

# Notes on the features of the flora and vegetation of the Republic of Kosovo

Fadil Millaku

Department of Biology, Faculty of Mathematics and Natural Sciences, "University of Prishtina"



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## Abstract

Kosovo is characterized by a high diversity of its flora and vegetation, which has been influenced by several factors, such as the phytogeographical position, the historical past of its territory, the diverse geological-pedological composition, as well as the variable climatic factors, among other long-term factors that have shaped its diversity. Phytogeographically, Kosovo is mainly influenced by the Mezig and Illyrian floral elements on the one hand, and the Mediterranean on the other, namely by the Adriatic and the Aegean, respectively. According to the available literature sources, the vegetation of Kosovo is divided into 20 classes, 35 orders, 63 alliances and 139 plant associations. Predominantly large syntaxonomic forest classes are the following: *Carpino-Fagetum sylvaticae* Jakucs ex Passarge 1968; *Vaccinio-Piceeta* Br.-Bl. in Br.-Bl. et al. 1939 and *Erico-Pinetea* Horvat 1959. The majority of grasslands and pastures that have a nutritional value for livestock fall into the following three classes: *Molinio-Arrhenatheretea* Tx. 1937; *Festuco-Brometea* Br.-Bl. et Tx. ex Soó 1947 and the class: *Koelerio-Corynephoretea canescens* Klika in Klika et Novák 1941 - which is rich in endemic plant communities occurring mainly on serpentinite soils. From the floristic point of view, according to the available data, there are about 3000 plant taxa in Kosovo. The richest regions in this regard are Sharri Mountains and the Albanian Alps of Kosovo. Additional floristic richness is provided by the serpentinite soils of Kosovo, which are particularly rich in

## INTRODUCTION

Republic of Kosovo is an important center of biodiversity in Europe with high levels of plant diversity and endemism. The total flora includes about 3,000 vascular plant taxa, of which 10% are threatened and over 19% are endemic. The richest regions in this regard are Sharri Mountains and the Albanian Alps of Kosovo. Additional floristic richness is provided by the serpentinite soils of Kosovo, which are particularly rich in endemic plant taxa. Kosovo vegetation consists of different types of phytocenoses, including endemic and endemolites. This diversity in terms of flora and vegetation has been enabled by various factors such as: the phytogeographical position, the historical past of its territory, the diverse geological-pedological composition, as well as the variable climatic factors, among other long-term factors that have shaped its diversity.

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Predominantly large syntaxonomic forest classes are the following: *Quercetea pubescentis*, *Carpino-Fagetum sylvaticae* Jakucs ex Passarge 1968; *Vaccinio-Piceeta* Br.-Bl. in Br.-Bl. et al. 1939 and *Erico-Pinetea* Horvat 1959. The majority of grasslands and pastures that have a nutritional value for livestock fall into the following three classes: *Molinio-Arrhenatheretea* Tx. 1937;

## Study area

Flora and vegetation research includes the entire territory of Kosovo, but the data analyzed from the field are presented mainly from the mountain ranges found in the border areas with Montenegro, Albania and North Macedonia, such as: Sharri Mountains, Koritnik, Pashtriku and the Albanian Alps.

## RESULTS

### Class: Quercetea pubescentis

Within this class the Order *Quercetalia pubescentis* (Oak forests) is dominant. Within this order enter the Alliance: *Ostryo-Carpinion orientalis* Ht., *Quercion frainetto* Ht. & *Quercion petraeae-cerris*, *Pruno tenelle-Syringion* and the Alliance *Fraxino-orni-Ostryon* belong to 5 associations where it is of special importance because they are dominated by endemic species: *Dioscoreo-Carpinetum orientalis* (Dominant species: *Dioscorea balcanica* as endemic species and *Carpinus orientalis*). This phytocenosis has limited extent. It is spread only in 2 localities: Pashtrik and Koritnik within the forest of *Carpinus orientalis* & *Ostrya carpinifolia*.

Within the Alliance *Pruno tenelle-Syringion* in Kosovo are present two associations created by endemic plants: *Ass. Polygalo-Forsythietum europaeae* (*Forsythia europaeae* & *Polygala doerflerii*), this community spread on serpentine rocks and *Ass. Astero-Juniperetum oxycedri* (*Aster albanicus*) - spread on serpentine rocks

From the Order *Fagetalia*/ Alliance: *Fagion mosiacae* dominate the *Ass. Fagetum montanum*, *Abieti-Fagetum* and *Ostryo-Fagetum*.

From the class: *Vaccinio-Piceeta* Br. Bl. In Albanian Alps (Kosovo), important are the Phytocenoses: *Wulfenio-Pinetum peucis*, dominated by endemic plants: *Wulfenia bleccici* & *Pinus peuce* and phytocenosis *Rhododendro ferruginei - Pinetum peucis*, which is dominated by *Pinus peuce* and *Rhododendron ferrugineum* present in Sharri Mt.

