

Monitoring of natural habitats in the reserves in the Natura 2000 protected site „Strandzha“ (BG0001007)

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Abstract: The total area of the Natura 2000 protected site “Strandzha” (BG0001007) is 153541,2 ha. Plant associations and complexes of other syntaxa were mapped in the reserves “Uzunbudzhak”, “Vitanovo”, “Tisovitsa”, “Sredoka” and “Silkosa”, which belong to the territory of this protected site. Plant associations connected with natural habitats 91S0* Western Pontic beech forests (*Fagus orientalis*) and 91M0 Pannonian-Balkan turkey oak-sessile oak forests were selected for monitoring since they were included in the EEC Directive 92/43, the Bulgarian Biodiversity Act and the Red Data Book of the Republic of Bulgaria with Endangered category. A monitoring programme with specific indicators has been developed, which allows assessment of the habitats in regard of their status and future prospects (threats and influences) with special attention to their Favorable conservation status (FCS).

Keywords: plant association, reserve, Silkosa, Sredoka, Tisovitsa, Uzunbudzhak, Vitanovo

Introduction

The total area of the Natura 2000 protected site “Strandzha” (BG0001007) is 153541,2 ha, with predominant land part (75.5%) situated in the Strandzha Mt and 24.5% marine area, represented by parts of the Black Sea aquatory. The vegetation of the land part belongs to the biome of deciduous forests of the temperate climate. Typical for the forests of Strandzha is the development of Euxinian and sub-Euxinian species as edificators and dominants. Very often laurel shrubs, such as the Pontic rhododendron (*Rhododendron ponticum* L.), occur in the mesophilic forests of the Eastern beech (*Fagus orientalis* Lipsky). The protected area is characterized by Mediterranean and sub-Mediterranean plant community types - thermophilic oak forests with a woodland undergrowth of evergreen sclerophyll shrubs, xerothermic grassland on the coast and in the western part of the area, and psammophyte vegetation along the costal sands.

The reserves „Uzunbudzhak“ („Lopushna“), „Vitanovo“, „Tisovitsa“, „Sredoka“ and „Silkosa“ are situated within the borders of the studied protected area, where 33 natural habitats are subject

of protection. Studies on different plants, vegetation and habitats have been conducted in the whole territory of the Strandzha mountain, or in its parts and in the abovementioned reserves in particular (STEFANOV 1924, VELCHEV et al. 1983, BONDEV 1991, DRAGANOV et al. 1992, PATRONOV 1995, MESHINEV et al. 1996, PATRONOV & RADKOV 1998, TZONEV et al. 2006, GUSSEV & TZONEV 2014, BISERKOV 2015).

Nowadays, in relation to the implementation of the project „Mapping and determination of the conservation status of natural habitats and species – Phase I“ of the Ministry of Environment and Water of Bulgaria, the habitats 91S0* Western Pontic beech forests (*Fagus orientalis*) and 91M0 Pannonian-Balkan turkey oak-sessile oak forests were mapped in all abovementioned reserves. The paper presents the results of the recent study aimed on the choosing and proposal of representative sections of these habitats for monitoring the changes in their composition, structure and functioning with the idea to provide an informational basis for applying of effective policy for their conservation.

Material and Methods

The present work was conducted in the frame of preparation of management plans of all above mentioned reserves. There the following forest habitats were described:

„Uzunbudzhak“ reserve: Six types listed in the Annex 1 of the Biodiversity Act (BDA), namely 9180* *Tilio-Acerion* forests of screes and ravines, 91AA* Eastern white oak woods, 91E0* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Pandion*, *Alnion incanae*, *Salicion albae*), 91G0* Pannonic woods with *Quercus petraea* and *Carpinus betulus*, 91M0 Pannonian-Balkan turkey oak-sessile oak forests, 91S0* Western Pontic beech forests (*Fagus orientalis*).

