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Checklist of the Superfamilies Hesperioidea and Papilionoidea (Insecta: Lepidoptera) of Bulgaria, with Application of the IUCN Red List Criteria at National Level

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Abstract: Updated checklist of the skippers and butterflies (Hesperioidea and Papilionoidea) of Bulgaria is presented. The last published checklist of the Bulgarian Hesperioidea and Papilinoidea contained 216 species. Six species appeared to be wrongly reported for Bulgaria due to misidentification or mislabelling and five of them were included in the last list. In this paper, those six species are excluded from the list. Since 2001, four additional species of Hesperioidea and Papilionoidea have been recorded as new to the Bulgarian fauna and these are added to this list. At present 27 species of skippers and 188 species of butterflies, or 215 species in total, are unambiguously confirmed for Bulgaria. The extinction risk of all listed species is assessed at the national level applying the IUCN Red List Criteria. Nine species (33.3%) of the Bulgarian Hesperioidea and 37 species (19.7%) of the Bulgarian Papilionoidea are considered threatened (Vulnerable, Endangered or Critically Endangered) based on the IUCN criteria.

Key words: Hesperioidea, Papilionoidea, checklist, threatened species, Bulgaria

Introduction

Skippers and butterflies are among the best studied groups of invertebrates in Bulgaria and several checklists of the superfamilies Hesperioidea and Papilionoidea have been published. The first one was by Bachmetjew (1902) who reported 221 taxa at the specific and the infraspecific levels. Thus, the total number of the species was less than 180 because he treated the subspecies and forms as species. Moreover, some of the data in Bachmetjew's list concerned specimens that originated from territories not included in the present political borders of Bulgaria. For example, he reported *Tomares nogelii* (Herrich-Schäffer, [1851]) for Bulgaria from Tulcea, a town that now is in Romania. Some other species were wrongly reported for Bulgaria due to incorrect determination. Although this list is now outdated, Bachmetjew made a valuable contribution to the knowledge of the Bulgarian butterfly fauna; his classical work is the first catalogue of the Bulgarian Lepidoptera.

The second catalogue was compiled by Rebel (1903). He examined critically large amount of materials from Bulgaria and the available literature sources. The number of Bulgarian skipper and butterfly species presented by this author was 162.

Buresch & Tuleshkov (1929, 1930) presented 182 species of the Hesperioidea and the Papilionoidea for Bulgaria. For each species, all localities and literature sources are given. For elaborating of this work, Buresch and Tuleshkov used all available published papers and explored the collection of the Royal Entomological Station in Sofia.

Later, Ganev (1985a) published 207 species. Two of them, *Thersamonia thetis* (Klug, 1834) and *Albulina orbitulus* (de Prunner, 1798), were wrongly reported for Bulgaria due to mislabelling (Ganev & Bocharov 1982, Ganev 1983).

The last published checklist was compiled by Abadjiev (2001). This catalogue contained 216 spe-

cies and all their known localities. The data of examined museum specimens and all previously published articles are summarised in this catalogue. A cartographic system based on UTM grid has been used for presentation of the species distributions. This is the most comprehensive work on the distribution of the Bulgarian butterflies and skippers.

In recent years, several species have been recorded as new to the Bulgarian fauna and others have been wrongly reported for the country. This provoked us to update the list of the Hesperioidea and Papilionoidea from Bulgaria using modern systematics and the latest faunistic records. All taxonomic and faunistic publications and critical reviews concerning Bulgarian skippers and butterflies are taken into account in order to update the existing data for these groups in Bulgaria.

The first Red list of Bulgarian Lepidoptera was published by Ganev (1985b). The extinction risk of 129 species belonging to 18 families was estimated by him. The number of the assessed skipper and butterfly species was 64. It should be noted that species included in this Red List have not been assessed following the IUCN Red List Criteria and are based on the author's best judgement.

In Beshkov (1993, 1998) are presented lists of endemic, relict and rare Lepidoptera species in Bulgaria with known localities todate, but in these publications are also not takaen into account IUCN Red List Criteria. In Beshkov (2011) is presented ReD List of the Bulgarian Macrolepidoptera, where are included 13 Hesperioidea and 82 Palilionoidea species, but also not assessed following IUCN Red List Criteria.

Materials and Methods

Systematics used here follows Tshikolovets (2011).

Mainly binominal nomenclature was used in the present list. Trinominal nomenclature was used for these species, which are represented in Bulgaria with subspecies differing from the nominotypical ones. In Bulgaria, only *Erebia ottomana* Herrich-Schäffer, 1847 and *Erebia cassioides* (Reiner & Hochenwarth, 1792) have more than one subspecies and these are not assessed separately due to taxonomic problems or lack of knowledge about their distribution.

The extinction risk of the listed species was assessed at national level. The assessments are conducted in accordance with the IUCN Red List Categories and Criteria (IUCN 2012a) used in conjunction with Guidelines for Using the IUCN Red List Categories and Criteria (IUCN 2014) and Guidelines for Application of IUCN Red List Criteria at Regional and National Levels (IUCN 2012b). Bulgarian skipper and butterfly species were assessed mainly against criterion B2 (area of occupancy) due to the nature of the available data. Area of occupancy was calculated by totalling the number of grid squares occupied by each species.

For defining the size of the species localities, we used the methodology for reporting under Article 17 of the Habitats Directive 92/43/EEC (Anonymous 1992). According to this methodology the size of each locality is usually equal to UTM grid cell 10 x 10 km; UTM grids with size 5 x 5 km or 1 x 1 km were used when the size of suitable habitat was smaller than 100 km^2.

