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ANALYSIS AND DATA COLLECTION (FLORA AND FAUNA) OF THE CROSS-BORDER MALASHEVSKA MOUNTAIN

The project is co-financed
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INTRODUCTION

The Malesh Mountain is one of the relatively poorly known mountains in Bulgaria. Being situated in the cross-border region between Republic of Bulgaria and Republic of Macedonia, it has been isolated for decades from the human presence. In the same time, various habitats –from the dry slopes with Mediterranean vegetation, through the temperate forest type to subalpine meadows are identified. The above mentioned particularities are a precondition for the existence of significant variety of biodiversity in all organism groups in the region. In this regard, studying and summarizing the flora and fauna on the territory of the mountain have a crucial role, both in scientic and social-economic aspect. Knowing the Malesh Mountain is the major precondion for making the mountain preferred destination for alternative tourism. At the same time, studying the biodiversity provides a solid basis for all future activities to be planned in a manner to minimize negative impacts on species and their habitats.

This analysis was carried out by the Fund for Wild Flora and Fauna, Blagoevgrad, within the framework of service contract 2007 CB16IPO007- 2011-2-04/04 „Carrying out of detailed analysis and data collection of the biodiversity (flora and fauna) in the Bulgarian part of the cross-border Maleshevska Mountain".

The aim of current analysis and data collection is to identify the existing plant and animal species on the territory of Malesh Mountain, within the Bulgarian part of the Mountain, by implementing the following activities:

1. Research of available information

    1.1. Research of available information from scientific studies, research, publications, projects and programs, international documents (resolutions, agreements, directives, etc.), national laws, regulations, orders, decisions, etc. including data from recent studies, researches carried under projects, programmes, etc.

    1.2. Conducting of additional field studies;

    1.3. Classification and summary of the collected information;

2. Analyse the populations and habitats of the identified most dominant, rare, endangered and endemic species in the Bulgarian part of Malesh Mountain.

2.1. Description of the most predominant, rare, endangered and endemic species on Malesh Mountain by conducting a desk research of international documents (resolutions, agreements, directives, etc.), National laws, regulations, orders, decisions, etc. related to the biodiversity conservation within the Malesh Mountain, including data from recent studies, researches carried under projects, programmes, etc.

2.2. SWOT analysis – analysis of the strengths, weaknesses, opportunities and threats for the territory and resources of Malesh Mountain;

2.3. Identification of measures needed for biodiversity conservation in the region of Malesh Mountain;

2.4. Description of the populations and habitats of rare, endangered and endemic species on the Territory of Malesh Mountain in the Bulgarian part of the Mountain.

3. Creating a data base with approximate GPS coordinates of the territories inhabitated with most dominat, rare, endandered and endemic animal and plant species.

4. Creating an electronic archive of photographs and video material of the identified rare, endangered and endemic species in the Bulgarian part of Malesh Mountain.

ABOUT THE PROJECT

The overall objective of project "MALESH" is to promote the preservation and restoration of the biodiversity on the territory of the border Malesh Mountain through raising the public awareness of local population and interested parties on environmental issues, as well as on mechanisms and possibilities for overcoming them in order to increase attractiveness and improve the quality of life in the common cross-border region.

The project will work for the achievement of number of specific objectives:

- To achieve higher awareness and increase knowledge on biodiversity in the territory of the Malesh Mountain;
- To raise public awareness on the issues and threats to the environment and its preservation in the common cross-border region;
- To foster the cooperation among the existing stakeholders at cross-border level – local authorities, environmental organizations, SMEs and educational institutions);
- To involve young people to the problems and challenges in preserving the environment and biodiversity;
- To establish opportunities and instruments stimulating the development of nature-friendly economic activities.

The target groups concerned by the implementation of the project "Malesh" are ecological associations and NGOs, Business Support Organizations; Regional development agencies and associations; Local Authorities - The Bulgarian Municipalities of Sandanski, Petrich, Strumyani, Kresna, Simitli and Blaghoevgrad and the FYROM Municipalities of Delchevo, Berovo, Pehchevo, Strumitsa and Novo Selo; educational institutions of both border region such as schools, universities, technical high schools, educational centers, vocational training institutions, etc. Small and Medium Sized enterprises operating on the territory of the target cross-border region; student, pupils, young people, nature lovers, visitors and tourist with specific interests.

The project's implementation shall achieve the following results:

- ✓ Elaborated detailed analysis and data collection of biodiversity of Malesh Mountain;
- ✓ Developed and constantly updated interactive portal "Maleshevia";
- ✓ Elaborated and distributed trilingual Info-guide "The Biodiversity of Malesh Mountain".

- ✓ Established a Partnership Network of the existing stakeholders of Bulgaria and FYROM;
- ✓ Carrying out a Contact Meeting in Bulgaria for the establishment of a Partnership Network of the existing stakeholders of Bulgaria and FYROM;
- ✓ Carrying out a Discussion forum "Malesh mountain – past, present and future";
- ✓ Carrying out a series of school meetings in the target cross-border regions of Bulgaria and FYROM;

ABOUT MALESH MOUNTAIN

Malesh Mountain (also known as Malesh among the local population) (Bulgarian and Macedonian: Малешевски Планини) is situated in Southwestern Bulgaria and Eastern Republic of Macedonia. It is the third of the five mountains of the Osogovo-Belasitsa mountain group, known also as the Western Border Mountains. The highest point is Ilyov Vrah (1,803 m).

In Bulgarian territory the mountain represents an elongated structure with area of 497 km^2. It has rich wildlife which includes many Mediterranean plant and animal species. There are two nature reserves to protect the varied wildlife.

Nature Reserve „Tisata" (575 ha and buffer zone of 420 ha) – for conservation of the largest natural habitat of juniper not not only in Bulgaria but also in Europe. The reserve Tisata has a global importance as a representative biome in the Mediterranean area.

Nature Reserve "Sokolata" (211 ha) is situated on 6 km south-west of Igralishte village. The reserve is a natural habitat of tall forests of Hungarian oak (Quercus frainetto).

Protected area "Moravska" (184,5 ha) is situated in Malesh mountain, on 2 km west of Kresna. This is the second largest habitat after the Nature Reserve "Tisata" of the protected species Greek Juniper (Juniperus excels).

Natural landmark "Chinarite" (11, 4 ha) – The landmark is a natural habitat of planes with age over than 300 years and is located near the village of Gorna Breznitsa in Malesh Mountain.

Natural landmark "Buina" (1, 1 ha) – the landmark is situated in the north-west part of the village of Gorna Breznitsa. It has centuries-old plane forest along the valley of Gorna

Breznitsa River, with an average therees' age of 180 years, and some of them more than 300 years old.

Kresna gorge - The Kresna gorge is formed along the Struma Valley and divides Malesh Mountain from Pirin Mountain. The length of the gorge is about 25 km, and the average altitude is 475m above sea level.

Protected area "Kuchkarnika" – It is a natural habitat of plane and is situated in the region of Village of Gorna Breznitsa, Municipality of Kresna.

FAUNA

Fauna in Malesh Mountain differs with large variety of species. Along the Struma Valley there are identified about 360 rare species of invertebrates. The composition of the fauna is characterized by many endemic and relict species, some of which specific only for the region.

Rare species for the country with Mediteranean origin - Eastern Spadfoot (Pelobates syriacus Boettger), Worm Snake (Typhlops vermicularis Merrem), Leopard snake (Zamenis situla), Four-lined Snake (Elaphe quatuorlineata), Cat snake (Telescopus fallax). There are also other southern species - Erhard's Wall Lizard (Podarcis erhardii), Orphean Warbler (Sylvia hortensis), Subalpine Warbler (Sylvia cantillans), Olivaceous Warbler (Hipolais pallida), Masked Shrike (Lanius nubicus), Syrian Woodpecker (Dendrocopos syriacus), (Eurasian) Scops Owl (Otus Scops).

There are also identified worldwide endengerd species – the both species of turtoises **Spur-thighed Tortoise (Testudo graeca Linnaeus) and Hermann's Tortoise (Testudo hermanni Gmelin), Common Otter (Lutra lutra).**

Only in the region of Kresna gorge were identified 147 bird species. 22 of them are included in the Red Book of Bulgaria. From the birds species 64 are of European conservation concern (SPEC), as globally endangered in category SPEC1 included 1 species (corncrake /Crex crex)/

Mammals – 6 species from Order Insectivora: Eastern Hedgehog (Erinaceus concolor), Common Mole (Talpa europaea), Water Shrew (Neomys fodiens), Miller's Water Shrew (Neomys anomalus), Bicoloured white-toothed Shrew (Crocidura leucodon), Lesser white-toothed Shrew (Crocidura suaveolens); 13 species from Order Chiroptera; 18 species from Order Rodentia; 8 from Order Carnivora- Beech Marten (Martes foina), Western Polecat (Mustela putorisus), Wildcat (Felis silvestris), Badger (Meles meles), Red Fox (Vulpes vulpes), Weasel (Mustela nivalis), Common Otter (Lutra lutra), Wolf (Canis lupus); 8 species from Order Artiodactyla – Wild boar (Sus scrofa), Roe Deer (Capreolus capreolus).

FLORA

In terms of flora, Bulgaria is divided into 20 floristic regions, two of which fall in Malesh Mountain. These are the floristic regions Struma Valley and West Border Mountains. The borders between both regions are not clear enough, especially if the strong anthropogenic influence typical for the lower parts of the mountain is considered. In general, it could be said that the margin of floristic region Struma valley ascends to about 800-1000 meters above sea

level, the frame to which reaches a considerable part of representatives of the Mediterranean and the transitional floral elements. Such species are the Oriental plane, Greek Juniper, Prickly Juniper, Kermes Oak, Turpentine tree, Phillyrea latifolia, Downy Oak, Oriental hornbeam, Wild Asparagus. In the part of Malesh mountain which falls in the floristic region West border mountains, more than 1000 meters above sea level, the central European species are predominant, such as Beech, Common hornbeam, Dog rose, Anemone, Meadow buttercups, Common Hazel, Common ivy.

On the territory of Malesh Mountain does not exist clear zoning. In many places the original plant communities are destroyed and replaced by farmland, pastures, and tree crops. In the lower zones, up to 500-600m above sea level, the grass phytocenosis prevail, dominated by King Ranch Bluestem, Medusa-head, Bulbous Meadow-grass, Psilurus incurvus, Purple false brome, Ovate Goatgrass, Rattail Six-weeks Grass. Tree plants community is highly degraded due to overexploitation and shrub dominated look. Most common are the forest of Downy Oak, mixed with Hungarian oak, Manna Ash, Turpentine tree, Phillyrea latifolia, Oriental hornbeam, European nettle tree, Greek Juniper. In some areas artificialy replanted forest crops of cedars and cypress trees could be seen. The shrub communities are dominated by Prickly Juniper, Jerusalem thorn, and Black thorn. The rare for the country comminuties of Greek Juniper, Phillyrea latifolia, Kermes Oak, Hairy Rock-rose are also presented in this zone. The Mountain slopes above Struma River, in the Kresna gorge, are almost bare rock habitats and screes in some places.

In the mountain belt between 600-1000(1200) m asl the plant phytocenosis is dominated by Hungarian oak, Delechampii oak, and in the dump gullies by Common hornbeam, Hop Hornbeam, Beech. Here in many places artificially planted crops of Scots pine, European black pine, Douglas fir, and rarely lime and ash were created. Herbaceous communities are dominated by King Ranch Bluestem, Chrysopogon gryllus, Bristly Dogtail Grass, Feathergrass, and in more humid places Perennial Quaking Grass and Crested Dogtail Grass are common.

Between 1000 to 1500 (1600) m prevails the forest vegetation dominated by Common Beech, in some places together with Sycamore maple, Scots pine and rarely Norway spruce. The Scots pine vegetation is artificially planted in many areas, but above the villages of Klepalo and Dobri laki there exist old forests of Scots pine more that 120 years old. There also could be found crops of foreign specy of Douglas fir. Herbaceous communities here occupy the places cleared by the forests and are characterized by the mountain meadows dominated by Perennial Quaking Grass, Spring Grass, Crested Dogtail Grass, Dropwort, Bedstraw, Common

Bird's-foot-trefoil. With the termination of grazing, the mountain meadows in many places are overgrown with Common bracken.