Reserves „Vitanovo“, „Tisovitsa“, „Sredoka“ and „Silkosia“: Five types listed in the Annex 1 of the BDA, namely 9180* *Tilio-Acerion* forests of screes and ravines, 91E0* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Pandion*, *Alnion incanae*, *Salicion albae*), 91G0* Pannonic woods with *Quercus petraea* and *Carpinus betulus*, 91M0 Pannonian-Balkan turkey oak-sessile oak forests, 91S0* Western Pontic beech forests (*Fagus orientalis*).

The classification of the forest vegetation was based on dominant and floristic methods. According to the dominant method, plant communities were referred to the following syntaxonomic categories: vegetation association and group of associations. According to the floristic method, syntaxa of different ranks, which were related to the natural habitats included in Annex 1 of the BDA, were used. Depending on the spatial differentiation of the specified classification units, specific legends were developed to map the vegetation.

When selecting habitats and plant communities, the following criteria were considered for monitoring: 1) high conservation significance; 2) presence of sufficiently representative indicators of environmental changes; 3) presence of an environmental risk for communities and habitats; 4) both habitats and plant communities have to be typical for all reserves and have been subject of mapping under the project „Mapping and determination of the conservation status of natural habitats and species – Phase I“. When selecting indicators and monitoring criteria, the focus was turned on the structure and functioning of the selected habitats. In terms of the structure, the observations were focused on the phytocoenoses and soils. Indicators related to succession changes and productivity, were used to assess the functioning of the habitats.

Results

Based on the results of the plant diversity study for each reserve, a vegetation map legend was developed. On the same basis, the associations and complexes of other syntaxa were also mapped. The habitats 91S0* Western Pontic beech forests (*Fagus orientalis*) and 91M0 Pannonian-Balkan turkey oak-sessile oak forests and related with them plant associations were selected as monitoring objects according to the perceived indicators and criteria.

Legends of the vegetation maps for each certain reserve included the following mapping units:

„Uzunbudzhak“ reserve: Assoc. *Fagetum orientalis*, Assoc. *Fagus orientalis* + *Quercus polycarpa*, Assoc. *Fagus orientalis* + *Quercus polycarpa* + *Quercus cerris* + *Quercus frainetto*, Assoc. *Fagus orientalis* + *Carpinus betulus* + *Quercus polycarpa* + *Tilia* ssp., Assoc. *Quercetum polycarpae*, Assoc. *Quercus polycarpa* + *Quercus frainetto*, Assoc. *Quercus polycarpa* + *Quercus frainetto* + *Quercus cerris* + *Fagus orientalis*, Assoc. *Quercus polycarpa* + *Quercus frainetto* + *Quercus cerris*, Assoc. *Quercus polycarpa* + *Fraxinus ornus*, Assoc. *Quercus polycarpa* + *Tilia rubra*, Assoc. *Quercetum frainetti*, Assoc. *Quercus frainetto* + *Quercus cerris* + *Quercus polycarpa*, Assoc. *Quercus frainetto* + *Quercus cerris* + *Quercus polycarpa* + *Fagus orientalis*, Assoc. *Carpinus betulus* + *Fagus orientalis* + *Quercus polycarpa*, Assoc. *Carpinus betulus* + *Quercus cerris* + *Acer campastre*, Assoc. *Fraxinetum orni*, *Fraxinus ornus* + *Carpinus orientalis* + *Acer campestre*, Assoc. *Carpinus orientalis* + *Fraxinus ornus* + *Quercus cerris*, Assoc. *Quercus cerris* + *Carpinus betulus* + *Fagus orientalis*, Assoc. *Quercetum cerris*, complexes of sclerophilous shrubs with predominance of *Phillyrea latifolia* L., complexes of mesophilic and hygrophilous grasslands and of flooded and dense forests, complexes of xerophytic grasslands of the *Festuco-Bromeata* class, vegetation of mesotrophic surface water habitats, secondary vegetation of anthropogenic habitats, rock vegetation communities of the *Asplenietea trichomanis* class, complexes of derived plant communities of ericoid habitats and mixed oak and beech forests.