Distribution maps and measurement of area of occupancy (criterion B2) were made using Google Earth Pro 7®.

The IUCN Red List Categories abbreviations used in the text are as follows: Least Concern (LC), Near Threatened (NT), Vulnerable (VU), Endangered (EN), Critically Endangered (CR), Regionally Extinct (RE), Data Deficient (DD) and Not Evaluated (NE).

Results and Discussion

After the publication of the last checklist, one species of Bulgarian Hesperioidea and five species of Bulgarian Papilionoidea have been wrongly reported for the country. In the present paper, those six species were excluded from the list of the Bulgarian fauna. Since 2001, one species of skippers and three butterfly species have been recorded as new for Bulgaria. The present list contained 27 species of skippers and 188 species of butterflies (215 species in total) unambiguously confirmed for Bulgaria.

Following the IUCN criteria at national level nine species (33,3%) of Bulgarian Hesperioidea and 37 species (19,7%) of Bulgarian Papilionoidea were identified as threatened and were listed as VU, EN or CR. The threatened species are not supposed to experience any significant "rescue effect" from the populations of the same taxa outside the country. Summarised results of the extinction risk assessments are given below: (Table 1).

Checklist of the superfamilies Hesperioidea and Papilionoidea in Bulgaria and species risk assessments at national level based on the IUCN Red List Criteria

Superfamily **HESPERIOIDEA** Latreille, 1809
Family **Hesperiidae** Latreille, 1809
Subfamily **Pyrginae** Burmeister, 1878
1. *Carcharodus lavatherae* (Esper, 1783); **LC**

Table 1. Sstatus of Bulgarian skipper and butterfly species based on the application of the IUCN Red List Criteria at national level

Family	Total number of species	LC	NT	VU	EN	CR	RE	DD	NE
		Species	Species	Species	Species	Species	Species	Species	Species
Hesperiidae	27	18	-	7	2	-	-	-	-
Papilionidae	6	5	1	-	-	-	-	-	-
Pieridae	25	17	-	4	-	2	-	1	1
Lycaenidae	60	51	-	1	5	1	-	1	1
Riodinidae	1	1	-	-	-	-	-	-	-
Nymphalidae	96	68	-	19	4	1	1	3	-

Footnote under the table:
Total number of species – species present in Bulgaria
Species – the number of species listed in each category

2. *Carcharodus alceae* (Esper, 1780); **LC**

3. *Carcharodus floccifera* (Zeller, 1847); **LC**

4. *Carcharodus orientalis* Reverdin, 1913; **LC**

5. *Erynnis marloyi* (Boisduval, 1834); in Bulgaria this species is known only from Struma Valley, SW part of the country; **VU** B2ab(iii)

6. *Erynnis tages* (Linnaeus, 1758); **LC**

Muschampia proto (Ochsenheimer, 1808) was wrongly reported for Bulgaria by Abadjiev (2001). This report was based on mislabelled specimen in the collection of Alexander Slivov kept at the Institute of Biodiversity and Ecosystem Research (IBER), BAS– Sofia, Bulgaria (Kolev, 2002).

7. *Muschampia cribrellum* (Eversmann, 1841); **VU** B2ab(iii); reported for the first time for Bulgaria from Burgas District by Kolev (2003). Massif Chepán is the second known locality in the country (Abadjiev & Beshkov 2007). Three years later, Dincă et al. (2010) found the species around the town of Burgas on the Black Sea Coast; Dragoman District; a canyon above Golesh Village; slopes north of Gubesh Village; river valley at the northeastern edge of the town of Godetch; a limestone quarry near Iskrets Village; the valley of Iskrets River, west of Zavidovtsi Village. Another two localities are known: near the town of Kotel (Hoejgaard & Beshkov 2011), and in the vicinity of Ponor Village above Belediye Han, Kostinbrod District, 14.VI.2014, S. Beshkov leg. The species distribution is fragmented across the country.

8. *Muschampia tessellum* (Hübner, 1803); **EN** B2ab(iii) - Tschorbadjiew (1915) reported the species for the first time for Bulgaria from two localities: between the Atanasovsko Lake and the Black Sea Coast; Chengene Skelya. Tuleschkow (1929) found this species in Slavyanka Mt., on the northern slopes of Chengene Kale ridge near Bistritsa River. These records were quoted also in the subsequent reports (Buresch & Tuleshkow 1930, Beshkov 1993, Beshkov 1998, Abadjiev 2001, Kolev 2003, Abadjiev & Beshkov 2007). Some unpublished data concerning specimens in the collection of Al. Slivov (IBER) is discussed by Kolev (2002, 2003). The samples were labelled "Belasitsa" and "Kresna Gorge" and the autor considers these localities as unconfirmed. *Muschampia tessellum* has not been found in Bulgaria over 80 years until it was rediscovered in 2010 near Zheravna Village (Hoejgaard & Beshkov 2011). The species was also found in the vicinity of Ponor Village

