

Biodiversity conservation status in the Republic of Kosovo with focus on biodiversity centres

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Abstract

This paper presents the most recent results on Kosovo biodiversity conservation efforts with focus on two main biodiversity centers of Kosovo: Sharri mountain (already declared as National Park) and Bjeshket e Nemuna mountains in process of designation as a National park. The study presents collection of up to date publications on biodiversity of Kosovo. Of course, there is still to be investigated particularly in the field of lower plants as well invertebrate fauna species. Beside the small territory of 10,887 km², Kosovo is quite rich in both plant and animal biodiversity. Up to date 1800 vascular plant species have been recorded, while expected number is about 2500 species. Number of higher vertebrates is 210, while the invertebrates are not studied with exception of Lepidoptera with about 150 species. There is no Red List of species for Kosovo developed yet, while some short term conservation measures have already taken place.

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Introduction

Republic of Kosovo, located in the Central Balkans, covers an area of 10,877 km², bounded by Serbia to the north and east, Macedonia to the southeast, Albania to the southwest and Montenegro to the west. Topographically, it is an elevated basin enclosed by mountains ranges and hills. Most of the area of Kosovo consists of two plains: Kosovo and Dukagjini divided by a hilly ridge running north to south. The Sharr mountains are a major range that form the southern border and are shared with Macedonia and Albania. The Bjeshket e Nemuna mountains forms the western border and is shared with Montenegro and Albania.

Kosovo varies in elevation, from 265 m to 2656 (Gjeravica peak) m a.s.l. with approximately 77% of its area lying between 500 and 1500 m. Higher altitude areas, above 1500 m, cover approximately 6% of the area and are significant from a biodiversity

standpoint (Schweithelm, 2003). The soils are generally nutrient rich, providing a good growth medium for natural plants and agricultural crops.

The climate is influenced by its proximity to the Adriatic and Aegean seas as well as the continental European landmass to the north. The overall climate is a modified continental type, with some elements of a sub-Mediterranean climate in the extreme south and an alpine regime in the higher mountains. Winters are cold with an average temperature in January and February of 0°C and with significant accumulation of snow, especially in the mountains. Summers are hot, with extremes of up to 40°C. The average annual rainfall in Kosovo is 720 mm, but can reach more than 1,000 mm in the mountains. The varied elevations, climatic influences, and soils within Kosovo provide a wide diversity of microhabitats to which plant and animal species are adapted (Mustafa, 2004).

Materials and Methods

This paper is based on field visit investigation results, during 2009-10 in the two main biodiversity rich sites of Kosovo Sharr mountains and Bjeshkete Nemuna mountains. Bjeshkete Nemuna mountains was a part of another study about the raised problems with designation of the area as a national park, the process which started in 1978. Also, huge number of studies and research results were consulted during preparation of the paper.

Results and Discussion

Despite a small surface area, Kosovo is characterized by a rich biodiversity. Two main centers of biodiversity are the Sharr and the Bjeshkete Nemuna mountains (Stevanovic, 1995).

Sharr mountains are characterized by a very rich flora. This floristic treasure represents about 25% of Balkan flora and 18% of the flora of Europe. Marking elements of the Sharr mountains are: 77 plant species with international significance, 26 species included in the European Red List and 32 species included in the IUCN Plant Red List. An important characteristic of the Sharr mountains flora is definitely the endemic and relic species (Veselaj, 2006). The main endemic species of Sharr mountains are: *Achillea alexandri-regis*, *Dianthus scardicus* Wettst., *Bormmuellera dieckii* Degen., *Dryas octopetala* L., *Sedum flexosum* Wettst., *Potentilla doerfleri* Wettst., *Viola grisebachiana* Vis., *Lilium albanicum* Griseb., *Saxifraga marginata* Stern, *Gentiana verna* L., *Gentiana nivalis* L., *Geum reptans* L., *Carex rupestris* All; whereas the number of endemic species of Balkan is around 200 (Rexhepi, 2000). Sharr mountains also represents the largest refuge of glacial flora and is characterized by: around 40 Arctic-alpine floristic relic elements of the glacial period, 92 boreal floristic elements, 57 Central Europe elements, 67 Eurasian elements and 151 South Europe. It also has Nordic-Alp elements, Carpathian-Balkan, Balkan-Apennine, etc. There are over 250 medicinal species such as: garden sage (*Salvia officinalis* L.) yellow gentian (*Gentiana lutea* L.) etc. There are 14 plant species, which in binomial nomenclature, after the genus have name species *scardicus*, *scardicum* and *scardica*, which is related to their localization in Sharr mountains such as: *Tulipa scardica* Bornm., *Dianthus scardicus* Wettst., *Saxifraga scardica* Griseb., *Onobrychis scardica* Griseb. etc (Krasniqi, 1998).