The mountain ridges on 1500-1800 m asl are occuppied of grass ans shrubs communities. Traditionally, these areas have been used for many years as a mountain pastures. Most important species found there are European blueberry, Spike heath, European raspberry, Chamaecytisus absinthioides, Nard Grass, Long-leaved Mullein, Dotted St. John's-wort, Thymus, Tufted Hairgrass and many others. In some places where grazing is terminated, the vegetation is replaced by Scots pine and Juniperus.

Riverside vegetation in Malesh Mountain is presented by Oriental plane, Black and Silver Poplar, White willow, Field Elm along the Struma River and its tributaries. On higher sea level the plane vegetation is replaced by Black alder and White willow, or Beech in the middle and upper streams of rivers, as well as near to mountain streams.

PART I: DATA COLLECTION AND INVENTORY OF EXISTING ECOSYSTEMS, BIOTOPES, FLORA AND FAUNA, AND IDENTIFICATION OF THE MOST DOMINANT, ENDANGERED AND RARE SPECIES.

As a result of the analysis of existing literature and field studies the following results were obtained:

1. AQUATIC COMMUNITIES OF INVERTEBRATES

Stream reaches or sites for benthic macroinvertebrate monitoring were selected using a targeted design. The main sampling sites (fifteen) were determined in accordance with the separation of the Bulgarian section of 10x10 km grids (tabl.1) and after a detailed analysis of the available data from existing literature sources. Sites were sampled during the spring high water and summer low water.

Table 1 GPS coordinates and altitude of the selected sites..

Site (No)	Name	GPS coordinates	Altitude	Site (No)	Name	GPS coordinates	Altitude
1	**Kresna Gorge (1st tributary of the Struma River)**	41°46′ 38.46″ N 23°09′ 14.97″ E	220 m	**9**	**Slivnitza (Slivnishka River)**	41°41′ 35.38″ N 23°09′ 32.91″ E	222 m
2	**Kresna Gorge (2nd tributary of the Struma River)**	41°48′ 52.51″ N 23°09′ 26.58″ E	270 m	**10**	**Drakata (4th tributary of the Struma River)**	41°36′ 20.97″ N 23°12′ 30.91″ E	137 m
3	**Gorna Breznitsa (Stara River)**	41°44′ 04.40″ N 23°08′ 41.69″ E	240 m	**11**	**Lebnitza (Lebnitza River)**	41°31′ 29.32″ N 23°14′ 00.92″ E	120 m
4	**Above the village of Gorna Breznitsa (Stara River)**	41°44′ 44.47″ N 23°05′ 33.42″ E	586 m	**12**	**Nikudin (5th tributary of the Struma River)**	41°34′ 18.92″ N 23°01′ 48.19″ E	730 m
5	**Below the village of Sushitza (Sushitza River)**	41°49′ 04.98″ N 23°04′ 52.87″ E	760 m	**13**	**Dobri Laki (6th tributary of the Struma River)**	41°34′ 32.20″ N 22°59′ 36.35″ E	822 m
6	**Above the village of Sushitza (Sushitza River)**	41°49′ 00.20″ N 23°02′ 35.63″ E	826 m	**14**	**Razdol (7th tributary of the Struma River)**	41°36′ 10.47″ N 22°59′ 39.49″ E	939 m
7	**Moravska (3th tributary of the Struma River)**	41°42′ 55.54″ N 23°09′ 03.64″ E	233 m	**15**	**Tsaparevo (Tsaparevska River)**	41°37′ 52.83″ N 23°04′ 54.04″ E	622 m
8	**Above the village of Slivnitza (tributary of the Slivnishka River)**	41°42′ 07.11″ N 23°09′ 28.57″ E	208 m				

After laboratory species identification was completed *Total Abundance, Shannon's Diversity, Sørensen index, EPT_{ind} index and EPT_{taxa} index* were calculated (Table 2). The highest total number of macroinvertebrate species was observed in the samples from Sushitza River (North-Western part of the Mountain), Lebnitza River and Tsaparevska River (Central part of the Malesh Mountain). These areas of the Mountain can be distinguished with the presence of many rare species of great conservation value (Caddisflies and Mayflies). (Annex 1.Invertabrates).

The Sörensen's similarity coefficient showed relatively high values in most stream sites (QS > 0.7). There were a few exceptions including the river sites mentioned above (QS < 0.5). The presence of rare species unique to those parts of the Malesh Mountain resulted in these lower values.

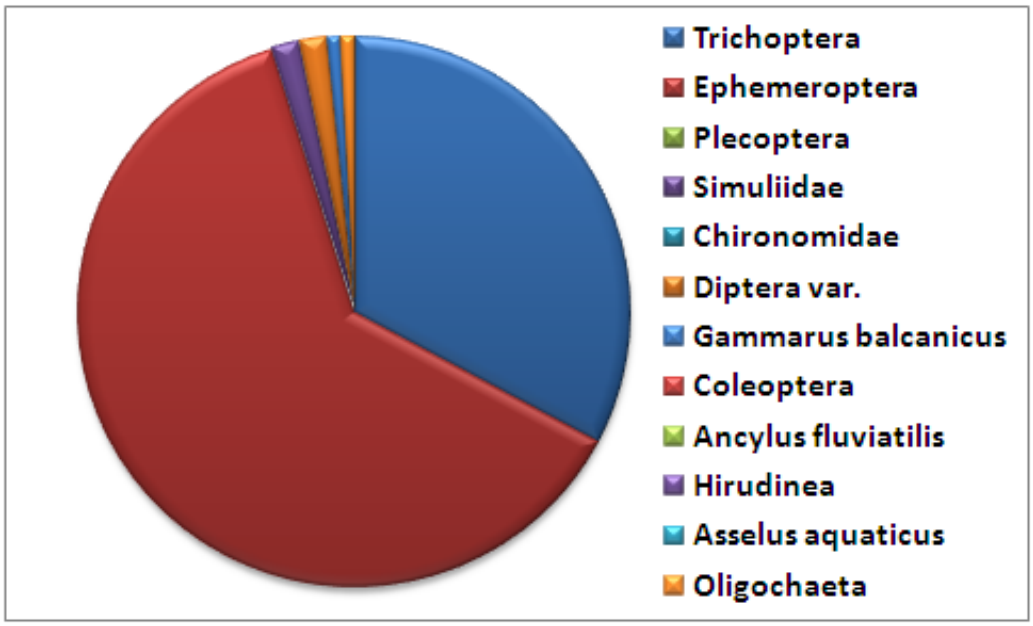
Anthropogenic disturbances at the landscape scale result in the lower values of EPT_{ind} и EPT_{taxa}. A good example of this tendency was observed in the sites of Slivnishka River and 4th tributary of the Struma River (next to the village of Drakata).

Table 2 Estimated biodiversity indices

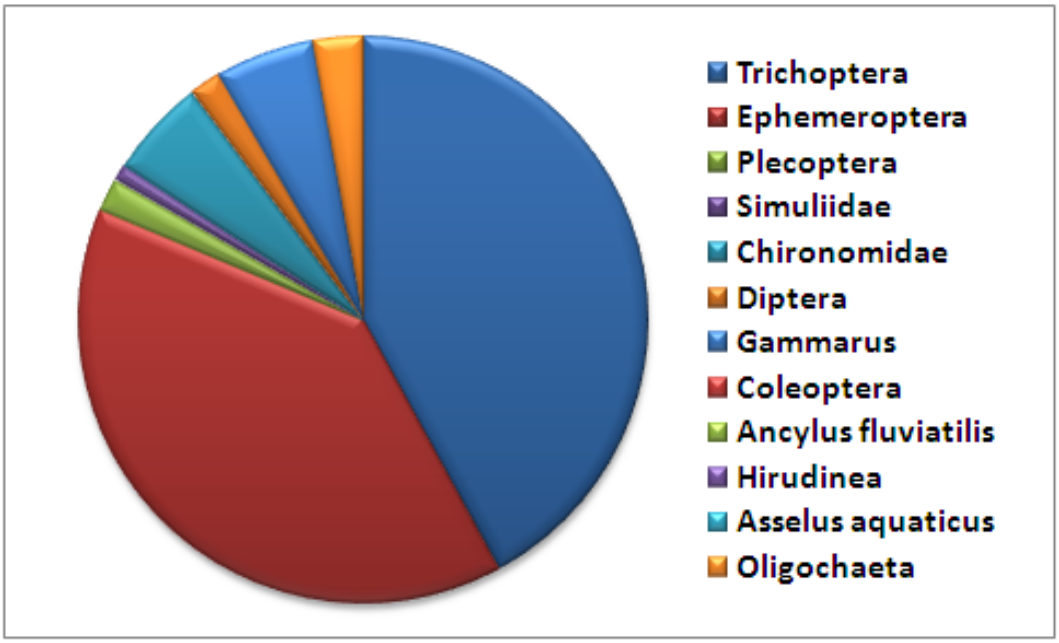
Site (No)	Total abundance	Total number of species	EPT ind	EPT taxa
1	63,00	12,00	0,90	0,67
2	54,00	15,00	0,67	0,60
3	42,00	11,00	0,69	0,45
4	67,00	15,00	0,66	0,60
5	155,00	22,00	0,82	0,68
6	125,00	15,00	0,95	0,73
7	96,00	12,00	0,18	0,58
8	71,00	5,00	0,99	0,80
9	175,00	12,00	0,39	0,75
10	252,00	18,00	0,36	0,50
11	94,00	19,00	0,85	0,68
12	225,00	16,00	0,84	0,75
13	152,00	14,00	0,82	0,71
14	52,00	16,00	0,69	0,69
15	107,00	18,00	0,83	0,67

Fig.1 Relative abundance (%) of the macroinvertebrate taxa (a) Sushitza River (б) Tzaparevska River

(a)



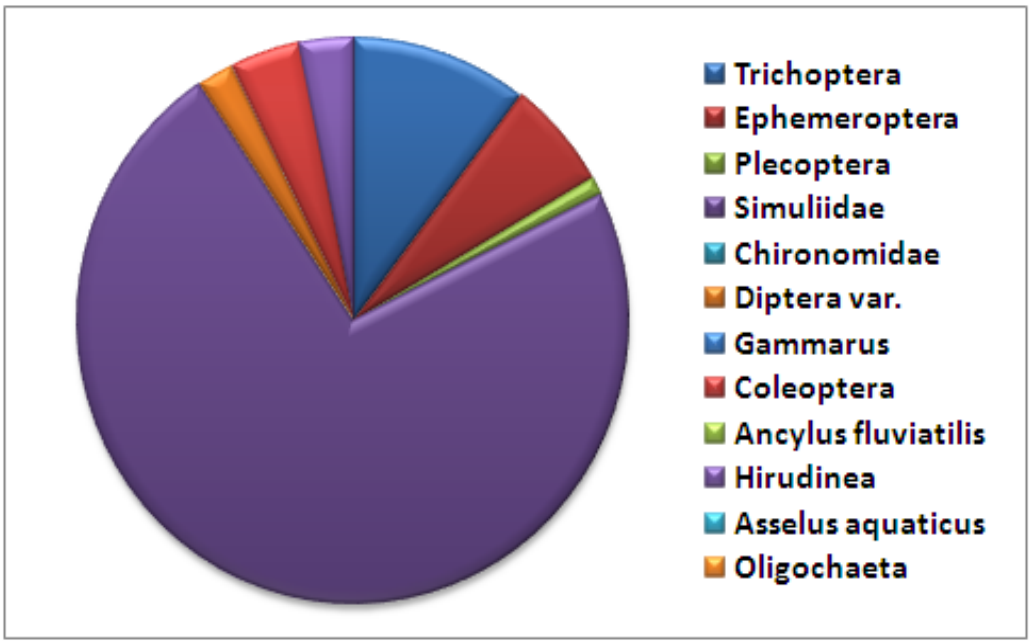
(b)