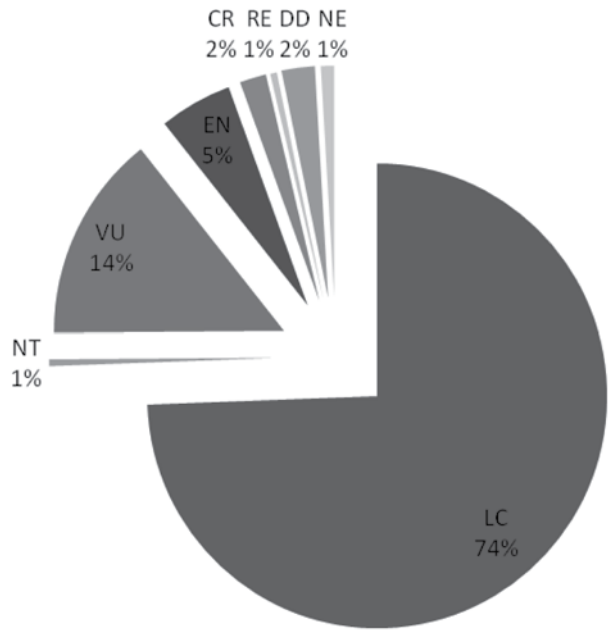

Fig. 1. Percentage of Bulgarian skipper and butterfly species within the IUCN categories: 160 species are considered Least Concern (LC) at national level; 1 species is Near Threatened (NT); 31 species are Vulnerable (VU); 11 species are Endangered (EN); 4 are Critically Endangered (CR); 1 species is Regionally Extinct (RE); 5 species are classified as Data Deficient (DD); 2 species are Not Evaluated (NE).

above Belediye Han, Kostinbrod District, 14.VI.2014, S. Beshkov leg.

9. *Pyrgus malvae* (Linnaeus, 1758); **LC**

10. *Pyrgus serratulae* (Rambur, 1839); **LC**

11. *Pyrgus armoricanus* (Oberthür, 1910); **LC**

12. *Pyrgus alveus* (Hübner, 1803); **LC**

13. *Pyrgus cinarae* (Rambur, 1839); fragmented distribution across the country; **VU** B2ab(iii)

14. *Pyrgus sidae* (Esper, 1784); **LC**

15. *Pyrgus carthami* (Hübner, 1813); **LC**

16. *Pyrgus cacaliae* (Rambur, 1839); fragmented distribution across the country; **VU** B2ab(iii)

17. *Pyrgus andromedae* (Wallengren, 1853); **EN** B2ab(iii); first mentioned by Abadjiev (2001) but no literature sources quoted this record; confirmed for Bulgaria from Vihren Peak (Pirin Mts.) by Shtinkov & Kolev (2014).

18. *Spialia orbifer* (Hübner, 1823); **LC**

19. *Spialia phlomidis* (Herrich-Schäffer, 1845); **VU** B2ab(iii)

Subfamily **Heteropterinae** Aurivillius, 1925

20. *Heteropterus morpheus* (Pallas, 1771); **VU** B2ab(iii). Currently in Bulgaria almost all localities of *H. morpheus* are in Strandzha Mts. and its adjacent Black Sea Coast territory.

21. *Carterocephalus palaemon* (Pallas, 1771); **LC**

Subfamily **Hesperiinae** Latreille, 1809

22. *Thymelicus acteon* (Rottemburg, 1775); **LC**

23. *Thymelicus lineola* (Ochsenheimer, 1808); **LC**

24. *Thymelicus sylvestris* (Poda, 1761); **LC**

25. *Hesperia comma* (Linnaeus, 1758); **LC**

26. *Ochlodes sylvanus* (Esper, 1777) = *venatus* auct. (Bremer & Grey, 1853); **LC**

27. *Gegenes nostrodamus* (Fabricius, 1793); **VU** B2ab(iii); currently known for Bulgaria only from Sakar Mt. and the southernmost parts of Struma Valley.

Superfamily **PAPILIONOIDEA** Latreille, 1802

Family **Papilionidae** Latreille, 1802

Subfamily **Papilioninae** Latreille, 1802

1. *Papilio machaon* Linnaeus, 1758; **LC**

2. *Iphiclides podalirius* (Linnaeus, 1758); **LC**

Subfamily **Parnassiinae** Duponchel, 1835

3. *Zerynthia polyxena* ([Denis & Schiffermüller], 1775); **LC**

4. *Zerynthia cerisy ferdinandi* (Stichel, 1907); **LC**

5. *Parnassius mnemosyne* (Linnaeus, 1758); **LC**

6. *Parnassius apollo* (Linnaeus, 1758); the only species of the Bulgarian fauna included in the Washington Convention (CITES). Although its Bulgarian population is still relatively stable in several mountains (Rila, Pirin, Rhodopi, Stara Planina) it is decreasing and has disappeared in some places. For example, in the middle of the last century this species was abundant in Vitosha Mt. but over the last few decades it has not been observed there; an attempt of reintroduction of *P. apollo* in Vitosha was made in 2013 (Beshkov 2014a). However, it is early to draw any conclusions about its success. Other regions from where the species has disappeared are Slavyanka Mt., Lyulin Mt., etc.; **NT**

Family **Pieridae** Swainson, 1820

Subfamily **Dismorphiinae** Schatz, 1887

7. *Leptidea duponcheli* (Staudinger, 1871); **LC**

8. *Leptidea sinapis* (Linnaeus, 1758); **LC**

9. *Leptidea juvernica* Williams, 1946 = *reali* Reissinger, 1990, auct.; **VU** B2ab(iii). Kristal & Nässig (1996) used the name *Leptidea reali* for the Bulgarian population of *L. juvernica* and Abadjiev (2001) quoted this record. Shtinkov (2013) demonstrated that only *L. juvernica* is presented in Bulgaria. Until recently, the distribution of this species in Bulgaria was not clearly known and perhaps in the old literature some part of the data of *L. sinapis* actually refered to *L. juvernica*. The work of Shtinkov *et al.* (2016) sheds light on the species distribution on the Balkan Peninsula in general, and Bulgaria in particular. Its distribution in the country is restricted to some of the mountains of SW Bulgaria and Sakar Mts.

