

Coleoptera and Lepidoptera (Insecta) diversity in the central part of Sredna Gora Mountains (Bulgaria)

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ABSTRACT. Despite the proximity of Sredna Gora Mountains to Sofia, the insect assemblages of this region are poorly studied. As a result of two studies carried out as a part of an Environmental Impact Assessment in the Natura 2000 Protected Areas: Sredna Gora and Popintsi, a rich diversity of insects was discovered, with 107 saproxylic and epigeobiont Coleoptera species and 355 Lepidoptera species recorded. This research was conducted during a short one-season field study in the surrounding areas of the town of Panagyurishte and Oborishte Village. Special attention was paid to protected species and their conservation status. Of the Coleoptera recorded, 22 species were of conservation significance. Forty-five Lepidoptera species of conservation importance were also recorded.

KEY WORDS. Saproxylic beetles, epigeobiont beetles, Macrolepidoptera, Natura 2000

INTRODUCTION

The Sredna Gora Mountains are situated in the central part of Bulgaria, parallel to the Stara Planina Mountains chain. They are insufficiently studied with regard to their invertebrate assemblages.

There is lack of information about the beetles from Sredna Gora Mountains in the region of the Panagyurishte town and Oborishte village. Most of the previous data is old and found in catalogues, mentioning the mountain without distinct localities (NEDELKOV, 1906, 1909; ANGELOV, 1976, 1978, 1979, 1980, 1981a, 1981b; GUÉORGUIEV & GUÉORGUIEV, 1995; GRUEV & TOMOV, 2007; BEKCHIEV, 2016). The collection of the National Museum of Natural History, Bulgarian Academy of Science, does not contain any specimens of beetle species collected from the vicinity of Panagyurishte and Oborishte. There is also no unpublished Coleoptera material amongst personal collections.

The butterflies are well known from the region, but data about the moths is scarce. Prior to this survey, 54 butterfly species were known from the area, published in the literature, deposited in collections and included in databases. They represent up to 25% of all Papilionoidea species in Bulgaria. The first records from the region were four species reported by NEDELKOV (1909). A more detailed study of Sredna Gora's butterflies was conducted by ILCHEV (1913), who reported 37 species from the area. BURESH & TULESHKOV (1929, 1930) summarised the available information on butterflies in Bulgaria, listing 24 species from the area. DIRIMANOV & HIKRENOV (1962) conducted a new study dedicated to the butterflies of Sredna Gora Mountains, with 31 species reported from the area. Single species were published by BURESH (1912), DRENOWSKI (1934) and ABADJIEV &

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BESHKOV (2007). Several moth species were reported by BESHKOV (2000; 2011; 2017). The reported localities of the species were above Oborishte, above Panagyurishte, the slopes of the Bratia peak, Panagyurski kolonii, Assarel, Popintsi and Koprivshitsa.

The present study provides information about saproxylic and epigeobiont beetle species and macrolepidoptera species from Sredna Gora Mountains in the region of Panagyurishte and Oborishte (NATURA 2000 zones: Sredna Gora BG0001389, Popintsi BG0001039 and Luda Yana River BG0000426). Such local faunistic information, lately neglected, is very important since it represents data which is necessary for biodiversity assessments and management decisions.

MATERIAL AND METHODS

The material was collected during the vegetation season between the periods of July 2014 - June 2015 and May - August 2017, totaling into eleven field expeditions. The study area was the central part of Sredna Gora Mountains (Sashtinska Sredna Gora), Natura 2000 zones: Sredna Gora BG0001389, Popintsi BG0001039 and BG0000426 Luda Yana River (Fig. 1). The sample sites were chosen to reflect the typical habitats of the zones: mixed oak/hornbeam forest, beech forest, meadows/open areas and swamps.



Figure 1: A map of the study area at the Natura 2000 zones from the central part of Sredna Gora Mountains, based on a satellite map of Bulgaria from Sentinel 2, created by Geopolymorphic Cloud. Satellite imagery source: Copernicus.eu.

The collecting methods employed to collect beetles were as follows: (i) Pitfall traps (totaling 15 traps) made from 500 ml containers filled with propylene glycol as a preservative; (ii) Substrate sifting (soil, leaf litter, etc.) by sifter; (iii) Manual collection in rotten wood, under tree bark and stones. The butterflies were collected on transects (1-1.5 km) with a standard entomological net. For the moths, the collecting methods consisted of two - three portable light traps with 8 W Actinic (368 nm) and 8 W blacklight were used, both powered by 12 V batteries, as well as Finnish “tent trap” with a 160 W Mercury Vapour bulb at the top of the pole and a 20 W (368 nm) blacklight over

the catching pot below, powered by a 220 V generator. An additional catching pot with funnel and a 20 W (368 nm) lamp was also positioned about 70 m from the tent trap. All traps ran throughout the night. Some problematic Lepidoptera species were identified after microscopic examination of the genitalia.

Three stationary sample sites with pitfall traps were chosen from Sredna Gora due to its larger territory (Table 1). The hand collecting was conducted around the areas of pitfall and light traps, as well as in additional localities, coordinates are noted in the species list, Table 1.

Table 1: Sample sites with pitfall and light traps at Sredna Gora.

Sample site	Pitfall traps (5 per site)			Light traps		
	Coordinates	Altitude (m)	Date	Coordinates	Altitude (m)	Date
1	From:	851	15.vii-03.x.2014	N42.5469 E24.0844	862	27-28.iv.2015
	N42.5647 E24.0906			N42.5522 E24.0856	861	
	To:	832		N42.5483 E24.0839	845	
	N42.5644 E24.0894			N42.5503 E24.0844	886	
2	From:	738	15.v-07.vi.2015	N42.5372 E24.0872	739	22.v.2015; 06.vi.2015
	N42.5353 E24.0878			N42.5380 E24.0867	764	
	To:	713		N42.5353 E24.0892	719	
	N42.5344 E24.0900			N42.5353 E24.0878	742	
3	From:	1154	15.vii-03.x.2014	N42.5561 E24.1403	1180	23.v.2015; 07.vi.2015
	N42.5553 E24.1400			N42.5558 E24.1408	1170	
	To:	1150		N42.5550 E24.1406	1158	
	N42.5556 E24.1394			N42.5569 E24.1408	1180	

RESULTS

Overall, 107 species of saproxilic and epigeobiont Coleoptera and 355 species of Lepidoptera were recorded from the territory of the central part of Sredna Gora. The data collected was mainly from the Natura 2000 zone of Sredna Gora (Tables 2 and 3) and only the species of conservation importance were listed from the zones Luda Yana River and Popintsi (Table 4).

The saproxilic and epigeobiont beetles collected belong to 23 families. Family Carabidae had the highest species richness, followed by family Staphylinidae.

The identified Lepidoptera species belong to 22 families. Among them, Noctuidae had the highest species diversity with 111 species, followed by Geometridae with 95 species and Erebiidae with 32 species; the most numerous family of butterflies is Nymphalidae with 28 species. Of the 54 Papilionoidea species previously known in the literature, 34 were found as part of this study and another 10 were newly discovered for the studied area. The majority of the identified moths were new records for the Sredna Gora Mountains, while 21 beetle species and 32 Lepidoptera species of conservation value were identified.

Table 2: Species list of epigeobiont and saproxylic beetles from Natura 2000 zone: Sredna Gora.

