

## **Floristic Study of Biocenosis Plant on the Suburb of the Castle of Prizren in Kosovo**

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### **Abstract**

The study and conservation of biodiversity and in particular the floristic diversity is a fundamental importance to the sustainability not only of natural ecosystems, but human-dominated ecosystems. Recognition of floristic diversity in these areas, especially when they are limited by fluvial space, presents important in many aspects. Floristic studies take an even greater importance when the research at these spaces are partial or when significant parts of phyto-diversity are still unknown. To make such research as full, they should not be limited to the botanical aspects but also met with other ecological aspects. The aim of the study was the identification of flora in the middle of the river Lumbardhi of Prizren in Kosovo and specifically in the Castle of Prizren and its surroundings for recognition, distribution and the current status of plant species and determining on the human impacts. Recognition of floristic richness of this territorial space will constitute an important instrument for identifying the values that it represents and measures for the conservation and management of its best.

**KEYWORDS:** spontaneous flora, plant species, phyto-diversity, biodiversity

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### **1. Introduction**

Biodiversity is considered one of the greatest treasures of humanity and its conservation is vital need to. That the fact that human population is closely dependent on the environment for good resources to services (Díaz et al. 2006). Particular importance in this regard presents floristic diversity, whose study should be done for each ecological zone. For this, the concept of biodiversity subdivided into different compounds to facilitate its measurement and to be subjected to a rigorous comparative study (Heywood, V., Iriondo, J.M. 2003). On the other hand, we study the floristic diversity should be considered human impacts as industrial pollution, deforestation and changing natural habitats in agricultural and industrial land that continuously verified wide spaces every continent often generating irreversible changes (Turner et al., 1991; Chapin et al., 2000). In global level is estimated that biodiversity is declining at a much greater speed than any other period of the previous (Chapin et al., 1998). Greater pressure on floristic diversity is verified especially in residential spaces, however the species that has come to be placed in environments often wary, can receive interest from the point of view of their use in the sink-type plants, dissemination of which is increased in recent years (Bretzel et al., 2009). Phyto-diversity is defined as a group of plant species in a certain territory (Pignatti et al., 2001) and taxonomic unit for the study is the species. The study of phyto-diversity means the number of plant species (check list) present in a territory. Phyto-diversity of a territory is the result of multiple factors as they geographical, climatic, terrestrial as well as human impact in this area. In the space of a flora present in a given territory, together

with native or indigenous units, arising naturally and are stabilized in residence, identify plants that are recognized as foreign by this territory, while coming from different regions of sometimes remote (Viegi et al. 1974). In the course of human history more species are introduced, willingly or accidentally, in the geographical space where there aren't previously existed (Vitousek et al. 1996). Kosovo's plant diversity is the result of the complex interaction of physical factors creating a wide variety of habitat conditions for plant growth. Diverse combinations of soil type, elevation, and microclimate provide a wide range of plant habitats (USAID/Kosovo, 2003). World flora is estimated between 300,000 and 500,000 species and European flora is estimated more or less 11,000 species (Pignatti et al., 2001). Kosovo is exceptionally rich in plant and tree species considering its relatively small area. To date, approximately 1,800 species of vascular plant species have been confirmed through field collection, and botanical experts believe that the actual number is closer to 2,500 (Mustafa B., 1998). About 150-200 plant species that grow in Kosovo are found only in the Balkans (Balkans endemics) and 13 are found only in Kosovo (Kosovo endemics). Phyto-diversity of the pre-mountainous area of Kosovo is very rich in species where a significant number are known and studied, but there are still many other types unstudied, which represent special not only botanical but also ecological interest. This heritage (phyto-diversity) is the result of heterogeneity of environmental conditions (climatic and terrestrial) and degree of adaptation to their vegetation. The geographical, weather conditions, landscape and hydrogeological features of the area have a significant impact on the distribution of plant and animal species (Shukriu A., 1979). This study was conducted in the Prizren Commune which is located in southern part of Kosovo and it has an area of 63,871.68 hectares and is bordered on the west by Albania, in the south by Dragash Commune, on southeastern by Macedonia, on the east by Strpce Commune, on the northeast by Suva Reka Commune, on the north by Orahovac Commune and on northwest by Djakovica Commune. The Prizren Commune is located at altitude of 412-500 m. It is surrounded by Sharr Mountains, and has a rich network of rivers which flow to the White Drin and then to the Adriatic Sea. Rivers which flow from Sharr mountain are very fast and deep and narrow cracks, which often form canyons. The climate is continental, but also penetrate the Adriatic Mediterranean currents through the White Drin Canyon. The average annual temperature is 12.5<sup>0</sup>C, with the lowest temperature of 1.3<sup>0</sup>C in January and highest temperature of 23.2 °C in July. The average value of rainfall in the area varies from 670 to 1200 mm / year and the average relative humidity is 60-70%. Wind goes from 1 to 30 m/s where wind directions dominate on the south, southwest and southeast. In this region there are 220 to 280 sunny days per year (Cavolli R., 1997). This climate has created the conditions for a very rich natural phyto-diversity. The purpose of this study has been the recognition of plant species in the subarea of Prizren Castle, distribution and condition of the existing plant species and which is the human impact on them. This study is organized in territorial space around the Prizren Castle which was an unexplored enough on this issue up to day. The study was conducted from April until October 2013 and during this period are conducted several field explorations that have given interesting results for phyto-diversity of this territory. It should be mentioned that a part of the flow of Prizren Lumbardh, from the Duvaska gorges up near the city of Prizren it is reached since 1976 with the "Cultural Monument" status (Shukriu A., 1979).

