 10, 12, 14, 17, 21, 26, 30, 31, 34, 36 |

*- montane to alpine type of distribution according to Carnelutti 1981

*- montanski do alpski tip razširjenosti povzeto po Carneluttiju 1981

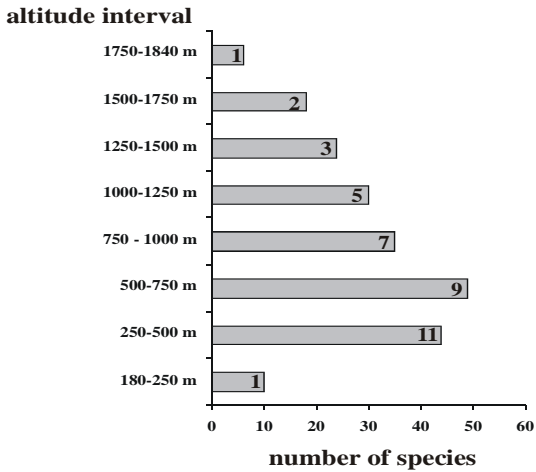


Figure 1: Vertical distribution of butterflies in the Cerkljansko-Idrijsko region including Mt. Črna prst in the Julian Alps. The numbers in columns represent the number of localities surveyed at that altitude interval.

Slika 1: Vertikalna razširjenost dnevnih metuljev Cerkljansko-Idrijske regije vključno s Črno prstjo v Julijskih Alpah. Številke v stolpcih označujejo število preiskanih lokalitet v danem višinskem intervalu.

Discussion

The high number of species recorded in a short period of time could be explained by the large altitude interval, including also the alpine region, different climatic zones within the region, and the configuration of the terrain. The habitat diversity was not as high as expected, with wetland habitats almost completely missing. Even some steep slopes in the region are regularly mowed and sometimes fertilised, therefore only a small proportion of the surveyed localities accounts for the observed butterfly diversity. Habitats of these localities were extremely thermophilous steep and to the south exposed slopes with partly overgrown grasslands, sometimes with exposed rocks. Apart from many lycaenid species, such as *Everes alcetas* Hffmgg., *Plebejus idas* L., *Agrodiaetus dorylas* Schiff., *Lysandra bellargus* Rott., *Lysandra coridon* Poda and *Maculinea arion* L., some nymphalid, satyrid and hesperiid species were also confined to such dry habitats. Among them, *Mellicta aurelia* Nick. and *Spialia sertorius* Hffmgg. were found only at a single locality.

The partly wet meadows at the bottom of the valleys were exposed to even greater human impact and only fragments of suitable habitats are still present, usually isolated from each

other. Most surprisingly, we were able to find two populations of *Maculinea telejus* Bergstr. in small meadows with *Sanguisorba officinalis* L.. Both localities are situated in the upper Bača valley just south of southernmost range of the Julian Alps. The closest known locality of this species is about 32 km to the southwest in the surroundings of Nova Gorica (Hafner 1910), where the species is still present (Verovnik 2000a). Further populations should therefore be expected in the lower part of the Bača and Soča valleys. Another hygrophilous species *Heteropterus morpheus* Pall. was also observed in the Bača valley, but the single record is probably due to the late season for this species. In other parts of Slovenia this species can be found in different, sometimes also extremely dry habitats (Verovnik 2000b).

In the Idrijsko region, remnants of wetlands can be found mostly in the valleys that are part of the Sava drainage system and are geographically more connected with central Slovenia. Only in this part we were able to observe *Araschnia levana* L. and *Lycaena hippothoe* L., which are not confined only to wet habitats, as they were also observed in dry meadows. *Pyrgus armoricanus* Obth. was found only at a single locality at Srednja Kanomlja near Idrija in a wet but cultivated meadow. This species is considered rare (Carnelutti 1992a) and present only in lowland open country. According to personal observations, this species is much more widespread and could be locally common in most parts of central and east Slovenia.