In the habitat 91S0* Western Pontic beech forests (*Fagus orientalis*) four associations were mapped: Assoc. *Fagetum orientalis*, Assoc. *Fagus orientalis* + *Quercus polycarpa*, Assoc. *Fagus orientalis* + *Quercus polycarpa* + *Quercus cerris* + *Quercus frainetto*, Assoc. *Fagus orientalis* + *Carpinus betulus* + *Quercus polycarpa* + *Tilia* ssp. The species of Pontic rhododendron, Common

laurel (*Prunus laurocerasus* L.) and Colchic holly (*Ilex colchica* Pojark.) participated in the shrub-grass synusia of the communities in various quantitative proportions.

In habitat 91M0 Pannonian-Balkan turkey oak-sessile oak forests the following associations were mapped: *Quercetum polycarpae*, *Quercus polycarpa* + *Quercus frainetto*, *Quercus polycarpa* + *Quercus frainetto* + *Quercus cerris* + *Fagus orientalis*, *Quercus polycarpa* + *Quercus frainetto* + *Quercus cerris*, *Quercus polycarpa* + *Fraxinus ornus* and Assoc. *Quercus polycarpa* + *Tilia rubra*.

The species of Pontic rhododendron, Pontic daphne (*Daphne pontica* L.), Common heather (*Calluna vulgaris* (L.) Hull), Jerusalem star (*Hypericum calycinum* L.) and Bishop's hat (*Epimedium pubigerum* L.) participated in the shrub-grass synusia of the communities with predominance of Oriental durmast oak (Oriental durmast - *Quercus petraea* subsp. *polycarpa* (Schur) Soo, Syn. *Q. polycarpa* Schur) and Hungarian oak (*Quercus frainetto* Ten.).

In the communities of Oriental durmast, Hungarian oak and Turkey oak (*Quercus cerris* L.) woodland undergrowth of summer-green shrubs Common medlar (*Mespilus germanica* L.), Common hawthorn (*Crataegus monogyna* Jacq.), Black hawthorn (*C. pentagyna* Waldst. & Kit. ex Willd), Oriental hornbeam (*Carpinus orientalis* L.), etc. was recorded.

„**Vitanovo**“ reserve: Assoc. *Fagetum orientalis*, Assoc. *Fagus orientalis* + *Quercus polycarpa*, Assoc. *Fagus orientalis* + *Quercus polycarpa* + *Carpinus betulus*, Assoc. *Fagus orientalis* + *Quercus polycarpa* + *Quercus cerris* + *Carpinus betulus*, Assoc. *Fagus orientalis* + *Quercus polycarpa* + *Quercus cerris* + *Quercus frainetto*, *Quercetum polycarpae*, Assoc. *Quercus polycarpa* + *Fagus orientalis*, Assoc. *Quercus polycarpa* + *Quercus frainetto* + *Quercus cerris* + *Fagus orientalis*, Assoc. *Quercus polycarpa* + *Carpinus betulus* + *Quercus cerris*, Assoc. *Quercus polycarpa* + *Fagus orientalis* + *Carpinus betulus*, Assoc. *Carpinus betulus* + *Fagus orientalis* + *Quercus polycarpa*, Assoc. *Quercetum frainetto* + *Quercus polycarpa* + *Tilia tomentosa*, Assoc. *Quercetum frainetto* + *Quercus cerris* + *Carpinus orientalis*, Assoc. *Pinus nigra*, Assoc. *Pinus nigra* + *Pinus sylvestris* + *Quercus polycarpa*, Assoc. *Pinus nigra* + *Pinus sylvestris* + *Carpinus betulus* + *Quercus frainetto*, Assoc. *Pinus sylvestris*, Assoc. *Pseudotsuga mensiesii*, Complex of *Festuco-Brometalia* and *Thero-Brachypodietea*.