Also we have to mention *Plantanus orientalis* plant that there is one nature monument, near Prizreni Castle, from 400 years.

## 2. Material and methods

The study included all territory around and inside the castle of Prizren, Kosovo and is realized during the year 2013. The study identifies existing phyto-diversity of this territory as well as the dominant plant species which are compared with those of other regions of Kosovo. The study has also identified rare species, endemic and medicinal plants. There are identified also human activities and their impact on phyto-diversity. It is done the evaluation of spatial geographic characteristics as geographic location, geomorphology, climate and hydrological conditions and their impact on phyto-diversity of the Castle (Shukriu A., 1979). The method used to identify herbaceous and woody species were that of Braun-Blanquet (1949) and Draget P., Poisonet J., (1969). During the study were identified all plant species found in this area (check list - list of species registered) which have been collected and are herbarized starting from April from the beginning of vegetation until October. Herbaceous plants were collected at the periode of flowering or frut formation and is made with special care to collect all vegetative and reproductive parts. From the woody plants are taking part from the stalk with leaves, flowers and fruit, in order to define them. The collected plants are placed in herbarium by standard methods. After they were placed in herbarium is done at the end of October has become the determination of the reference plant sources of literature (Demiri,M., 1983; Rexhepi F.,1979, 1983, 1986, 2000,2003;Krasniqi F., 1985; Tutin T.G.,et al., 1964-1976; Millaku F., 1993; Horvat,I., 1949; Vangjeli V., et.al. 2000; Diklic, N., Nikolic B., 1970-1977; Pajazitaj Q.,2004).

## 3. Results and discussions

This study was based on floristic method were found in total, 35 families, 95 genus and 103 species. There were identified these types: Coniferopsidae, 1 Cupresaceae families with a total of 1 genus 1 species; Dicotyledoneae , 32 families with a total of 87 genus 94 species; Monocotyledoneae, 2 families with a total of 7 species. From all groups of plants mostly families with species found are: Pinophyta (Coniferopsidae) family: Cupresaceae. Magnoliatae (Dicotyledoneae) family with more species are found: Asteraceae, Rosaceae, Fabaceae, Oleaceae Convolvulaceae, Betullaceae, Ranunculaceae, Brassicaceae, Primulaceae, Lamiaceae etc.; Liliate (Monocotyledoneae) families with more species found is the family of Poaceae with a total of 6 species and Liliaceae with 2 species.

**Table 1. The families and the number of species**

<b>No</b>	<b>Family</b>	<b>Number of species</b>
1.	<i>CUPRESSACE</i>	1
2.	<i>ASTERACEAE</i>	15
3.	<i>APIACEAE</i>	2
4.	<i>ACERACEAE</i>	2
5.	<i>ARALIACEAE</i>	1
6.	<i>ARISTOCHIACEAE</i>	1
7.	<i>BRASICACEAE</i>	3
8.	<i>BETULLACEAE</i>	4
9.	<i>CORNACEAE</i>	2
10.	<i>CAPRIFOLIACEAE</i>	2
11.	<i>CONVOLVULACEAE</i>	5
12.	<i>FABACEAE</i>	10
13.	<i>FAGACEAE</i>	2
14.	<i>GENTIANACEAE</i>	1
15.	<i>HYPERICACEAE</i>	1
16.	<i>JUGLANACEAE</i>	1
17.	<i>LAMIACEAE</i>	3
18.	<i>MALVACEAE</i>	2
19.	<i>MORACEAE</i>	2
20.	<i>OLEACEAE</i>	3
21.	<i>PLANTANACEAE</i>	1
22.	<i>PLANTAGINACEAE</i>	1
23.	<i>POLYGONACEAE</i>	2
24.	<i>PAPAVERACEAE</i>	1
25.	<i>PRIMULACEAE</i>	2
26.	<i>ROSACEAE</i>	12
27.	<i>RANUNKULACEAE</i>	4
28.	<i>SCROPHULLARIACEAE</i>	1
29.	<i>SALICACEAE</i>	2
30.	<i>ULMACEAE</i>	1
31.	<i>URTICACEAE</i>	2
32.	<i>VITACEAE</i>	2
33.	<i>VIOLACEAE</i>	1
34.	<i>LILIACEAE</i>	2
35.	<i>POACEAE</i>	6