Species	Sample site	Species	Sample site
Carabidae			
1. <i>Abax carinatus</i> (Duftschmid, 1812)	1	21. <i>Harpalus distinguendus</i> (Duftschmid, 1812)	1; 2
2. <i>Acupalpus flavicollis</i> (Sturm, 1825)	2	22. <i>Harpalus honestus</i> (Duftschmid, 1812)	N42.5414 E24.1228
3. <i>Agonum viridicupreum</i> Goeze, 1777	2	23. <i>Harpalus rubripes</i> (Duftschmid, 1812)	2
4. <i>Amara aenea</i> (De Geer, 1774)	2	24. <i>Harpalus rufipes</i> (De Geer 1774)	1
5. <i>Amara ovata</i> (Fabricius, 1792)	1	25. <i>Harpalus tardus</i> (Panzer, 1797)	2
6. <i>Amara saphyrea</i> Dejean, 1828	3	26. <i>Laemostenus cimmerius</i> (Fischer-Waldheim, 1823)	3
7. <i>Anchomenus dorsalis</i> (Pontoppidan, 1763)	1; 2	27. <i>Laemostenus terricola</i> (Herbst, 1784)	1; 3
8. <i>Anisodactylus binotatus</i> (Fabricius, 1787)	2	28. <i>Molops alpestris</i> Dejean, 1828	3
9. <i>Aptinus bombardia</i> (Illiger, 1800)	1	29. <i>Molops dilatatus</i> <i>angulicollis</i> J. Müller, 1936	1; 3
10. <i>Bembidion sp.</i>	1	30. <i>Molops piceus</i> <i>bulgaricus</i> Mařan, 1938	N42.5414 E24.1228
11. <i>Calathus distinguendus</i> Chaudoir, 1846	1; 2; 3	31. <i>Molops robustus</i> <i>robustus</i> Dejean, 1828	1
12. <i>Calosoma inquisitor</i> (Linnaeus, 1758)	1; 2	32. <i>Myas chalybaeus</i> (Palliard, 1825)	1; 3
13. <i>Carabus convexus</i> Fabricius, 1775	1; 3	33. <i>Nebria brevicollis</i> (Fabricius, 1792)	2
14. <i>Carabus coriaceus</i> Linnaeus, 1758	2	34. <i>Ophonus laticollis</i> Mannerheim, 1825	N42.5414 E24.1228
15. <i>Carabus hortensis</i> Linnaeus, 1758	1; 3	35. <i>Ophonus</i> <i>schraubbergerianus</i> Puel, 1937	1
16. <i>Carabus intricatus</i> Linnaeus, 1761	1; 3	36. <i>Pangus scaritides</i> (Sturm, 1818)	2
17. <i>Carabus montivagus</i> Palliard, 1825	1; 3	37. <i>Limodromus assimilis</i> (Paykull, 1790)	1; 3
18. <i>Cicindela campestris</i> Linnaeus, 1758	1	38. <i>Pterostichus niger</i> (Schaller, 1930)	1; 3
19. <i>Cicindela hybrida</i> Linnaeus, 1758	3	39. <i>Pterostichus</i> <i>oblongopunctatus</i> Fabricius, 1787	1
20. <i>Cychnus semigranosus</i> <i>balcanicus</i> Hopffgarten, 1881	1		

Species	Sample site	Species	Sample site
40. <i>Tapinopterus</i> sp.	1	58. <i>Euplectus brunneus</i> Grimmer, 1814	3
41. <i>Trechus quadristriatus</i> (Schränk, 1781)	1; 3	59. <i>Euplectus kirbii</i> Denny, 1825	3
42. <i>Xenion ignitum</i> (Kraatz, 1875)	1; 3	60. <i>Plectophloeus nubigena</i> (Reitter, 1877)	3
Histeridae		61. <i>Scaphidium</i> <i>quadrimaculatum</i> Olivier, 1790	3
43. <i>Eblisia minor</i> (Rossi, 1792)	1	62. <i>Trimium carpathicum</i> Saulcy, 1875	3
44. <i>Hister quadrimaculatus</i> Linnaeus, 1758	1; 2	63. <i>Trimium puncticeps</i> Reitter, 1880	1; 3
45. <i>Margarinotus merdarius</i> (Hoffmann, J., 1803)	2	64. <i>Trissemus atennatus</i> <i>serricornis</i> Shmidt-Göbel, 1838	2
46. <i>Margarinotus</i> <i>punctiventer</i> (Marseul, 1854)	2	65. <i>Tychus aphelbecki</i> Karaman, 1955	2
47. <i>Saprinus georgicus</i> Marseul, 1862	3	Geotrupidae	
Silphidae		66. <i>Anoplotrupes stercorosus</i> (Scriba, 1791)	N42.5414 E24.1228
48. <i>Necrodes littoralis</i> (Linnaeus, 1758)	2	67. <i>Jekelius punctulatus</i> (Jekel, 1866)	1
49. <i>Nicrophorus humator</i> Gleditsch, 1767	2	68. <i>Trypocopris vernalis</i> (Linnaeus, 1758)	1; 2
50. <i>Nicrophorus vespilloides</i> Herbst, 1783	1	Lucanidae	
51. <i>Dendroxena</i> <i>quadrimaculata</i> (Scopoli, 1771)	N42.5414 E24.1228	69. <i>Dorcus parallelipedus</i> (Linnaeus, 1758)	1; 3 N42.5414 E24.1228
Staphylinidae		70. <i>Lucanus cervus</i> (Linnaeus, 1758)	1; 2; 3 N42.5910 E24.2242
52. <i>Batrisodes delaportei</i> Aubé, 1833	1	Aphodiidae	
53. <i>Batrisodes venustus</i> Reichenbach, 1816	3	71. <i>Nimbus contaminatus</i> (Herbst, 1783)	1
54. <i>Batrisus formicarius</i> Aubé, 1833	1	Scarabaeidae	
55. <i>Bryaxis islamitus</i> Reitter, 1885	1	72. <i>Copris lunaris</i> (Linnaeus, 1758)	2
56. <i>Bryaxis roumaniae</i> Raffray, 1904	3	73. <i>Euoniticellus fulvus</i> (Goeze, 1777)	1
57. <i>Bythinus lunicornis</i> Reitter, 1884	3	74. <i>Gymnopleurus geoffroyi</i> (Fuessly, 1775)	2