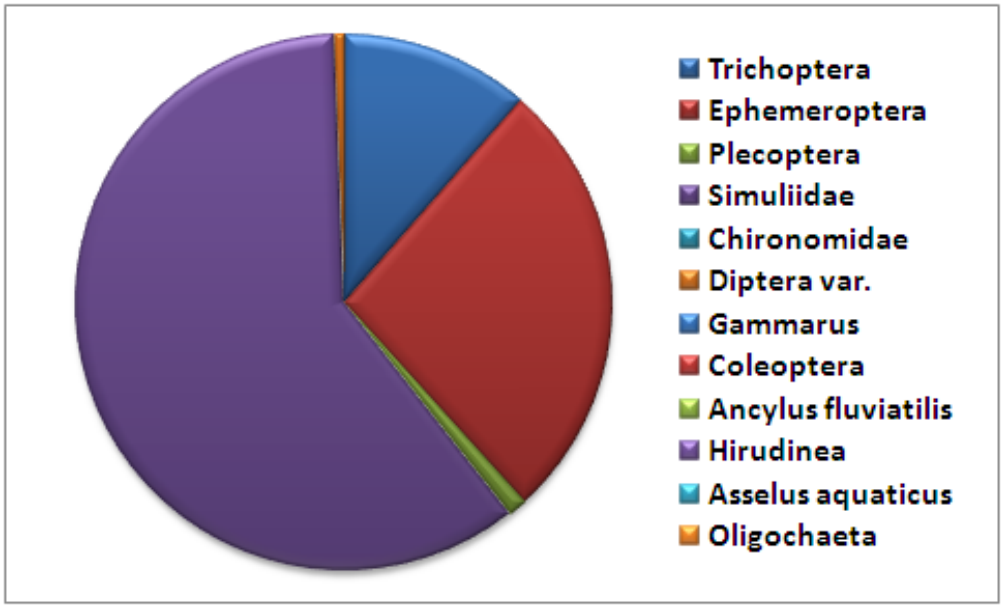
In most rivers in the region the dominant benthic invertebrates taxa were Mayflies (order Ephemeroptera - *Baetis rhodani*, *Oligoneuriella rhenana*, *Ephemerella ignita*) and Caddisflies (order Trichoptera - *Hydropsyche incognita, Hydropsyche bulbifera*). The stream sites No. 7 (41°42′ 55.54″ N and 23 °09′ 03.64″ E), No. 9 (41°41′ 35.38″ N and 23 °09′ 32.91″ E) and No.10 (41°36′ 20.97″ N and 23 °12′ 30.91″ E) with higher levels of organic pollution and respectively lower EPT_{ind} values have mainly dominant black flies species (order Diptera, family Simuliidae - *Simulium degrangei*, *Odagnia rheophila*) (Fig. 2). Rare species were found in a relatively high percentage of studied sampling sites (30% - mainly Mayflies and Caddislflies). (Annex 1. Invertabrates)

Fig.2 Relative abundance (%) of the macroinvertebrate taxa (a) 3th tributary of the Struma River (Moravska) (b) Slivnishka River

(a)



(b)



As a result of the bibliographic review and conducted field studies totally 235 benthic species (descripted in details in Annex 1. Invertabates), including 11 target rare species were found in the Malesh Mountain (Table 3 below).

Table 3 Number of macroinvertebrate species in the Malesh Mountain (* Larval stages of insect groups listed are inhabitants of fresh water, while older forms (imago) are the inhabitants of terrestrial habitats)

Taxa	Number of species in Bulgarian part of the Malesh Mountain	Number of species of major concern /target species/
Insects (class Insecta)		
Mayflies (order Ephemeroptera)	35	1
Stoneflies (order Plecoptera)	9	-
Caddisflies (order Trichoptera)	68	10
Dragonflies (order Odonata)	23	-
Nonbiting midges (order Diptera, family Chironomidae)	51	-

Black flies (order Diptera, family Simuliidae)	12	-
Freshwater snails (class Gastropoda)	3	-
Oligochaetes (freshwater warms) (class Oligochaeta)	30	-
Crustaceans (class Malacostraca)	4	-

2. TERRESTRIAL COMMUNITIES

2.1. PLANTS

Table 4 Number of plant species in the Malesh Mountain

Taxa	Number of species in Bulgarian part of the Malesh Mountain	Number of species of major concern /target species/
Trees	58	3
Shrubs	62	2
Flowers	953	76

Combining the results of field studies with those from available literature 1073 species of plants, including 101 target species were described (Table 4). From them the highest number are species families *Poaceae* (118), *Asteraceae*/(101), *Fabaceae* (87), *Lamiaceae* (67), *Caryophylaceae* (47), *Rosaceae* (46), *Scrophulariaceae* (45), *Brassicaceae* (38), *Apiaceae*/(33), *Liliaceae* (32), *Ranunculaceae* (29), *Orchidaceae*(28), *Boraginaceae* (26) etc. (Table4).

According to their habitus, plant species can be deivided on trees - 58 species, shrubs – 62 species, herbaceous plants – 953 species.

81 of the plants species are target – with important nature conservation and endemic status. In the Red list of the International Union for Conservation of Nature and Natural Resources (IUCN Red List) fall 19 species with rank “Vulnerable” (VU) and 10 species with rank “Endengered” (EN). 26 species presented here are in included in the list of Annex 2 of the Bulgarian Biodiversity Conservation Act. 19 of them are recored in the Red Book of Bulgaria - Volume 1 - Plants and Mushrooms. All species of Orchidaceae family as well the Ivy-leaved Cyclamen, Giant Snowdrop, Sternbergia colchiciflora are included in the list of Convention on International Trade of Endangered Species of Wild Fauna and Flora (CITES). In Malesh Mountain are identified two Bulgarian endemic species and 31 species of Balkan endemic. (Annex 6. Endemics)

Other rare plant species for Bulgaria to which special attention should be given are: Wild Asparagus (Asparagus acutifolius), Arrhenatherum palaestinum, Slender Oat (Avena barbata), Campanula scutellata, Starved Wood-sedge (Carex depauperata), Holy thistle (Cnicus Benedictus), Purple Gooseneck Loosestrife (Lysimachia atropurpurea), Lotus aegaeus, Etruscan honeysuckle (Lonicera etrusca), Greek oregano (Origanum vulgare subsp. hirtum), Tulipa australis etc.

2.2 INVERTEBRATES

Combining the results of field studies with those from available literature 3970, invertebrate species (Annex 1. Invertabrates) including 231 target species were described (Table 5).

Table 5 Number of invertebrate species in the Malesh Mountain

Taxa	Number of species in Bulgarian part of the Malesh Mountain	Number of species of major concern /target species/
Insects (class Insecta)		
Butterflies (order Lepidoptera)	1007	68
Daylight Butterflies (Rhopalocera)	120	35
Night Butterflies (Noctuidae)	887	33
Beetles (order Coleoptera)	1070	68
True bugs (order Hemiptera, suborder Heteroptera)	406	12
Hymenoptera (order Hymenoptera)	326	1
Flies (order Diptera – сем. Tachinidae и Phoridae)	60	-
Grasshoppers, crickets, weta and locusts (order Orthoptera)	46	12
Cockroaches (order Blattaria)	5	-
The mantises (order Mantodea)	5	1
Earwigs (order Dermaptera)	2	-

Termites (order Isoptera)	1	-
Webspinners (order Embioptera)	1	-
Myriapods (Myriapoda)	19	-
Terrestrial snails	15	1

In order to receive a better idea on the level of study of insect fauna within Malesh Mountain, the results of the current analysis were compared to the aggregated data for Bulgaria. (Table 6).

Table 6 Taxonomic diversity and study of Bulgarian insects (by Houbenov, 2005), compared with the terrestrial species found in the Malesh Mountain within the current research.

Taxa	Species in Bulgaria			Species in the Malesh Mountain
	found	potential	studied, %	
Cockroaches (order Blattaria (Blattodea))	16	20	80.0	5
The mantises (order Mantodea)	4	5	80.0	5
Earwigs (order Dermaptera)	7	15	46.6	2
Termites (order Isoptera)	2	2	100	1
Webspinners (order Embioptera)	1	2	50.0	1
Grasshoppers, crickets, weta and locusts (order Orthoptera)	225	237	94.9	46
True bugs (order Hemiptera, suborder Heteroptera)	1050	1100	95.4	406
Beetles (order Coleoptera)	6000	9000	66.0	1070
Butterflies (order Lepidoptera)	2900	4200	69.0	1007
Hymenoptera (order Hymenoptera)	4000	12000	33.3	326
Flies (order Diptera)	3500	10000	35.0	60

The results presented in Table 6 show the existence of clear distinction in the level of study of the different groups of insects. As it could be expected, small groups are significantly better studied both throughout the country and within Malesh Mountain, and the big orders like Coleoptera, Hemiptera, Lepidoptera, Hymenoptera and Diptera are not studied likewise. As regards to Malesh Mountain only

the results for butterflies can be considered satisfactory in respect of fauna. In the same time the results for the rich of species groups as lepidopteran and dipterous are extremely scarce.

On this stage of the analysis, sufficiently precise assessment on the level of study on some groups could not be made, in particularly for the high endemic groups (Orthoptera) or attachement to a particular trophic environment or habitat (Hemiptera).

Based on these results it could be concluded that Malesh Mountain is relatively poorly studied as regards to the terrestrial insect fauna. According to Hubenov (2005) this mountain belongs to the least studied regions of the all insects' orders.

2.3 VERTEBRATES

Combining the results of field studies with those from available literature 206, vertebrate species (Please see Annex 3. Vertabrates) including 62 target species were described (Table 7).

Table 7 Number of vertebrate species in the Malesh Mountain

Taxa	Number of species in Bulgarian part of the Malesh Mountain	Number of species of major concern /target species/
Fish (class Pisces)	11	4
Amphibians (class Amphibia)	12	2
Reptiles (class Reptilia)	23	5
Birds (class Aves)	160	51
Mammals (class Mammalia)	57	24

PART II: ANALYSIS OF POPULATION AND HABITATS OF THE MOST DOMINANT, ENDANGERED AND RARE SPECIES IN THE BULGARIAN PART OF MALESH MOUNTAIN

Habitat is the place where a certain organism or a group of organisms inhabits, together with all living and inanimate factors and environmental conditions.
Protection of biodiversity is closely connected with protection of natural habitats. Their preservation ensures to a great extent the future of connected living organisms.

Different climate and soil conditions, the specifics of water regime and human impact determine diversity of habitats presented on the territory of Malesh Mountain.
Habitat diversity is established through a literature review of scientific and popular articles and fieldwork within the mountain.

Identification of natural habitats is made through comparison of the ecological and floristic characteristics (typical, diagnostic species) with the respective characteristics of the habitats in "Guide for determination of habitats of European importance in Bulgaria" (Kavrakova and other, 2005) and/or „Interpretation Manual of European Habitats - EUR27". For all other natural habitats is used the Red Book of Bulgaria – volume 3: Natural habitats.

On the territory of Malesh Mountain there are established 33 types of habitats. All of them fall under the protection of Biodiveristy Conservation Act. Six of them are of priority for protection under the Habitats Directive 92/43/EEC of EU according to which priority types of habitats represent endangered from extinction, met on the territory for which protection the EU takes responsibility in terms of their natural distribution. These priority natural habitats are marked in Annex I of the Directive with asterisk (*).

All types of habitats on the territory of Malesh Mountain also fall in the Red Book of Bulgaria – volume 3: Natural habitats, wherein can be found detailed classification, descriptions, distribution, threats and activities about protection of natural habitats on the territory of Bulgaria. Vegetation of Malesh Mountain is typical and diverse. Here can be found unique and rare, both for Bulgaria and Europe, types of natural habitats.

