

CHARACTERIZATION OF NATURAL MEADOWS AND PASTURES IN PEŠTER

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Abstract

The phytocenological composition estimated on grasslands of hilly-mountain area of Pešter (vicinity of Sjenica). Meadows and pastures in this area developed on forest land based on stone with feldspat and silicate. On the geological base of nonorganic sediments, sandstone, gravels and clays and seldom phillites are developed different associations. In the investigation identified 124 different plant species which belong to different plant life form and different associations. Investigation carried out from May to August in 2012 year. In this region prevail natural pasturelands distributed on large plateau approximately 1200m above the sea level on the acid soil type pseudogleys, luvisol. Large area used for grazing and meadow area near the villages exploited for hay production and after that used for grazing. These natural grasslands exist without application of scientific farming measure of technology. In these successive inventories of lands registered floristic associations and identified individual plant species. Investigation showed different floristic elements and phytocenological associations on meadow and pastures.

Key words: Floristic diversity, meadow, pasture, mountain

Introduction

Meadows and pastures developed mainly on the lands after deforestation and spread in different geographic, ecological and orographic condition on different type of soil. All these factor connected to floristic and phytocenological diversity. Numerous plant species on natural meadows and pasture are desirable for animal feed. Some of plants can be harmful for animals. Pastures are used for grazing during spring, summer and autumn season, while meadows hay produced and after that can be used for grazing. Meadows usually situated near the villages integrated within arable land, while pastures spread at the higher altitudes on the larger area. Except climatic factors, orographic exposition, rocky substrate and soil fertility, the relation of man to nature protection is important for survival plant diversity. Meadows and pastures are rich with floristic and phytocenological diversity (Koji et al., 2005). The plant communities on meadow and pasture differ depending of parent rock that underlies soil where are developed and can classified on: basic rocks with feldspat and ultra basic rocks; communities on limestone; communities on acid siliceous rocks; hilly and mountainous communities of wide ecological amplitude; alpine communities. The statement of meadows and pastures depends on position, environmental conditions and how they are managed. The natural grasslands have less productivity of biomass that is under the high environmental influence. The grasslands production is very important sustainable source of animal feed and production of milk and meat. The intensive study of grasslands reported that different ecological conditions have influence to developing different meadow associations which

differ according to their floristic elements and their productivity association (Lazarevi et al., 2004). These authors noted that on hilly-mountainous region of Serbia, the greatest presence and economical importance have associations *Danthonietum calycinae*, *Festucetum rubrae*, *Agrostietum vulgaris* and *Nardetum strictae* (Lazarevi et al., 2009) and that productivity increase under anthropogenic influence.

The objective of this study was analysis of floristic and phytocenological characteristics on meadows and pastures in Pešter plateau.

Material and methods

Investigation of phytocenological diversity carried out on meadows and pasture in Pešter plateau. Study of phytocenological associations conducted according to methods of the French-Swiss school Braun-Blanquet (Braun-Blanquet, 1928, 1921) that is, in Serbia, widely accepted in phytocenological researches. The floristic and phytocenological estimation carried out on surface of 50 m², in 4 sites in location Duga Poljana and Štavalj. Estimation of floristic diversity by records in 23. June, 30. June, 10. July and 20. July 2012. The analyzed meadows and pastures developed on soil type pseudogleys and luvisol. The average pH value was 4.2. In the soil content were found humus (4.5-6.0%), Nitrogen (0.2%), low content of Phosphorus (1.8 mg per 100g of soil) and Potassium in average 19.2 mg per 100 g of soil). The standard laboratory methods were used for the determination of the soil quality.

Results and discussion

Floristic elements identified in four location on Pešter plateau, developed under the specific environmental condition (frequently changes values of temperature, humidity, sun-light regime and precipitation). Analyzed locations situated at eastern, southeastern, southwestern and northeastern expositions.