Leptidea morsei (Fenton, 1882) - recorded in Bulgaria as a result of misidentifications and all of its localities are actually not occupied by the species (Beshkov 2011). However, at present there is a single unpublished record based on material from unverified source from SW Bulgaria (R. Verovnik, pers. comm.). For this reason *L. morsei* should be excluded from the checklist of the Bulgarian fauna. If its presence in Bulgaria would be confirmed, the species should be considered Critically Endangered.

Subfamily **Pierinae** Swainson, 1820

10. *Aporia crataegi* (Linnaeus, 1758); **LC**

11. *Pieris krueperi* Staudinger, 1860; **LC**

12. *Pieris rapae* (Linnaeus, 1758); **LC**

13. *Pieris mannii* (Mayer, 1851); **LC**

14. *Pieris ergane* (Geyer, 1828); **LC**

15. *Pieris napi* (Linnaeus, 1758); **LC**

16. *Pieris balcana* Lorkovic, 1970; **DD**. This species shares some morphological characters with *P. napi* (especially with its summer generation) and these two species could be easily confused so the distribution of *P. balcana* in Bulgaria is not well defined.

17. *Pieris brassicae* (Linnaeus, 1758); **LC**

18. *Euchloe ausonia* (Hübner, 1804); **LC**

19. *Euchloe penia* (Freyer, 1851); **CR** B2ab(iii)

20. *Anthocharis cardamines* (Linnaeus, 1758); **LC**

21. *Anthocharis gruneri* Herrich-Schäffer, [1851];**VU** B2ab(iii)

22. *Pontia edusa* (Fabricius, 1777) = *daplidice* auct. (Linnaeus, 1758); **LC**

23. *Pontia chloridice* (Hübner, 1813); **VU** B2ab(iii)

Subfamily **Coliadinae** Swainson, 1827

24. *Colias erate* (Esper, 1805); **LC**

25. *Colias croceus* (Fourcroy, 1785); **LC**

26. *Colias hyale* (Linnaeus, 1758); **LC**

27. *Colias alfacariensis* Ribbe, 1905; **LC**

28. *Colias caucasica balcanica* Rebel, 1901; **VU** B2ab(ii, iii, iv)

Colias myrmidone (Esper, [1781]) was wrongly reported for Bulgaria due to misidentification with *C. caucasica balcanica*. Therefore, we excluded from the list of the Bulgarian fauna.

29. *Gonepteryx cleopatra* (Linnaeus, 1767); **NE**. Ganev (1989) firstly reported this species from Rila Mts. as new for Bulgaria. Many other localities of the species were found but the data were not included in the final version of this manuscript. Domozetski (2013) who reported *G. cleopatra* from the region of Rupite (SW Bulgaria), near the church of St. Petka. This species is well known as a vagrant in Bulgaria, therefore it is not assessed against the IUCN Red List Criteria.

30. *Gonepteryx farinosa* (Zeller, 1847); **CR** B2ab(iii); currently known only from the Volcanic Hill of Kozhouh near the town of Petrich..

31. *Gonepteryx rhamni* (Linnaeus, 1758); **LC**

Family **Lycaenidae** Leach, 1815

Subfamily **Theclinae** Swainson, 1831

32. *Favonius quercus* (Linnaeus, 1758); **LC**

33. *Thecla betulae* (Linnaeus, 1758); **LC**

34. *Callophrys rubi* (Linnaeus, 1758); **LC**

35. *Satyrium acaciae* (Fabricius, 1787); **LC**

36. *Satyrium ilicis* (Esper, 1779); **LC**

37. *Satyrium spini* ([Denis & Schiffermüller], 1775); **LC**

38. *Satyrium pruni* (Linnaeus, 1758); **LC**

39. *Satyrium w-album* (Knoch, 1782); **LC**

Subfamily **Lycaeninae** Leach, 1815

40. *Lycaena phlaeas* (Linnaeus, 1761); **LC**

41. *Lycaena helle* ([Denis & Schiffermüller], 1775); **EN** B2ab(iii). Popović *et al*. (2014) reported *L. helle* for the first time for Bulgaria from Stara Planina Mts. above the Chiprovtsi waterfall; and about 3 km south-east of the first locality. There are two other localities published by Kolev & Shtinkov (2015): above the town of Chiprovtsi and below the Golema Chuka Peak. At present, all localities of *L. helle* in Bulgaria are situated in W Stara Planina Mts., in the area above Chiprovtsi.