Vegetation of Sharr mountains can be classified into three types: forest vegetation, herbal and anthropogenic. Several forest communities are distinguished in the Sharr mountains. The black alder (*Alnetum glutinosa*) association is noticeable besides streams and rivers of this natural habitat.

The thermopylae forest community extends into mountainsous zones and is represented by association of oak (*Quercetum confertae-cerris scardicum*). Also in these zones, there can be found: black hornbeam (*Carpinetum orientalis*, *Ostrietum carpiniifolie*), oak and black hornbeam (*Quercetum-Carpinetum betulis*, *Quercetum pubescens* dhe *Quercetum montanum*) etc. In the thermopylae forests, a differentiation can be noticed: the lower

zone is dominated by *Quercum conferta* and *Quercum cerris* forests, whereas the upper community is dominated by oak forests.

The mesophile forest community is dominated by two forest communities: beech (*Fagetum moaseicae*) and spruce-beech (*Abieti-Fagetum*) which are among the largest most protected forests masses in the Sharr. The beech community extends in two variants: the mountains beech (*Fagetum moesicae-montanum*) up to 1,700 m a.s.l and the sub-alp beech variant (*Fagetum moesicae subalpinum*) above 1,700 m. Associations of beech and spruce extends above 1,500 m.

Frigoriphyllic forest community extends in the higher parts of the Sharr (1200-1800 m) and is represented by endemic relict of *Pinetum heildreichi*. Transitional forest community vegetation – extends in the higher parts of the Sharr (above 2000 m). It consists of dwarf mountains pines *Pinetum mughi*- degraded from destruction and fires. Over the last one is the community of juniper (*Juniperus sp.*) and the endemic relict species *Bruckenthalia spiculifolia* (Salish) Rchb.

The herbal vegetation (grazes and meadows) is the most abundant in the hills under the anthropogenic influence, whereas the higher zones are primary grazes. They cover the most part of the Sharr mountains starting in the gorge of Kaçanik, with Luboten in the east all the way to the rivers Radike, and Korab in the west, covering a distance of 83 km and average width of 15-35 km at 2,000-2,200 a.s.l. The continuous graze zone in Sharr mountains is largest in the Balkan peninsula, and among the largest in Europe. Primary vegetation for grazes extends between the upper forest boundary and the lichens vegetation (Rexhepi, 1986).

With its various biotopes, the Sharr mountains territory is very rich in terms of fauna. Particular species of animals are present in it, which are exclusively linked to specific biotopes, which means that their distribution is narrow and they belong to endemic species.

Sharr mountains fauna and Kosovo's fauna in general has not been researched completely, but based on archives it can be stated that Sharr's fauna consists of: 7 species of fish, 9 species of amphibians, 10 species of reptilians, 154 species of birds and 30 species of mammals (Mustafa, 2001).

Bjeshkete Nemuna mountains are characterized by an extraordinary floristic diversity, and they represent one of the main floristic centers of the Balkans, especially in regards to the floristic endemism (Hoxha, 2004)

Their vascular flora in the Kosovo part is made of 1,611 taxons (species and subspecies): 435 genera, 105 families, 50 orders and 6 classes. Just in the subalpine and alpine zone of the Bjeshkete Nemuna mountains, 797 floral species have been identified. According to data from the highest tops of the Bjeshkete Nemuna, such as Gjeravica, the hills of Lumbardhi, Guri i Verdhe, Koprivnik and Neqinat, there are 255 endemic species and

subspecies of the Balkans (Veselaj, 2010). Out of the flora of the Bjeshkët e Nemuna, 19 floral taxon's have been included in the IUCN Red List of endangered plants (Mustafa, 2004).