On analyzed location registered 124 plant species, including: 118 herbaceous plants, 4 shrubs and 2 tree species (Table 1.). Identified plants belong to different group of floral elements Euro-Asian (cosmopolite plants), middle European (mesophilic plants), sub-Mediterranean (xerophilic plants) and Balkan-Appennine floristic elements (xerophilic). Investigated meadows and pastures are very rich and diverse in the floristic and phytocenological composition. Identified floristic elements different phytocenological associations: *Ass. Danthonietum calycinae*, *Ass. Festuco-Chrysopogonetum grylli*, etc. *Ass. Festucetum vallesiaca*, *Ass. Festucetum fallaci*, *Ass. Cynosuretum cristati*, *Ass. Cariceto-Brometum erecti*.

These associations on warmer exposures are represents grasslands on serpentine and meadows which are mostly developed in the oak-pine-belt trees, ranging in altitude from 1000 m and higher. In this area most of the sward was occupied by meadows for their ecological and floristic elements belong to the plant community composition of grass species *Danthonietum calycinae*; *Cynosurus cristatus*, *Bromus racemosus*, *Festuca vallesiaca*, *Festuca rubra*, broadly.

Similar association on mountain region of Serbia (Stara planina) registered (Tomi et al., 2003). The wealth of floristic elements of ruderal association developed on soils which are typical for mountainous area, also registered in other region example Bosnia and Herzegovina (Petroni and Pavlovi, 2006). Areal spectrum of *Cirsietum candelabri* association points to the presence different floral elements: Euro-Asian, boreal, cosmopolitan etc.

Table 1. Floristic elements on Pester Plateau (Duga Poljana and Štavalj)

