FLORA AND VEGETATION OF THE "MILKINI SKALI" NATURAL LANDMARK, STARA ZAGORA REGION

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ABSTRACT

222 species, classified in 161 genera and 54 families of the higher flora and vegetation are established as a result of the "Milkini Skali" Natural Landmark exploration. Plant diversity is categorized with respect to biological type, phyto-geographic belonging, and Nature preserving status. Common objective laws, connected with distribution of the flora and plant life in our country are found.

KEY WORDS: Sarnena Sredna Gora Mountain, higher plants, Nature preserving status.

INTRODUCTION

The accelerated economic and agricultural development of the recent times leads to a constantly increasing urbanization of the environment. In this connection the need of biological diversity conservation in all its aspects – from ensuring protection of individual vegetation and animal species to creation of a nation-wide system of protected territories – becomes stronger and stronger.

The biological diversity monitoring system, founded in our country reflects the necessity of long term surveillance. The need of foreign policy, adequate to the European and world trends, connected with protection of biological diversity makes our state regular participant in a number of global and all-European conventions. (Ramsar, Bern, Bonn, CITES).

A result of the observation of the primary objectives and priorities is creation of 6 forms of biological diversity protection according to IUCN, one of which is revelation and preservation of

Natural landmarks. In conformity with the Nature Preservation Law (1967) the Natural landmarks are objects of the inanimate Nature, which are exceptionally rare, possess imposing appearance and aesthetic beauty, or are of great significance for the science and culture.

In the forthcoming pre-categorization of the protected territories, the part representing habitat types of plant and animal species with Nature preserving status will receive a statute of protected places.

The purpose of the current study is a complete inventory of the flora and vegetation in the "Milkini Skali" Natural landmark, and creation of a data base in case of an impending inclusion in a network of protected territories.

MATERIALS AND METHODS

Subject of the present research are the flora and vegetation in the "Milkini Skali" rocky complex. The above mentioned Natural landmark is declared as such by № 3039 / 03. 10. 1974 Ordinance from the Ministry of Forests and Environment. The object is located on the land of the Kolena village, Stara Zagora Region. It is registered under № 105 in the Public Register as a rocky formation, connected with the legend of the courage display of a Bulgarian woman called Milka during the Osman invasion in 1368.

The total area of the rocky complex is 1,0 hectare. Its altitude is 500 meters, with South-West aspect, and a tilt of 27°.

The plant components, registered in the above mentioned Natural landmark, are a part of the vegetative diversity of the Sarnena Sredna Gora Mountain – an area insufficiently explored with regard to the floristics.

Records of the plant life of the Stara Zagora Region can be found in the publications of Gantchev (1965); Bondev (1991); and in the publications of Radanova (2003), Radanova, Pavlov (2003); Radanova, Ivanova (2004) in the recent times.

The study is extended with improved floristic analysis of the vegetation in the vicinities of the Natural landmark – the entire № 263 Section (according to the Forest Management Plan) with total area of 66,4 hectares, including western and south-western components. Altitude is varying from 500 to 750 meters and tilt from 8^0 to 29^0.

The soil is maroon-leached, sandy- clayey, loose, and strongly rocky, on slates.

Investigation comprises two vegetation periods – 2004-2006 years. The main approach while working on the terrains was covering the routes. During the vegetation periods the terrain was beaten twice a month.

Nomenclature of the taxa is in conformity with the works of Yordanov (ed.-in-chief) (1963 – 1989), Kozhuharov (ed)(1992), Petrova and all.(1999).

The floristic belonging of taxa is according to Stefanov (1943); Walter (1954); Вальтер (1982); Asyov and all.(2002).

RESULTS AND DISCUSSION

The floristic analysis established the presence of 222 species, classified in 54 families and 161 genera (**Table 1**).

Plant diversity in the "Milkini Skali" Natural landmark, calculated with respect to the total variety in Bulgaria is as follows: (**Table 2**).

Distribution of genera and species with regard to families is as follows: (**Table 3**).

The flora in the area is best represented by small families, which include 1 genus and 1-2 species (41), which are to be seen in the table. The families with the biggest number of genera are 10.(**Fig. 1**). The *Asteraceae* Family and *Poaceae* Family are with the greatest number of taxa with genus rank – 16 each.

The richest in species families are shown in **Table 4**. In **Table 5** they are compared to those with the greatest number of species in whole Bulgaria**.** There is a coincidence of the families in the following positions: 1, 2, 3, 5, 7 and 9. The rest of the positions are with mutually changed places.

29 species of trees and bushes, and 193 species of herbaceous plants are established on the territory of the "Milkini Skali" Natural landmark. Trees and bushes belong to 15 families and 23 genera, while the herbaceous plants to 39 families and 138 genera.