In habitat 91S0* Western Pontic beech forests (*Fagus orientalis*) the following associations were

mapped: Assoc. *Fagetum orientalis*, Assoc. *Fagus orientalis* + *Quercus polycarpa*, Assoc. *Fagus orientalis* + *Quercus polycarpa* + *Carpinus betulus*, Assoc. *Fagus orientalis* + *Quercus polycarpa* + *Quercus cerris* + *Carpinus betulus* and Assoc. *Fagus orientalis* + *Quercus polycarpa* + *Quercus cerris* + *Quercus frainetto*. The species of Pontic rhododendron, Common laurel and Colchic holly participated in the shrub-grass synusia.

In habitat 91M0 Pannonian-Balkan turkey oak-sessile oak forests the following associations were mapped: Assoc. *Fagetum orientalis*, Assoc. *Fagus orientalis* + *Quercus polycarpa*, Assoc. *Fagus orientalis* + *Quercus polycarpa* + *Carpinus betulus* and Assoc. *Fagus orientalis* + *Quercus polycarpa* + *Quercus cerris* + *Quercus frainetto*. The species of Pontic rhododendron, Pontic daphne, Common heather, Jerusalem star, Bishop's hat and summer-green shrubs Common medlar, Common hawthorn, Black hawthorn, Oriental hornbeam, etc. participated in the shrub-grass synusia in various quantitative proportions.

„**Tisovitsa**“ reserve: Assoc. *Fagetum orientalis*, Assoc. *Fagus orientalis* + *Quercus polycarpa*, Assoc. *Fagus orientalis* + *Quercus polycarpa* + *Quercus frainetto*, Assoc. *Fagus orientalis* + *Quercus polycarpa* + *Carpinus betulus*, Assoc. *Fagus orientalis* + *Quercus frainetto* + *Quercus cerris* + *Carpinus betulus*, Assoc. *Quercetum polycarpae*, Assoc. *Quercus polycarpa* + *Fagus orientalis*, Assoc. *Quercus polycarpa* + *Quercus frainetto*, Assoc. *Quercus polycarpa* + *Quercus frainetto* + *Quercus cerris*, Assoc. *Quercus polycarpa* + *Quercus frainetto* + *Fagus orientalis*, Assoc. *Quercetum frainetti*, Assoc. *Quercetum frainetto* + *Quercus polycarpa*, Assoc. *Quercus frainetto* + *Quercus polycarpa* + *Fagus orientalis* + *Carpinus betulus*, Assoc. *Quercus frainetto* + *Robinia pseudoacacia*, Assoc. *Quercus frainetto* + *Quercus cerris* + *Quercus polycarpa* + *Pinus sylvestris*, Assoc. *Quercus frainetto* + *Quercus cerris* + *Quercus polycarpa* + *Carpinus orientalis*, Assoc. *Carpinus betulus* + *Fagus orientalis*, Assoc. *Carpinus orientalis* + *Fraxinus ornus* + *Quercus cerris*, Assoc. *Quercus cerris* + *Quercus polycarpa* + *Quercus frainetto* + *Carpinus betulus*, Assoc. *Pinus nigra* + *Quercus polycarpa* + *Quercus frainetto*, Assoc. *Pinus nigra* + *Quercus frainetto*, Assoc. *Pinus nigra* + *Carpinus betulus*, Assoc. *Pinus sylvestris*, Complex of *Festuco-Brometalia* and *Thero-Brachypodietea*.

In habitat 91S0* Western Pontic beech forests (*Fagus orientalis*) the following associations were mapped: Assoc. *Fagetum orientalis*, Assoc. *Fagus orientalis* + *Quercus polycarpa*, Assoc. *Fagus*

orientalis + *Quercus polycarpa* + *Quercus frainetto*, Assoc. *Fagus orientalis* + *Quercus polycarpa* + *Carpinus betulus* and Assoc. *Fagus orientalis* + *Quercus frainetto* + *Quercus cerris* + *Carpinus betulus*. Pontic rhododendron, Common laurel and Colchic holly participated as a woodland undergrowth.