Most commonly observed species are the ecological generalists, such as *Ochlodes venatus* Brem et Gray, *Maniola jurtina* L. and *Polyommatus icarus* Rott., and forest species, such as *Erebia aethiops* Esp.. On the other hand, some otherwise common and widespread species in Slovenia, such as *Melictha athalia* Rott, *Coenonympha arcania* L. and *Aphantopus hyperanthus* L., were found only at one or two localities. That could be partially explained by the late season, but they should still be present at higher altitudes.

Vertical distribution

Although one cannot assess vertical distribution of species in any area solely on the basis of one-week observations due to seasonal presence of imagines at different altitudes, some information can be derived from the gathered data. Butterflies with typical colline distribution in this area are also extremely thermophilous and their range is therefore limited also by suitable climate. Such butterflies were found especially in the warmer parts of the Bača valley, at Most na Soči in the Soča valley and on a single very warm and partially stony slope in the Poljanščica river valley. *Artogeia manni* Mayer and *Scolitantides orion* Pall. were found only in

the Soča valley at the bottom of a large scree with extremely hot microclimate. Although both species can be found at higher altitudes in warmer parts of Slovenia (Verovnik 1997, pers. observations), *Artogeia manni* Mayer can be regarded a colline butterfly. *Maculinea telejus* Bergstr. is also a colline butterfly throughout Slovenia with the upper limit of distribution at 500 m (Verovnik 1995). Other species limited to the colline parts of the Cerkljansko-Idrijsko region, as are *Minois dryas* Scop., *Aphantopus hyperanthus* L., *Mellicta aurelia* Nick., *Argynnis niobe* L., *Celastrina argiolus* L., *Heteropterus morpheus* Pall. and *Spialia sertorius* Hffmgg., are generalists, sometimes present also at higher altitudes. *Argynnis niobe* L. and the previously mentioned *Scolitantides orion* Pall. were even considered a montane species by Carnelutti (1981).

Altogether, 16 species with montane to alpine distribution (according to Carnelutti 1981) were observed in the region. The butterflies with alpine distribution were mainly observed on Mt. Črna prst, where *Erebia gorge* Hübn. was limited to the stony ridges at the top, and other *Erebia* species, such as *E. manto* Schiff., *E. pharte* Hübn. and *E. calcaria* Lork., were distributed above the tree line. *Artogeia bryoniae* Hübn and *Erebia pronoe* Esp. were found also on Mt. Porezen, which has surprisingly depauperated alpine butterfly fauna. The reason for that could be the partly non-carboniferous soil and severe grazing activity. Even the almost 100 m lower Mt. Blegoš, which is even more isolated from the Julian Alps, has a richer alpine fauna, with species such as *Boloria pales* Schiff. (Carnelutti 1980). One of the alpine species *Aricia artaxerxes* F. was found only below 1000 in the Idrijsko region. All populations were found on warm grassy slopes with most specimens almost completely lacking orange submarginal spots. The colline distribution of this species was observed also in other parts of the Alps (Ebert & Rennwald 1993, Pro Natura-Schweizerischer Bund für Naturschutz 1994), where this species can be sympatric with closely related *Aricia agestis* Schiff.. This species has entirely colline distribution and reaches only up to 900 m in Switzerland (Pro Natura-Schweizerischer Bund für Naturschutz 1994). The identity of *Aricia* specimen from the upper part of Mt. Črna prst, which was tentatively determined as *A. agestis* Schiff. according to the wing coloration, is therefore most intriguing. Among other species it is interesting to note that all ova of *Maculinea rebeli* Hirscke were found on *Gentiana cruciata* L. at altitudes ranging from 950 to 1250 m.

Vertical distribution of all observed butterflies is summarised in the graph where reduction of species with altitude is evident. Although biased by less surveyed localities, the reduction of species observed is visible also towards lower altitudes. The interval with the biggest species count is from 500 to 750 meters, where habitat diversity was the highest.