42. *Lycaena ottomanus* (Lefèbvre, 1830); **LC**

43. *Lycaena dispar* (Haworth, 1802); **LC**

44. *Lycaena candens* (Herrich-Schäffer, 1844); **LC**

45. *Lycaena thersamon* (Esper, 1784); **LC**

46. *Lycaena alciphron* (Rottemburg, 1775); **LC**

47. *Lycaena virgaureae* (Linnaeus, 1758); **LC**

48. *Lycaena tityrus* (Poda, 1761); **LC**

Subfamily **Polyommatinae** Swainson, 1827

49. *Lampides boeticus* (Linnaeus, 1767); **LC**

50. *Leptotes pirithous* (Linnaeus, 1767); **LC**

51. *Tarucus balkanica* (Freyer, 1844); **LC**

52. *Chilades trochylus* (Freyer, 1845); **CR** B2ab(iii). Slivov &Abadjiev (1999c) firstly reported this species for Bulgaria from Veleka River. Later Abadjiev (2001) quoted this record. Ignatov *et al*. (2013) reported the species near Chuchuligovo Village in SW Bulgaria and considers the previous record as doubtful because of mislabelling of a specimen that probably did not originate from Bulgaria. The single reliable locality (near Chuchuligovo Village) is on the verge of being destroyed because of an ongoing infrastructure project.

53. *Cupido alcetas* (Hoffmannsegg, 1804); **LC**

54. *Cupido argiades* (Pallas, 1771); **LC**

55. *Cupido decolorata* (Staudinger, 1886); **LC**

56. *Cupido osiris* (Meigen, 1829); **LC**

57. *Cupido minimus* (Fuessly, 1775); **LC**

58. *Iolana iolas* (Ochsenheimer, 1816); **LC**

59. *Phengaris arion* (Linnaeus, 1758); **LC**

60. *Phengaris alcon* ([Denis & Schiffermüller], 1775) = *rebeli* (Hirschke, 1904); **LC**

61. *Phengaris nausithous* (Bergsträsser, 1779); **EN** B2ab(iii). All localities of this species in Bulgaria are situated in Lyulin Mt. and north-western part of Vitosha Mt. The Bulgarian population is isolated from the other populations of this species in Europe. The nearest populations are several hundred kilometres away – in Transylvania and Croatia.

62. *Glaucopsyche alexis* (Poda, 1761); **LC**

63. *Celastrina argiolus* (Linnaeus, 1758); **LC**

64. *Scolitantides orion* (Pallas, 1771); **LC**

65. *Pseudophilotes vicrama schiffermuelleri* (Hemming, 1929); **LC**

66. *Plebejus sephirus* (Frivaldzky, 1835) = *pylaon* auct (Fischer von Waldheim, 1832); **LC**; listed in Abadjiev (2001) as *P. pylaon*. These two are separate species and *P. pylaon* has never been found in Bulgaria.

67. *Plebejus argus* (Linnaeus, 1758); **LC**

68. *Plebejus idas* (Linnaeus, 1761). It seems that in Bulgaria *P. idas* is rarer than it is considered to be. Some of its known localities are incorrectly reported due to misidentification with its closely related species *P. argus*; **LC**

69. *Plebejus argyrognomon* (Bergsträsser, 1779); **LC**

70. *Plebejus dardanus* (Freyer, 1844); **EN**B2ab(iii). In Bulgaria this species is known from the highest part of Slavyanka Mt.; W Rodopi Mts. - Chepelare District; and S. Pirin Mts. - below Orelek Peak (Abadjiev, 2001).

71. *Aricia agestis* ([Denis & Schiffermüller], 1775); **LC**

72. *Aricia artaxerxes* (Fabricius, 1793); **LC**

73. *Aricia anteros* (Freyer, 1838); **LC**

74. *Aricia eumedon* (Esper, 1780); **LC**

75. *Cacyreus marshalli* Butler, 1898; **NE**. Langourov & Simov (2014) reported *C. marshalli* for Bulgaria from Novo Hodzhovo and Levunovo Villages. Known also

from W Rodopi Mts. - Trigrad Village (Anonymous 2014). Invasive species of no conservation concern.

76. *Polyommatus escheri* (Hübner, 1823); **LC**

77. *Polyommatus amandus* (Schneider, 1792); **LC**

78. *Polyommatus dorylas* ([Denis & Schiffermüller], 1775); **LC**

79. *Polyommatus semiargus* (Rottemburg, 1775); **LC**

80. *Polyommatus thersites* (Cantener, 1835); **LC**

81. *Polyommatus icarus* (Rottemburg, 1775); **LC**

82. *Polyommatus eros eroides* (Frivaldszky, 1835); **LC**

83. *Polyommatus daphnis* ([Denis & Schiffermüller], 1775); **LC**

84. *Polyommatus bellargus* (Rottemburg, 1775); **LC**

85. *Polyommatus coridon* (Poda, 1761); **LC**

86. *Polyommatus admetus* (Esper, 1783); **LC**

87. *Polyommatus aroaniensis* (Brown, 1976); **VU** B2ab(iii). Firstly reported for Bulgaria from Hambar Dere (Slavyanka Mt.) by Kolev (1994). "Chudnite mostove" carst arches (W Rodopi Mts.) is the second known locality in the country (Bálint 1995). Kolev & van der Poorten (1997) reported it east of Paril Village (Pirin Mts.); above the town of Sliven (Stara planina Mts.), in the highest part of National Park "Karandila". Some other localities inhabited by the species are: Gaytaninovo Village (S Pirin Mts.); Sliven town; "Cherkovnata Koriya" near Sliven (Abadjiev 2001). The last species' locality found is situated in W Rodopi Mts., in the vicinity of "Trigradski skali" chalet (Kolev 2005).