Some of the endemic species of the Balkans include: *Crepis balcanica* Velen., *Draba korabensis*, Kümmerle and Degen ex Jav. *Cerastium dinaricum* G. Beck and Szysz., *Sempervivum macedonicum* Praeger, *Euphorbia montenegrina* (Bald.) K.Maly, *Lilium albanicum* Griseb., *Rumex balcanicus* Rech, *Ranunculus scutatus* Waldst. and Kit., *Geum bulgaricum* Pancic, *Viola elegantula* Schott., *Ligusticum albanicum* Jav., *Teucrium arduini* L. Endemic species of Kosovo in the Bjeshkët e Nemuna include: *Sempervivum kosaninii* Praeger, *Cephalaria pastricensis*, Doerfl. et Hay., *Astragalus fialae* Degen., *Aconitum pentheri* Hayek., *Rubus ipecensis* Rech., *Saxifraga scardica*, *Wulfenia blecicii* Lakusic, *Centaurea nervosa* Rchb. ex Steud., *Thlaspi cuneifolium* Griseb. ex Pant., *Thymus rohlenae* Velen. (Schweithlem, 2003).

Bjeshkët e Nemuna mountains are characterized by a rich, heterogenic, endemic fauna which is very interesting. This wealth of fauna of the Bjeshkët e Nemuna, as the biggest massive in the Balkans, is a result of the many impacts of the Mediterranean, Euro-Siberian and Nordic-alp region, as well as the frequent variations of the ecologic conditions in the past. The territory of the Bjeshkët e Nemuna mountains houses species of mammals and birds that are very rare for the region and even for wider Balkans. Many of them are relic species, endemic, endangered and therefore are present in international protection lists.

Based on research so far, the fauna of the Bjeshkët e Nemuna mountains consists of: 8 species of fish, 13 amphibians, 10 reptiles, 148 species of birds (over 200 species are thought to exist) and 37 species of mammals. 129 butterfly species live in the Bjeshket e Nemuna mountains of the order Lepidoptera, which make the region among the richest in Europe, and is identified a Primary butterfly area (PBA) (Veselaj, 2010).

Large pressures are noticeable in both biodiversity centers, which are represented by the degradation of habitats, forest cutting and burning, construction on protected habitats, pollution, etc. (Mustafa, 2004). The degradation of habitats is characteristic for countries in transition, and Kosovo as well. In this aspect, most important are the large constructions which didn't spare protected areas, even in nature's strictest reserves. Most severe cases include: the construction of the tourist village of Sharr, at the boundary of the protected reserves of the *Pinus heildreichii* Christ. Also, the habitat of the lynx (*Lynx lynx* L.) was attacked: a quarry was allowed to be constructed at the protected reserve of Rusenica, and this led to lynx moving away from the zone and has not been seen in the last 10 years (Mustafa, 2004).

The highway construction will split the territory of Kosovo in two halves, in the south-west and north-east. Since Kosovo's terrain in the parts where the freeway will pass is relatively flat, with very few natural overpasses and underpasses, it is possible that there will

be impassable obstacles for the movement and communication especially of the large mammals: brown bear (*Ursus arctos* L.), wolf (*Canis lupus* L.), wild pig (*Suss scrofa* L.) etc. which are currently very limited. Therefore, although this issue has not been touched until today, we must look into the possibility of building an underpass from one territory to another.

Woodcutting has taken on a dramatic dimension in the past decades and there are no documented data on the amount of cuttings. Adding to this burning, it can be said that forest ecosystems are the most endangered. The biodiversity of water ecosystems is endangered by the large pollution: there is no plant for treatment of waste waters in Kosovo. Thus, the water used for various purposes, is given back to the rivers, unprocessed, damaging their quality and threatening their biodiversity.