**Table 2. The identified types of families with more species**

<p><b>I.PINOPHYTA-CONIFEROPSIDA</b>  <b>1.FAM. CUPRESSACE</b>                      1. <i>Juniperus Communis L.</i></p>	<p><b>12. FAM. ULMACEAE</b>                      1. <i>Ulmus minor Miller L.</i></p>
<p><b>MAGNOLIATE (DICOTYLEDONE)</b>  <b>2. FAM. ASTERACEAE</b>                      1. <i>Centaurea jaceae L.</i>                      2. <i>Centaurea alba L.</i>                      3. <i>Xeranthem inapertum L.</i>                      4. <i>Cicorium intybus. L.</i>                      5. <i>Inula salicina L. .</i>                      6. <i>Anthemis tincotria L.</i>                      7. <i>Lucanthemum vulgare L.</i>                      8. <i>Cardus nutans L.</i>                      9. <i>Achillea millefolium L.</i>                      10. <i>Tragopogon pratensis L.</i>                      11. <i>Eupotarium canabium L.</i>                      12. <i>Bellis perenis.L</i>                      13. <i>Taraxacum officinale. Weh.</i>                      14. <i>Stenactis annua L.</i>                      15. <i>Arctium llapa L.</i></p>	<p><b>13. FAM. CONVULVULACEAE</b>                      1. <i>Calystegia sylvatica L. ( Kit) Griseb</i>                      2. <i>Convovulus arvensis L.</i>                      3. <i>Convovulus althaeoides L.</i>                      4. <i>Convolvulus cantabrica L.</i>                      5. <i>Cuscuta europea L.</i></p> <p><b>14. FAM. MALVACEAE</b>                      1. <i>Alcea pallid (Willd).</i>                      2. <i>Malva Sylvestris.L</i></p> <p><b>15. FAM. GENTIANACEAE</b>                      1. <i>Centarium erythrea Rafn .</i></p> <p><b>16. FAM. ARISTOCHIACEAE</b>                      1. <i>Aristolochia clematitis L.</i></p>
<p><b>3. FAM. ROSACEAE</b>                      1. <i>Pyrus eleagrifolia Pallas.</i>                      2. <i>Pyrus pyrasterL. -</i>                      3. <i>Pyrus communis L.</i>                      4. <i>Prunus spinosa L.</i>                      5. <i>Prunus Avium L.</i>                      6. <i>Mespilus germanika L.</i>                      7. <i>Malus sylvestris L.</i>                      8. <i>Crategus monogyna Jascq.</i>                      9. <i>Rosa canina L.</i>                      10. <i>Fragaria vesca L.</i>                      11. <i>Cydonia oblonga Mill.</i>                      12. <i>Robus ulmifolius Schott.</i></p>	<p><b>17. FAM. PLANTAGINACEAE</b>                      1. <i>Plantago media L.</i></p> <p><b>18. FAM. SCROPHULLARIACEAE</b>                      1. <i>Digitalis lanata Her.</i></p> <p><b>19. FAM. FAGACEAE</b>                      1. <i>Quercus robur L.</i>                      2. <i>Castanea Sativa Miller.</i></p> <p><b>20. FAM. PLANTANACEAE</b>                      1. <i>Plantanus orientalis L.</i></p> <p><b>21. FAM. VITACEAE</b>                      1. <i>Vitis sylvestris. L</i>                      2. <i>Vitis vinifera. L</i></p>
<p><b>4. FAM. FABACEAE</b>                      1. <i>Melilotus alba Med.-</i>                      2. <i>Ononis Spinosa L.</i>                      3. <i>Lathyrus tuberosum L.</i>                      4. <i>Trifolium pretense L.</i>                      5. <i>Trifolium repens L.</i>                      6. <i>Vicia sativa L.</i>                      7. <i>Robinia Pseudoacacia L.</i>                      8. <i>Medicago sativa. L.</i>                      9. <i>Medicago polymorpha L. ( Medicago</i></p>	<p><b>22. FAM. CORNACEAE</b>                      1. <i>Cornus sanguine L.</i>                      2. <i>Cornus mas L.</i></p> <p><b>23. FAM. CAPRIFOLIACEAE</b>                      1. <i>Sambucus ebulus L.</i>                      2. <i>Sambucus nigra L.</i></p> <p><b>24. FAM. URTICACEAE</b>                      1. <i>Urtica dioica L.</i>                      2. <i>Parietaria officinalis L.</i></p> <p><b>25. FAM. PAPAVERACEAE</b></p>