With regard to the biological type they are classified in 8 groups (**Fig. 2**). It is the perennials - 129 taxa (58 %), followed by the annuals – 51 taxa (23 %) that prevail in the vital forms spectrum. The group of the transitional biologic type – a-b, b-p, and f-l with its total part of 4,1 % is with the weakest representation.

Data of the flora distribution analyzed with respect to the biological type supports the results obtained for the Northern hemisphere moderate zone floras.

In conformity with Raunkier's classification vital forms spectrum assumes the following appearance (**Fig. 3**).

The predominant share of the hemicryptophytes – 135 taxa (60,8 %), followed by the terrophytes – 51 taxa (30 %) reveals objective laws established for the floras of the moderate zone.

The taxa registered belong to 30 phyto-geographic regions and provinces. (**Fig. 4**).

It is the thermophytes with Mediterranean origin that are prevalent, which sustains the common relationships, connected with the distribution of the flora and vegetation in the southern parts of our country (Stefanov, 1943).

15 species with Nature preserving status – 7 Balkan endemics and 8 Tertiary relicts are registered in the territory under surveillance (**Table 6**).

CONCLUSION

Exploration of plant diversity in the “Milkini Skali” Natural landmark supports the common trends in spreading of the flora and plant life in the southern parts of Bulgaria and reveals the general objective laws to the floras of the moderate zone.

The plant taxa registered can be used as a data base with respect to the flora and vegetation of the Sarnena Sredna Gora Mountain – a region insufficiently examined as regard to the floristics.

Determination of the Nature preserving species requires taking measures for their preservation.

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Table1. Taxonomic structure of the "Milkini Skali" countryside (in pcs)

Taxonomic category	**Families**	**Genera**	**Spicies**
Section *Polypodiophyta*	1	2	2
Section *Pinophyta*	1	1	2
Section *Magnolophyta*	52	158	218
Class *Magnoliopsida*	46	135	185
Class *Liliopsida*	6	23	33
Total	54	161	222

Table2. Relative participation of the plant diversity of the "Milkini Skali" Natural landmark with respect to Bulgarian flora (in %).

Sections	**Families**			**Genera**			**Species**		
	1	**2**	**%**	**1**	**2**	**%**	**1**	**2**	**%**
Polypodiophyta	15	1	6,6	20	2	10	44	2	4,5
Pinophyta	4	1	25	6	1	16,6	17	2	11,7
Magnolophyta	139	52	37,4	870	158	18,1	3823	218	5,7
Общо:	158	54	**34,1**	896	161	**17,9**	3884	222	**5,7**

Legend: 1- total number of taxa in Bulgaria; 2 – number of taxa in the "Milkini Skali" Natural landmark; % - the part of the taxa in the "Milkini Skali" Natural landmark with respect to the total number of taxa in Bulgaria

Table3. Distribution of species and genera in the “Milkini Skali” Natural landmark in families.

Family	**Genera**		**Species**	
	number	**% of the total number**	**number**	**% of the total number**
Acanthaceae	1	0,6	1	0,4
Aceraceae	1	0,6	2	0,9
Anacardiaceae	1	0,6	1	0,4
Apiaceae	6	3,7	8	3,6
Apocynaceae	1	0,6	2	0,9
Araceae	1	0,6	1	0,4
Araliaceae	1	0,6	1	0,4
Asphodelaceae	1	0,6	1	0,4
Asteraceae	16	3,7	26	11,7
Athyraceae	1	0,6	1	0,4
Betulaceae	3	1,7	3	1,4
Boraginaceae	5	3,1	5	2,2
Brassicaceae	5	3,1	9	4,0
Campanulaceae	1	0,6	3	1,4
Caprifoliaceae	1	0,6	1	0,4
Caryophyllaceae	8	5,0	12	5,4
Chenopodiaceae	2	1,2	3	1,4
Cistaceae	1	0,6	1	0,4
Convolvulaceae	1	0,6	2	0,9
Cornaceae	1	0,6	2	0,9
Cuscutaceae	1	0,6	1	0,4
Cyperaceae	1	0,6	4	1,8
Dioscoreaceae	1	0,6	1	0,4
Dipsacaceae	1	0,6	1	0,4
Euphorbiaceae	2	1,2	4	1,8
Fabaceae	13	8,0	22	9,9
Fagaceae	2	1,2	4	1,8
Hypericaceae	1	0,6	3	1,4
Iridaceae	1	0,6	1	0,4
Juncaceae	2	1,2	3	1,4
Lamiaceae	12	7,5	15	6,7
Liliaceae	2	1,2	3	1,4
Linaceae	1	0,6	4	1,8
Malvaceae	1	0,6	1	0,4
Oleaceae	3	1,7	3	1,4
Onagraceae	1	0,6	1	0,4
Orobanchaceae	1	0,6	1	0,4
Paeoniaceae	1	0,6	1	0,4