Conservation value of the Cerkljansko-Idrijsko region

According to the current Red Data Book covering the butterflies of Slovenia (Carnelutti 1992a, b), the following IUCN categories are given for the species from the pre-Alpine region that were observed during our survey:

Endangered (E):

Maculinea telejus

Rare (R):

Artogeia manni

Erebia stirijs

Hipparchia fagi

Kanetisa circe

Minois dryas

Issoria lathonia

Satyrrium spini

Everes alcetas

Scolitantides orion

Maculinea rebeli

Maculinea arion

Aricia artaxerxes

Plebejus idas

Heteropterus morpheus

Pyrgus armoricanus

Due to the special ecological requirements and patchy distribution, all *Maculinea* species should be considered vulnerable (V). The same status should be given also to *Scolitantides orion* Pall., *Plebejus idas* L. and *Pyrgus armoricanus* Obth..

If we consider the inclusion of species in the Atlas of endangered butterfly species of Slovenia (Čelik & Rebeušek 1996) as more recent and therefore more relevant regarding the conservation status, the following species have been observed:

Lycaena hippothoe

Scolitantides orion

Maculinea rebeli

Maculinea arion

Maculinea telejus

Plebicula dorylas

According to the Wan Swaay & Warren Red data book of European butterflies (1999), the following species are listed among the threatened ones:

Mellicta aurelia
Scolitantides orion
Maculinea rebeli
Maculinea arion
Maculinea telejus

As seen from the lists above, only a small proportion of the observed species have any conservation value, and since most of them are considerably rare, the entire Cerkljansko-Idrijsko region has only few areas that should be in some way protected. Slovenia has ratified the Bern convention, which obligates us to protect the endangered species and habitats. *Maculinea arion* Pall. and *Maculinea telejus* Bergstr. are listed in Appendix II of the above stated convention. Therefore, the highest conservation value has the relative abundance of *Maculinea arion* Pall. at some localities and its patchy but continuous distribution in the eastern part of the region. Although no exact conservation measures could be taken without further investigation of distribution and habitat requirements for this species, it is certainly important that the use of dry meadows at currently known localities remain at the same level as at present. Any use of fertilisers or abandonment of the habitats would result in local extinction of *Maculinea arion* Pall..

The remarkable discovery of *Maculinea telejus* Bergstr. in the Bača valley has pushed the distribution limit further northwest. Further monitoring of these populations would be necessary to ascertain their stability and to recommend conservation measures for their long-term survival. The most important conservation issue is certainly the mowing period, which should be accomplished before the flying period of imagines (at the end of May) and after the larvae forsake the foodplant and are taken into ants nests (after mid September). Any deviation from this scheme would cause relatively fast extinction of populations. Further investigation of this geographically very heterogeneous region should bring new interesting discoveries and help designate priority areas for the protection of the local butterfly fauna.

Povzetek

Veliko število opaženih vrst v tako kratkem časovnem intervalu lahko pripišemo predvsem geografski razgibanosti obravnavanega območja. Tako je v spodnjih delih dolin, ki so povezane s Soško dolino, čutiti submediteranski vpliv. Na drugi strani pa je tu ostro podnebje predgorja Julijskih Alp s Poreznom, katerega ovršje sega nad naravno gozdno mejo. Kljub temu pa je večji del območja intenzivno obdelan in le malo ekstenzivno rabljenih travniških površin omogoča preživetje pestri združbi dnevnihi metuljev. To so predvsem suha, delno skalnata in zaraščena travnata pobočja, kjer srečamo tipične termofilne vrste, kot

so na primer modrini *Everes alcetas* Hffmegg., *Plebejus idas* L., *Agrodiaetus dorylas* Schiff., *Lysandra bellargus* Rott., *Lysandra coridon* Poda in *Maculinea arion* L..