Species	1	2	3	4		1	2	3	4
<i>Campanula trachelium</i> L.	+1		+1	+1	<i>Briza media</i> L.		+1.1		+1.1
<i>Campanula persicifolia</i> L.	+1	+1	+1	+1	<i>Campanula patula</i> L.		+1	+1	
<i>Anemone nemorosa</i> L.	+1.1	+1.1	+2.2		<i>Carex montana</i> L.	+1		+1	
<i>Avena pubescens</i> L.		+1.1	+1.1		<i>Cerastium brachypetalum</i> L.		+1		+1
<i>Alchemilla vulgaris</i> L.	+1	+1.1	+1.1		<i>Chamaecytisus supinus</i> L.	+1			
<i>Cephalantrea longipholia</i> L.	+1	+1	+1		<i>Cytisus scoparius</i> L.		+2.2		+1
<i>Cephalantrea rubra</i> L.		+1	+1		<i>Bromus racemosus</i> L.	+1	+1	+1	
<i>Centaruea jacea</i> L.		+1	+1	+1	<i>Dianthus armeria</i> L.			+1	
<i>Centaurea montana</i> L.				+1	<i>Digitalis ferruginea</i> L.		+1		
<i>Geranium sanguineum</i> L.	+1	+1	+1		<i>Dorycnium herbaceum</i> L.				+1
<i>Trifolium alpestre</i> L.		+1.1		+1.1	<i>Festuca vallesiaca</i> L.	+1.1			
<i>Veratrum album</i> L.			+1	+1	<i>Galium vernum</i> L.				+1
<i>Solidago virga-aurea</i> L.			+1	+1	<i>Hypericum montanum</i> L.	+1			
<i>Bromus erectus</i> L.	+1	+1	+1		<i>Lathyrus niger</i> L.				+1.1
<i>Aremonia agrimonioides</i> L.	+1.1		+1		<i>Leontodon hispidus</i> L.				+1
<i>Brachypodium sylvaticum</i> L.		+1.1		+1.2	<i>Leucanthemum vulgare</i> L.		+1.1		+1.1
<i>Filipendula hexapetala</i> L.	+1	+1	+1.1		<i>Lolium perenne</i> L.		+1.1		+1.1
<i>Galium boreale</i> L.		+1	+1	+1	<i>Linum hirsutum</i>			+1.1	
<i>Galium mollugo</i> L.	+1	+1	+1	+1	<i>Luzula campestris</i> L.				+1
<i>Prunella vulgaris</i> L.	+1	+1.1	+1	+1	<i>Luzula luzuloides</i> L.				+2.2
<i>Astrantia major</i> L.	+1	+1	+1	+1	<i>Luzula pilosa</i> L.	+1			
<i>Phyteuma spicatum</i> L.		+1	+1		<i>Lysimachia vulgaris</i> L.	+1.1			+1
<i>Cynosurus cristatus</i> L.			+1.1	+1	<i>Melampyrum pratense</i> L.			+1.1	
<i>Hypericum perforatum</i> L.			+1.1	+1	<i>Melica nutans</i> L.	+1	+1.1		
<i>Fragaria vesca</i> L.	+1	+1	+1.1		<i>Melittis melissophyllum</i> L.	+1.1			
<i>Lilium martagon</i> L.			+1	+1	<i>Mercurialis perennis</i> L.		+1		
<i>Lilium hirsutum</i> L.			+1	+1	<i>Myosotis arvensis</i> L.				+1
<i>Trifolium repens</i> L.	+1	+1	+1	+1	<i>Plantago altissima</i> L.		+1.1	+1	
<i>Ajuga reptans</i> L.	+1	+1	+1	+1	<i>Plantago argentea</i> L.	+1			
<i>Dactylis glomerata</i> L.	+1	+1.1	+1.1	+1.1	<i>Plantago major</i> L.	+1		+1.1	
<i>Trifolium montanum</i> L.	+1	+2.2	+1.1	+1.1	<i>Poa nemoralis</i> L.		+1.1	+1	
<i>Viola silvestris</i> L.	+1	+1	+1	+1	<i>Poa pratensis</i> L.		+1.1		+1.1
<i>Aegopodium podagraria</i> L.	+1			+1	<i>Polygala comosa</i> L.				+1.1
<i>Carex praecox</i> L.			+1	+1.1	<i>Polystichum lobatum</i> L.	+1			
<i>Cirsium acaule</i> L.		+1	+1.1		<i>Potentilla erecta</i> L.	+1	+1		
<i>Coronilla varia</i> L.	+1	+1			<i>Potentilla australis</i> L.		+2	+1	
<i>Crepis viscidula</i> L.	+1			+1	<i>Potentilla heptaphylla</i> L.				+1
<i>Danaa cornubiensis</i> L.	+1	+1	+1		<i>Ranunculus repens</i> L.		+1	+1	
<i>Danthonia provincialis</i> L.			+1.1	+1.2	<i>Primula vulgaris</i> L.	+1			+1
<i>Deschampsia flexuosa</i> L.		+1		+1.2	<i>Pteridium aquilinum</i> L.		+1		
<i>Dorycnium herbaceum</i> L.	+1		+2		<i>Pulmonaria officinalis</i> L.	+1			+1
<i>Euphorbia amygdaloides</i> L.	+1			+1	<i>Rumex acetosa</i> L.		+1		+1.1
<i>Festuca heterophylla</i> L.		+1.1		+1.1	<i>Selinum carvifolia</i> L.	+1			
<i>Galium silvaticum</i> L.	+1			+1.1	<i>Silene italica</i> L.		+1		
<i>Galium cruciata</i> L.	+1				<i>Stelaria graminea</i> L.	+2			
<i>Galium rubioides</i> L.			+1		<i>Thymus longicaulis</i> L.			+1	
<i>Geum rivale</i> L.		+1			<i>Thymus serpyllum</i> L.			+2	
<i>Helleborus odoratus</i> L.					<i>Trifolium hybridum</i> L.		+1		+1.1
<i>Hieracium bauhini</i> L.		+1.1		+1.1	<i>Trifolium medium</i> L.	+1.1			+1.1
<i>Hieracium cymosum</i> L.	+1			+1	<i>Trifolium pratense</i> L.	+1.1		+1.1	
<i>Hieracium maculatum</i> L.	+1	+1			<i>Festuca rubra</i> L.		+1.1	+1.1	
<i>Hieracium panosum</i> L.	+1		+1		<i>Verbascum lanatum</i> L.	+1			+2
<i>Hieracium pilosella</i> L.		+1		+1.1	<i>Veronica paecox</i> L.		+1	+1	
<i>Inula hirta</i> L.		+1.1		+1.1	<i>Vicia cassubica</i> L.	+1		+1	
<i>Inula salicina</i> L.	+1		+1		<i>Vicia cracca</i> L.			+1.1	+1.1
<i>Lamium galeobdolon</i> L.			+1	+1	Shrubs				
<i>Lathyrus venetus</i> L.		+1	+1	+1	<i>Genista ovata</i> L.	+1			+1.2
<i>Leontodon hispidus</i> L.	+1			+1	<i>Teucrium chamaedrys</i> L.	+1.1			
<i>Polygonatum odoratum</i> L.	+1				<i>Prunus spinosa</i>		+1		+1
<i>Silene nutans</i> L.		+1		+1.1	<i>Rubus canescens</i>		+1	+1	
<i>Stachys officinalis</i> L.		+1.1	+1	+1.1	Trees				