There is no Red List species for Kosovo. However, some efforts have been made to protect the most endangered species. There is a list of 29 plant species that was proposed last year for legal protection. Animal species are without any strict legal protection. Hunting laws have not spared even some species that are protected by international conventions and European Union directive (EU) directives (Birds and Habitat Directive).

On the other hand, the Ministry of Environmental and Spatial Planning (MESP) has passed an instruction (Instruction nr. 04/03, 23 May, 2003) for the strict legal protection of some animal species considered rare and endangered, such as: brown bear, lynx, wild goat (*Rupicapra rupicapra* L.), deer (*Capreolus capreolus* L.), wild cat (*Felis sylvestris* Schr.), red deer (*Cervus elaphus* L.), squirrel (*Sciurus vulgaris* L.), gold musteline (*Martes martes* L.), white musteline (*Martes foina* Exleben), the hazel dormouse (*Muscardinus avellanarius* L.). There are cases of trade with species from Kosovo.

According to the instructions given for these species, it is especially prohibited to catch, isolate, keep and trade these animals and also actions that breach the foreseen provisions with this instruction will be punished by law.

There is no research which would realistically present the endangerment scale of the species. We are aware by now that the wild goat is being killed whereas the lynx has rarely been seen for last 10 years.

Although Kosovo has a small surface area, it has a rich biodiversity. This biodiversity is especially concentrated in its two biodiversity centers: the Sharr national park and the Bjeshke e Nemuna mountains. A large number of endemic plant and animal species are present in these zones. Of significance, are the endemic plant species, which are represented by 255 plant species. Due to these values, these zones have been classified as Important plant area (IPA) and regional Important bird area (IBA's) as well as primary butterfly area (PPA). However, the biodiversity is under continuous threat from developmental activities and from the lack of competent

institutional care. The main threatening factors are: the fragmentation of the habitats, forest cutting and degradation, uncontrolled construction in protected dwellings and environment pollution. The steps to improve the situation are very symbolic. The existing legislation for the protection of biodiversity, although is generally in harmony with EU directives, it is not being enforced.

References

- Hoxha, E., B. Mustafa and Z. Veselaj: Aspects of flora and vegetation for designation Bjeshket e Nemuna-national park. Geographical studies, Tirana, **15**, 267-272 (2004).
- Krasniqi, F.: Specifics of flora and vegetation of Kosovo, and problem of their protection. Academy of Sciences and Arts of Kosovo, Prishtina, **6**, 126-132, (1998).
- Mustafa, B.: Basic characteristics of flora and vegetation of Kosovo and danger of their disappearance. AJNTS, Tirana, **5**, 115-123, (2004).
- Mustafa, B., E. Hoxha and Z. Veselaj: Biodiversity of Germia-values and threats. The Regional Environmental Center and Kosovo Association of Ecologists, Prishtina (2001).
- Mustafa, B. and E. Hoxha: Biodiversity and protected areas. University of Prishtina, Prishtina, **1**, p. 107 (2004).
- Rexhepi, F.: Endemic plants of Kosovo. University of Prishtina, Prishtina, **1**, p. 23 (2000).
- Rexhepi, F.: Flora of higher mountains of Kosovo. Enti i Teksteve dhe Mjeteve Mesimore te Kosoves, Prishtina, **1**, p. 8 (1986).
- Schweithelm: Biodiversity assessment of Kosovo, ARD/BIOFOR, Vermont, US, **1**, p. 32 (2003)
- Stevanovic, V.: Biodiversity of Yugoslavia- with list of international importance. University of Belgrade, Belgrade, **1**, p. 57 (1995).
- Veselaj, Z., F. Krasniqi, B. Mustafa and A. Hajdari: Species of international significance in flora of Kosovo. Proceedings of IVth Balkan Botanical Congress. Sofia. p. 156-160 (2006).
- Veselaj, Z.: Bjeshkët e Nemuna- natural pearl of Kosovo. Regional Environmental Center of Kosovo and Kosovo Foundation for Open Society, Prishtina (2010).