Family	Genera		Species	
	number	% of the total number	number	% of the total number
Papaveraceae	3	1,7	3	1,4
Pinaceae	1	0,6	2	0,9
Plumbaginaceae	1	0,6	1	0,4
Poaceae	16	9,9	21	9,4
Polygalaceae	1	0,6	1	0,4
Polypodiaceae	1	0,6	1	0,4
Primulaceae	2	1,2	2	0,9
Ranunculaceae	4	2,4	4	1,8
Resedaceae	1	0,6	1	0,4
Rhamnaceae	1	0,6	1	0,4
Rosaceae	8	5,0	10	4,5
Rubiaceae	3	1,7	4	1,8
Scrophulariaceae	6	3,7	10	4,5
Solanaceae	2	1,2	2	0,9
Ulmaceae	1	0,6	1	0,4
Urticaceae	2	1,2	2	0,9
Verbenaceae	1	0,6	1	0,4
Violaceae	1	0,6	1	0,4

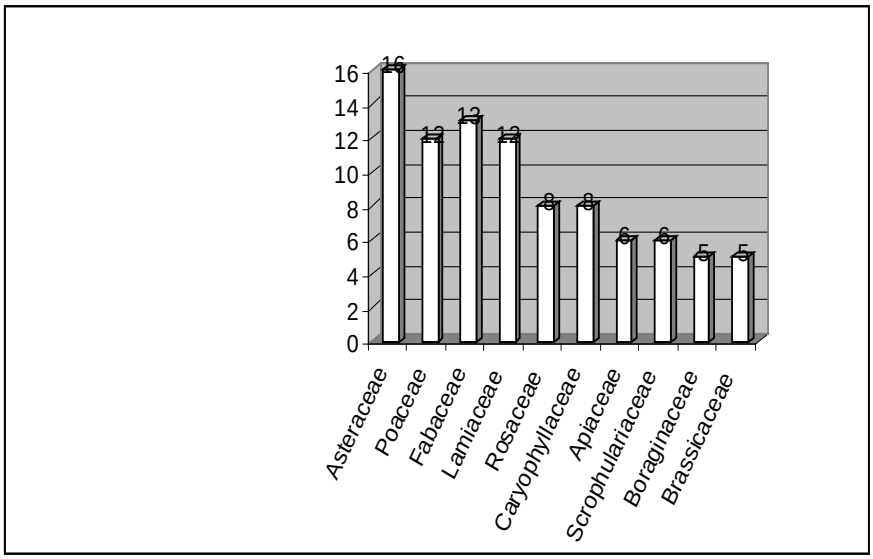


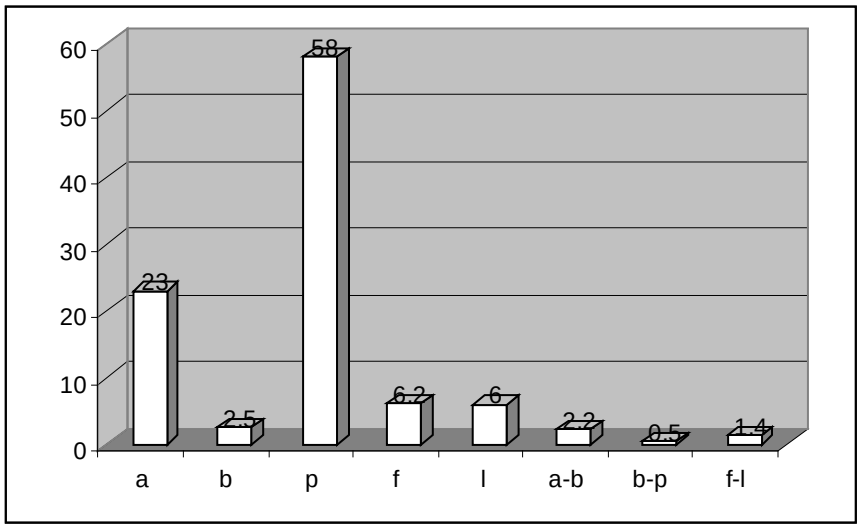
Fig.1. The richest in genera families (in %, more than 5).

The "Milkini Skali" Natural landmark			
№	Family	Number of species	% from the total number
1	***Asteracea***	**26**	**11,7**
2	***Fabaceae***	**22**	**9,9**
3	***Poaceae***	**21**	**9,4**
4	*Lamiaceae*	15	6,7
5	***Caryophyllaceae***	12	5,4
6	*Rosaceae*	10	4,5
7	***Scrophullariaceae***	10	4,5
8	*Brassicaceae*	9	4,0
9	***Apiaceae***	8	3,6
10	*Boraginaceae*	5	2,3