Species	Sample site	Species	Sample site
75. <i>Onthophagus furcatus</i> (Fabricius, 1781)	1; 2	Coccinellidae	
76. <i>Onthophagus illyricus</i> (Scopoli, 1763)	1	90. <i>Coccinella septempunctata</i> (Linnaeus, 1758)	N42.5414 E24.1228
77. <i>Anoplotrupes stercorosus</i> (Scriba, 1791)	1	Mycetophagidae	
Orphnidae		91. <i>Mycetophagus quadripustulatus</i> (Linnaeus, 1761)	3
78. <i>Chaetonyx robustus</i> Schaum, 1862	3	Tenebrionidae	
Melolonthidae		92. <i>Accanthopus velikensis</i> (Piller & Mitterpacher, 1783)	1; 3
79. <i>Melolontha melolontha</i> (Linnaeus, 1758)	2; 3	93. <i>Gnaptor spinimanus</i> (Pallas, 1781)	1; 3
80. <i>Rhizotrogus aestivus</i> (Olivier, 1789)	1; 2	Cerambycidae	
Rutelidae		94. <i>Cerambyx scopoli</i> Linnaeus, 1758	N42.5414 E24.1228
81. <i>Blitopertha lineolata</i> (Fischer von Waldheim, 1824)	2	95. <i>Morimus asper funereus</i> Mulsant, 1863	1;3 N42.56085 E24.16315; N42.56234 E24.16200; N42.56387 E24.15953; N42.57635 E24.15784; N42.65539 E24.13776; N42.65814 E24.13823
Cetoniidae			96. <i>Prionus coriarius</i> Linnaeus, 1758
82. <i>Cetonia aurata</i> Linnaeus, 1761	1; 3	97. <i>Rhagium bifasciatum</i> Fabricius, 1775	2; 3
83. <i>Tropinota hirta</i> (Poda, 1761)	2; 3 N42.5414 E24.1228	98. <i>Rosalia alpina</i> Linnaeus, 1758	1 N42.56460 E24.15793; N42.61108 E24.22312; N42.59129 E24.22601
84. <i>Valgus hemipterus</i> (Linnaeus, 1758)	2		99. <i>Anaglyptus mysticus</i> Linnaeus, 1758
Bostrichidae		100. <i>Pedestredorcadion pedestre</i> (Poda, 1761)	1; 2; 3
85. <i>Bostrichus capucinus</i> (Linnaeus, 1758)	1	Cleridae	
Erotylidae		86. <i>Clerus mutillarius</i> Fabricius, 1775	1
87. <i>Triplax russica</i> (Linnaeus, 1758)	2	Silvanidae	
Silvanidae		88. <i>Uleiota planata</i> Linnaeus, 1761	1
Endomychidae		Endomychidae	
89. <i>Mycetina cruciata</i> (Schaller 1783)	1; 3		

Species	Sample site
101. <i>Leiopus nebulosus</i> Linnaeus, 1758	1; 2
102. <i>Xylotrechus antilope</i> (Schönherr, 1817)	1; 2; 3
103. <i>Agapanthia cynarae</i> Germar, 1817	1; 2; 3
104. <i>Cortodera humeralis</i> Schaller, 1783	1; 2; 3
Chrysomelidae	
105. <i>Timarcha tenebricosa</i> (Fabricius, 1775)	2
Anthribidae	
106. <i>Platyrhinus resinosus</i> (Scopoli, 1763)	1; 3

Table 3: Species list of Macrolepidoptera from Natura 2000 zone: BG0001389 “Sredna Gora”.

Species	Sample site	Species	Sample site
Hepialidae		8. <i>Jordanita budensis</i> (Speyer & Speyer, 1858)	2; 3
1. <i>Korscheltellus lupulinus</i> (Linnaeus, 1758)	3	9. <i>Jordanita notata</i> (Zeller, 1847)	2; 3
Psychidae		10. <i>Zygaena minos/</i> <i>purpuralis</i>	2; 3 N42.5369 E24.1306
2. <i>Rebelia perlucidella/</i> <i>macedonica</i>	1; 2	11. <i>Zygaena filipendulae</i> (Linnaeus, 1758)	1; 3 N42.5369 E24.1306
Euploclamidae		Cossidae	
3. <i>Euploclamus</i> <i>anthracinalis</i> (Scopoli, 1763)	2	12. <i>Dyspessa ulula</i> (Borkhausen, 1790)	2
Limacodidae		Lasiocampidae	
4. <i>Apoda limacodes</i> (Hufnagel, 1766)	2	13. <i>Malacosoma neustria</i> (Linnaeus, 1758)	2
Zygaenidae		14. <i>Macrothylacia rubi</i> (Linnaeus, 1758)	2; 3 N42.5369 E24.1306
5. <i>Adscita statices</i> <i>drenowskii</i> (Alberti, 1939)	2; 3	15. <i>Phyllodesma tremulifolia</i> (Hübner, 1810)	1; 3
6. <i>Adscita mannii</i> (Lederer, 1853)	2; 3		
7. <i>Jordanita graeca</i> (Jordan, 1907)	2; 3		

Species	Sample site	Species	Sample site
Saturniidae		Pieridae	
16. <i>Agria tau</i> (Linnaeus, 1758)	1	34. <i>Antocharis cardamines</i> (Linnaeus, 1758)	1; 2; 3 N42.5369 E24.1306
Sphingidae		35. <i>Aporia crataegi</i> (Linnaeus, 1758)	1; 2; 3
17. <i>Deilephila porcellus</i> (Linnaeus, 1758)	2; 3	36. <i>Colias alfacariensis</i> Ribbe, 1905	3
18. <i>Hyles euphorbiae</i> (Linnaeus, 1758)	2; 3	37. <i>Colias crocea</i> (Geoffroy in Fourcroy, 1785)	1
19. <i>Sphinx pinastri</i> (Linnaeus, 1758)	2; 3	38. <i>Euchloe ausonia</i> (Hübner, [1804])	1
20. <i>Laothoe populi</i> (Linnaeus, 1758)	2; 3	39. <i>Leptidea sinalis/ juvernica</i>	1; 2; 3 N42.5369 E24.1306
21. <i>Macroglossum stellatarum</i> (Linnaeus, 1758)	N42.5369 E24.1306	40. <i>Pieris napi</i> (Linnaeus, 1758)	1; 2 N42.5369 E24.1306
22. <i>Marumba quercus</i> ([Denis & Schiffermüller], 1775)	2	41. <i>Pieris rapae</i> (Linnaeus, 1758)	3
23. <i>Proserpinus proserpina</i> (Pallas, 1772)	3	Lycaenidae	
Hesperiidae		42. <i>Plebeius agestis</i> ([Denis & Schiffermüller], 1775)	1; 2; 3 N42.5369 E24.1306
24. <i>Erynnis tages</i> (Linnaeus, 1758)	1; 3	43. <i>Plebeius artaxerxis</i> (Fabricius, 1793)	1; 2; 3 N42.5369 E24.1306
25. <i>Ochlodes sylvanus</i> (Esper, [1779])	N42.5369 E24.1306	44. <i>Plebeius idas</i> (Linnaeus, 1761)	N42.5925 E24.1583
26. <i>Pyrgus alveus</i> (Hübner, [1800-1803])	N42.6547 E24.1367	45. <i>Callophris rubi</i> (Linnaeus, 1758)	1; 2; 3 N42.5369 E24.1306
27. <i>Pyrgus malvae</i> (Linnaeus, 1758)	1; 2; 3 N42.5369 E24.1306	46. <i>Celastrina argiolus</i> (Linnaeus, 1758)	1
28. <i>Pyrgus seratulae</i> (Rambur, [1839])	2	47. <i>Glaucopsyche alexis</i> (Poda, 1761)	3
29. <i>Pyrgus sidae</i> (Esper, [1784])	1; 2	48. <i>Lycaena alciphron</i> (Rottemburg, 1775)	1 N42.5369 E24.1306
30. <i>Spialia orbifer</i> (Hübner, [1823])	1; 2; 3	49. <i>Lycaena phlaeas</i> (Linnaeus, 1761)	1; 2; 3 N42.5369 E24.1306
31. <i>Thymelicus lineola</i> (Ochsenheimer, 1808)	1	50. <i>Lycaena thersamon</i> (Esper, 1784)	1; 2
Papilionidae		51. <i>Lycaena tityrus</i> (Poda, 1761);	2; 3 N42.5369 E24.1306
32. <i>Iphiclides podalirius</i> (Linnaeus, 1758)	3	52. <i>Plebeius argus</i> (Linnaeus, 1758)	1; 2; 3 N42.5369 E24.1306
33. <i>Parnassius mnemosyne</i> (Linnaeus, 1758)	1; 3	53. <i>Plebeius argyrognomon</i> (Bergsträsser, 1779)	2