In habitat 91M0 Pannonian-Balkan turkey oak-sessile oak forests the following associations were mapped: Assoc. *Quercetum polycarpae*, Assoc. *Quercus polycarpa* + *Fagus orientalis*, Assoc. *Quercus polycarpa* + *Quercus frainetto*, Assoc. *Quercus polycarpa* + *Quercus frainetto* + *Quercus cerris*, Assoc. *Quercus polycarpa* + *Quercus frainetto* + *Fagus orientalis*. The species of Pontic rhododendron, Pontic daphne, Common heather, Jerusalem star, Bishop's hat and summer-green shrubs Common medlar, Common hawthorn, Black hawthorn, Oriental hornbeam, etc. participated in the shrub-grass synusia.

„Silkosa“ reserve: Assoc. *Fagetum orientalis*, Assoc. *Fagus orientalis* + *Quercus polycarpa*, Assoc. *Fagus orientalis* + *Quercus polycarpa*, + *Quercus frainetto*, Assoc. *Quercus polycarpa* + *Fagus orientalis* + *Quercus frainetto*, Assoc. *Quercetum polycarpae*, Assoc. *Quercus polycarpa* + *Quercus frainetto* + *Quercus cerris*, Assoc. *Quercetum frainetti*, Assoc. *Quercus frainetto* + *Quercus polycarpa*, Assoc. *Quercus cerris* + *Quercus frainetto*, complexes of shrub-grass communities of (*Fruticeto-Herbosa*), Forest crops of *Pinus nigra* J. F. Arnold and *Pinus sylvestris* L.

In habitat 91S0* Western Pontic beech forests (*Fagus orientalis*) the following associations were mapped: Assoc. *Quercetum orientalis*, Assoc. *Fagus orientalis* + *Quercus polycarpa* and Assoc. *Fagus orientalis* + *Quercus polycarpa* + *Quercus frainetto*. The species of Pontic rhododendron, Common laurel and Colchic holly participated in the shrub-grass synusia.

In habitat 91M0 Pannonian-Balkan turkey oak-sessile oak forests are mapped the following associations: Assoc. *Quercus polycarpa* + *Fagus orientalis* + *Quercus frainetto*, Assoc. *Quercetum polycarpae* and Assoc. *Quercus polycarpa* + *Quercus frainetto* + *Quercus cerris*. The species of Pontic rhododendron, Pontic daphne, Common heather, Jerusalem star, Bishop's hat and summer-green shrubs Common medlar, Common hawthorn, Black hawthorn, Oriental hornbeam, etc. participated in the shrub-grass synusia in various quantitative proportions.

„Sredoka“ reserve: Assoc. *Fagetum orientalis*, Assoc. *Fagus orientalis* + *Quercus Polycarpa*,

Assoc. *Fagus orientalis* + *Quercus polycarpa* + *Quercus frainetto*, Assoc. *Fagus orientalis* + *Carpinus betulus* + *Quercus frainetto* + *Quercus polycarpa*, Assoc. *Carpinus betulus* + *Fagus orientalis*, Assoc. *Carpinus betulus* + *Quercus cerris* + *Quercus polycarpa* + *Quercus frainetto*, Assoc. *Quercetum polycarpae*, Assoc. *Quercus polycarpa* + *Fagus orientalis*, Assoc. *Quercus polycarpa* + *Quercus frainetto*, Assoc. *Quercus polycarpa* + *Quercus frainetto* + *Fagus orientalis* + *Carpinus betulus*, Assoc. *Quercus polycarpa* + *Quercus frainetto* + *Quercus cerris* + *Carpinus betulus*, Assoc. *Quercus polycarpa* + *Quercus frainetto* + *Quercus cerris* + *Carpinus orientalis* + *Fraxinus ornus*, Assoc. *Quercus frainetto* + *Quercus polycarpa*, Assoc. *Quercus frainetto* + *Quercus polycarpa* + *Quercus cerris* + *Fagus orientalis*, Assoc. *Quercus frainetto* + *Quercus polycarpa* + *Quercus cerris* + *Carpinus orientalis* + *Fraxinus ornus*, Assoc. *Pinus nigra*, Assoc. *Pinus nigra* + *Robinia pseudoacacia*, Assoc. *Pinus nigra* + *Quercus polycarpa* + *Quercus frainetto*, Assoc. *Robinia pseudoacacia*, complexes of *Festuco-Brometalia* and mixed thermophile forest communities, complexes of *Festuco-Brometalia* and *Thero-Brachypodietea*.

