

## RESEARCH ARTICLE

**(Open Access)****Flora and its values in the massif of Sharr mountain-Macedonia**NASUF ABDII<sup>1</sup>, MURAT XHULAJ<sup>2</sup><sup>1</sup>State University of Tetovo, Department of Biology<sup>2</sup>University of Tirana, Department of Biology

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**Abstract**

Sharr Mountain presents a variety of geological forms, reliefs, rich hydro network, splicing of Continental factors and Mediterranean, creation of microclimates etc. which create conditions for development and housing of a value of a flora for Geno fond, as well as for creating cohabitation of interesting plant communities, and existence of diverse natural habitats.

The Massif of Sharr Mountain stands for a great variety of habitats, which represent the settlements for about 2,000 plant species. Or 2/3 of higher plants of Macedonia. In the Massif of Sharr Mountain are about 200 endemic and non-endemic species which make Sharr to stand as an important center of Balkan and European mountain endemism.

Sharr Mountain as a result of the great diversity of ecological, geomorphological, hydrologic, conditions, etc. stands out as a country with rich flora. "Flora of Macedonia reports 3250 species, of which about 80% of the species are found in the flora of Sharr Mountain.

In this paper are given data of the 4 years study (2013-20116) for "**Flora and its values in the Sharr Mountain Massif - Macedonia**".

The study is undertaken for the first time, in particular within the Flora of Macedonia, which will complement the study of the Flora in Sharr Mountain. The study is focused on 20 stations in the Shar Mountain. The collection of scientific material is made from early spring until late autumn of this year. During this study it was accumulated a rich material of flora associated with data about the site it was found, the time of collection, habitat, etc.

From the systematic-ecological evaluation of the flora of Sharr Mountain turns out that the flora of this mountain massif is rich with numerous species. The set material consists of 94 families, 411 genus and about 1045 species.

The analysis so far shows that the flora of Sharr Mountain massif represents a major scientific value of floristic composition, chorological, bio forms, endemic species, endangered relicts and economically valuable species.

**Keywords:** Sharr Mountain, Flora, endemic, relict, botanical evaluation.

**1. Introduction***General considerations.*

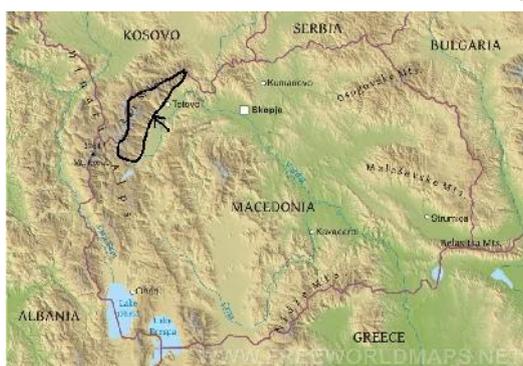
Sharr mountain massif represents a mountain range stretching from the southern part of Kosovo and northwestern Macedonia to northeastern Albania. This marks the tripartite border from the Maja e Sherupes (2,092 m). The mountain system is about 80 kilometers long and 10 to 20 kilometers wide. It includes a high number of peaks, among which is the highest one or Maja e Dielli (Titov Vrv) with approximately 2,747 m, Mali Turcin (2,702 m),

Luboten (2,498 m) and Bistra (approximately 2,641 m).

The Sharr Mountain is famous for its rugged terrain and mountain peaks. There are traces of glaciation in the form of frozen lakes and High Mountain. Sharr Mountain is connected with the Korab Mountain (2,764 m) to the southwest. Its average altitude is 2200 m.

Sharr Mountain represents the largest mountain massif in Macedonia and lies in the geographical coordinates: between 42 ° 4r43 "and 42 ° 16'34" and geographical north latitude between 20 34'51 "and 21 ° 16'00".

Unlike other mountains of the Balkan Peninsula that stretch northwest-southeast, the Sharr



Mountain massif stretches in northeast-southwest. This mountain massif lies in 80 km length and 10-20 km width [1].

**Figure 1:** Location of the Sharr Mountain in

R. Macedonian

### *Geology*

The geological formation of Sharr is combined of different rock age composition. A larger expansion is Paleozoic, then carbonate rocks of marble and serpentines and diabase formations, Neogene lake sediments and river alluvium in the lower parts present the younger geological formation.

Paleozoic formations have a greater expansion, and this makes the essential difference from other parts of the country of Kosovo. Paleozoic formations represented by phylitic and schist sercite, in the form of narrow band, are stretching from Maja e Bistres (2.640 m), continuing along Kosovo's border with Macedonia.

In geological terms (Menkovic, 1978), in creating of mountains in the province of Sharr are included loamy rocks, but there are also limestone appearance and magmatic rocks.

Seen from the aspect of geological composition, mainly are Paleozoic elements that dominate large quantities of lime and dolomite. Bistra Mountain from geological aspect is composed of rocks of Paleozoic old glacial landscape, especially circuses [2].