Še bolj kot pobočja so intenzivnemu kmetijstvu izpostavljeni ravninski deli, kjer le poredkoma srečamo ostanke manjših vlažnih travnikov. Med metulji, vezanimi na ta habitatni tip, je gotovo največje presenečenje odkritje vrste *Maculinea telejus* Bergstr. v dolini Bače, kar je precej bolj severozahodno od do sedaj znane meje areala te vrste v Sloveniji. Med higrofilnimi vrstami velja omeniti še debeloglavčka *Heteropterus morpheus* Pall. in *Pyrgus armoricanus* Obth., ki sta bila najdena le na eni lokaliteti.

Vertikalna razporeditev favne dnevnih metuljev na obravnavanem območju je pri večini vrst odvisna od ustreznega habitata. Od skupno sedmih alpskih vrst (po Carneluttiju 1981) je bila večina opažena le nad gozdno mejo na Črni prsti, na Poreznu pa je bilo zaslediti le vrsti *Artogeia bryoniae* Hübn. in *Erebia pronoe* Esp.. Med alpske vrste sodi tudi *Aricia artaxerxes* F., ki pa je bila najdena le na nadmorski višini pod 1000 m predvsem v vzhodnem delu Cerkljansko-Idrijske regije. V nasprotju s pričakovanji pa je bila blizu vrha Črne prsti opažena njena sestrška vrsta *A. agestis* Schiff., ki je sicer razširjena predvsem v nižinah (Ebert & Rennwald 1993, Pro Natura-Schweizerischer Bund für Naturschutz 1994). Poleg *Maculinea telejus* Bergstr. so na nižinski pas v tem območju vezane še nekatere druge, predvsem termofilne vrste, kot sta na primer *Artogeia manni* Mayer in *Scolitantides orion* Pall. iz bližine Mosta na Soči.

Le malo vrst iz obravnavanega območja je uvrščenih na različne sezname ogroženih vrst in še te se večinoma pojavljajo zelo lokalno. Zaradi tega je le nekaj predelov v Cerkljansko-Idrijski regiji vsaj delno pomembnih za ohranitev nekaterih ogroženih vrst metuljev v Sloveniji. To velja predvsem za vrsto *Maculinea arion* L., ki je lokalno razširjena predvsem v vzhodnem delu obravnavane regije in ponekod dosega tudi večje gostote populacij. Nadaljnje raziskave te geografsko heterogene regije bodo zagotovo prinesle nova zanimiva odkritja in pripomogle k določitvi pomembnih območij za ohranitev lokalne favne metuljev.

Literatura

- Carnelutti J., Michieli Š. (1955): Prispevek k favni lepidopterov Slovenije. *Biološki vestnik* 4: 43-55.
- Carnelutti J., Michieli Š. (1966): Makrolepidopteri Triglavskega narodnega parka in okolice I (Lepidoptera: Rhopalocera, Hesperioidea). *Varstvo narave* 5: 107-127.
- Carnelutti J. (1980) Metulji Blegošja in okolice, In: Ramovš A. (Ed.), *Blegoš*. Muzejsko društvo Škofja Loka, Škofja loka, pp. 93-100.
- Carnelutti J. (1981): Horološka, ekološka in zoogeografska analiza makrolepidopterov Slovenskega ozemlja. Doctors thesis, Ljubljana, 210 pp.
- Carnelutti J. (1992a): Rdeči seznam ogroženih metuljev (Macrolepidoptera) v Sloveniji. *Varstvo narave* 17: 61-104.
- Carnelutti J. (1992b): Popravki-Errata: Rdeči seznam ogroženih metuljev (Macrolepidoptera) v Sloveniji. *Varstvo narave* 18: 189.
- Čelik T. & Rebeušek F. (1996): Atlas ogroženih vrst dnevnih metuljev Slovenije. Ljubljana, 100 pp.
- Ebert G. & Rennwald E. (1993): Die Schmetterlinge Baden-Württenbergs, Band I in II: Tagfalter. Stuttgart, 1055 pp.