Table 4. The richest in species families in the "Milkini Skali" Natural landmark

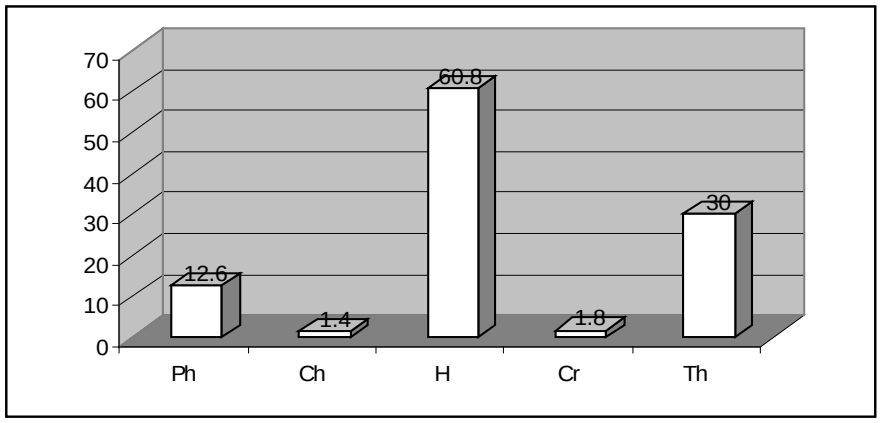
Bulgaria		
№	Family	% from the total number
1	***Asteracea***	**13,8**
2	***Fabaceae***	**7,9**
3	***Poaceae***	**7,6**
4	*Rosaceae*	5,9
5	***Caryophyllaceae***	5,4
6	*Brassicaceae*	5,1
7	***Scrophullariaceae***	4,6
8	*Lamiaceae*	4,0
9	***Apiaceae***	3,9
10	*Liliaceae*	3,2

Table 5. The richest in species families in Bulgaria



Legend: a – annual**;** b – biannual**;** p – perennial; l – ligneous
f – frutescent;

Fig. 2 Biologic spectrum of the flora in the "Milkini Skali" Natural landmark (in %)



Legend: Ph- Phanerophytes; Ch – Chamaephytes;
H – Hemicryptophytes; Cr – Cryptophytes; Th - Therpthytes

Fig.3 Distribution of the vital forms according to Raunkier (in %)

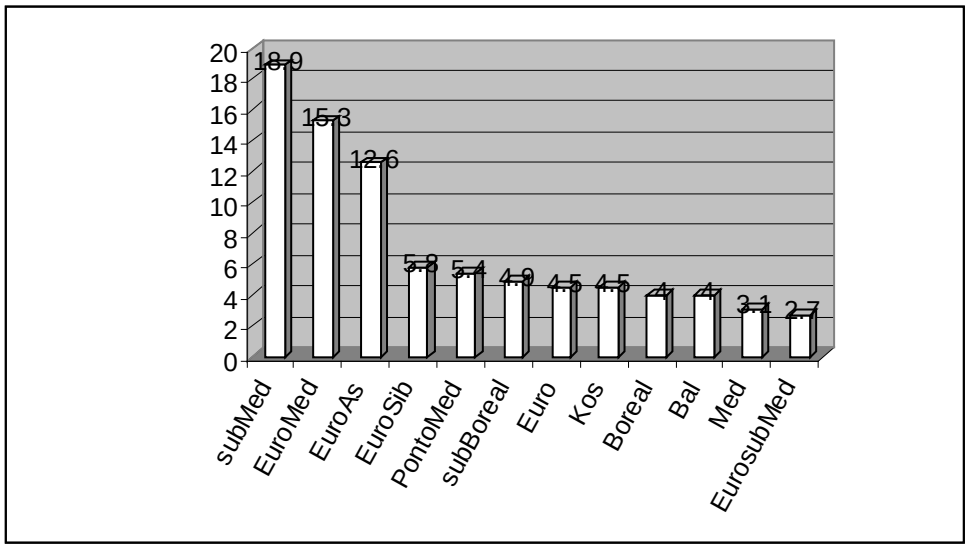


Fig.4 Distribution of the phyto-geographic elements in the "Milkini Skali" Natural landmark (in %)

Table6. Species with Nature preserving status in the "Milkini Skali" Natural landmark

Species	**Endemics and relicts**
Acanthus spinosus L.	BE.
Acer tataricum L.	tr
A. campestre L.	tr
Achillea clypeolata Sibth. et Sm.	BE
Carpinus orientalis Mill.	tr
Corylus avellana L.	tr
Cotinus coggygria Scop.	tr
Digitalis viridiflora Lindl.	BE.
Dianthus moesiacus Vis.	BE.
Hedera helix L.	tr
Hypericum degenni Bornm.	BE.
Linum thracicum (Griseb.) Deg.	BE.
Fraxinus ornus L.	tr
Syringa vulgaris L.	tr
Trifolium dalmaticum Viss.	BE.

Legend: tr – Tertiary relict; BE – Balkan endemic