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FOREST HABITATS IN OBORISHTE LOCALITY, SREDNA GORA MOUNTAIN

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Abstract: Oborishte locality is a historical site in Sredna Gora Mountain, where the First Great National Assembly took place in 1876 against the Ottoman slavery in Bulgaria. A memorial was built in the first half of the 20th century to mark this significant place. The territorial scope of the present investigation is concentrated at the middle stream of Panova River, which flows alongside down into Tundzha River. Being a site of historical significance, Oborishte locality attracts lots of tourists. It borders on the Nature 2000 site Sredna Gora according to both the Birds Directive and the Habitats Directive.

With its typical for Sredna Gora Mountain broadleaved forests Oborishte locality is rather attractive for tourists during the whole year. The vegetation cover around is presented by an interesting community complex of xerothermic oak and meso-xerothermic beech forests. **The present study aims to reveal their** floristic composition and to determine their classification status according to Braun-Blanquet phytosociological approach and habitat affiliation according to the EUNIS classification system.

The forests ecosystems around Oborishte locality are presented by communities of *Quercion confertae* and *Cephalanthero-Fagion* alliances forming community complexes – *Quercion confertae* forests taking the steeper and dry stands and *Cephalanthero-Fagion* forests taking the less steep stands. The floristic diversity of the forests consists of 34 plant species in total.

The present study is the basis of a further investigation of the condition of forest ecosystems in this locality.

INTRODUCTION

Habitat diversity is an important component of biodiversity. In general terms, the habitats are identified with plant communities. Sometimes due to the specific

orographic factors, natural habitats form complexes of syntaxonomically different vegetation units but of similar ecological characteristics.

The present study aims to reveal the floristic composition of the community complex of oak *(Quercus frainetto)* and beech *(Fagus sylvatica)* forests in Oborishte locality and to determine their classification status according to the Braun-Blanquet's phytosociological approach and habitat affiliation according to EUNIS classification system. Both vegetation types have been a subject of interest of classification and ecological studies according to the Braun-Blanquet's method in Bulgaria (Tzonev et al., 2006; Gogushev, 2009). Vegetation classification according to this method is a good basis of crosswalks to habitat classification systems (Rodwell et al., 2002). The most actual habitat classification which is being renewed and actualized constantly is that of EUNIS (European Union of Nature Information System) classification scheme (Davies et al., 2004; http://eunis.eea.europa.eu/habitats). An advantage of this scheme is the possibility to combine natural habitats, artificial plantations and anthropogenic structures, all as compatible mapping units.

MATERIALS AND METHODS

Object of investigation

Oborishte locality is a site of great historical significance where the First Great National Assembly in the fight against the Ottomans took place in 1876. It is located in Sredna Gora Mountain at the foothill of the peak Lisets (Fig. 1). In 1928 a memorial was built in memory of the victims from the April Uprising in 1876. Since 1977 the locality has been designated as a historical site in the State Gazette, Issue 52. In the present study Oborishte locality is treated as the whole area in the middle stream of Panova River which flows around this historic memorial. The investigated territory is about 5 ha area.

The locality spreads over the slopes of the gully of Panova River, which flows down into Tundzha River. Being a site of historical significance it attracts lots of tourists. Broadleaved forest communities form a characteristic appearance of the vegetation cover. They occupy slopes in the deep and deaf valley of Panova River, which is a tributary of Luda Yana River. Upstream the river some kilometers to the north of Oborishte is one of the biggest mine tailing in Bulgaria – that of mine "Asarel". As a result of the exploitation of the mine the landscape of the region is deeply indented and anthropogenically altered (Fig. 1). Panova River which flows through the locality has a specific orange color that is probably due to the pollutants from the mine.