88. *Polyommatus nephohiptamenos* (Brown & Coutsis, 1978); **EN** B2ab(iii). Ganev (1984) firstly reported this species for the country from W Rodopi Mts. Recent examinations of Ganev's "*P. nephohiptamenos* " material from Rodopi Mts. proved that these specimens actually belong to *Polyommatus ripartii* (Freyer, 1830). Therefore, Hambar Dere (Slavyanka Mt.) is the first accurately recorded locality for Bulgaria (Kolev 1994). There are two localities in Pirin Mts.: Orelek Peak (Beshkov & Nowacki 1998); Vihren Peak (Domozetski 2012). This Balkan endemic species is only known from Bulgaria and the North Aegean mountains.

89. *Polyommatus orphicus* Kolev, 2005; **EN** B2ab(iii). This Bulgarian endemic species was described by Kolev (2005) and the author reported it from Rodopi Mts.: above Hvoyna Village; Mine Persenk; Lukovitsa Gorge near the town of Asenovgrad; in the visinity of Gela Village. Trigrad is the last known locality in Bulgaria (Abadjiev & Beshkov 2007). Pamperis (2009) recorded it from the Greek part of Rodopi Mts. but the specimens illustrated in his work as *P. orphicus* actually did not belong to this species.

90. *Polyommatus ripartii* (Freyer, 1830); **LC**

91. *Polyommatus damon* ([Denis & Schiffermüller], 1775); **DD**. Repoted for Bulgaria from two localities only: Sini Vrah (Drenowski 1920, Drenowski 1921, Gogov & Loukov 1964); Kapatnik Peak (Gogov & Loukov 1964). This species is also listed by Abadjiev (2001) who cited the previous records. It is possible that *P. damon* is reported for Bulgaria by mistake due to misidentification of females with other *Polyommatus* (*Agrodiaetus*) species with white streaks. In order to exclude it from the list of the Bulgarian fauna more research and fieldwork are needed.

Family. **Riodinidae** Grote, 1895

92. *Hamearis lucina* (Linnaeus, 1758); **LC**

Family **Nymphalidae** Rafinesque, 1815

Subfamily **Libytheinae** Boisduval, 1833

93. *Libythea celtis* (Laicharting, 1782); **LC**

Subfamily **Satyrinae** Boisduval, [1833]

94. *Kirinia roxelana* (Cramer, 1777); **LC**

95. *Kirinia climene* (Esper, 1783); **VU** B2ab(iii); possibly unclear distribution in Bulgaria because of confusion with other species. i.e. *Maniola jurtina* (Linnaeus, 1758). More focused surveys are needed for *K. climene* to establish if the species is actually as rare as it is thought to be.

96. *Pararge aegeria* (Linnaeus, 1758); **LC**

97. *Lasiommata maera* (Linnaeus, 1758); **LC**

98. *Lasiommata petropolitana* (Fabricius, 1787); **LC**

99. *Lasiommata megera* (Linnaeus, 1767); **LC**

100. *Lopinga achine* (Scopoli, 1763); **DD**. This species has been reported at the beginning of the 20th century from Samuil Village and Trapotansko place (Vratsa District) but since 1906 *L. achine* has not been found in Bulgaria and according to Abadjiev (2015) it is Regionally Extinct. Although the species has not been found for such a long time, it has not been subject of any studies so its extinction in Bulgaria has not been proven beyond any doubt. **DD**

101. *Coenonympha oedippus* (Fabricius, 1787); **RE.**

The only data available about the species presence in Bulgaria dated back to the beginning of the last century for the sites Poda and Ala tepe (in the vicinity of Marinka Village, Burgas District). It has not been found in the country for over a century and according to Abadjiev (2015) it is Regionally Extinct. This species has been subject of some unsuccessful field surveys although there are many suitable habitats for the species.

102. *Coenonympha arcania* (Linnaeus, 1761); **LC**

103. *Coenonympha leander* (Esper, 1784); **LC**

104. *Coenonympha glycerion* (Borkhausen, 1788); **LC**

105. *Coenonympha pamphilus* (Linnaeus, 1758); **LC**

106. *Coenonympha rhodopensis* Elwes, 1900; **LC**

107. *Pyronia tithonus* (Linnaeus, 1767); **LC**

108. *Maniola jurtina* (Linnaeus, 1758); **LC**

109. *Hyponephele lycaon* (Rottemburg, 1775); **LC**

110. *Hyponephele lupinus* (O; Costa, 1836); **LC**

111. *Aphantopus hyperantus* (Linnaeus, 1758); **LC**

112. *Erebia ligea* (Linnaeus, 1758); **LC**

113. *Erebia euryale* (Esper, 1805); **LC**

114. *Erebia orientalis* Elwes, 1900; **LC**

115. Erebia alberganus phorcys (Freyer, 1836); Balkan endemic taxon, known in Bulgaria from Central and Western Stara Planina Mts; VU B2ab(iii)

116. Erebia medusa ([Denis & Schiffermüller], 1775); LC

117. Erebia aethiops (Esper, 1777); LC

118. Erebia gorge pirinica Buresch, 1918; EN B2ab(ii, iii)

119. *Erebia rhodopensis* Nicholl, 1900; **VU** B2ab(ii, iii). The species localities in Bulgaria are situated in the highest parts of Stara planina Mts., Rila Mts. and Pirin Mts.

120. *Erebia cassioides* (Reiner & Hochenwarth, 1792); **VU** B2ab(iii). In Bulgaria this species is represented by three (more likely by two) separate subspecies known from Rila Mts., Pirin Mts. and Central Stara Planina Mts.