In habitat 91S0* Western Pontic beech forests (*Fagus orientalis*) the following associations were mapped: Assoc. *Fagetum orientalis*, Assoc. *Fagus orientalis* + *Quercus polycarpa*, Assoc. *Fagus orientalis* + *Quercus polycarpa* + *Quercus frainetto*, Assoc. *Fagus orientalis* + *Carpinus betulus* + *Quercus frainetto* + *Quercus polycarpa* and Assoc. *Carpinus betulus* + *Fagus orientalis*. The species of Pontic rhododendron, Common laurel and Colchic holly participated in the shrub-grass synusia.

In habitat 91M0 Pannonian-Balkan turkey oak-sessile oak forests the following associations were mapped: Assoc. *Quercetum polycarpae*, Assoc. *Quercus polycarpa* + *Fagus orientalis*, Assoc. *Quercus polycarpa* + *Quercus frainetto* and Assoc. *Quercus polycarpa* + *Quercus frainetto*, Pontic rhododendron, Pontic daphne, Common heather, Jerusalem star, Bishop's hat and summer-green shrubs Common medlar, Common hawthorn, Black hawthorn, Oriental hornbeam, etc.

Discussion

The results obtained during the study allowed to state that the natural habitats 91S0 and 91M0, listed in the Directive 92/43/EEC, in the Biodiversity Act and in the Bulgarian Red Data Book with Endangered category, were with the greatest conservation significance in the reserves „Uzunbudzhak“, „Vitanovo“,

Table 1 shows the indicators, the periodicity of observations of the habitats and plant associations, subject to monitoring.