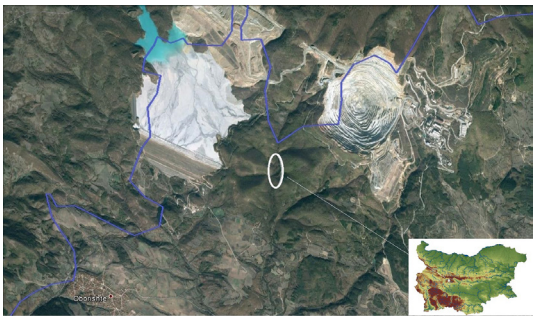

Figure 1. Oborishte locality in Sredna Gora Mountain, Valley of Panova River (white ellipse). Very close in the north direction (dark line) is the border of SCI "Sredna Gora", a Nature 2000 site

Oborishte locality belongs to Sashtinska Sredna Gora Mountain of Kraishtensko-Srednogorski physical geographical region (Velev et al., 2002). The relief of the region is mountain-valley with complex block-mosaic structure. The climate is temperate continental in the western parts to transitional continental in the eastern. Natural vegetation is mainly mesophytic and xerophytic forest (Drenovski et al., 2002). Soils in Oborishte locality are shallow *LEPTOSOLS – Lithosols and Rankers* (Ninov, 2002). Rock structure and geological composition are diverse. According to Alexiev (2002) rocks are mainly granitoids from the end of the Paleozoic and metamorphic complexes. The Geological Map of the People's Republic of Bulgaria (Iliev and Katskov, 1990) shows also the presence of quartz diorites, marls, argillites and clay limestones with a Mesozoic origin. This situation assumes difference in pH in different stands.

Oborishte locality is on the south border a NATURE 2000 site according to both Habitats Directive and Birds Directive. Of the investigated forest ecosystems are located at about 1 kilometer to the north of Oborishte hut.

Methods of investigation

The methods of the investigation follow the principles of the Braun-Blanquet's phytosociological school (Mueller-Dombois and Ellenberg, 1974; Kent and Coker, 1992). The terrain work in Oborishte locality was implemented during the vegetation season in 2015. Three relevés were made in representative stands of the prevailing vegetation – two of them in beech forests and one – in an oak forest. The determination of vascular plants follows Kozhuharov (1992) and Delipavlov and Cheshmedzhiev (2003). Geo-elements are indicated in accordance with Walter's system (Assyov and Petrova, 2012). The nomenclature of syntaxa is according to Rodwell et al. (2002) and Tzonev et al. (2009). EUNIS habitats are determined (http://eunis.eea.europa.eu/habitats) and their correspondence to the ecological net Nature 2000 is indicated (Biserkov et al., 2015).

RESULTS AND DISCUSSION

Forest ecosystems in Oborishte locality are presented by a complex of beech and oak habitats at about 700 m altitude. Oriental hornbeam (*Carpinus orientalis*) communities are also distributed near the hut, but they are excluded from the present study. The investigated beech and oak forests take neighboring stands. At the ridge parts of the slope forests are dominated by *Quercus frainetto* and the lowerings of the relief are taken by beech forests. Floristic diversity in the investigated forests is presented by 32 species in total, belonging to 27 genera and 15 families (Table 1). This list is complemented by the hypnum moss *Hypnum cupressiforme*.

Table 1. Phytocoenological data for the investigated forest ecosystems – relevés, species composition and geo-elements. Layer codes species: t – tree (high, middle, low); s – shrub (high, low); h – herbaceous; j – juvenile; m – moss.

Geo-element	Layer	**№ of relevé**	1	2	3
		Altitude, m	730	716	711
		Exposition	E	W	NW
		Slope, degrees	35	25	5
		Canopy, %	70	90	80
Eur	t (high)	*Quercus frainetto* Ten.	4	1	1
Eur	t (high)	*Fagus sylvatica* L.	+	5	3
Eur-subMed	t (high)	*Quercus cerris* L.			+
Adv	t (low)	*Robinia pseudoacacia* L.	1		
	t (low)	*Quercus frainetto* Ten.	1		
	t (low)	*Fagus sylvatica* L.	+	1	
Eur-subMed	t (high)	*Carpinus betulus* L.		3	
	t (low)	*Carpinus betulus* L.		+	2
Pont-Med	s (low)	*Chamaecytisus ciliatus* (Wahlenb.) Rothm.	1		
Eur-Sib	s (low)	*Genista tinctoria* L.	+		
Eur	h	*Luzula luzuloides (*Lam.) Dandy	2	3	+
Boreal	h	*Senecio nemorensis* L.	+		
Eur-As	h	*Dactylis glomerata* L.	+		+
Boreal	h	*Poa nemoralis* L.	+		+
Pann-Bal	h	*Galium pseudoaristatum* Schur	+	+	1
subMed	h	*Lathyrus laxiflorus* (Desf.) Kuntze	+		+
Eur-Sib	h	*Campanula persicifolia* L.	+		