From the Pinion mugo alliance important are association with endemic character:

*Ass. Wulfenio - Pinetum mugo* (*Wulfenia bleccici* & *Pinus mugo*) which is present in Albanian Alps and *Ass. Achilleo - Pinetum mugo* (*Achillea alexandri regis* & *Pinus mugo*) - spread only in Sharri Mt. (Oshlak). From the *Erico-Pinetea* in Kosovo important are the associations formed by the subendemic and relict species *Pinus heldraichii*. Forest phytocenosis of importance with this species are: *Ass. Pinetum heldraichii typicum* present in Shari Mt. (Koritnik) and *Ass. Helleboro - Pinetum heldraichii* (*Helleborus purpureus* & *Pinus heldraichii*) present in Albanian Alps (Kosovo).

From the Classes: *Asplenietea trichomanis*/ Order: *Potentilletalia caulescentis* and from the Alliance: *Ramondion nathaliae* in Kosovo are present *Ass. Musco - Ramondetum serbica* (Albanian Alps 500-2000 m), *Ass. Ramondo-Ostryetum carpinifoliae* (Sharri Mt. locality - Luboten (1000 m) and *Musco-Ramondetum nathaliae* (widespread in the Sharri Mountains)

From the Class. *Scheuchzerio Caricetea fuscae* two associations are with endemic character: *Ass. Carici - Narthecietum scardici* (Sharri Mt. (Vraca, Rudok), present in wet places in alpine zone dominated by species *Carex flava*, *C. fusca*, *Narthecium scardicum*, *Pinguicula vulgaris*, *Eriophorum angustifolium*, *Parnassia palustris* and *Ass. Pinguiculo-Narthecietum scardici*, present in Albanian Alps of Kosovo (Gjeravica) dominated by species *Pinguicula leptoceras*, *Narthecium scardicum*, *Gymnadenia frivaldii* etc.

### The peculiarities of the Flora of Kosovo

Republic of Kosovo, a small country in SE Europe, is characterized by a great floristic richness. This richness is the result of the interaction of various geographical, geological, climatic, evolutionary, edaphic, and other factors. Kosovo generally has a continental climate with semi-arid summers and cold winters. Four basic groups of geological substrates are known in Kosovo: Silicate rocks with acidic to neutral pH, Silicate rocks with basic to ultrabasic reaction (serpentinites), Carbonate rocks with neutral to basic pH reaction, and Pleistocene sediments and deposits. Important centers of plant endemism in Kosovo are the Albanian Alps of Kosovo and the Sharri Mountains. These two biodiversity-rich regions of the country have been declared national parks, where the most sensitive and potentially endangered natural habitats have been placed under legal protection. As far as endemic plants (native and Balkan) are concerned, the Albanian Alps of Kosovo (e.g. Bjeshket e Namuna) are definitely the richest in endemic plant taxa, as the highest number of endemic taxa was recorded here (151 plant taxa). The Sharri Mountains is almost as rich in endemic plant taxa, hosting 128 endemic plants. Except Alb. Alp. & Shari Moun. and the Pashtriku Mountain which lies between the Albanian Alps and the Sharri Mountains alone host 115 endemic plant taxa of the Balkans (Tomovic et al. 2014). This makes the Albanian Alps, Pashtriku Mountain and Sharri Mountain of Kosovo factually the most important centre of plant endemism in Kosovo and regionally a centre of high floristic richness in the Balkan Peninsula.

### Some rare & endemic plants growing in Kosovo:

*Achillea alexandri-regis*, *Aristolochia merxmulleri*, *Bornmullera dieckii*, *Dianthus scardicus*, *Centaurea kosaninii*, *Centranthus longiflorus*, *Cephalaria pastricensis*, *Cerastium neoscardicum*, *Crepis baldacii*, *Crepis bertisea*, *Dioscorea balcanica*, *Draba korabensis*, *Fritillaria macedonica*, *Gnaphalium pichleri*, *Hieracium naegelianum*, *Laserpitium siler*, *Lilium albanicum*, *Micromeria albanica*, *Narthecium scardicum*, *Pinguicula balcanica*, *Potentilla visianii*, *Saxifraga federici-augusti*, *Saxifraga scardica*, *Sesleria wetsteinii*, *Solenanthes krasniqi*, *Valeriana pancicii*, *Viola dukadjinica*, *Viola elegantula*, *Viola speciosa*, *Wulfenia bleccici*.

## METHODOLOGY

Taxonomic nomenclature follows Euro+Med (2006+), while all the nomenclature decisions follow the fourth edition of the International Code of Phytosociological Nomenclature (Theurillat et al. 2020). The names of higher syntaxa follow Mucina et al. (2016).

## Some types of vegetation in the Republic of Kosovo