- Fridl et al. (main editor) (1998): Geografski atlas Slovenije: država v prostoru in času. DZS, Ljubljana.
- Hafner J. (1909): Verzeichnis der bisher in Krain beobachteten Grossschmetterlinge. *Carniola* III: 77-108.
- Hafner J. (1910): Makrolepidoptern von Görz und umgebung. *Entomologischen Zeitschrift* 24: 1-40.
- Hornig J.V. (1854): Ein lepidopterologischer Besuch der Alpen Mangert und Rombon in Istrien. *Verhandlungen des zoologisch-botanischen Vereins in Wien* 4: 177-184.
- IUCN (1996): IUCN red list of threatened animals. Gland.
- Mann J. (1854): Aufzählung der Schmetterlinge, gesammelt auf einer Reise nach Oberkrain und dem Küstenlande in den monaten Mai und Juni 1854. *Verhandlungen des zoologisch-botanischen Vereins in Wien* 4: 545-596.
- Pro Natura-Schweizerischer Bund für Naturschutz, (1994): Schmetterlinge und ihre Lebensräume- Arten- Gefährdung-Schutz. *Vol 1 -Schmetterlinge und ihre Lebensräume*, Basel, 516 pp.
- Rebel H. (1905): Lepidopteren aus dem Gebiete des Triglav und der Crna Prst in Krain. *Jahresbericht des Wiener entomologischen Vereines* 16: 53-73.
- Rebel H. (1906): Lepidopteren aus dem Gebiete des Triglav und der Crna Prst in Krain, I Nachtrag. *Jahresbericht des Wiener entomologischen Vereines* 17: 33-60.
- Rebel H. (1907): Lepidopteren aus dem Gebiete des Triglav und der Crna Prst in Krain, II Nachtrag. *Jahresbericht des Wiener entomologischen Vereines*. 18: 123-144.
- Rebel H. (1910): Lepidopteren aus dem Gebiete des Triglav und der Crna Prst in Krain, III Nachtrag. *Jahresbericht des Wiener entomologischen Vereines* 21: 1-37.
- Scopoli J.A. (1763): Entomologia Carniolica exhibens Insecta Carnioliae indigena et distributa in ordines, genera, species, varietates. *Methodo Linnaeana*, Vindobonae.
- Tolman T. & Lewington R. (1997): Collins field guide Butterflies of Britain and Europe. HarperCollins pub., London, 104 pl. 320 pp.
- Van Swaay C. & Warren M. (1999): Red data book of European Butterflies (Rhopalocera). *Nature and Environment* 99: 260 pp.
- Verovnik R. (1995): Poročilo o delu entomološke skupine, Tabor študentov biologije Raka 92, Smast 93, Črneče 94. *Zbornik poročil*, Ljubljana: 83-92.
- Verovnik R. (1997): Prispevek k poznavanju favne dnevnih metuljev (Lepidoptera: Rhopalocera) jugozahodne Slovenije. *Zbornik poročil*, Ljubljana: 33-44.
- Verovnik R. (2000a): Prispevek k poznavanju favne dnevnih metuljev (Lepidoptera: Rhopalocera) Vipavske doline s širšo okolico (jugozahodna Slovenija) (A contribution to the knowledge of butterfly fauna (Lepidoptera: Rhopalocera) of Vipava valley and surrounding areas, Southwest Slovenia. *Natura Sloveniae* 2(1): 29-40.
- Verovnik R. (2000b): Razširjenost dnevnih metuljev (Lepidoptera: Rhopalocera) na Goričkem (severovzhodna Slovenija) (Distribution of Butterflies (Lepidoptera: Rhopalocera) at Goričko, Northeast Slovenia. *Natura Sloveniae*, 2 (1): 41-59.