Juniper habitats (9560* Endemic forests of Juniperus spp.) are one of the best preserved in Bulgaria and Europe. Here are also found significant for the territory of Bulgaria areas of natural habitats:

92CO Forests of Platanus orientalis, Shrubs and low forests of Kermes oak (Quercus coccifera), Shrubs of Phillyrea (Phillyrea latifolia), Sub-Mediterranean garugues, Bulgarian pseudomaquises, Forest of Hop-hornbeam (Ostrya carpinifolia), 9280 Forests of Quercus frainetto, 6420 Mediterranean wetland communities of high grass from Molinio-Holoschoenion, 6220* Pseudo-steppes with corn and annual from class Thero-Brachypodietea, 91AA* Eastern forests of Pubescent oak.

4060 Alpine and boreal ericoid communities

On the territory of Malesh Mountain there are established three sub-species of habitat 4060:

31.46 - *Bruckenthalia spiculifolia* communities

Its distribution is restricted to the high parts of the mountain, in the region of Iliov vrah (Dzama) peak.

31.4A - Ericoid communities in sub-Alpine belt of the mountain composed of blueberries. Main species here is the bilberry (*Vaccinium myrtillus*). It is met in the high parts of the mountain over the villages Goreme and Gorna Breznitsa.

31.4B - Highland communities of Chamaecytisus and Genista.

These sub-species habitats represent communities of Chamaecytisus ((*Chamaecytisus absinthioides*). They are distributed mainly in high parts of the mountain near the upper border of the forest and in bare areas on the slopes of mount Pastrets. They have a secondary origin.

4090 Endemic oro-Mediterranean communities of low thorny bushes

This type of habitat represents tufted communities of thorny shrubs, distributed on hills and mountains in the Misian zone. From the two sub-species on the territory of Bulgaria, here is met only one sub-species:

31.782 – Misian communities of Astragalus *angustifolius*.

Communities of *Astragalus angustifolius,* most often secondary, distributed from the belt of xerothermic oak forests to sub-Alpine belt, in dry rocky and limestone terrains on humus-carbonate soils, highly eroded with large content of skeletal material and outcrops of the basic rock.

These habitats are not found in Bulgaria but they are mentioned in “Guide for determination of habitats of European importance in Bulgaria” (Kavrakova and others, 2005) for the region of Sushitsa village.

5130 Shrubs of common juniper (*Juniperus communis*)

Communities of common juniper represent complex shrub-grass vegetation located on siliceous and limestone terrains. These communities are formed in result of cutting of trees and turning them into mountain pastures. On the territory of Malesh mountain, this type of communities are restrictedly met only in the highest, mountain parts, in the region of Iliov vrah mount (Dzama) where are formed communities with habitats 4060 and 6230.

5210 Shrubs of prickly juniper (Juniperus oxycedrus)

This is one of the most typical habitats for the mountain. It represents shrub communities of prickly juniper, widely distributed on eroded slopes and bare rocky habitats in the low parts of the mountain up to 800 m asl. Most often they represent an end stage of antropogenic degradation of xerothermic oak forests. It participates in different shrub communities – of oriental hornbeam (*Carpinus orientalis*), Christ's thorn (*Paliurus spina-christi*), Kermes oak (*Quercus coccifera*), as well as grass types - *Chrysopogon gryllus, Dichanthium ischaemum,* Volga fescue (*Festuca valesiaca*), etc.

6110* Open calcareous or basophilic grasslands of *Alysso-Sedion albi*

The habitats occupy a very small area of open rocky substrates, rock terraces, the edges of rocky canyons and gorges. Here, prevailing are the spring annuals and succulent plants, mostly White stonecrop (Sedum album), Goldmoss Stonecrop (Sedum acre), Spanish stonecrop (Sedum hispanicum), fragile fern (Cystopteris fragilis), Clypeola jonthlaspi, goldentuft alyssum (Alyssum saxatile). Its development is mainly in winter and spring, when the rocks moisture is still adequate. On the territory of Malesh Mountain this habitat is spread over an area of several square meters in locations around Kresna gorge, along the Sushichka river, on the rocky shores of Razdolska river, near the village of Dobri laki.

6210 Semi-natural dry grasslands and shrubland communities on calcareous substrates (*Festuco-Brometalia*) (*important orchid habitats)

This habitat is widespread throughout the mountain, up to 1000-1200 m asl. Here, the main species are represented by high tufted grasses and other perennial grass species adapted to long periods of drought, as well as shrubs and low trees, a remnant of primary forest vegetation. In many areas, cenoses are open, located on the slopes of varying degrees of erosion. These are basically the lowest areas of the mountain, near the settlements. Here are the main representatives: Chrysopogon gryllus, Dichanthium ischaemum, feather grass (Stipa spp.), Dorycnium herbaceum, Proliferous Pink

(Petrorhagia prolifera), Volga fescue (Festuca valesiaca), Christ's thorn (Paliurus spina- christi), blackthorn (Prunus spinosa), Wild jasmine (Jasminum fruticans), Prickly juniper (Juniperus oxycedrus), Small Burnet (Sanguisorba minor), Cantabrian Morning Glory (Convolvulus cantabrica), myrtle spurge (Euphorbia myrsinites) and others. This habitat is mixed with habitat types 6220, 5210.

In the area of the villages Igralishte, Dobri Laki, Razdol, the composition of this habitat includes representatives of wetland, typical for the so-called meadow steppes , such as: Sweet vernal grass (Anthoxanthum odoratum), Quaking-grass (Briza media), Crested Dog's-tail (Cynosurus cristatus), Grassleaf starwort (Stellaria graminea), Field Scabious (Knautia arvensis), Ox-eye daisy (Leucanthemum vulgare), Lady's bedstraw (Galium verum), Fragrant orchid (Gymnadenia conopsea), Bug orchid (Orchis coriophora), Common bracken (Pteridium aqulinum) and others. This habitat is traditionally used as pasture or for hay collecting.

6220* Pseudo-steppes of corn plants and annual plants of class *Thero-Brachypodietea*

This habitat is common throughout the lower parts of the mountain until 700-800 m asl. It takes up limited space and in many places it is used as pasture. It involves mainly warm-loving and dry-loving annual corn plants - Three-awn goat grass (*Aegilops neglecta*), Ovate goatgrass (*Aegilops geniculata*), Bristly dogtail grass (*Cynosurus echinatus*), Psilurus incurvus, Annual false brome (*Trachynia distachya*), Fringed fescue (*Vulpia ciliata*), Rat's-tail fescue (*Vulpia myuros*), etc., some medium-high perennial grasses - Bulbous bluegrass (*Poa bulbosa*), Bermuda grass (*Cynodon dactylon*), Cocksfoot (*Dactylis glomerata*), and many bulbs and root crops – Wild leek (*Allium*), Grape Hyacinth (*Muscari*), Crocus (*Crocus*), Autumn crocus (*Colchicum*), Bee orchid (*Ophrys*), Crocus-leaved romulea (*Romulea*) and others. Vegetation does not cover tightly the ground, as it occupies mainly dry, eroded areas or areas with shallow soils. Active growing season for vegetation is in the early spring months, while the soil is still relatively moist.

6230 * Species-rich Nardus grasslands, on siliceous substrates in mountains

This habitat type is found only in the highest parts of Malesh Mountain where in the past, and still in places, people have pastured their livestock. Vegetation is developed in dry and medium-wet soils. The grass cover is thick and is composed mainly of the species mat grass (*Nardus stricta*), Normal bent (*Agrostis capillaris*), Crested Dog's-tail (*Cynosurus cristatus*), Spike Heath (*Bruckenthalia spiculifolia*), Common Tormentil (*Potentilla erecta*), Viola dacica, spotted St. John's-wort (*Hypericum*

maculatum), Wavy-hair grass (*Deschampsia flexuosa*), Long-leaved mullein (*Verbascum longifolium*), and various shrubs and semi-shrubs such as thyme (*Thymus spp.*), Chamaecytisus absinthioides, Bilberry (*Vaccinium myrtillus*), Common juniper (*Juniperus communis*) and others.

6420 Mediterranean tall humid grasslands of the *Molinio-Holoschoenion*

This habitat type is composed of vegetation dominated by tall grasses, sedges and corn grasses, situated along riverside sand terraces of the Struma River and some of its smaller tributaries, south of Kresna, up to 300 m asl. It is characterized by the participation of the following types: Field wormwood (*Artemisia campestris*), Hardy pampas grass (*Erianthus ravennae*), Gypsywort (*Lycopus europaeus*), Common reed (*Phragmites australis*), Lesser Bulrush (*Typha angustifolia*), Marsh Helleborine (*Epipactis palustris*), Tamarisk (*Tamarix spp.).*

6430 Hydrophilic communities of tall grasses in the plains and of the montane to alpine belt

This habitat type is formed on the banks of rivers and streams and on the outskirts of the forests in the presence of high soil and air moisture. It is separated into two types:

37.7 - Damp and nitrophilous tall grasslands along water courses and on the borders of woods. This sub - type is found primarily in large, flooded banks of rivers in shady places, often in the range of forests around the mountain. Typical types are: Ground ivy (*Glechoma hederacea*), Great willow herb (*Epilobium hirsutum*), Common butterbur (*Petasites hybridus*), Ground elder (*Aegopodium podagraria*), Garlic root (*Alliaria petiolata*), Herb robert (*Geranium robertianum*), Plain purple loosestrife (*Lythrum salicaria*), Canary figwort (*Scrophularia nodosa*), Common nettle (*Urtica dioica*) and others.

37.8 - communities of tall perennial grasses in mountain and alpine belt:

This sub-species is restricted to the high parts of the mountain, near springs. Typical species are: Meadowsweet (*Filipendula ulmaria*), *Cirsium appendiculatum*, *Angelica pancicii,* Wood forget-me-not (*Myosotis sylvatica*), False helleborine (*Veratrum album*), *Geum coccineum,* Monk's-rhubarb (*Rumex alpinus*), Marsh marigold (*Caltha palustris*), etc.

6520 Mountain hay meadows

Mointain hay meadows are secondary developed plant communities, replacing destructed beech and coniferous forests. On the territory of Malesh Mountain, this habitat type is widespread over 1,200 m above sea level, on the ridge of the mountain and in the villages Dobri Laki, Klepalo, Goreme. Mountain hay meadows are maintained and preserved by the recovery of the forest through

systematic mowing in some places, and there where mowing and grazing have ceased, are noticed overgrowth of bracken (*Pteridium aquilinum*) and young pine trees (*Pinus stlvestris*). Typical species of this habitat are:

Dropwort (*Filipendula vulgaris*), Lady's bedstraw (*Galium verum*), Silver cinquefoil (*Potentilla argentea*), sweet vernal grass (*Anthoxanthum odoratum*), Quaking grass (*Briza media*), Crested Dog's-tail (*Cynosurus cristatus),* Birdsfoot trefoil *(Lotus corniculatus)*, Alpine clover *(Trifolium alpestre),* Palmate hop clover *(T. aureum),* Hop trefoil *(T. campestre)*, mountain clover *(T. montanum),* meadow clover *(T. pratense),* white clover *(T. repens),* adder wort *(Bistorta major),* spotted St. John's wort *(Hypericum maculatum),* common St. John's wort *(H. perforatum),* Field Scabious *(Knautia arvensis),* Fernleaf plantain *(Plantago lanceolata),* cowslip *(Primula elatior),* buttercup *(Ranunculus spp.),* rattle *(Rhinanthus spp.)*, common sorrel *(Rumex acetosa),* field sorrel *(R. acetosella),* Germander Speedwell*(Veronica chamaedrys),* heartsease *(Viola tricolor)* and others.