121. *Erebia ottomana* Herrich-Schäffer, 1847; **LC**

122. *Erebia melas* (Herbst, 1796); **VU** B2ab(iii)

123. *Erebia pronoe* (Esper, 1780); **VU** B2ab(iii)

124. *Erebia oeme* (Hübner, 1804); **LC**

125. *Erebia pandrose ambicolorata* Varga, 1971; **VU** B2ab(iii)

126. *Chazara briseis* (Linnaeus, 1764); **LC**

127. *Brintesia circe* (Fabricius, 1775); **LC**

128. *Pseudochazara anthelea amalthea* (Frivaldszky, 1845); **VU** B2ab(iii)

129. *Pseudochazara orestes* De Prins & van der Poorten, 1981; **CR** B2ab(iii). Balkan endemic known from Bulgaria and the North Aegean mountains only. Abadjiev (1993) reported *P. orestes* for the first time in Bulgaria from S Pirin Mts. - Gradishte hill. This remains the only known locality of the species in the country.

Pseudochazara geyeri (Herrich-Schäffer, 1846). Slivov & Abadjiev (1999a) reported this species based on samples kept in the collection of Al. Slivov (IBER) as new to the Bulgarian fauna from Slavyanka Mt. and Belasitsa Mt. According to Kolev (2002) this record is due to mislabelling of specimens that did not originate from Bulgaria. It is known that Slivov made a number of unfortunate labelling errors involving Bulgarian and non-Bulgarian specimens and a lot of his records shoud be treated as doubtful (Ignatov *et al.* 2013). We accept Kolev's explanation so the species is excluded from the present list and the list of the Bulgarian fauna.

Pseudochazara graeca (Staudinger, 1870) is also reported as new for Bulgaria (from Slavyanka Mt.) by Slivov & Abadjiev (1999a) but Kolev (2002) considers this report as doubtful because of the same reasons given above. We also support this conclusion, so *P. graeca* is excluded from the list of the Bulgarian fauna.

130. *Hipparchia semele* (Linnaeus, 1758); **DD**. Unclearly known; some of the data of *H. semele* actually refer to *Hipparchia volgensis* (Mazochin-Porshnjakov, 1952) because the two species were confused in the past.

131. *Hipparchia volgensis* (Mazochin-Porshnjakov, 1952); **LC**

132. *Hipparchia senthes* (Frühstorfer, 1908); **VU** B2ab(iii)

133. *Hipparchia fagi* (Scopoli, 1763); **LC**

134. *Hipparchia syriaca* (Staudinger, 1871); **LC**

135. *Hipparchia fatua* Freyer, 1844; fragmented distribution across the country; **VU** B2ab(iii)

136. *Hipparchia statilinus* (Hufnagel, 1766); **LC**

137. *Arethusana arethusa* ([Denis & Schiffermüller], 1775); **LC**

138. *Satyrus ferula* (Fabricius, 1793); fragmented distribution across the country; **VU** B2ab(iii)

139. *Minois dryas* (Scopoli, 1763); **LC**

140. *Melanargia galathea* (Linnaeus, 1758); **LC**

141. *Melanargia larissa* (Geyer, 1828); **LC**

Subfamily **Apaturinae** Boisduval, 1840

142. *Apatura metis* Freyer, 1829; **LC**

143. *Apatura iris* (Linnaeus, 1758); **LC**

144. *Apatura ilia* ([Denis & Schiffermüller], 1775); **LC**

Subfamily **Limenitidinae** Behr, 1864

145. *Limenitis populi* (Linnaeus, 1758); **LC**

146. *Limenitis reducta* Staudinger, 1901; **LC**

147. *Limenitis camilla* (Linnaeus, 1764); **LC**

148. *Neptis rivularis* (Scopoli, 1763); **LC**

149. *Neptis sappho* (Pallas, 1771); **LC**

Subfamily **Nymphalinae** Swainson, 1827

150. *Araschnia levana* (Linnaeus, 1758); **LC**

151. *Vanessa atalanta* (Linnaeus, 1758); **LC**

152. *Vanessa cardui* (Linnaeus, 1758); **LC**

153. *Polygonia c-album* (Linnaeus, 1758); **LC**

154. *Polygonia egea* (Cramer, 1775); **VU** B2ab(iii)

155. *Aglais io* (Linnaeus, 1758); **LC**

156. *Aglais urticae* (Linnaeus, 1758); **LC**

157. *Nymphalis vaualbum* ([Denis & Schiffermüller], 1775); **EN** B2ab(iii). In Bulgaria this species has been recorded from only a few localities: town of Sliven; Sotirya Village, Sliven District; the City of Sofia; W Stara Planina Mts. - "St. Nikola" pass. In Sofia and Sliven the species has not been found over the last few decades (Beshkov 2001). In addition, there is one confirmed record from Western Stara planina Mts – above Gorni Lom Village, September 2012, S. Beshkov leg.

158. *Nymphalis xanthomelas* (Esper, 1781); **EN** B2ab(iii).

In the past this species has been widespread and abundant in Bulgaria but from the middle of the last century until the second decade of 21th century it has not been found in the country; the species was rediscovered in 2014 near Dyavolskya most bridge over Vedena River (Beshkov

2014b). At present this is the ony recently published locality for the species in Bulgaria. However, there are several other unpublished records.