Species	Sample site	Species	Sample site
54. <i>Polyommatus amandus</i> (Schneider, 1792)	1	74. <i>Polygonia c-album</i> (Linnaeus, 1758)	1; 3 N42.5369 E24.1306
55. <i>Polyommatus icarus</i> (Rottemburg, 1775)	2; 3 N42.5369 E24.1306	75. <i>Coenonympha arcania</i> (Linnaeus, 1761)	N42.5369 E24.1306
56. <i>Polyommatus semiargus</i> (Rottemburg, 1775)	1; 2; 3 N42.5369 E24.1306	76. <i>Coenonympha leander</i> (Esper, 1784)	1; 2; 3 N42.5369 E24.1306
57. <i>Polyommatus thersites</i> (Cantener, 1835)	3	77. <i>Coenonympha pamphilus</i> (Linnaeus, 1758)	1; 2; 3 N42.5369 E24.1306
Nymphalidae		78. <i>Erebia medusa</i> ([Denis & Schiffermüller], 1775)	1; 2; 3 N42.5369 E24.1306
58. <i>Aglais utricae</i> (Linnaeus, 1758)	3	79. <i>Hipparchia semele/volgensis</i>	1
59. <i>Argynnis niobe</i> (Linnaeus, 1758)	1; 3	80. <i>Lasiommata maera</i> (Linnaeus, 1758)	2; 3 N42.5369 E24.1306
60. <i>Argynnis paphia</i> (Linnaeus, 1758)	N42.5369 E24.1306	81. <i>Lasiommata megera</i> (Linnaeus, 1767)	2; 3
61. <i>Boloria dia</i> (Linnaeus, 1767)	3	82. <i>Maniola jurtina</i> (Linnaeus, 1758)	1; 2; 3 N42.5369 E24.1306
62. <i>Boloria euphrosyne</i> (Linnaeus, 1758)	3 N42.5369 E24.1306	83. <i>Pararge aegeria</i> (Linnaeus, 1758)	1; 2; 3 N42.5369 E24.1306
63. <i>Brenthis daphne</i> (Bergsträsser, 1780)	1; 2 N42.5369 E24.1306	Thyatiridae	
64. <i>Vanessa cardui</i> (Linnaeus, 1758)	1; 2; 3	84. <i>Watsinalla binaria</i> (Hufnagel, 1767)	2; 3
65. <i>Issoria lathonia</i> (Linnaeus, 1758)	1; 2; 3 N42.5369 E24.1306	85. <i>Watsonalla cultraria</i> (Fabricius, 1775)	1; 3
66. <i>Melitaea athalia</i> (Rottemburg, 1775)	1; 3 N42.5369 E24.1306	86. <i>Habrosyne pyritoides</i> (Hufnagel, 1766)	2; 3
67. <i>Melitaea cinxia</i> (Linnaeus, 1758)	1; 2; 3 N42.5369 E24.1306	87. <i>Polyplocia ridens</i> (Fabricius, 1787)	1
68. <i>Melitaea didyma</i> (Esper, [1778])	1; 2	Geometridae	
69. <i>Melitaea ornata</i> Christoph, 1893	2	88. <i>Alelucis orientalis</i> (Staudinger, 1892)	1
70. <i>Melitaea phoebe</i> ([Denis & Schiffermüller], 1775)	1; 2	89. <i>Anticlea badiata</i> ([Denis & Schiffermüller], 1775)	1
71. <i>Melitaea trivia</i> ([Denis & Schiffermüller], 1775)	1; N42.5369 E24.1306	90. <i>Anticlea derivatai</i> ([Denis & Schiffermüller], 1775)	1
72. <i>Neptis sappho</i> (Pallas, 1771)	3	91. <i>Apeira syringaria</i> (Linnaeus, 1758)	N42.6547 E24.1367
73. <i>Nymphalis polychloros</i> (Linnaeus, 1758)	1	92. <i>Aplocera plagiata</i> (Linnaeus, 1758)	2; 3

Species	Sample site	Species	Sample site
93. <i>Aplocera praeformata</i> (Hübner, 1826)	3	113. <i>Crocallis elinguaris</i> (Linnaeus, 1758)	1
94. <i>Asovia maeoticaria</i> (Alphéraky, 1876)	2	114. <i>Cyclophora puppillaria</i> (Hübner, [1799])	2; 3 N42.5369 E24.1306
95. <i>Aspilates ochrearia</i> (Rossi, 1794)	2	115. <i>Cyclophora quircimontaria?</i> (Bastelberger, 1897)	1
96. <i>Asthena albulata</i> (Hufnagel, 1767)	1	116. <i>Cyclophora</i> sp.	2
97. <i>Biston betularia</i> (Linnaeus, 1758)	2; 3	117. <i>Dyscia innocentaria</i> (Christoph, 1885)	2
98. <i>Biston strataria</i> (Hufnagel, 1766)	2	118. <i>Dysstroma truncata</i> (Hufnagel, 1767)	N42.5925 E24.1583
99. <i>Campaea margaritata</i> (Linnaeus, 1767)	2; 3	119. <i>Ematurga atomaria</i> (Linnaeus, 1758)	3
100. <i>Camptogramma bilineata</i> (Linnaeus, 1758)	2; 3	120. <i>Ecliptopera silaceata</i> ([Denis & Schiffermüller], 1775)	N42.6156 E24.2161; N42.5925 E24.1583
101. <i>Cataclysmis riguata</i> (Hübner, [1813])	2; 3	121. <i>Epirrhoe alternata</i> (Müller, 1764)	3
102. <i>Catarrhoe cucullata</i> (Hufnagel, 1767)	3	122. <i>Ennomos quercinaria</i> (Hufnagel, 1767)	
103. <i>Charissa obscurata</i> ([Denis & Schiffermüller], 1775)	N42.5925 E24.1583	123. <i>Epirrhoe rivata</i> (Hübner, [1813])	3
104. <i>Chiasmia clathrata</i> (Linnaeus, 1758)	1; 2; 3	124. <i>Eupithecia breviculata</i> (Donzel, 1837)	2
105. <i>Chlorissa cloraria?</i> (Hübner, [1813])	3	125. <i>Eupithecia icterata</i> (de Villers, 1789)	N42.6156 E24.2161
106. <i>Chloroclysta siterata?</i> (Hufnagel, 1767)	1; 3	126. <i>Eupithecia insigniata</i> (Hübner, 1790)	1
107. <i>Rhinoprora chloerata</i> (Mabille, 1870)	2	127. <i>Eupithecia</i> sp.	1; 2; 3
108. <i>Cleta filaceata</i> (Herrich-SchäfferR, 1847)	3	128. <i>Eupithecia linariata/pyreneata</i>	2
109. <i>Colostygia pectinataria</i> (Knock, 1781)	2	129. <i>Horysme tersata</i> ([Denis & Schiffermüller], 1775)	2
110. <i>Comibaena bajularia</i> ([Denis & Schiffermüller], 1775)	2	130. <i>Horysme vitalbata</i> ([Denis & Schiffermüller], 1775)	2
111. <i>Cosmorrhoe ocellata</i> (Linnaeus, 1758)	2; 3	131. <i>Hydriomena impluviata</i> ([Denis & Schiffermüller], 1775)	N42.6547 E24.1367
112. <i>Costaconvexa polygrammata</i> (Borkhausen, 1794)	1		