Eur-As	h	*Trifolium medium* L.	+		
	j	*Quercus frainetto* Ten.	+		
Eur-As	h	*Buglossoides purpurocaerulaea* (L.) I. M. Johnst.	+		
Eur	h	*Melica uniflora* Retz.	+	+	+
Boreal	h	*Lerchenfeldia flexuosa* (L.) Schur	2	+	
	h	*Hieracium murrorum gr.*	+		
Med	h	*Mycelis muralis* (L.) Dumort.		+	+
subMed	h	*Mercurialis perennis* L.		+	
Euro-Sib	h	*Polygonatum odoratum* (Mill.) Druce		+	
subMed	h	*Cephalathera damasonium* (Mill.) Druce		+	1
subMed-CAs	h	*Cruciata glabra* (L.) Ehrend.		+	+
Eur-Med	h	*Lathyrus venetus* (Mill.) Wohlf.			1
Eur-Med	h	*Lathyrus niger* (L.) Bernh.	1		
Eur-OT	t (low)	*Acer campestre* L.			+
subBoreal	h	*Geranium robertianum* L.			+
Eur-As	h	*Vicia cracca* L.			+
Eur-As	h	*Neottia nidus-avis* (L.) Rich.		+	+
	m	*Hypnum cupressiforme* Hedw			+
Eur	h	*Euphorbia amygdaloides* L.	+	+	
Eur-subMed	h	*Helleborus odorus* Waldst. et Kit.	+	+	

The investigated beech ecosystem is presented by 24 species. It is inverse comparing to the xerothermic oak forest and occupies the shadier and humid low places. The canopy of the forest in both stands is high – 80-90%. The dominant species is *Fagus sylvatica.* There are no shrub species and shrub layer is presented only by single young trees. Percentage cover of the herbaceous layer is low – about 30%. It is presented by typical species from the beech communities – *Poa nemoralis, Mycelis muralis, Mercurialis perennis, Geranium robertianum,* the saprophytic orchid *Neottia nidus-avis,* the white helleborine *Cephalanthera damasonium* and others. There are also character taxa for the alliance *Quercion confertae* Horvat 1949 like *Lathyrus laxiflorus, L. venetus* in the herbaceous layer and *Quercus frainetto, Q. cerris* – in the tree layer. Syntaxonomically beech communities in Oborishte locality belong to ass. *Galio pseudaristati-Fagetum sylvaticae* Tzonev et al. 2006 of the alliance *Cephalanthero-Fagion* Tüxen 1955 (Tzonev et al., 2006). These xeromesothermic forests are affiliated to 11G1. Limestone forests of Common beech (*Fagus sylvatica*) (Dimitrov, 2015). In the ecological net NATURE 2000 this is habitat 9150 Medio-European limestone beech forests of the *Cephalanthero-Fagion.*

The oak forest takes a stand of a little higher altitude and an eastern

exposition. The canopy of the forest is about 70% and this makes it warmer and lighter in comparison to the beech forests. Tree layer is presented by *Quercus frainetto*, but *Fagus sylvatica* also participates with a low abundance. Shrub layer is presented mostly by young beech and oak trees with 30% of coverage. Low shrubs (chamaephytes) as *Chamaecytisus ciliatus* and *Genista tinctoria* take part in the species composition. Herbaceous layer is presented by 13 species typical for xerothermic oak forests – *Poa nemoralis, Galium pseudoaristatum, Euphorbia amygdaloides, Lathyrus laxiflorus* and others. The acidophilic *Lerchenfeldia flexuosa*, which is not so typical for this habitat participates with a higher abundance (see Table 1).