7140 Transition mires and quaking bogs

Mountainous moorland communities include low sedges and peat or brown mosses. This habitat is found only in one place, above the village of Goreme, near the springs of Goremska and Tseparevska rivers, at 1500 m asl. Typical for this habitat are species like adderwort (Bistorta major), spike heath (Bruckenthalia spiculifolia), sedge (Carex spp.), Broad-leaved cotton grass (Eriophorum latifolium), red avens (Geum coccineum), common tormentil (Potentilla erecta), peat moss (Sphagnum spp.).

8220 Siliceous rocky slopes with chasmophytic vegetation

The habitat includes vegetation growing in the cracks of steep rocky slopes in the mountains and their foothills. The diversity of the flora varies depending on the exposure, altitude, degree of porosity of the rock. It is composed of extremely diverse open rock groups, involving a large number of species: maidenhair spleenwort (*Asplenium trichomanes*), rock pennywort (*Umbilicus rupestris*), Dianthus gracilis, common polypody (*Polypodium vulgare*), white stonecrop (Sedum album), fragile fern (*Cystopteris fragilis*) and others. This habitat type occurs mainly through the Kresna gorge and in separate locations near Sushitsa village, Dobri laki village, the village of Igralishte - the rocks above the river Lebnitsa.

8230 Siliceous rock with pioneer vegetation of the *Sedo-Scleranthion* or of the *Sedo albi-Veronicion dillenii*

This habitat occurs on exposed siliceous rocks in the lower and middle parts of Malesh Mountain. It represents bare rock surfaces overgrown with annual plants, low succulents, mosses and lichens. Its

development is mainly in winter and spring, when the rocks moisture is still enough. Typical types are: mouse-ear hawkweed (*Hieracium pilosella*), bulbous bluegrass (*Poa bulbosa*), silver cinquefoil (*Potentilla argentea*), sheep's sorrel (*Rumex acetosella*), bur medick (*Medicago minima*), perrenial knowel (*Scleranthus perennis*), annual stonecrop (*Sedum annuum*) showy stonecrop (*Sedum maximum*), goldmosss stonecrop (*Sedum acre*), white stonecrop (*Sedum album*), pennywort (*Umbilicus erectus*), rat's-tail fescue (*Vulpia myuros*).

9110 *Luzulo-Fagetum* beech forests

This type beech forests occur restrictedly in the mountains. It develops in poor, often eroded, dry to moderately moist soils. It occupies both shaded and sunny exhibitions. The dominant tree species is beech (Fagus sylvatica). As accompanying tree species are rowan (Sorbus aucuparia), aspen (Populus tremula), white pine (Pinus sylvestris), silver fir (Abies alba), spruce (Picea abies).

Typical species of undergrowth vegetation are: bittercress (*Cardamine bulbifera*), wavy hair grass (*Deschampsia flexuosa*), woodruff (*Galium odoratum*), plain geranium (*Geranium macrorrhizum*), herb robert (*Geranium robertianum*), yellow archangel (*Lamium galeobdolon*), wall lettuce (*Mycelis muralis*), wood sorrel (*Oxalis acetosella*), wood bluegrass (*Poa nemoralis*), bilberry (*Vaccinium myrtillus*), heath speedwell (*Veronica officinalis*), oak-forest woodrush (*Luzula luzuloides*), great wood rush (*Luzula sylvatica*), *Cruciata glabra*), rough small reed (*Calamagrostis arundinacea*) and others. This habitat is divided into two types:

Sub-species 1: Typical acidophile beech forests – association *Luzulo-Fagetum*.It is met in the valley of Gorno-Breznishka River.

Sub-species 2: Acidophile beech forests on screes and rocky terrains – group *Geranium macrorrhizum-Fagus sylvatica*.

They are met west of the village of Klepalo, along the valley of Tsaparevska River, on the northern slopes of Pastrets mount.

9130 *Asperulo-Fagetum* beech forests

The habitat is characterized by the dominance of beech (Fagus sylvatica), developing in medium wet and moist soils and rivers. These are the most common type of beech forests in Malesh Mountain with altitude range of 800-1500 m above sea level.

They are characterized by a rich and diverse species composition. In the lower parts there are formed mixed deciduous forests with participation of Dalechampii oak (*Quercus dalechampii*), sycamore maple (*Acer pseudoplatanus*), common hornbeam (*Carpinus betulus*), manna ash (*Fraxinus*

excelsior), common aspen (*Populus tremula*), hop hornbeam (*Ostrya carpinifolia*) and sweet chestnut (Castanea sativa). In the higher parts of the mountain beech is met with Scots pine (*Pinus sylvestris*), silver fir (*Abies alba*) and rarely Norway spruce (*Picea abies*). Dominant species in the grassy layer are sweet woodruff (*Galium odoratum*), smell fox (*Anemone nemorosa*), yellow archangel (*Lamium galeobdolon*), large-flowered bittercress (Cardamine bulbifera), bastard agrimony (*Aremonia agrimonioides*), wood melick (*Melica uniflora*), wall lettuce (*Mycelis muralis*), Great woodrush (*Luzula sylvatica*), European raspberry (*Rubus idaeus*) and others.

On the slopes of Mount Pastrets, over the villages Klepalo and Dobri laki, in the valleys of Goremska and Tsaparevska rivers, as well as in small areas along steep gullies can be found preserved old beech forests over 150 years old.

Established sub-types of this habitat found within the Malesh Mountain are as follows:

1. Typical mesophytic beech forests - *Asperulo-Fagetum*.

This is the most common sub-species beech forests in the mountain.

2. Mesophytic beech forests on poor soils and relatively lower slope - *Festuco drymejae-Fagetum*.

3. Mesophytic beech forests transitional *Luzulo-Fagetum - Luzula sylvatica–Fagus sylvatica*.

4. Higromesophylic and mesohygrophilic beech forests.

It can be observed in the valley of Sushichka river.

9170 *Galio-Carpinetum* oak-hornbeam forests

The habitat 9170 represents mixed forests of common hornbeam (*Carpinus betulus*) and Dalechampii oak (*Quercus dalechampii*) with participation of the common beech (*Fagus sylvatica*), between 500 to 1000 m asl. The composition of this habitat includes other wood species, depending on local environmental conditions - maple (*Acer campestre*), Balkan maple (*A. hyrcanum*), Norway maple (*A. platanoides*), Wild cherry (Prunus avium), Wild service tree (Sorbus torminalis) Small-leaved lime (*Tilia cordarta*). At places, in the lower parts of the distribution of this habitat, forests are highly diluted and among them are found several tree species from adjacent habitats like common hornbeam (*Carpinus orientalis*), pubescent oak (*Quercus pubescens*), Hungarian oak (*Quercus frainetto*), manna ash (*Fraxinus ornus*). In the composition of the habitat, though as a second floor, participates the Hop hornbeam (*Ostrya carpinifolia*), mostly in the river valleys and deep ravines. On a small area, along the river Goremska, participation in this type of habitat takes also the Sweet chestnut (*Castanea sativa*). In the shrub layer can be found the common hazel (*Corylus avellana*), common hawthorn (*Crataegus monogyna*), as well as specific types of grass cover like ground elder

(Aegopodium podagraria), large-flowered bittercrest (*Cardamine bulbifera*), various-leaf fescue (*Festuca heterophylla*), woodruff (*Galium odoratum*), Hairy Melick (*Melica uniflora*).

This habitat is distributed mainly in the valley of the Gornobreznishka river and hills and gullies in the Krupnik share of Malesh Mountain.

91E0 * Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)

Habitat 91E0 * represents riparian forest of black alder (Alnus glutinosa) distributed mainly along the banks of the rivers in their middle and upper reaches. This habitat type includes four sub-types. On the territory of Malesh Mountain there is presented only the sub-type **Riparian forests of alder (Alnus spp.) and European ash (Fraxinus excelsior).**

Typical for this sub-type are gallery of riparian communities with basic type - black alder (Alnus glutinosa) and participation of oriental plane (Platanus orientalis), European ash (Fraxinus excelsior), various types of willows, often brittle willow (Salix fragilis) and crack willow (Salix alba). It is found on the banks of the larger rivers – Lebnitsa, Tseparevska river, Goremska river, Razdolska river.

91M0 Pannonian-Balkanic turkey oak - sessile oak forests

Habitat 91M0 represents oak forests, with participation of various types of oaks like Hungarian oak (*Quercus frainetto*), Dalechampii oak (*Quercus dalechampii*) and to a lesser extent - Turkey oak (*Quercus cerris*) and pubescent oak (*Quercus pubescens*). Distribution is mainly on the slopes between 200 and 1000 m asl., in the Krupnik part of the mountain, near the villages Karpelevo, Budiltsi. From those presented subtypes in Bulgaria, on the mountain territory can found only the subtype sub-Mediterranean (Thracian) mixed oak forests.

In the tree layer can be also found Field maple (*Acer campestre*), Manna ash (*Fraxinus ornus*), Turpentine tree (*Pistacia terebinthus*), Quercus virgiliana. Under the human influence, often these habitats have changed their natural look and enhanced the degree of erosion. Here is often practised trimming of outer branches for extraction of leaf fodder. In this habitat often can be found the Oriental hornbeam (*Carpinus orientalis*), which may form a second wood floor with a height of about 3-4 m. Of shrub species typical are the Scorpion senna (*Coronilla emerus subsp. Emeroides),* prickly juniper (*Juniperus oxycedrus*), rose (*Rosa spp.*), Broom (*Chamaecytisus spp.*), as well as representatives of grass species – slender false brome (*Brachypodium sylvaticum*), bloody crane's-bill (*Geranium sanguineum*), black bitter vetch (*Lathyrus niger*), cock's foot (*Dactylis glomerata*), rose

campion (*Lychnis coronoria*), wall lettuce (*Mycelis muralis*), wild basil (*Clinopodium vulgare*), Germander speedwell (*Veronica chamaedrys*) and others.

91Z0 Moesian silver lime woods

91Z0 habitat represents forests dominated by silver linden (*Tilia tomentosa*), distributed in small areas on the high and steep, right banks of the Struma River in northern Kresna Gorge. This habitat has mosaic distribution on steep slopes with a slope of 50-60 degrees and a high degree of erosion. It is located in the belt of xerothermal oak forests and often occurs in conjunction with pubescent oak (*Quercus pubescens*), Manna ash (*Fraxinus ornus*), Turpentine tree (Pistacia terebinthus). In the undergrowth can be found species like common ivy (*Hedera helix*), wood melick (*Melica uniflora*), greater stitchwort (*Stellaria holostea*), common chickweed (*Stellaria media*), common violet (*Viola odorata*), Cardamine graeca, wood avens (*Geum urbanum*).

91AA * Eastern oak forests

Habitat 91AA* represents forests of pubescent oak (*Quercus pubescens*) located in the lower parts of Malesh Mountain between 200-600 m asl. Main areas occupied by this habitat are found around settlements and places under strong anthropogenic impact. Forests are coppice ones, multiple minted in the past. In many places due to logging, erosion is significant. Forests are very sparse in the composition of plant communities entering kinds of surrounding habitats. Often, together with hairy oak can be observed another species - hornbeam (*Carpinus orientalis*), flowering ash (*Fraxinus ornus*), maple (*Acer campestre*), turpentine tree (*Pistacia terebinthus*), Greek juniper (*Juniperus excelsa*). In the shrub layer, an essential role plays tree bladder senna (*Colutea arborescens*), common dogwood (*Cornus sanguinea*), Scorpion senna (*Coronilla emerus subsp. Emeroides*), common hawthorn (*Crataegus monogyna*), prickly juniper (*Juniperus oxycedrus*), Christ's thorn (*Paliurus spina-christi*), common lilac (*Syringa vulgaris),* wild asparagus (*Asparagus acutifolius*), *Phillyrea latifolia*. In the herbaceous layer can be found red anemone (*Anemone pavonina*), *Asparagus verticillatus*, cocksfoot (Dactylis *glomerata*), gas plant (*Dictamnus albus*), bloody cranesbill (*Geranium sanguineum*), Olympic Hypericum (*Hypericum olympicum*), violet limodore (*Limodorum abortivum*), *Ophrys mammosa*, pink starlets (*Petrorhagia illyrica*), *Ruscus aculeatus*, wall germander (*Teucrium chamaedrys*), Thymus striatus, round-leaved birthwort (*Aristolochia rotunda*) and others.