Species	Sample site	Species	Sample site
132. <i>Hypomecis punctinalis</i> (Scopoli, 1763)	3	151. <i>Opistograptis luteolata</i> (Linnaeus, 1758)	3
133. <i>Hypomecis roboraria</i> ([Denis & Schiffermüller], 1775)	3	152. <i>Paiographa etruscaria</i> (Zeller, 1849)	2
134. <i>Idaea aversata</i> (Linnaeus, 1758)	1	153. <i>Perconia strigillaria</i> (Hübner, 1787)	2; 3
135. <i>Idaea degeneraria</i> (Hübner, [1799])	3	154. <i>Peribatodes rhomboidaria</i> ([Denis & Schiffermüller], 1775)	2
136. <i>Idaea dilutaria?</i> (Hübner, [1799])	3	155. <i>Peribatodes umbraria</i> (Hübner, [1809])	2
137. <i>Idaea filicata</i> (Hübner, [1799])	2	156. <i>Perizoma alchemillata</i> (Linnaeus, 1758)	N42.6156 E24.2161; N42.5925 E24.1583
138. <i>Idaea ochrata?</i> (Scopoli, 1763)	3	157. <i>Perizoma albulata</i> ([Denis & Schiffermüller], 1775)	3
139. <i>Idaea rusticata</i> ([Denis & Schiffermüller], 1775)	1	158. <i>Petrophora chlorosata</i> (Scopoli, 1763)	3
140. <i>Idaea straminata?</i> (Borkhausen, 1794)	3	159. <i>Pseudopanthera macularia</i> (Linnaeus, 1758)	1; 2; 3 N42.5369 E24.1306
141. <i>Idaea subsericeata?</i> (Haworth, 1809)	3	160. <i>Rhodostrophia discopunctata</i> Amsel, 1935	2
142. <i>Idaea sylvestraria</i> (Hübner, [1799])	2	161. <i>Rhodostrophia vibicaria</i> (Clerck, 1759)	2
143. <i>Lampropteryx suffumata?</i> ([Denis & Schiffermüller], 1775)	3	162. <i>Scitopteryx luridata/mucronata</i>	3
144. <i>Lobophorea halterata</i> (Hufnagel, 1767)	1; 3	163. <i>Scopula imitaria</i> (Hübner, [1799])	2
145. <i>Lomographa temerata</i> ([Denis & Schiffermüller], 1775)	3	164. <i>Scopula immorata</i> (Linnaeus, 1758)	2
146. <i>Lycia hirtaria</i> (Clerck, 1759)	1	165. <i>Scopula incanata</i> (Linnaeus, 1758)	1; 3
147. <i>Lygris pyraliata</i> ([Denis & Schiffermüller], 1775)	2	166. <i>Scopula marginepunctata</i> (Goeze, 1781)	1; 2
148. <i>Macaria alternata</i> ([Denis & Schiffermüller], 1775)	N42.6547 E24.1367	167. <i>Scopula ornata</i> (Scopoli, 1763)	1; 2
149. <i>Minoa murinata</i> (Scopoli, 1763)	3	168. <i>Scopula rubiginata</i> (Hufnagel, 1767)	2
150. <i>Nebula salicata?</i> ([Denis & Schiffermüller], 1775)	1	169. <i>Selenia lunularia</i> (Hübner, 1788)	1; 3

Species	Sample site	Species	Sample site
170. <i>Selenia tetralunaria</i> (Hufnagel, 1767)	1	188. <i>Phalera bucephala</i> (Linnaeus, 1758)	2; 3
171. <i>Siona lineata</i> (Scopoli, 1763)	1; 2; 3	189. <i>Pheosia tremulae</i> (Clerck, 1759)	3
172. <i>Synopsia sociaria</i> (Hübner, [1799])	2	190. <i>Pterostoma palpina</i> (Clerck, 1759)	2; 3
173. <i>Tephрина murinaria</i> ([Denis & Schiffermüller], 1775)	2	191. <i>Ptylodon capucina</i> (Linnaeus, 1758)	3
174. <i>Tethidea smaragdaria</i> (Fabricius, 1787)	2; 3	192. <i>Ptylodon cucullina</i> ([Denis & Schiffermüller], 1775)	3
175. <i>Thera variava balcanicola</i> Lattin, 1951	N42.6156 E24.2161	193. <i>Spatalia argentina</i> ([Denis & Schiffermüller], 1775)	2; 3
176. <i>Therapis flavicaria</i> ([Denis & Schiffermüller], 1775)	3	194. <i>Stauropos fagi</i> (Linnaeus, 1758)	2; 3
177. <i>Tymandra comae</i> A. Schmidt, 1931	2	195. <i>Thaumetopoea processionea</i> (Linnaeus, 1758)	1
178. <i>Xanthorhoe biriviata</i> (Borkhausen, 1794)	N42.6547 E24.1367	Nolidae	
179. <i>Xanthorhoe ferrugata</i> (Clerck, 1759)	N42.6547 E24.1367	196. <i>Meganola albula</i> ([Denis & Schiffermüller], 1775)	2
180. <i>Xanthorhoe fluctuata</i> (Linnaeus, 1758)	3	197. <i>Nola aerugula</i> (Hübner, 1793)	3
Notodontidae		198. <i>Nola chlamitulalis</i> (Hübner, [1813])	2
181. <i>Drymonia dodonaea</i> ([Denis & Schiffermüller], 1775)	3	199. <i>Nola cicatricalis</i> (Treitschke, 1835)	1
182. <i>Drymonia obliterata</i> (Esper, [1785])	3	200. <i>Nola cucullatella</i> (Linnaeus, 1758)	2
183. <i>Drymonia querna</i> ([Denis & Schiffermüller], 1775)	2	201. <i>Pseudoips prasinana</i> (Linnaeus, 1758)	3
184. <i>Drymonia ruficornis</i> (Hufnagel, 1766)	1; 2	Erebidae	
185. <i>Notodonta dromedarius</i> (Linnaeus, 1767)	3	202. <i>Scoliopteryx libatrix</i> (Linnaeus, 1758)	3
186. <i>Peridea anceps</i> (Goeze, 1781)	1	203. <i>Calliteara pudibunda</i> (Linnaeus, 1758)	3
187. <i>Peridea korbi</i> (Rebel, 1918)	2	204. <i>Lymantria dispar</i> (Linnaeus, 1758)	1
		205. <i>Penthophera morio</i> (Linnaeus, 1767)	1; 3