### *Soils (soil types)*

In the massif of Shara, on the slopes of the barren and wooded space they are formed different types of soils. The types of soil are present in this massive mountain respond to cemented soils, skeletal and regional ones. You can see these types of soils (1):

**Brown mountain soils** are prevalent in height 700-1600 m of Sharr Mountain, i.e., in herbal oak floor.

**Dun forest soils** lie on the mountain by brown soils, occupying second place from the surface and form a band at the height 1200-1700 m, i.e. almost herbal beech floor.

**Smonica soils** are scattered at different heights above sea level, unlike other types of soils. Their formation is of tertiary lacustrine clay, at an altitude of 600-800 meters.

**Mountain pastures soils** stretching over 1800-2000 m height, so for the most part placed in the Sharr Mountain range, especially from the peak of Lumbardhi (Bistrica) north to Rudok in south.

### *Climate*

The geographical position of Sharr Mountains in the northwest part of Macedonia, and the predominance of mountainous terrain approximately meridian direction of its disintegration, have defined two types of climate such as: a moderate continental climate and mountain climate. This mountain massif is located in the mid geographical width of the northern hemisphere. The proximity to the Adriatic Sea makes the Shar mountain massif lies beneath this sea climate impacts.

Mediterranean cold climate dominate in areas with an altitude of 550- 1,000 m., Whereas in areas with an altitude over 1,000 meters dominate mountain climate, or in areas with altitude of 1000-1700 m. is rural mountainous climate and in altitude over 1,700 m. is harsh mountain climate [3].

## **2. Material and Methods**

Study of diversities of plants in Sharr Mountain is based on classical methodology on ecological floristic- studies, classical methodologies of study of flora and vegetation.

Floristic research in the context of this study were conducted during the full vegetative period starting from early spring until late autumn. The research of flora is conducted through direct observations on the ground, photographing, collecting, herbarization and determination of plant species. On this occasion they were carefully kept notes on everything found in the field, it has been photographed and collected the material needed for further analysis. The collected material is dried and stored in herbarium, according to standard methods which are practiced in these cases.

Expeditions have been focused in four areas of time, 2013, 2014, 2015, 2016 in the early spring in order to observe the flora early, because this type of flora is less studied. According to the previously developed methodology there were done about 44 days expeditions in the field, the material is collected and defined herbal material. It was developed a preliminary list of flora and its spread.

**Expedition realized:**

1. May, June, July, August, 2013, 2014. 2015, 2016- Upper Pallçisht (1100 m.)

2. May, June, July, August, 2013, 2014. 2015, 2016-Lisec ( 1200 m.)

3. May, June, July, August, 2013, 2014. 2015, 2016-Sellcas baths (900-1000 m.)

4. May, June, July, August, 2013, 2014. 2015, 2016- Popova Shapka ( 1100-1550 m)

5. May, June, July, August, 2013, 2014. 2015, 2016-Leshnica (1400 m).

6. July, August, September, 2013, 2014. 2015, 2016-Titov vrv (2747 m.)

7. July, August, September, 2013, 2014. 2015, 2016- Luboten. (1600-2450 m)

8. July, August, September, 2013, 2014. 2015, 2016- Rogaçeva (2500-2700 m)

9. July, August, September, 2013, 2014. 2015, 2016- Jelacki (1890 m.).

10. July, August, September, 2013, 2014. 2015, 2016-Bogovinsko Ezero- Lake (1960m).

**3. Results and discussion**

Sharr Mountain is characterized by a very rich flora and it is estimated that there are about 2000 species from 3500 identified species in the Republic of Macedonia.

In editions of domestic and foreign authors, it is said that the in the flora of Sharr Mountain exist about 2000 species, while the number of species described in the publication "Flora of Macedonia" are described around 590 species. These variable number make the flora of Sharr Mountain to be explored in the future.

Our current scientific research so far, consists of around 1045 species, belonging to **421** genres and **94** families and about 100 species are to be determined. These data testify to a rich flora of the massif of Shar Mountain. (Table 1).

**Table. 1** Total number of taxonomy of Sharr Mountain.

<i>Division</i>	<i>Phylum</i>	<i>Classis</i>	<i>Familia</i>	<i>Genus</i>	<i>Species</i>
PTERIDOPHYTA	-	3	12	19	31
	GYMNOSPERMAE	1	3	5	12
SPERMATOPHYTA	ANGIOSPERMAE	DiCOTILEDONAE	71	333	876
		MONOCOTILEDONAE	8	64	122
			94	421	1045

*3.1. Biological spectrum (bioform)*

The analysis of data derived in our study results as follows:

<b>Ch</b> (Kamefite)	63 specie	6.14 %
<b>G</b> (Geofite)	122 specie	11.9 %
<b>H</b> (Hemikriptofite)	566 specie	55.2 %
<b>H/Ch</b> (Hemikriptofite/Geofite)	7 specie	0.68 %
<b>Hidro.</b> (Hidrofitite)	2 specie	0.002 %
<b>Liane</b> (Liane)	2 specie	0.002 %
<b>NPh</b> (Nanophanerofite)	20 specie	0.02 %
<b>Ph</b> (Fanerofite)	89 specie	8.6 %
<b>T</b> (Terofite)	144 specie	14 %
<b>T/H</b> Terofite/Hemikriptofite	10 specie	0.97%

### 3.2. Floristic element (chorological)

From the analysis of data realized in our study the result is as follows ":

From what can be seen above the flora of the mountain massif Sharr dominates the Floristic-Eurasian element with 131 species, followed by the Balkan element, 123 species, circumboreal 78 species, the European-Southern with 65 species, Eusiberiane with 54 species and Artic-alpine 43 species.

### 3.3. Endemic and Relict Species.

Sharr Mountain is one of the most important Balkan and European of endemism where endemic species grow, with rare relicts. In Shar Mountain there are about 200 endemic and sub-endemic taxonomy. Steno endemic Orofites (mountain species).

Sharr Mountain Flora is diverse and interesting. Here you can see plants from the glacial period (**glacial relicts**). Sharr Mountain stands for a variety of habitats such as those from multi-altitudes (up to 2747 m height), high cliffs, areas exposed to

strong winds, or places where the snow stays for a long time.

Besides **Artic-alpine** species in the Shar Mountain can be found types which according to their spread in the world, belong to the group of floristic elements of Middle Europe.

Within the rich flora with about 2,500 species, are distinguished 323 endemic plants which makes this territory as unique in the Balkans, perhaps even in Europe. Most important types of wood are endemic pine (*Pinus heldreichii*) and Arneni {*Pinus peuce*}, while with specific values are 20 species of plants stenoendem ike: Alexander barpesmi {*Achillea alexandris regis*}, Diecki bommulera (*Bornmullera dieckii*), Sharr Cerasti (*Cerastium neoscardicum* Sar), cloves of Sharr (*Dinathus scardicus*); Korab Draba (*Draba korabensis*); Potentila of doerfleri (*Potentila of doerfleri*), Sharr *Crocus scardicus*; Bar Sharr (*Verbascum scardicum*), Kokeza e Shmukerit (*Silene schmucheri*), Kemashna e Lubotenit (*Hieraceum naegelianum* supss. *Lubotenicum*), wall pepper (*Sedum flexousum*) [4].



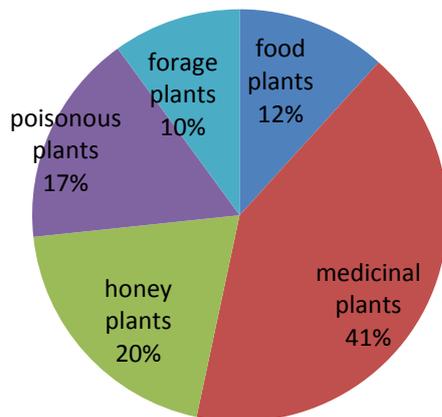
**Figure 2:** *Crocus scardic*; *Lilium albanicum*; *Nartheicum scardicus*



**Figure 3:** *Sempervivum kosanini*; *Salix retusa*; *Salix reticulata*

*Plants with economic value*

In the study area grow economically valuable species, which constitute 26% of the total flora of the park and are included in 182 genus and 66 families. They represent 6 different categories, such as food plants, medicinal plants, honey plants, poisonous plants and fodder plants. Their presentation is given schematically in Fig graph. 3:14.



**Figure 4:** Plants with economic value

As seen, the greatest number of species with economic value, evidenced until now in Sharr Mountain is medicinal species by 41%, honey species 20%, poisonous plants with 17% and nutritious species 12% [5].

**Conclusions**

In the Shar Mountain, as a result of our study, as well as from previous data, are found about 2,000 different plant taxonomy, among which 12 subspecies and 25 becoming varieties. They represent about 75% of the total flora of R.M., and rank Sharr Mountain as one of the areas with the richest and most diverse area with flora. We estimate that this number is even greater if we consider the very dense forests and steep slopes where our surveying and scarce or absent.

By analyzing and comparing our material so far with what is known to date about the Flora of Sharr Mountain, it is noted a significant number of endemic plants and 3 species: Endemic Mediterranean scardice, 12 Illyrian species, 6 relict species, Arctic boreal Relics 3. Endangered species of vascular flora of Shar 15 species, migratory species and relict from glacial period 17 species,

*Regarding the practical value*

In the study area grow economically valuable species, which constitute 26% of the total flora of the park and are included in 182 genus and 66 families. They represent 6 different categories like food plants 21 species, 75 species of medicinal plants, honey plants 36 species, 30 species of poisonous plants and 18 species of forage plants.

**References**

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