91CA - Rhodopide and Balkan Range Scots pine forests

91CA habitat within the Malesh Mountain represents a forest dominated by Scots pine (*Pinus sylvestis*), distributed in the villages Klepalo and Dobri laki at 1200-1400 m altitude. These are

natural forests over 120 years old. In their undergrowth can be seen mainly common bracken (*Pteridium aquilinum*), Bilberry (*Vaccinium myrtillus),* raspberry (*Rubus idaeus*), oak-forest wood rush (*Luzula luzuloides*), wood spurge (*Euphorbia amygdaloides*), Chamaecytisus (*Chamaecytisus absinthioides*), bastard-agrimony (*Aremonia agrimonoides*), wild strawberry (*Fragaria vesca*), Cruciata glabra, Rubus hirtus, wood meadow-grass (*Poa nemoralis*), common juniper (*Juniperus communis*) and others.

Artificial plantations of Scots pine are widespread in the mountain between 800 and 1500 m asl.

9260 *Castanea sativa* woods

Natural habitat 9260 within Malesh Mountain represents an artificial plantation of plain chestnut (*Castanea sativa*) on small areas distributed between 500-1000 m asl. The forests are young, pure or mixed with common beech (*Fagus sylvatica*), Dalechampii oak (*Quercus dalechampii*) and silver lime (*Tilia tomentosa*). They are found along the valley of the river Goremska. The species composition of the ground cover is typical for hornbeam and durmast forests - Wall salad (*Mycelis muralis*), large flowered bittercress (*Cardamine bulbifera*), Alpine squill (*Scilla bifolia*), Lathyrus laxiflorus and others.

92A0 *Salix alba* and *Populus alba* galleries.

Natural habitat 92A0 represents riparian forest communities dominated by white willow (*Salix alba*), black poplar (*Populus nigra*), white poplar (*Populus alba*) and featuring oriental plane (*Platanus orientalis*), distributed along the Struma River. In many places, the habitat is replaced with artificial plantations of hybrid poplars, black pine and silver lime. There are also found black alder (*Alnus glutinosa*), common walnut (*Juglans regia*), field elm (*Ulmus minor*). Species composition of the ground cover includes – Hedge bindweed (*Calystegia sepium*), cleavers (*Galium aparine*), common hops (*Humulus lupulus*), European bugleweed (*Lycopus europaeus*), water mint (*Mentha aquatica*), common reed (*Phragmites australis*), bittersweet (*Solanum dulcamara*), blackberry (*Rubus spp.),* saltcedar (*Tamarix ramosissima*), common bulrush (*Typha latifolia*), purple loosestrife (*Lythrum salicaria*) and others.

92C0 Forests of *Platanus orientalis*

The nature habitat 92C0 represents riveside forests of Oriental plane (*Platanus orientalis*) along the riverbanks of the Struma River and its tributaries, as well as in dry gullies to about 900 m asl. On the tree communities level there are met species of Black Alder (*Alnus glutinosa*), Common walnut (*Juglans regia*), White willow (*Salix alba*), Common Beech (*Fagus sylvatica*), and along the Gorna

Breznitza river valley Hop Hornbeam (*Ostrya carpinifolia*) is met. Ground cover is composite of Aegopodium podagraria, Garlic Mustard (*Alliaria petiolata*), Garden Balm (*Melissa officinalis*), Large-flowered Bittercress (*Cardamine bulbifera*), Cardamine graeca, Ivy-leaved Cyclamen (*Cyclamen hederifolium*), Cock's-foot (*Dactylis glomerata*), Common ivy (*Hedera helix*), Yellow Archangel (*Lamium galeobdolon*), Bastard-agrimony (*Aremonia agrimonoides*), Black spleenwort (*Asplenium adiantum-nigrum*), common lady-fern (*Athyrium filix-femina*), Wall Pellitory (*Parietaria erecta*), Common Nettle (*Urtica dioica*) etc.

Plane communities on the Gorna Breznitza river valley are some of the most representative for Bulgaria. There are two protected areas for their conservation: Protected area "Nature Habitat of Planes – Buina" and "Nature Habitat of Planes – Kuchkarnika", which keep plane populations over 300 years old.

92D0 Southern riparian galleries and thickets *(Nerio-Tamaricetea u Securinegion tinctoriae)*

The habitat is covered by Saltcedar (*Tamarix ramosissima*) and Tamarisk tree (*Tamarix tetrandra*), on sand and stoney river banks, mainly in the widest parts of Struma Valley and the mouths of Struma tributaries. They are spread on small groups of single or tens of individuals, separate or together with vegetation of habitats 6420 and 92A0.

9560 * Endemic forests of *Juniperus spp*

Nature habitat 9560* represents forest communities dominated or co-dominated by Greek Juniper (*Juniperus excelsa*) spreaded in the low parts of Kresna Gorge, on the slopes of Malesh mountain in the region of Kresna, Slivnitza village, between 200-600 m asl. The Greek Juniper communities become very sparse, as the free space is occupied by number of tree species such as Downy Oak (*Quercus pubescens*), Hungarian oak (*Quercus frainetto*), Oriental hornbeam (*Carpinus orientalis*), Manna Ash (*Fraxinus ornus*), Turpentine tree (*Pistacia terebinthus*) and European nettle tree (*Celtis australis*). The most representative communities are located in the Reserve "Tisata" and protected area "Moravska". There are also established the oldest individuals of Greek Juniper and small groups of trees in old growth forest. Habitat 9560* is in high anthropogenic pressure. Negative influence have the cuttings of forests in the past, fires, pastures and the trampling by domestic animals, as a result to which the soil erosion in many places is strong, with access to the core scale and lack of undergrowth. Many places, cleared by tree vegetation, were occupied by shrubs of Christ's Thorn (*Paliurus spina-christi*) and Prickly Juniper (*Juniperus oxycedrus*), as the process is most intensive in the regions close to the city of Kresna and the nearby villages. Bladder senna (Colutea arborescens)

and Osyris (*Osyris alba*) are met relatively rare and only in the law parts of the mountain. Species composition is very rich and includes many Mediterranean and endemic taxa. Herbaceous layer is well developed and differs with huge variety - Moonshine Yarrow (*Achillea clypeolata*), Wild Asparagus (*Asparagus acutifolius*), Chrysopogon gryllus (*Chrysopogon gryllus*), Holy thistle (*Cnicus benedictus*), Dwarf morning glory (*Convolvulus cantabrica*), Bristly Dogtail Grass (*Cynosurus echinatus*), Dianthus gracilis, Field Eryngo (*Eryngium campestre*), Broad-leaved Glaucous Spurge (*Euphorbia myrsinites*), Statice (*Goniolimon tataricum*), Mount Olympus St. John's wort (*Hypericum olympicum*), Wild Jasmine (*Jasminum fruticans*), Love In A Mist (*Nigella damascena*), Hulwort (*Teucrium polium*), Thyme (*Thymus spp.*), Small Burnet (*Sanguisorba minor*), Christ's Thorn (*Paliurus spina-christi*), Phillyrea latifolia (*Phillyrea latifolia*), Phleum graecum etc.

9280 Forest of *Quercus frainetto*

The dominant species in this habitat is the Hungarian oak (*Quercus frainetto*), and typical species are these of Common Beech (*Fagus sylvatica*), Green Foxglove (*Digitalis viridiflora*), Cowslip (*Primula veris*), Woodland strawberry (*Fragaria vesca*).

The habitat is not included in the Guidance for identifying habitats of European importance in Bulgaria (by Kavrakova and others 2009), but it is mentioned in studies of Gogushev (2010) and Dimitrov (2012) related to the territory of Nature Reserve "Sokolata".

Forests of Hop Hornbeam (Ostrya carpinifolia)

This habitat is dominated by Hop Hornbeam (*Ostrya carpinifolia*). It grows on steep rocky slopes, near rivers and moist gullies in the area of Gorna Breznitsa village and along the Valley of Sushichka River, up to 1000 m asl. Often, other tree species participate in the composition of these communities: *Carpinus betulus*, *Fraxinus excelsior*, Platanus *orientalis*, *Fagus sylvatica*, *Quercus dalechampii*. In the undergrowth cover grow the Common ivy (*Hedera helix*), Dog's Mercury (*Mercurialis perennis*), Common polypody (*Polypodium vulgare*), Black Bryony (*Tamus communis*) etc.

Balkanic pseudomaquis

The habitat is presented by 0,5–3 m tall xerotermic mixed shrubs of Mediterranean and sub-Mediterranean xerophilic deciduous and evergreen shrubs and low trees. They are typical for transitional Mediterranean climate, in the layer of xerothermic oak forests, in the low parts of the mountain and in Kresna gorge. Pseudomaquises are most commonly degraded communities of oaks

in shrub shape, formed after tree cuttings, fires, and pastures of domestic animals. Most commonly there are not distict edificators and dominants. In mixed communities both evergreen vegetation as Common fig (*Ficus carica*), Greek Juniper (*Juniperus excelsa*), Prickly Juniper (*J. oxycedrus*), Phillyrea latifolia (*Phillyrea latifolia*), Kermes Oak (*Quercus coccifera*), and decidous species as *Carpinus orientalis*, *Fraxinus ornus*, *Jasminum fruticans*, *Paliurus spina-christi*, *Pistacia terebinthus*, *Prunus spinosa*, *Celtis australis*, *Quercus frainetto*, *Quercus pubescens*, *Rhus coriaria* are common. In the composition of pseudomaquis the following shrub species are frequent: Webii wild almond (*Amygdalusx delipavlovii)*, *Asparagus acutifolius*, *Colutea arborescens*, *Coronilla emerus subps. Emeroides*, Etruscan honeysuckle (*Lonicera etrusca*), *Syringa vulgaris*, and from the grass vegetation mot common species are: Peacock Anemone (*Anemone pavonina*), Feathergrass (*Stipa bromoides*), King Ranch Bluestem (*Dichanthium ischaemum*), Chrysopogon gryllus, Volga Fescue (*Festuca valesiaca*), *Nigella damascena*, *Poa bulbosa*, Psilurus incurvus etc.

Sub-Mediterranean garrigues

The habitat represents low (0,3–1 m) open sclerophyll shrubs communities of Mediterranean character, dominated by Hairy Rock-rose (*Cistus incanus*). They are one of the last stages of degradation of mixed xerotherm oak forests and pseudomaquises in regions of transional-medirreanean climate. They are spread in low parts of the mountain, on flat terrains or slopes with slight incline (5–10°) – village of Gorna Sushitza, Village of Kamenitza, village of Vulkovo, village of Palat. These species grow in the periphery of sparse forests of Downy Oak (*Quercus pubescens*), Hungarian oak (*Quercus frainetto*) or shape shrub complexes of sclephyll shruberries, as Prickly Juniper (*Juniperus oxycedrus*), Christ's Thorn (*Paliurus spina-christi*), Phillyrea latifolia (*Phillyrea latifolia*), Kermes Oak (*Quercus coccifera*) etc.