159. *Nymphalis polychloros* (Linnaeus, 1758); **LC**

160. *Nymphalis antiopa* (Linnaeus, 1758); **LC**

Subfamily **Argynninae** Duponchel,[1835]

161. *Argynnis niobe* (Linnaeus, 1758); **LC**

162. *Argynnis adippe* ([Denis & Schiffermüller], 1775); **LC**

163. *Argynnis paphia* (Linnaeus, 1758); **LC**

164. *Argynnis pandora* ([Denis & Schiffermüller], 1775); **LC**

165. *Argynnis aglaja* (Linnaeus, 1758); **LC**

166. *Brenthis ino* (Rottemburg, 1775); **LC**

167. *Brenthis hecate* ([Denis & Schiffermüller], 1775); **LC**

168. *Brenthis daphne* (Bergsträsser, 1780); **LC**

169. *Issoria lathonia* (Linnaeus, 1758); **LC**

170. *Boloria eunomia* (Esper, 1799); **EN** B2ab(iii). In Bulgaria this species is known only from the highest part of Central Stara Planina Mts. - between Levski and Botev Peaks.

171. *Boloria euphrosyne* (Linnaeus, 1758); **LC**

172. *Boloria selene* ([Denis & Schiffermüller], 1775); **LC**

Boloria titania (Esper, 1793) was reported as new for Bulgaria from Pirin Mts. - "Gotse Delchev" Chalet and Rila Mts – "Makedonia" Chalet by Slivov & Abadjiev (1999b). According to Kolev (2002) this report is doubtful and it is a result of mislabelling of specimens, kept in the collection of A. Slivov, that did not originate from Bulgaria. The present authors also corroborate this conclusion so *B. titania* is excluded from the list.

173. *Boloria dia* (Linnaeus, 1767); **LC**

174. *Boloria pales rilaensis* Varga, 1971; **VU** B2ab(iii)

175. *Boloria graeca balcanica* (Rebel, 1903); **LC**

Subfamily **Melitaeinae** Grote, 1897

176. *Melitaea phoebe* ([Denis & Schiffermüller], 1775); **LC**

177. *Melitaea ornata* Christoph, 1893 =*telona* Frühstorfer, 1908; =*punica* Oberthür, 1876 auct; **DD**. In the past (and perhaps at present) this species has been confused with its closely related species *M. phoebe* due to misidentification. For this reason the actual distribution of *M. ornata* in Bulgaria is not clearly defined.

178. *Melitaea arduinna rhodopensis* Freyer, [1836]; **VU** B2ab(iii)

179. *Melitaea didyma* (Esper, [1778]); **LC**

180. *Melitaea trivia* ([Denis & Schiffermüller], 1775); **LC**

181. *Melitaea diamina* (Lang, 1789); **VU** B2ab(iii). In the past this species was known from relatively large number of localities but there are no reports for Bulgaria from the last few decades. It is possible that this could be related to strong declines in the country.

182. *Melitaea aurelia* Nickerl, 1850; **LC**

183. *Melitaea britomartis* Assmann, 1847;**VU** B2ab(iii)

184. *Melitaea athalia* (Rottemburg, 1775); **LC**

185. *Melitaea cinxia* (Linnaeus, 1758); **LC**

186. *Euphydryas aurinia* (Rottemburg, 1775); **VU** B2ab(iii)

187. *Euphydryas cynthia* ([Denis & Schiffermüller], 1775); **VU** B2ab(iii)

188. *Euphydryas maturna opulenta* Rákosy & Varga, 2012; **VU** B2ab(iii). It occurs at low altitudes in the eastern part of the country: the regions of Dobrudzha, Ludogorie, E Stara Planina Mts. and Black Sea Coast (Abadjiev & Beshkov 2003). It is known mainly from NE Bulgaria, northern from the line Russe - Varna where possibly more than 90% of the Bulgarian population is found.

Conclusions

About one-fifth (46 species) of the Bulgarian Hesperioidea and Papilionoidea are considered threatened at national level based on the IUCN criteria (Fig. 1). Biological Diversity Act (BDA) of the Republic of Bulgaria (Anonymous 2015) adopted the European Directives (e.g. 92/43 EEC) and International conventions (Bern Convention, CITES). As a result in the Annexes II and III of the BDA are listed species mainly from Central and Western Europe. In Annex II of the BDA are included nine Bulgarian butterfly species, which are the same as those in Annex II of the The Habitats Directive 92/43/EEC. Eight of the species in the Annexes II and III of the BDA are identical. Annex III of the BDA contains 16 Bulgarian butterfly species that are the same as those in Annex IV of the Habitats Directive 92/43/EEC. Half of them are also listed in Annex II of the Bern Convention (e.g. *Euphydryas aurinia*) or CITES (*Parnassius apollo*). Only two species (*Colias caucasica balcanica* and *Erebia rhodopensis*) are added at national level, and five of the 16 species protected by BDA in Bulgaria are actually considered threatened (three of them are VU, the others are EN) and one species is Regionally Extinct. The Red Data Book of the Republic of Bulgaria (Abadjiev 2015) deals only with the Regionally Extinct species. The implementation of the European Legislation and adopting the lists for Central and Western Europe as part of the National law is the reason why the Annexes of the BDA are not precise enough, or even misleading. Protection of the endemic and rare species of each

country is an obligation at the national level and these species must be included in the Annexes of The Biological Diversity Act of the Republic of Bulgaria. We strongly recommend all threatened species listed in this article to be eventually included in the Annex III of the BDA of the Republic of Bulgaria.

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