

Grassland vegetation on calcareous terrains west of Sofia

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The aim of this study is to reveal the syntaxonomic diversity of grasslands developed on calcareous terrains west of capital Sofia. A total of 633 relevès were collected following Braun-Blanquet approach during 2008-2010. They were analysed with divisive and agglomerative numerical methods for classification. As a supervised classification method was used Cocktail method. In addition we applied indirect (DCA) and direct (CCA) gradient analysis in order to reveal the main environmental gradients of plant communities distribution in the area.

Collected data was classified to 4 classes, 4 orders, 9 alliances, 16 associations, 6 subassociations and 1 community. Nine associations (*Galio lovcense-Artemisietum chamaemelifoliae*, *Hieracio pilosello-Festucetum dalmaticae*, *Trifolio aureae-Festucetum valesiaca*, *Alyso minori-Scleranthetum pereni*, *Teucrio polii-Festucetum dalmaticae*, *Alyso minoris-Stipetum eriocaulis*, *Teucrio montani-Festucetum stojanovii*, *Sempervivo marmorei-Corothamnetum procumbentis*, *Thymo moesiaci-Trifolietum alpestre*) and 4 sub-associations were described for the first time for science, whereas one alliance (*Cirsio-Brachypodion pinnati*) and 1 association (*Festucetum rupicola*) were observed for the first time in Bulgaria and 3 alliances (*Caricion canescenti-nigrae*, *Saturejion montanae* and *Chrysopogono-Danthonion*) and 1 association (*Caricetum nigrae*) were new for the study region. We also found new localities of associations *Carici echinatae – Sphagnetum*, *Geo coccinei – Sphagnetum contorti*, *Nardetum strictae sensu lato*, *Ranunculo bulbosae-Arrhenatheretum elatioris* and *Tanaceto vulgaris-Arrhenatheretum elatioris*.

Class *Festuco-Brometea* has the widest distribution and is represented by two orders – *Festucetalia valesiaca* and *Brachypodietalia pinnati* and 4 alliances – *Cirsio-Brachypodion pinnati*, *Chrysopogono-Danthonion calycinae*, *Festucion valesiaca* and *Saturejion montanae*. *Cirsio-Brachypodion pinnati* and *Chrysopogono-Danthonion calycinae* comprise meso-xerophytic vegetation communities distributed mainly on southern slopes of Western Balkan Range and limited in Znepole region.

Festucion valesiaca and *Saturejion montanae* are the most widespread syntaxa in the study area. *Saturejion montanae* is found on southern slopes, on slightly to moderately inclined terrains with rocky outcrops. Communities of *Festucion valesiaca* cover north slopes, flat to slightly inclined slopes and soils are shallow to moderately deep. *Saturejion montanae* is represented by 3 associations whereas *Festucion valesiaca* by 4 associations and 1 community.

Mesophilous grasslands have limited distribution in the study area and belong to class *Molinio-Arrhenatheretea*, represented by 1 order – *Arrhenatheretalia* and two associations *Ranunculo bulbosae-Arrhenatheretum elatioris* and *Tanaceto-Arrhenatheretum*. They are managed as pastures and meadows.

Communities of class *Nardo-Callunetea* and association *Nardetum strictae* sensu lato are found in Western Balkan Range and locally in Znepole region. They are rich in acidophilus species and are dominated by grasses like *Nardus stricta*, *Agrostis capillaris*, *Festuca rubra*, *Lerchenfeldia flexuosa*. In the past they have been used as pastures but nowadays they are mostly abandoned.

Hygrophilous vegetation is found in Ponor Mt. and was assigned to class *Scheuchzerio-Caricetea fuscae*, with 3 alliances - *Sphagno recurvi-Caricion cenescentis*, *Caricion canescenti-nigrae* and *Sphagno warnstorffii-Tomenthypnion nitentis* and 3 associations - *Carici echinatae – Sphagnetum*, *Caricetum nigrae* and *Geo coccinei – Sphagnetum*. *Carici echinatae – Sphagnetum* is located in pot-holes of the mountains on flat to slightly inclined terrains, where conditions are suitable for retaining water and its poor drainage. Unlike the previous association, *Caricetum nigrae* develops in the periphery of pot-holes or along rivers and undergo periods of drought during the summer. *Geo coccinei – Sphagnetum* is endemic for Bulgaria and is represented with 2 subassociations - *typicum* and *caricetosum lasiocarpae*.

All collected relevès assigned to classes *Scheuchzerio-Caricetea fuscae*, *Molinio-Arrhenatheratea* and alliance *Saturejion montanae* were analyzed together with all available relevès of these syntaxa from Bulgarian Vegetation Database and Balkan Dry Grassland Vegetation Database. Obtained results have not only local but also regional validity.

Grassland vegetation in the area under study has mainly secondary origin and has taken the place of cleared forests. Only grassland communities found on rocky and eroded terrains with shallow soils might be considered as primary persisted from the Last Glacial period.

Main threats leading to destruction of grasslands or changes in their composition and structure were analyzed. Abandonment of grasslands, construction of quarries and solar parks, distribution of invasive and non-native species were considered as main hazards for grasslands in study area. As part of this investigation we compared community parameters, environmental variables and main gradients in the vegetation compositional variation between abandoned and extensively used pastures in Ponor Mt, Western Balkan Range. Additionally we revealed the response of vascular plants to grazing or abandonment at the levels of species composition and functional groups.