Shrubberies of Phillyrea latifolia (Phillyrea latifolia)

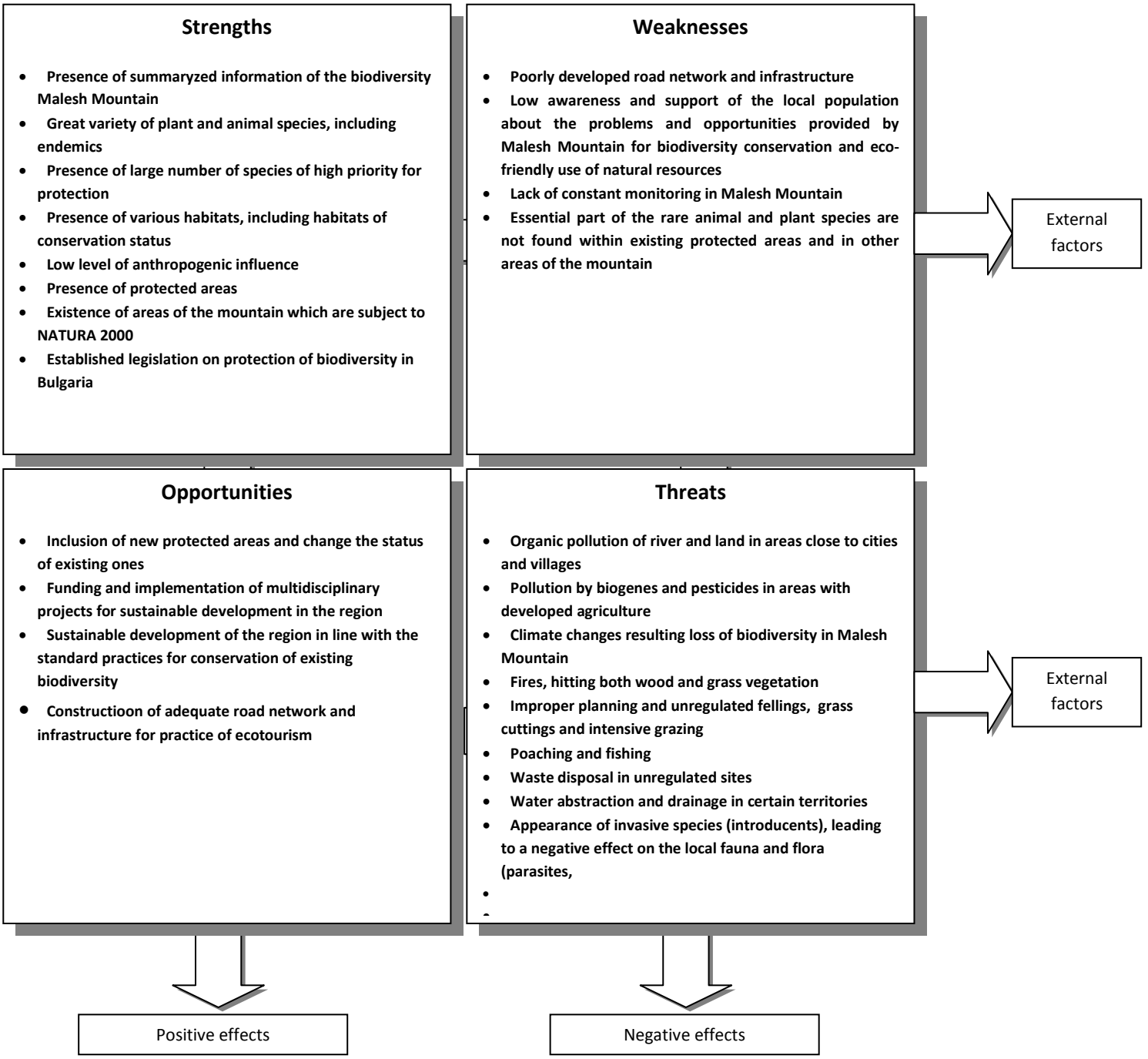
The habitat represents evergreen hard leaf relict shrubberies dominated by Phillyrea latifolia (*Phillyrea latifolia*), which relate to the Mediterranean-type vegetation. Phillyrea latifoliата is an evegreen shrub or low tree (от 1 до 5–6 m) with small leathery hard leaves. The vertical range of distribution is 500 m above sea level. It could be seen in the area between the villages of Kamenitza and Slivnitza, as well in some places around the village of Gorna Breznitza. Dominating part of Phillyrea latifolia's phytocenosis has secondary occurred (as a consequence of cuttings, fires and pastures), in places of xerotherm woodland, mailnly oak communities. In the phytocenosis establishment participate *Acer campestre*, *Asparagus acutifolius*, *Carpinus orientalis*, *Celtis australis*, *Cistus incanus*, *Fraxinus ornus*, *Jasminum fruticans*, *Juniperus excelsa*, *Juniperus oxycedrus*, *Paliurus*

spina-christi, *Pistacia terebinthus*, *Pyrus amygdaliformis*, *Quercus pubescens*, *Quercus frainetto*, *Quercus virgiliana*, *Rhus coriaria*, *Ruscus aculeatus* and grass species as *Stipa bromoides*, *Cyclamen hederifolium*, *Euphorbia myrsinites*, *Dichanthium ischaemum*, *Chrysopogon gryllus*, etc.

Srubberies and low forests of Kermes Oak (Quercus coccifera)

The habitat represent evergreen hard leaf shrubbery species and low forests (pseudomaquis) dominated by Kermes Oak (*Quercus coccifera*), and belonging to a Mediterranean type of vegetation. Kermes Oak is a typical evegreen tree or shrub with hard leathery spiny leaves. It is met in the area of the village of Kamenitza. In physiognomic aspect, its communities look like shrubs. Species composition of phytocenosis is rich. In their development participate not only Kermes Oak, but also tree species as *Carpinus orientalis*, *Celtis australis*, *Fraxinus ornus*, *Pistacia terebinthus*, *Pyrus amygdaliformis, Quercus pubescens. От храстите по-често се срещат Juniperus oxycedrus*, shrubs - *Asparagus acutifolius*, *Colutea arborescens*, *Coronilla emerus subsp. emeroides*, *Jasminum fruticans*, *Paliurus spina-christi*, and rather *Cistus incanus*, *Ficus carica*, *Phillyrea latifolia* etc. Typical species for herbaceous cover are *Clinopodium vulgare*, *Cyclamen hederifolium*, *Cynosurus echinatus*, *Dactylis glomerata*, Purple false brome (*Trachynia distachya*), Alkanet (*Alkanna tinctoria*), Wormwood Sagewort (*Artemisia campestris*), *Nigella damascena* and others.

2.1 SWOT ANALYSIS –ANALYSIS OF THE STRENGTHS, WEAKNESSES, OPPORTUNITIES AND THREATS FOR THE TERRITORY AND RESOURCES OF MALESH MOUNTAIN



2.2 IDENTIFICATION OF MEASURES NEEDED FOR BIODIVERSITY CONSERVATION IN THE REGION OF MALESH MOUNATIN

As a result of the field studies and desk research carried out, and the identification of the above mentioned habitats, the following measures contributing to the conservation of biodiversity in the territory of Malesh Mountain, were laid down:

1. Management of protected areas, expressed in ensuring of adequate security, placing of markings and information boards.

2. Organisation of campaigns for raising public awareness and responsibility for biodiversity conservation. Identification of measures for involvement of local population in conservation projects;

3. Monitoring and collection of actual data on mountain's species. Such activities are a precondintion for protection of existing and declaration of new protected areas in the mountain.

4. Reducing the conflict between humans and predators through compensation and educational programs. Reducing the use of poison baits against predators;

5. Evaluation of potential impact of each investment project on biodiversity. Recommending individual measures to minimize the negative impact of each project.

6. Promotion of the mountain as a destination for sustainable tourism.

PART III: APPROXIMATE GPS COORDINATES OF HABITATS OF IDENTIFIED RARE, ENDANGERED AND ENDEMIC SPECIES

Number	Latin name of the species	Name (English)	Name (Bulgarian)	Habitat	GPS coordinates
Plants					
1	*Juniperus excelsa*	(Greek Juniper)	Дървовидна хвойна	Dry, sunny slopes on rocky-sandy soils with a high degree of erosion, 600 m asl	41°48'52.51"N and 23°09'26.58" E; 41°45'21"N and 23°8'32"E;
2	*Platanus orientalis*	Oriental plane	Източен чинар	Inhabits sandy river sides, often with species like black alder (*Alnus glutinosa*), white willow (Salix alba), white poplar (Populus alba) and black poplar (Populus nigra). The juniper is met near drying rivers and gullets during the summer period.	41°44' 04.40" N and 23 °05' 33.42 "E
3	*Pistacia terebinthus*	Turpentine tree	Кукуч	It inhabits dry, sunny slopes with	41°31' 29.32 " N and 23

				shallow, rocky-sandy soil, areas with high erosion or on bare rock habitats. It occurs through oak forests, often along with pubescent oak (Quercus pubescens), Hungarian oak (Quercus frainetto) and only at some places around rocky scree gorges it appears alone or with various types of lime tree (Tilia spp.). It is a typical species for habitats 91AA * 91M0, 9560 *, and Balkan transitional Mediterranean communities.	ºl4l 00.92 "E
4	*Quercus coccifera*	Quercus coccifera L.	Пърнар	It inhabits sunny, dry slopes with rocky-sandy, shallow soils, with high erosion, sometimes on bare rock. The climate is transitional, Mediterranean. It participates as a full or concomitant species in the formation of communities as Mediterranean plane communities and sub-Mediterranean Garrigues. It is rarely found alone on large areas, more often mixed with pubescent oak (Quercus pubescens), prickly juniper	41.65N and23.16667 "E

				(Juniperus oxycedrus), phillyrea (Phillyrea latifolia), Christ's thorn (Paliurus spina-christi) and others.	
5	*Juniperus oxycedrus*	Prickly Juniper	Червена хвойна	It inhabits dry, sunny, rocky habitats, often eroded grassy places. It participates in various shrub communities - from hornbeam (Carpinus orientalis), Christ's thorn (Paliurus spina-christi), Kermes oak (Quercus coccifera), as well as herbaceous - Chrysopogon gryllus, Dichanthium ischaemum, Festuca valesiaca and others. It is also found in sparse forests and along the borders of forest habitats type 91AA *, 91M0, 9560.	41°34' 32.20 "N and 22 °59' 36.35 "E; 41°49' 00.20 "N and 23 °02' 35.63 "E
6	*Phillyrea latifolia*	na	Широколистна грипа	It occurs in dry, sunny places, up to 500 meters altitude in transitory climatic conditions. The species rarely forms pure communities, more often builds phytocenoses	41.65N and 23.16667E; 41°44'04.40 "N and 23 °05' 33.42 "E

				with Asparagus acutifolius, hornbeam (*Carpinus orientalis*), juniper (*Juniperus excelsa*), prickly juniper (*Juniperus oxycedrus*), Christ's thorn (*Paliurus spina-christi*), turpentine tree (*Pistacia terebinthus*), almond pear (*Pyrus amygdaliformis*), Hungarian oak (*Quercus pubescens*), Kermes oak (*Quercus frainetto*) and others. It takes part in herbaceous communities with dominating species as *Stipa spp*., Dichanthium ischaemum, Chrysopogon gryllus and others.	
7	*Amygdalus delipavlovii*	Webii wild almond	Вебиев див бадем	It is met on rocky and dry places, in shrub communities with Shrubby jasmine (*Jasminum fruticans),* Christ's thorn (*Paliurus spina-christi*), Almond-leaved pear, (*Pyrus amygdaliformis*), etc.	41°46' 56.05'' N, 23°09' 06.93'' E
8	*Asparagus acutifolius*	Wild Asparagus	Остролистна зайча сянка	It grows on dry, sunny, rocky-sandy habitats, often with significant soil erosion, at about 1000 m above sea level. It often grows among shrubs like Christ's thorn (*Paliurus spina-christi*), bushy jasmine (Jasminum fruticans), Phillyrea latifolia,	41°46' 58.35'' N, 23°09' 10.47'' E