Species	Sample site	Species	Sample site
206. <i>Idia calvaria</i> ([Denis & Schiffermüller], 1775)	2	225. <i>Watsonarctia deserta</i> (Bartel, 1902)	2; 3
207. <i>Herminia tarsipennalis</i> (Treitschke, 1835)	N42.6156 E24.2161; N42.6547 E24.1367	226. <i>Lygephila cracca</i> ([Denis & Schiffermüller], 1775)	2
208. <i>Herminia tarsicrinalis</i> (Knoch, 1782)	N42.6547 E24.1367	227. <i>Eublemma purpurina</i> ([Denis & Schiffermüller], 1775)	2
209. <i>Paracolax tristalis</i> (Fabricius, 1794)	1	228. <i>Eublemma polygramma</i> (Duponchel, 1842)	2
210. <i>Trisateles emortualis</i> ([Denis & Schiffermüller], 1775)	3	229. <i>Dresteria cailino</i> (Lefébvre, 1827)	2; 3
211. <i>Arctia caja</i> (Linnaeus, 1758)	3	230. <i>Euclidia glyphica</i> (Linnaeus, 1758)	1; 2; 3 N42.5369 E24.1306
212. <i>Arctia vilica</i> (Linnaeus, 1758)	2; 3	231. <i>Euclidia mi</i> (Clerck, 1759)	3
213. <i>Diacrisia sannio</i> (Linnaeus, 1758)	2; 3	Noctuidae	
214. <i>Diaphora mendica</i> (Clerck, 1759)	3	232. <i>Acronicta aceris</i> (Linnaeus, 1758)	2
215. <i>Eilema caniola</i> (Hübner, [1808])	1; 2	233. <i>Acronicta alni</i> (Linnaeus, 1767)	N42.6547 E24.1367
216. <i>Eilema complana</i> (Linnaeus, 1758)	1	234. <i>Acronicta euphorbiae</i> ([Denis & Schiffermüller], 1775)	1; 2
217. <i>Eilema lutarella?</i> (Linnaeus, 1758)	2	235. <i>Acronicta megacephala</i> ([Denis & Schiffermüller], 1775)	2; 3
218. <i>Eilema sororcula</i> (Hufnagel, 1766)	3	236. <i>Acronicta psi</i> (Linnaeus, 1758)	3
219. <i>Eilenma pseudocomplana</i> (Daniel, 1938)	1 N42.5925 E24.1583	237. <i>Acronicta rumicis</i> (Linnaeus, 1758)	1
220. <i>Euplagia quadripunctaria</i> (Poda, 1761)	1	238. <i>Actinotia radiosa</i> (Esper, [1804])	3
221. <i>Lithosia quadra</i> (Linnaeus, 1758)	2	239. <i>Abrostola asclepiadis</i> ([Denis & Schiffermüller], 1775)	N42.6547 E24.1367
222. <i>Epatolmis luctifera</i> ([Denis & Schiffermüller], 1775)	2	240. <i>Aedia funesta</i> (Esper, 1766)	2
223. <i>Phragmatobia fuliginosa</i> (Linnaeus, 1758)	1	241. <i>Agrotis cinerea</i> ([Denis & Schiffermüller], 1775)	2; 3
224. <i>Amata phegea</i> (Linnaeus, 1758)	1	242. <i>Agrotis clavus</i> (Hufnagel, 1766)	3

Species	Sample site	Species	Sample site
243. <i>Agrotis exclamationis</i> (Linnaeus, 1758)	2; 3	263. <i>Charanyca trigrammica</i> (Hufnagel, 1766)	2; 3
244. <i>Agrotis ipsilon</i> (Hufnagel, 1766)	3	264. <i>Heliothis incarnata</i> (Freyer, [1838])	2; 3
245. <i>Agrotis segetum</i> ([Denis & Schiffermüller], 1775)	2	265. <i>Chersotis rectangula</i> ([Denis & Schiffermüller], 1775)	2
246. <i>Amphipoea oculatea</i> (Linnaeus, 1761)	N42.6156 E24.2161; N42.5925 E24.1583	266. <i>Chloantha hyperici</i> ([Denis & Schiffermüller], 1775)	1; 3
247. <i>Amphipyra trahopoginis</i> (Clerck, 1759)	1	267. <i>Colocasia coryli</i> (Linnaeus, 1758)	1; 3
248. <i>Anarta trifolii</i> (Hufnagel, 1766)	1	268. <i>Conisania luteago</i> ([Denis & Schiffermüller], 1775)	2
249. <i>Apamea anceps</i> ([Denis & Schiffermüller], 1775)	2; 3	269. <i>Conistra erythrocephala</i> ([Denis & Schiffermüller], 1775)	1
250. <i>Apamea crenata</i> (Hufnagel, 1766)	N42.6547 E24.1367	270. <i>Conistra rubiginea</i> ([Denis & Schiffermüller], 1775)	1
251. <i>Apamea illyria</i> Freyer, 1846	3	271. <i>Conistra vaccinii</i> (Linnaeus, 1761)	1
252. <i>Apamea sordens</i> (Hufnagel, 1766)	2; 3	272. <i>Conistra veronicae</i> (Hübner, [1813])	1
253. <i>Athetis gluteosa</i> (Treitschke, 1835)	2; 3	273. <i>Cosmia trapezina</i> (Linnaeus, 1758)	1
254. <i>Autographa gamma</i> (Linnaeus, 1758)	1; 3	274. <i>Crantophora ligustri</i> ([Denis & Schiffermüller], 1775)	2
255. <i>Calocucullia celsiae</i> (Herrich-Schäffer, 1850)	1	275. <i>Cryphia algae</i> (Fabricius, 1775)	1
256. <i>Calophasia opalina</i> (Esper, [1794])	1	276. <i>Cryphia raptricula</i> ([Denis & Schiffermüller], 1775)	1
257. <i>Caradrina aspersa</i> Rambur, 1834	1	277. <i>Cucullia santonici</i> (Hübner, [1813])	2
258. <i>Caradrina flavirena</i> Guenée, 1852	3	278. <i>Diachrysis stenochrysis</i> (Warren, 1913)	2
259. <i>Caradrina suscianja</i> (von Mentzer, 1981)	3	279. <i>Dichagyris signifera</i> ([Denis & Schiffermüller], 1775)	1
260. <i>Caradrina terrea</i> Freyer, [1839]	1		
261. <i>Caradrina wulschlegeli</i> Püngeler, 1903	3		
262. <i>Cerastis rubricosa</i> ([Denis & Schiffermüller], 1775)	1		