Stelaria holostea L. +1.1 *Pyrus pyraaster* +1.1 +.1
Veronica officinalis L. +.1 *Quercus cerris* +1.1 +.1
 The ordinal number of the record 1, 2, 3, 4 ; Date of the record 23.06.'2012, 30.06.'12; 10.07.'2012, 20.07.'2012;
 Location: Duga Polajna, Štavalj; Surface record (50m²) 200; Exposition E S-SE, S-SW, N-NE,
 Geological base Phillites Sandstones, clays, hornstones and marls; Soil type: luvisol, pseudogley.

These floral elements in the area of oak-pine forests that span the slopes, in natural meadows, forest clearings and plains, mainly in shallow, rocky soil (limestone, silica substrates and acidic soil). Similar results on mountain region reported Koji et al., 2005; Tomi et al., 2005.

The identified herbaceous species cover soil in range up to 90%. The most dominant species are: *Campanula persicifolia*, *Prunella vulgaris*, *Ajuga reptans*, *Dactylis glomerata*, *Trifolium montanum*. Also, frequently present plant species but with reduced sociability are: *Viola silvestris*, *Aegopodium podagraria*, *Anemone nemorosa*, *Aremonia agrimonioides*, *Brachypodium silvaticum*, *Cirsium acaule*, *Danaa cornubiensis*, *Euphorbia amygdaloides*, *Festuca heterophylla*, *Galium cruciata*, *Galium silvaticum*, *Genista ovata*, *Geranium sanguineum*, *Helleborus odoratus*, *Helianthemum nummularium*, *Hieracium baubinia*, etc.

On the investigated locations meadow and pastures used for grazing during long-term period. The meadows were grown and lasted in period from May to July. However, anthropogenic factor can influence to make system of grazing and improve grassland production. Developing grazing system can contribute to improving production of forage for livestock (LazareviC et al., 2009). Also, system of seasonal grazing animals on a particular area, allows the land than not used for grazing to rest and growing new forage. Most farmers try rotational grazing because of economic factors. Grazing may stimulate pasture growth, decrease soil erosion potential, minimal pesticides and fertilizer application..

Conclusions

The most changes of sustainable meadows and pastures in this area threatened by land abandonment, afforestation, overgrazing and rarely by using land for arable farming other crops and urban development. Floristic composition contains 124 species: 118 herbaceous species, 4 shrub species and 2 tree species. Identified floral elements present mixture of different communities of plants with identified species floral elements floral elements Euro-Asian (cosmopolite plants), middle European (mesophilic plants), sub-Mediterranean (xerophilic plants) and Balkan-Apennine floristic elements (xerophilic). The floristic wealth developed on deforested surfaces on soil pseudogley and luvisol. The geological base is nonorganic sediments, sandstone, gravels and clays and rarely phillites.

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