				Kermes oak (Quercus coccifera) and through highly degraded habitats of pubescent oak (Quercus pubescens), hornbeam (Carpinus orientalis) and Greek juniper (Juniperus excelsa).	
9	*Celtis australis*	European nettle tree	Южна копривка	It inhabits dry, rocky places, singly or in small groups in a variety of shrub and forest habitats.	41°41' 40.70'' N, 23°09' 40.35'' E
10	*Crocus olivieri*	Olivieri's crocus	Оливиеров минзухар	It is met on rocky and dry places, in shrub communities with Shrubby jasmine (*Jasminum fruticans),* Christ's thorn (*Paliurus spina-christi*), Almond-leaved pear, (*Pyrus amygdaliformis*), etc.	41°45' 19.13'' N, 23°08' 53.27'' E
11	*Fritillaria orientalis*	-	Източна ведрица	It grows on dry, grassy places, meadows, grasslands, bushy places, in the vicinities of forests, in the belt of xerothermic oak forests, often on limestone.	41°45' 20.88'' N, 23°08' 55.66'' E
12	*Jasminum fruticans*	Wild Jasmine	Храстовиден смин	It grows on dry, sunny foothill slopes, up to 500 m above sea level, in grassy, stony and rocky habitats, often with other shrubs and trees such as Greek juniper (*Juniperus excelsa*), prickly juniper (*Juniperus*	41°39' 09.29'' N, 23°09' 23.63'' E

				oxycedrus), phillyrea (*Phillyrea latifolia*), hairy oak (Quercus pubescens), Wild Asparagus (Asparagus acutifolius), Christ's thorn (Paliurus spina-christi), Coronilla emerus and others. It appears in communities with Kermes oak (Quercus coccifera) and in Balkans oak communities and sub-Mediterranean garrigues. It is a highly drought-resistant species.	
13	*Limodorum abortivum*	Violet Limodore	Недоразвит лимодорум	It is met in sparse forests and shrub habitats, in the oak forests belt.	41°34ˡ 08.28ˡˡ N, 23°07ˡ 18.50ˡˡ E
14	*Origanum vulgare subsp. hirtum*	Greek oregano	Бял риган	It inhabits bright, dry grasslands and scrublands, in communities of sparse oak forests. It occurs mainly in the herbaceous communities of Chrysopogon gryllus, Dichanthium ischaemum, Poa bulbosa.	41°38ˡ 40.98ˡˡ N, 23°01ˡ 57.02ˡˡ E
Amphibians and reptiles					
15	*Malpolon insignitus*	Eastern Montpellier Snake	Вдлъбнаточел смок	It inhabits dry, sunny, rocky or sandy terrain, slopes with shrubs and sparse low-stemmed forests.	41o48' 52.51 "N and 23 o09I'26.58 " E

16	*Bombina variegata*	Yellow-bellied Toad	Жълтокоремна бумка	It lives predominantly in water reservoirs, streams, small rivers and basins of fountains	41°46’38.46” N and 23 °09”14.97” E; 41.583N и 23.033E
17	*Elaphe quatuorlineata*	Four-lined Snake	Ивичест смок	It inhabits areas with barren forests and bushes. Often found near swamps and river banks.	41°48”52.51 "N and 23 o09’ 26.58 "E
18	*Telescopus fallax*	Cat Snake	Котешка змия	Lives in stony, rocky and sandy areas with sparse grass and shrubs and also in sparse forests.	41°48’ 52.5' "N and 23 °09’ 26.58 " E
19	*Zamenis situla*	Leopard Snake	Леопардов смок	Inhabits areas with barren forests and shrubs with stone piles, talus and others.	41°48’ 52.51 "N and 23 °09”26.58 "E
20	*Platyceps najadum*	Dahl's Whip Snake	Тънък стрелец	It is found in dry, stony or rocky habitats with sparse grass and shrubs, sparse forests. Commonly found in walls of ordinal stone, fortress walls and more.	41°3”29.32 "N and 23 °14’00.92 "E; 41°34’ 32.20 "N and 22 °59’36.35 "E
21	*Typhlops vermicularis*	Worm Snake	Червейница	Prefers areas with breakable, sandy soils covered with xerophytic vegetation - grasses and rare shrubs, sparse forests.	41°31’29.32 "N and23 °14’ 00.92 "E; 41.6N and 23.2E,
22	*Testudo graeca*	Spur-thighed Tortoise	Шипобедрена сухоземна костенурка	Most often found in low mountains and hilly areas overgrown with shrubs and sparse deciduous	41°31’29.32 "N and 23°14’ 00.92"E; 41o36’10.47 "N

				forests. Unlike Hermann's Tortoise, prefers open areas with herbaceous and shrub vegetation and is well adapted to live in dry, rocky habitats.	
23	*Triturus ivanbureschi*	Buresch's Crested Newt	Южен гребенест тритон	It occurs in a variety of habitats - rocky and stony ground, in deciduous forests.	From 150 to 1000м m asl in Malesh Mountain
Mammals					
24	*Lutra lutra*	European otter	Видра	Otters are found in a wide range of habitats in natural and man made water reservoirs.	41°36" 20.97 "N and 23 °12'30.91 "E;
25	*Canis lupus*	Gray wolf	Вълк	Wolves are found in a variety of habitats such as forests, tundra, taiga, plains and mountains.	41°31'29.32 "N and 23 °14' 00.92 "E; 41.583N and 23.033E
26	*Erinaceus concolor*	Southern white-breasted hedgehog	Източноевропейски таралеж	Eastern European hedgehog prefers deciduous trees and shrubs, rarely meadows. It also lives near places inhabited by people, such as farm yards, suburbs, gardens, parks, cemeteries.	41°31' 29.32 "N and 23°14'00.92"E; 41.583N and 23.033E
27	*Muscardinus*	Common dormouse	Лешников сънливец	Hazel dormouse is fond of different types of forests, combined with	41°45' 19.94'' N,

	avellanarius			various shrubs. More likely to be seen in the mountain areas, reaching the highest parts of the forests.	23 °06ˡ 46.59 ˡˡ E
28	*Vulpes vulpes*	Red fox	*Лисица*	Foxes are found in a wide range of habitats - open spaces, landscapes and different types of forests, including near settlements.	41o31I'29.32 "N and 23 o14I 00.92 "E; 41.583N and 23.033E
Birds					
29	*Gyps fulvus*	Griffon Vulture	**Белоглав лешояд**	Griffon Vulture nests in rocky valleys and rocky walls. It also occurs on steep earth embankments in river valleys and generally can be seen in areas from sea level to the subalpine zone. During its wanderings the species visits various habitats.	41o36I 20.97 " N and 23 o12I 30.91"E; 41°48I 52.51 "N and 23 o09I 26.58 "E
30	*Bubo bubo*	Eagle owl	Бухал	The owl inhabits gorges, ravines, dry eroded slopes, coasts of large dams. Outside the breeding period, the species performs wanderings and can occur in a variety of habitats.	41°36' 20.97 " N and 23 °12'30.91 "E; 41o48I 52.51 I I N and 23 o09I 26.58 I I E
31	*Strix aluco*	Tawny owl	Горска улулица	Tawny owl occurs mostly in old	41o31I 29.32 "N and 23

				deciduous forests, in river valleys with old trees and comes in larger parks and gardens in the villages.	o14I 00.92 "E; 41.617N and 23E
32	*Neophron percnopterus*	Egyptian Vulture	Египетски лешояд	Egyptian vultures inhabit different types of rocky habitats – gorges, ravines, isolated rocks near open areas, small settlements.	41° 45' 42.38" N 23° 09' 20.42" E
33	*Oenanthe hispanica*	Black-eared wheatear	Испанско каменарче	It nests on sunny, rocky slopes.	41o31I'29.32 "N and 23o14'00.92"E
34	*Sylvia melanocephala*	Sardinian Warbler	Малко черноглаво коприварче	It nests mainly in dry-loving shrubs.	41o49'04.98 "N 23 o04'52.87"E
35	*Emberiza cia*	Rock bunting	Сивоглава овесарка	It nests mainly in very rocky places.	41o49' 04.98"N 23 o04I'52.87"E
36	*Aquila chrysaetos*	Golden eagle	Скален орел	It is met in the Kresna gorge region.	41° 45' 42.38" N 23° 09' 20.42" E
37	*Sitta neumayer*	Rock Nuthatch	Скална зидарка	It inhabits Kresna gorge and rocky places on the Struma tributaries.	41° 45' 42.38" N 23° 09' 20.42" E
38	*Emberiza melanocephala*	Black-headed bunting	Черноглава овесарка	It nests mainly in shrubs and herbaceous communities, on sunny open hilly terrains.	41o36' 20.97 "N and23 o12' 30.91 "E; 41o48I 52.51 "N and 23 o09I 26.58 "E
Insects					

39	*Parnassius mnemosyne*	Clouded Apollo	Аполонова пеперуда	It is observed in the region of Krupnik village, Malesh mountain.	41.8500N, 23.11'67E
40	*Paranocaracris bulgaricus*	na	Български паранокаракрис	It is met in the region of Kresna gorge.	41°47'58"N , 23°09'20"E
41	*Rhyssa persuasoria*	Giant Ichneumon	Гигантска рисса	It is met mainly in coniferous forests.	41°48'59"N , 23°05'09"E
42	*Lucanus cervus*	Stag beetle	Бръмбър рогач, Голям еленов рогач	Old, mainly oak and mixed forests.	41°36' 20.97'' N, 23°12' 30.91'' E
43	*Cerambyx cerdo*	Great capricorn beetle	Голям сечко, Обикновен сечко	It is met in old, oak forests up to 600-800 m asl.	41°36' 42.90'' N, 23°04' 07.29'' E
44	*Saturnia pyri*	Giant Peacock Moth	Голямо нощно пауново око	It prefers region with well-developed shrub and tree vegetation, forest outskirts, gardens and orchards.	41°46' 11.41'' N, 23°09' 19.71'' E
45	*Vespa crabro*	European hornet	Европейски стършел	Deciduous forests, parks, old buildings, rock niches.	41°48' 56.80'' N, 23°05' 45.15'' E
46	*Calosoma sycophanta*	Forest caterpillar hunter	Златист гъсеничар	It prefers deciduous forests (mainly oak) but it can be seen in orchards.	41°49' 52.36'' N, 23°06' 28.56'' E
47	*Xylocopa violacea*	Violet carpenter bee	Обикновена ксилокопа, Синя ксилокопа	It is met in old buildings, wood and electric poles, hollow thick trees,	41°50' 22.85'' N, 23°06' 39.73'' E

				etc.	
48	*Scolopendra cingulata*	Mediterranean banded centipede	Средиземноморска сколопендра	It prefers dark and wet hidings, under stones, fallen trees, under the bark of old logs.	41°50' 43.27'' N, 23°08' 19.88'' E
49	*Rhynocoris iracundus*	Assassin bug	Червен редувий	It prefers meadows and pastures.	41°42' 02.66'' N, 23°09' 20.06'' E
50	*Euplagia quadripunctaria*	Jersey Tiger	Червена калиморфа	It prefers evergreen riparian forests, as well as narrow valleys.	41°47' 45.53'' N, 23°09' 29.02'' E

PART IV: CONCLUSION

The present research confirms the significant biodiversity of species in Malesh Mountain.

In the framework of the present research, there were established 33 types of habitats on the territory of the mountain. All of them fall under the protection of the Biodiversity Act of Bulgaria. Six of them have priority under the Habitats Directive 92/43/EEC of EU, according to which, priority types of habitats are those endangered from extinction, met on a territory for which the EU is responsible in order to protect their natural distribution. These priority types of natural habitats are marked in Annex I of the Directive with asterisk (*).

The main organism groups were systematized and described. These activities gave a ground to be made an analysis and to be taken measures for protection of biodiversity in the mountain.

The diversity of Malesh flora and fauna is the main resource which can help improving the social-economic conditions in the region. Development of sustainable tourist, educational and scientific activities in the region is a process with win-win benefits – improvement of the status of local communities and sustainable use of resources which will guarantee protection from globally changing environment projects.

PART V: BIBLIOGRAPHY

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ANNEXESS:

1. Excel sheets containing information on the analyzed variety of species inhabiting Maleshevska Mountain:
    - Annex 1: Invertibles;
    - Annex 2: Plants;
    - Annex 3: Vertibles;
    - Annex 4: Rare species;
    - Annex 5: Endangered species;
    - Annex 6: Endemic species;

2. Selected species of Malashevska Mountain.

3. GPS files of the analysed habitats and territories.

4. Pictures and multimedia content.