This ecosystem has a rather limited and fragmented distribution. It is surrounded by a pasture with single *Quercus cerris* trees. The path and the monument contribute to its fragmentation and explain to some extend the relatively low species diversity. *Quercus frainetto* dominated forests syntaxonomically belong to the alliance *Quercion confertae* Horvat 1949 (Gogushev, 2009). On the basis of species composition, ecological and structural characteristics of the forests and geographical distribution the described oak community is affiliated to habitat 16G1.Thracian mixed thermophilic oak forests (Tzonev et al., 2015). The habitat is distributed in the hilly plains and low mountains in South Bulgaria including the southern slopes of the Balkan Range and Sredna Gora Mountain. It is endangered, according to the Red Data Book of the republic of Bulgaria, Vol III. In the ecological net Nature 2000 these forests are affiliated to habitat 91M0 Pannonian-Balkanic Turkey oak-sessile oak forests.

A map of the habitats in Oborishte locality is shown in fig. 2. It is seen from the figure that the Medio-European limestone beech forests (h9150) take a larger area – about 3.5 ha, and the Pannonian-Balkanic Turkey oak-sessile oak forests (h91M0) take a smaller part on the ridges of the slopes – less than 1.5 ha.

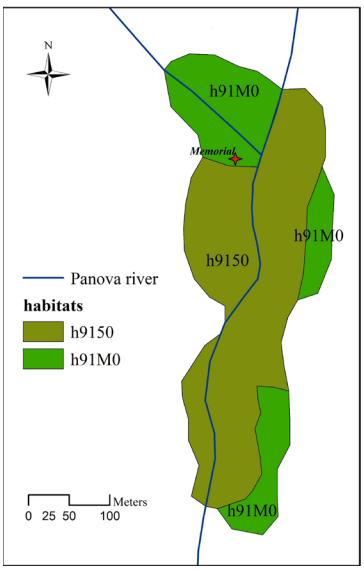

Figure 2.
A map of the forest habitats in Oborishte locality

The investigated oak and beech habitats show typical characteristics of continental oak and beech forests. This is obvious from the phytogeographical elements (Table 1). Elements of the European types prevail in both habitats (European, Eur-Asian, Eur-Mediterranean, Eur-Siberian, Eur-Oriental-Turanian). The presence of elements of the Mediterranean type (Mediterranean, sub-Mediterranean, Pontic-Mediterranean and Mediterranean-Central-Asian) and from the Boreal type (Boreal and sub-Boreal) demonstrates their similarity to the Mediterranean thermophilic forests and mountain flora. The only one element from the Balkan type *Galium pseudoaristatum* presented in both habitats is a characteristic species of the beech association – *Galio pseudoaristati-Fagetum sylvaticae.*

Correspondence between syntaxonomy of the investigated forest communities and their habitat affiliation is shown in Table 2.

Table 2. Syntaxonomical status and habitat affiliation of the investigated oak and beech forests in Oborishte locality.

Syntaxon	EUNIS habitat	Nature 2000 habitat	Threat category	Approximate area, ha
Quercion confertae	16G1.Thracian mixed thermophilic oak forests	91M0 Pannonian-Balkanic Turkey oak-sessile oak forests	Endangered	1.35
*Cephalanthero-Fagion (*ass. *Galio pseudoaristati-Fagetum sylvaticae)*	11G1.Limestone forests of Common beech (*Fagus sylvatica*)	9150 Medio-European limestone beech forests of the *Cephalanthero-Fagion*	Nearly threatened	3.6

CONCLUSIONS

Forest vegetation in Oborishte locality is presented by Thracian oak forests (*Quercus frainetto* forests) and Limestone forests of common beech (*Fagus sylvatica* forests). Species composition and the ecological specifics of the habitats show their marked thermophilic character. The diversity of phytogeographical elements distinguishes the specific geographic position of these habitats and proves their difference from similar communities in Central and Southern Europe. Both habitats make a characteristic complex in which beech forests take inverse position to the xerothermic oak forests occupying the shady lower places and ravines. This habitat complex is fragmented by the existing path and monument. The nearness of a hut downwards and a mine tailing upwards the stream raises the question of a future sustainable management of the territory whose main

function will be tourism and recreation. Future studies of the condition of the forest ecosystems in the region and clarification of the pollutants in the river and their impact on the flora and vegetation are necessary for the implementation of any particular management and conservation measures.

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