Species	Sample site	Species	Sample site
280. <i>Dioszeghyana schmidtii</i> (Diószeghy, 1935)	1	299. <i>Heliothis adauca</i> Butler, 1878	2; 3
281. <i>Dyciela oo</i> (Linnaeus, 1758)	2	300. <i>Heliothis peltigera</i> ([Denis & Schiffermüller], 1775)	2; 3 N42.5369 E24.1306
282. <i>Dypterygia scabriuscula</i> (Linnaeus, 1758)	2; 3	301. <i>Heliothis viriplaca</i> (Hufnagel, 1766)	2
283. <i>Egira conspicillaris/tibori</i>	1	302. <i>Hoplodrina ambigua</i> ([Denis & Schiffermüller], 1775)	2; 3
284. <i>Acontia trabealis</i> (Scopoli, 1763)	2	303. <i>Hoplodrina octogenaria</i> (Goeze, 1781)	1
285. <i>Euxoa nigrofusca</i> (Esper, 1788)	1	304. <i>Hoplodrina respersa</i> ([Denis & Schiffermüller], 1775)	1
286. <i>Euxoa nigricans</i> (Linnaeus, 1761)	N42.6156 E24.2161	305. <i>Lacanobia w-lainum</i> (Hufnagel, 1766)	2; 3
287. <i>Hada plebeja</i> (Linnaeus, 1761)	3	306. <i>Leucania comma</i> (Linnaeus, 1761)	3
288. <i>Hadena albimacula</i> (Borkhausen, 1792)	3	307. <i>Lithophane ornitopos</i> (Hufnagel, 1766)	1
288. <i>Hadena capsincola</i> ([Denis & Schiffermüller], 1775)?	N42.6547 E24.1367	308. <i>Macdunnoughia confusa</i> (Stephens, 1850)	1
290. <i>Hadena compta</i> ([Denis & Schiffermüller], 1775)	3	309. <i>Mesapamea secalis/secalella</i>	1
291. <i>Hadena filograna</i> (Esper, [1788])	2; 3	310. <i>Mythimna albipuncta</i> ([Denis & Schiffermüller], 1775)	1; 2
292. <i>Hadena magnolii</i> (Boisduval, 1829)	2; 3	311. <i>Mythimna alopecuri</i> (Boisduval, 1840)	1; 2
293. <i>Hadena perplexa</i> ([Denis & Schiffermüller], 1775)	2	312. <i>Mythimna anderreggii pseudocomma</i> Rebel & Zwerny, 1931	3
294. <i>Hadena syriaca podolica</i> (Kremky, 1937)	2	313. <i>Mythimna ferrago</i> (Fabricius, 1787)	2
295. <i>Hecatera bicolorata</i> (Hufnagel, 1766)	3	314. <i>Mythimna impura</i> (Hübner, [1808])	N42.6047 E24.3925
296. <i>Hecatera dysodea</i> ([Denis & Schiffermüller], 1775)	2	315. <i>Mythimna l-album</i> (Linnaeus, 1767)	2
297. <i>Helicoverpa armigera</i> (Hübner, [1808])	2	316. <i>Mythimna vitellina</i> (Hübner, [1808])	2; 3
298. <i>Sideridis reticulata</i> (Goeze, 1781)	3	317. <i>Noctua comes</i> Hübner, [1813]	1

Species	Sample site	Species	Sample site
318. <i>Noctua fimbriata</i> (Schreber, 1759)	3	336. <i>Shargacucullia verbasci</i> (Linnaeus, 1758)	3
319. <i>Noctua interposita</i> (Hübner, 1790)	1; 2; 3	336. <i>Sideridis turbida</i> (Esper, 1790)	2
320. <i>Noctua pronuba</i> (Linnaeus, 1758)	1; 2; 3	338. <i>Trachea atriplicis</i> (Linnaeus, 1758)	3
321. <i>Ochropleura plecta</i> (Linnaeus, 1761)	2; 3	339. <i>Tyta luctuosa</i> ([Denis & Schiffermüller], 1775)	2
322. <i>Oligia latruncula</i> ([Denis & Schiffermüller], 1775)	2	340. <i>Valeria oleagina</i> ([Denis & Schiffermüller], 1775)	1
323. <i>Oligia strigilis</i> (Linnaeus, 1758)	2; 3	341. <i>Xestia c-nigrum</i> (Linnaeus, 1758)	1; 2; 3
324. <i>Omphalophana antirrhinii</i> (Hübner, [1803])	2		
325. <i>Oria musculosa</i> (Hübner, [1808])	2		
326. <i>Ortrhosia cerasi</i> (Fabricius, 1775)	1		
327. <i>Ortrhosia cruda</i> ([Denis & Schiffermüller], 1775)	1		
328. <i>Ortrhosia gothica</i> (Linnaeus, 1758)	1		
329. <i>Ortrhosia incerta</i> (Hufnagel, 1766)	1		
330. <i>Ortrhosia miniosa</i> ([Denis & Schiffermüller], 1775)	1		
331. <i>Pachetra sagittigera</i> (Hufnagel, 1766)	2; 3		
332. <i>Anorthoa munda</i> ([Denis & Schiffermüller], 1775)	1		
333. <i>Phlogophora meticulosa</i> (Linnaeus, 1758)	3		
334. <i>Pyrrhia purpura</i> (Hübner, [1814-1817])	2		
335. <i>Shargacucullia thapsiphaga</i> (Treitschke, 1826)	2; 3		

Table 4: List of Lepidoptera and Coleoptera species of conservation importance from Natura 2000 zones: BG0000426 “Luda Yana River” and BG0001039 “Popintsi”

Species	Sample site
Zone BG0000426	
Lycaenidae	
<i>Dasycorsa modesta</i> (Staudinger, 1879)	N42.3077 E24.3529
<i>Lycaena dispar</i> (Haworth, 1802)	N42.4318 E24.2394
Noctuidae	
<i>Mythimna alopecuri</i> (Boisduval, 1840)	N42.3077 E24.3529
Saturniidae	
<i>Saturnia pyri</i> (Denis & Schiffermüller, 1775)	N42.4319 E24.2400
Geometridae	
<i>Asovia maeoticaria</i> (Alphéraky, 1876)	N42.3077 E24.3529
Cerambicidae	
<i>Morimus asper funereus</i> Mulsant, 1863	N42.4320 E24.2400; N42.4320 E24.2410; N42.4320 E24.2409
Zone BG0001039	
Papilionidae	
<i>Parnassius mnemosyne</i> (Linnaeus, 1758)	N42.4765 E24.2457; N42.4110 E24.1558; N42.4192 E24.1632
Lycaenidae	
<i>Glaucopsyche alexis</i> * (Poda, 1761)	N42.4111 E24.1372
<i>Pseudophilotes vicrama</i> * (Moore, 1865)	N42.4775 E24.2467
Nymphalidae	
<i>Erebia medusa</i> * ([Denis & Schiffermüller], 1775)	N42.4106 E24.1500
<i>Hipparchia fagi</i> (Scopoli, 1763)	N42.4106 E24.1500
<i>Euphydryas aurinia</i> (Rottemburg, 1775)	N42.4825 E24.2358
<i>Neptis sappho</i> * (Pallas, 1771)	N42.4825 E24.2358
Drepanidae	
<i>Cilix asiatica</i> O. Bang-Haas, 1907	N42.4106 E24.1500
Saturniidae	
<i>Saturnia pyri</i> (Denis & Schiffermüller, 1775)	N42.4106 E24.1500; N42.4775 E24.2467
Notodontidae	
<i>Peridea korbi</i> (Rebel, 1918)	N42.4775 E24.2467
Noctuidae	
<i>Autographa bractea</i> ([Denis & Schiffermüller], 1775)	N42.4106 E24.1500

Species	Sample site
<i>Amphipyra micans</i> Lederer, 1857	N42.4106 E24.1500
Erebidae	
<i>Eupalagia quadripunctaria</i> (Poda, 1761)	N42.4108 E24.1552; N42.4108 E24.1515; N42.4134 E24.1615
<i>Eilema costalis</i> (Zeller, 1847)	N42.4106 E24.1500
<i>Ocneria rubea</i> ([Denis & Schiffermüller], 1775)	N42.4106 E24.1500
Geometridae	
<i>Dasycorsa modesta</i> (Staudinger, 1879)	N42.4775 E24.2467
<i>Eupithecia cretaceata fenestrata</i> Millière, 1874	N42.4106 E24.1500
Lasiocampidae	
<i>Eriogaster catax</i> (Linnaeus, 1758)	N42.4118 E24.1599
Lucanidae	
<i>Lucanus cervus</i> (Linnaeus, 1758)	N42.4829 E24.2356; N42.4107 E24.1506; N42.4110 E24.1532;
	N42.4112 E24.1534; N42.4118 E24.1599
Cerambycidae	
<i>Morimus asper funereus</i> Mulsant, 1863	N42.4105 E24.1494; N42.4134 E24.1615; N42.4171 E24.1629
<i>Cerambyx cerdo</i> Linnaeus, 1758	N42.4107 E24.1505; N42.4220 E24.1644

Conservation status of the Coleoptera species

Three of the species are included in The Habitats Directive (Council Directive 92/43/EEC): *Lucanus cervus*, *Morimus asper funereus* and *Rosalia alpina*. The hermit beetle *Osmoderma barnabita* is known from the region (Panagyurishte Town env., 25.viii.1953, N 42.5000 E24.1667, obs. Minkova; near Petrich Village, obs. Z. Hubenov – unpublished data), but was not found during this field work. However, the presence of suitable habitat, old trees, suggests that it is likely present there and would probably be found if a more detailed study is conducted. The state of the populations of these beetle species for the zone of Sredna Gora was assessed by the project “Mapping and assessing of the conservation status of habitats and species – Phase I” (2012), however the environmental conditions were due to the presence of fires as a threat.