Reserve	Habitat type	Plant association	Assessing indicators	Periodicity
Uzunbudzhak	Habitat 91S0	<i>Fagetum orientalis</i> ; <i>Fagus orientalis</i> + <i>Quercus polycarpa</i> ; <i>Fagus orientalis</i> + <i>Quercus polycarpa</i> + <i>Quercus cerris</i> + <i>Quercus frainetto</i> .	Structure: Phytocoenotic characterization of plant communities: 1. General flora composition, incl. habitat diagnostic species, Conservation of significant species, Invasive species, Dominant species. 2. Vertical and horizontal structure of the communities Functioning: 1. Moisture regime and nutrient status of the soil. 2. Successional amendments. 3. Biological productivity. Overall assessment of the favorable conservation status of the habitats (FCS).	Regular observations in a five-year period in permanently marked sampling sites.
	Habitat 91M0	<i>Quercetum polycarpae</i> ; <i>Quercus polycarpa</i> + <i>Quercus frainetto</i> ; <i>Quercus polycarpa</i> + <i>Quercus frainetto</i> + <i>Quercus cerris</i> + <i>Fagus orientalis</i> ; <i>Quercus polycarpa</i> + <i>Quercus frainetto</i> + <i>Quercus cerris</i> ; <i>Quercus polycarpa</i> + <i>Fraxinus ornus</i> .		
Tisovitsa	Habitat 91S0	<i>Fagetum orientalis</i> ; <i>Fagus orientalis</i> + <i>Quercus polycarpa</i> ; <i>Fagus orientalis</i> + <i>Quercus polycarpa</i> + <i>Quercus frainetto</i> ; <i>Fagus orientalis</i> + <i>Quercus polycarpa</i> + <i>Carpinus betulus</i> ; <i>Fagus orientalis</i> + <i>Quercus frainetto</i> + <i>Quercus cerris</i> + <i>Carpinus betulus</i> .		
	Habitat 91M0	<i>Quercetum polycarpae</i> ; <i>Quercus polycarpa</i> + <i>Fagus orientalis</i> ; <i>Quercus polycarpa</i> + <i>Quercus frainetto</i> ; <i>Quercus polycarpa</i> + <i>Quercus frainetto</i> + <i>Quercus cerris</i> ; <i>Quercus polycarpa</i> + <i>Quercus frainetto</i> + <i>Fagus orientalis</i> .		
Silkositia	Habitat 91S0	<i>Fagetum orientalis</i> ; <i>Fagus orientalis</i> + <i>Quercus polycarpa</i> ; <i>Fagus orientalis</i> + <i>Quercus polycarpa</i> + <i>Quercus frainetto</i> .		
	Habitat 91M0	<i>Quercus polycarpa</i> + <i>Fagus orientalis</i> + <i>Quercus frainetto</i> ; <i>Quercetum polycarpae</i> ; <i>Quercus polycarpa</i> + <i>Quercus frainetto</i> + <i>Quercus cerris</i> .		
Vitanovo	Habitat 91S0	<i>Fagetum orientalis</i> ; <i>Fagus orientalis</i> + <i>Quercus polycarpa</i> ; <i>Fagus orientalis</i> + <i>Quercus polycarpa</i> + <i>Carpinus betulus</i> ; <i>Fagus orientalis</i> + <i>Quercus polycarpa</i> + <i>Quercus cerris</i> + <i>Carpinus betulus</i> ; <i>Fagus orientalis</i> + <i>Quercus polycarpa</i> + <i>Quercus cerris</i> + <i>Quercus frainetto</i> .		
	Habitat 91M0	<i>Quercetum polycarpae</i> ; <i>Quercus polycarpa</i> + <i>Fagus orientalis</i> ; <i>Quercus polycarpa</i> + <i>Quercus frainetto</i> + <i>Quercus cerris</i> + <i>Fagus orientalis</i> ; <i>Quercus polycarpa</i> + <i>Carpinus betulus</i> + <i>Quercus cerris</i> ; <i>Quercus polycarpa</i> + <i>Fagus orientalis</i> + <i>Carpinus betulus</i> .		
Sredoka	Habitat 91S0	<i>Fagetum orientalis</i> ; <i>Fagus orientalis</i> + <i>Quercus polycarpa</i> ; <i>Fagus orientalis</i> + <i>Quercus polycarpa</i> + <i>Quercus frainetto</i> ; <i>Fagus orientalis</i> + <i>Carpinus betulus</i> + <i>Quercus frainetto</i> + <i>Quercus polycarpa</i> ; <i>Carpinus betulus</i> + <i>Fagus orientalis</i> .		
	Habitat 91M0	<i>Quercetum polycarpae</i> ; <i>Quercus polycarpa</i> + <i>Fagus orientalis</i> ; <i>Quercus polycarpa</i> + <i>Quercus frainetto</i> ; <i>Quercus polycarpa</i> + <i>Quercus frainetto</i> + <i>Fagus orientalis</i> + <i>Carpinus betulus</i> ; <i>Quercus polycarpa</i> + <i>Quercus frainetto</i> + <i>Quercus cerris</i> + <i>Carpinus betulus</i> ; <i>Quercus polycarpa</i> + <i>Quercus frainetto</i> + <i>Quercus cerris</i> + <i>Carpinus orientalis</i> + <i>Fraxinus ornus</i> .		

„Tisovitsa“, „Sredoka“ and „Silkositia“. For monitoring purposes from the associations mapped in all the reserves, 43 objects were selected and they all were parts of the habitats 91S0 and 91M0. During

the study phytocoenological indicators related to the structure of the communities and to the functioning of the habitats were tested and included in the proposed monitoring program. The collected data and

records allowed us to recommend a five-year period for monitoring of certain plant associations when

assessing the amendments in the structure and functioning of the natural habitats 91S0 and 91M0.

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