<i>dendriculata</i> Eilld). 10. <i>Colutea Arborescent</i> L.	1. <i>Papaver rhoeas</i> L.
<b>5. FAM. RANUNKULACEAE</b> 1. <i>Helleborus odorus</i> Ealdst et Kit. 2. <i>Nigella damascena</i> L. 3. <i>Thalictrum flavum</i> L. 4. <i>Clematis vitalba</i> L. <b>6. FAM. APIACEAE</b> 1. <i>Eringium campestre</i> L. 2. <i>Heracleum sphondylium</i> L.	<b>26. FAM. SALICACEAE</b> 1. <i>Populus tremula</i> L. 2. <i>Salix alba</i> L. <b>27. FAM. ACERACEAE</b> 1. <i>Acer tataricum</i> L. 2. <i>Acer monssulanum</i> L. <b>28. FAM. MORACEAE</b> 1. <i>Morus alba</i> L. 2. <i>Ficus carica</i> L.
<b>7. FAM. LAMIACEAE</b> 1. <i>Clinopodium vulgare</i> ( <i>Statureja vulgaris</i> Fritsh ) 2. <i>Origanum Vulgare</i> L.. 3. <i>Lamium bifidum</i> - L	<b>29. FAM. JUGLANACEAE</b> 1. <i>Juglans regia</i> L. <b>30. FAM. ARALIACEAE</b> 1. <i>Hedera helix</i> L. <b>31. FAM. PRIMULACEAE</b> 1. <i>Cyklamen neapalitanum</i> Ten. 2. <i>Primula vulgaris</i> Huds.
<b>8. FAM. BRASICACEAE</b> 1. <i>Capsella bursa pastoris</i> L. 2. <i>Cardamine hirsute</i> L. 3. <i>Thlapsi praecox</i> Wulfen.	<b>32. FAM. VIOLACEAE</b> 1. <i>Viola odorata</i> L. <b>33. FAM. HYPERICACEAE</b> 1. <i>Hypeicum perforatum</i> L.
<b>9. FAM. POLYGONACEAE</b> 1. <i>Rumex acetosella</i> L. 2. <i>Rumex crispus</i> L.	<b>LILIATE (MONOCOTILEDONE)</b> <b>34. FAM. LILIACEAE</b> 1. <i>Allium flavum</i> L. 2. <i>Muscari commutatum</i> Guuss.
<b>10. FAM. OLEACEAE</b> 1. <i>Fraxinus ornus</i> . L. 2. <i>Fraxinus excelsior</i> L. 3. <i>Ligustrum Vulgare</i> L. <b>11. FAM. BETULLACEAE</b> 1. <i>Alnus glutinosa</i> L. Geartn 2. <i>Carpinus orientalis</i> L. 3. <i>Coryllus avellana</i> L. 4. <i>Betulla verrukosa</i> Ehrh	<b>35. FAM. POACEAE</b> 1. <i>Lolium perenne</i> L. 2. <i>Hordeum murinum</i> L. 3. <i>Dactylis glomerata</i> L. 4. <i>Bromus squarresus</i> L. 5. <i>Poa pratensis</i> L. 6. <i>Poa bulbosa</i> L.

During exploration, especially in the territory around the castle, there are obviously some plants species that are damaged by various activities in the area as cutting woods or other activities as collecting medicinal plants, and also from uncontrolled constructions.

#### 4. Conclusions

Based on the results of the study conducted in the suurb of the Prizren castle for the determination of phyto-diversity we may conclude that it is rich with specie phyto-diversity, compare this with other regions of Kosovo.

Results of the study demonstrate that there are found: 35 families, 95 genus and 103 species. There have been identified the types: 1 Cupressaceae families with a total of 1 genus and 1 species; Dicotyledoneae 32 families with a total of 87 genus 94 species; Monocotyledoneae 2 families with a total of 7 genus, in total 8 species.

All groups of plants mostly families with species found are: Pinophyta (Coniferopsidae) family: Cupressaceae; Magnoliatae (Dicotyledoneae) as families with more species that are found are the families: Asteraceae, Rosaceae, Fabaceae, Convolvulaceae, Betullaceae, Ranunculaceae, Brassicaceae, Lamiaceae, Olaceae, Urticaceae, Salicaceae, Vitaceae, Primulaceae, Polygonaceae, Malvaceae, Fagaceae, Cornaceae, Caprifoliaceae, Apiaceae, Aceraceae, Araliaceae, Aristochiaceae, Gentianaceae, Ulmaceae, Hypericaceae, Juglanaceae, Plantanaceae, Plantaginaceae, Papaveraceae, Schrophullariaceae, Violaceae. Liliatae (Monocotyledoneae) as families with more species are found the family: Poaceae with a total of 6 species and Liliaceae with 2 species.

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