Thirteen of the species found are included in the IUCN Red List (2017) and European Red List of Saproxyllic Beetles (CALIX *et al.*, 2018). Category Vulnerable (VU): *Morimus asper funereus* and *Rosalia alpina*; Category Near Threatened (NT) *Carabus intricatus* and *Lucanus cervus*; category Least Concern (LC) *Triplax russica*, *Bostrichus capucinus*, *Dorcus parallelipedus*, *Prionus coriarius*, *Rhagium bifasciatum*, *Anaglyptus mysticus*, *Xylotrechus antelope*, *Cortodera humeralis* and *Cerambyx scopolii*. Six species have very restricted distribution: Balkan sub-endemic *Carabus montivagus* and *Molops robustus robustus*; Balkan endemic *Cyhrus semigranosus balcanicus*

and *Molops alpestris*; and Bulgarian endemic: *Molops dilatatus anguicollis* and *Molops piceus bulgaricus*. One relict species, *Myas chalybaeus* and one rare species, *Pangus scaritides* were also collected.

Conservation status of the Lepidoptera species

Four species are included in The Habitats Directive (Council Directive 92/43/EEC): *Euplagia quadripunctaria*, *Dioszeghyana schmidtii*, *Proserpinus proserpina*, and *Parnassius mnemosyne*. *D. schmidtii* was found for the first time in the Sredna Gora zone. The state of the priority species *Euplagia quadripunctaria* was assessed as favourable in 2012. Seven of the collected species are included in IUCN Red List (2017) and European Red List of Butterflies (VAN SWAAY *et al.*, 2010): *Proserpinus proserpina* (Data Deficient), *Pyrgus seratulae* (LC/NT), *Parnassius mnemosyne* (NT/LC), *Lycaena alciphron* (LC/NT), *Argynnis niobe* (LC/NT), *Melitaea trivia* (LC/NT), *Hipparchia semele/volgensis* (LC). Two species are included in the European Red Book: *Parnassius mnemosyne*, *Plebeius argyrognomon*. Three species are subendemic: *Hipparchia semele/volgensis* (not indentified in the field to species), *Caradrina suscianja*, *Mythimna anderreggii pseudocomma*. Twenty of the collected species are rare: *Korscheltellus lupulinus*, *Aricia artaxerxis*, *Melitaea ornata*, *Alelucis distinctata*, *Asovia maeoticaria*, *Cleta filiceata*, *Epirrhoe rivata*, *Peridea korbi*, *Phragmatobia casarea*, *Callocucullia celsiae*, *Caradrina suscianja*, *Caradrina terrea*, *Caradrina wullschlegeli*, *Cucullia santonici*, *Hadena syriaca*, *Mythimna alopecuri*, *Mythimna anderreggii pseudocomma*, *Oria musculosa*, *Pyrrhia purpurina* and *Acrionicta alni*.

Acrionicta alni is a very rare species in Bulgaria, with definite records for Bulgaria only from Stranzha Mountains and Steneto Reserve in Central Stara Planina Mountains and with a doubtful record from the district of Sliven Town (BESHKOV, 2000). The invasive pest species *Cydalima perspectalis* (Lepidoptera: Crambidae) was found in the wild with its food plant (*Buxus* spp.) at high altitude (1458 m), far away from urban areas. It was collected at light in the following localities: Sredna Gora: Bratiya summit N42.5925 E24.1583 and Popintsi, above Borimechkovo Village N42.4106 E24.1500.

From the Natura 2000 zone of Luda Yana River, one beetle and five Lepidoptera species of conservation importance were recorded (Table 4). The species *Morimus asper funereus* and *Lycaena dispar* were recorded for the first time from this zone.

Morimus asper funereus was found in the vicinity of Popintsi village, inhabiting old poplar trees along the Luda Yana River. The population was small and its status is unfavorable due to the threat of habitat loss, since the riverside forest habitat is an important corridor and has limited space. Although specimens of other saproxylic species were not detected (*Cerambyx cerdo*, *Rosalia alpina* and *Lucanus cervus*), the riparian habitats are also suitable for these species and they are very likely to be found in a more detailed study of the zone. Since the finding of *L. dispar* is a single observation, it is not possible to assess its conservation status without detailed studies of the area.

From the Natura 2000 zone Popintsi, three beetles and eighteen lepidopteran species of conservation importance were found during the terrain study (Table 4). The presence of *M. asper funereus* was verified for the first time in this zone. The status of the three saproxylic beetles *L. cervus*, *M. asper* and *C. cerdo* was assessed as unfavorable in 2012 due to the presence of large territories burnt by fires in the zone. *Euphydryas aurinia* and *Eriogaster catax* are new species from the Popintsi zone. The determination of *E. catax* is not confirmed, because only early larvae of the species

were found. Field studies in October are needed in order to verify the presence of the species in the area. For both species, an unfavourable population status would be suitable, as both inhabit a single locality with single records. The species *D. schmidtii* had been collected in studies under the project "Mapping and assessing of the conservation status of habitats and species – Phase I" (2012) in the region of Popintsi Village (the hills Golyamo Petelovo and Malko Petelovo), but it was not found in the current study, probably due to poor weather conditions during field trips in April when it was most likely to be encountered. The host plant of the larvae of *D. schmidtii*, *Acer tataricum*, was well represented, but the species no doubt has other host plants, such as other maple species and oak trees. This is supported by terrain data from other parts of the country where there are no *A. tataricum* or other species of maple, but the species is common in the xerothermic oak forests.

DISCUSSION AND CONCLUSION

The results showed relatively high diversity of both studied groups. In total, 113 species of the family Carabidae were known from both Sredna Gora and Lozenska Mountains, according to GUÉORGUIEV & GUÉORGUIEV (1995). The 42 species found as a result of the present study on this comparatively small area represent over 47% of the known species for both mountains. The identified butterflies and moths represent about 25% of all macrolepidoptera group species in Bulgaria. Since the epigeobiont and saproxylic beetles, as well as the macrolepidoptera group, could be considered as indicators for the state of the ecosystem, it could be assumed that the biodiversity is high in the region of the central part of Sredna Gora Mountains.

The territory of the mountains is under high anthropogenic influences, including a mine for copper ore, roads, agricultural land, habitat fragmentation and frequent large fires. The relatively unspoilt small fragments in the zones protected by Natura 2000 and especially in the zone of Luda Yana River, serve as refuge for biodiversity. It is important that this is taken into account when management decisions about the investment intentions of the region are taken.

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