

# Biological Spectrum and Floristic Composition of Flora of Gjirokastra District, Albania

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## Abstract

*The flora of Gjirokastra district, south Albania is represented with more than 795 plant taxa belongs from 65 families. A floristic study on flora of Gjirokastra district carried out during years 2007-2011 shows a high presence of species of the Asteraceae family with 103 taxa or 12.57 % of total number of taxa. The Leguminosae and Gramineae families are also the most represented with respectively 69 and 67 plant taxa. The biological spectrum is dominated from Hemicryptophytes that covered (405 taxa) 52% of all species and than Therophytes with 139 taxa or 17 %. High presences of Mediterranean and Balkan floristic elements of flora in the Gjirokastra district indicate the influence of Mediterranean climate on its flora and vegetation.*

**Keywords:** Albania, Gjirokastra district, floristic composition, biological spectrum, hemicryptophytes, therophytes

## Introduction

In phyto-geographic terms, the territory of the district of Gjirokastra lies in the Mediterranean Region. The whole territory of this district is located between three mountain ranges: Trebeshine – Gjembel – Nemercke, Shëndëlli-Lunxhëri-Bureto and Murganë-Mali i Gjerë-Mali i Lucës, which are part of the South-Mountaneous Region. The direction of the mountain ranges, which run almost parallel to each other, is South-East/North-West (Kabo *et al.*, 1991). It is this direction of the mountain ranges that creates specific climatic and terrain conditions for the growth and development of a varied, spontaneous flora. (Malo & Shuka, 2007). These mountain ranges create two deep vallies: the Drino Valley and the Zagoria Valley with altitudes ranging from 200 m to 2400 m a.s.l. and energy up to 700 m/km<sup>2</sup>. Although many foreign and local scholars have carried out several floristic expeditions in the district of Gjirokastra, there is, as of today, no complete study on the the flora of the district. None of the studies gives complete floristic evidence for the district of Gjirokastra. From the records over the past years, it turns out that in the district of Gjirokastra there are 719 naturally growing plant taxa constituting almost 22 % of the flora of our country.

## Materials and Methodology

The study and identification of the rare and endangered plants in the district of Gjirokastra was carried out during the years 2007-2010, through the periodic floristic expeditions carried out in the terrain throughout the year. During these expeditions the plant material was collected and labeled. The location of the plants as well as data on their substrate, orientation and level of location were recorded. The localization of the species in its new location was first done with the classic method and later its position was determined using GPS Alan Map 500. The evaluation of the species, subspecies genus, or family based diversity was done based on the use of the transect sampling method (strip or belt transect) combined with relevés of the Mashroot type (plant collection during free movement across the terrain) described in Reis & Chapman, 2000; Sutherland, 2006). The determination of the plants has been done based on the Floras of Albania (Paparisto *et al.*, 1988; Qosja *et al.*, 1996, Demiri, 1983), the floras of the neighbouring countries (Strid & Kit Tan, 1985, Pignatti, 1982), (Kit Tan & Iatrow, 2001), Flora of Europaea (Tutin *et al.*, 1964-80). The status of endangered species has been established based on the methodology described by W. Sutherland in "The Conservation Handbook" (Sutherland, 2006), the existing red lists of our country (Vangjeli *et al.*, 1994), IUCN (Walater & Gilllet, 1998) and the Red Book of threatened plants of Greece (Phitos *et al.*, 1995).

## Results and Discussion

From the expeditions carried out during the years 2007 – 2011, part of the dissertation work on the topic: "The Study of the plant Diversity in the District of Gjirokastra", it turns out that there are 719 naturally growing plant species in this district. Based on the field results, the number of species per releve as well as the rare and endangered species, we claim that the richest floristic areas in the district of Gjirokastra are those of Kardhiq-Zhulat-Maja e Lucës, Cajupi Mountain, Vrisera-Koshovicë-Murganë, Selcka Pass, Nemërcka Mountain. Below, I will focus below on the description of the areas where the expeditions were carried out.

**The Kardhiq-Zhulat-Maja e Lucës Area.** This is one of the richest floristic areas of the district. It lies at the bottom of the valley with the same name and ends at the dividing Golem heights. Apart from the forest formations covering the northern slope of the mountain range mentioned above, this area is known for the endemic genera *Hypericum haplophyloides* Halascy et Baldacci subsp. *haplophyloides* F.K.Meyer, *Noccaea cikaea* F.K.Meyer and *Viola acrocerauniensis* Erben. The Kardhiq-Zhulat-Maja e Lucës area is also rich in other sub-endemic, subBalkan and Balkan species, among which we could distinguish *Alkanna corcyriensis* Hayek, *Cymbalaria microcalyx* subsp. *minor* Greuter, *Crocus boryi* Gay., *Centaurea epirota* Halácsy. *Fritillaria thessala* (Boiss.) Kamari subsp. *ionica* (Halacsy) Kamari, *Galanthus reginae-olgae* Orph. subsp. *vernalis* Kamari, *Scabiosa epirota* Halacsy et Bald., *Sideritis raeseri* subsp. *raeseri* Boiss. et Heldr., and *Ramonda serbica*.

**The Cajupi Mountain** area covers all the altitudes of that mountain starting from 500 m above sea level up to 1800m. Apart from its varied plant life and aesthetic values, this area is also known for the rare plant species like *Centaurea zuccariniana* DC. *Crataegus heldreichii* Boiss., *Ptilotrichum ciclocarpum* subsp. *pindicum* *Minuartia stellata* Maire & P., *Asperula chlorantha* Boiss at Heldr. *Lilium chalcedonicum*, *Dianthus haematocalyx* Boiss. et Heldr. subsp. *pindicola*, *Silene ungerFenzl.*, *Astragalus baldaccii* Degen, *Helichrysum plicatum* DC as well as *Juniperus foetidissima* formations.

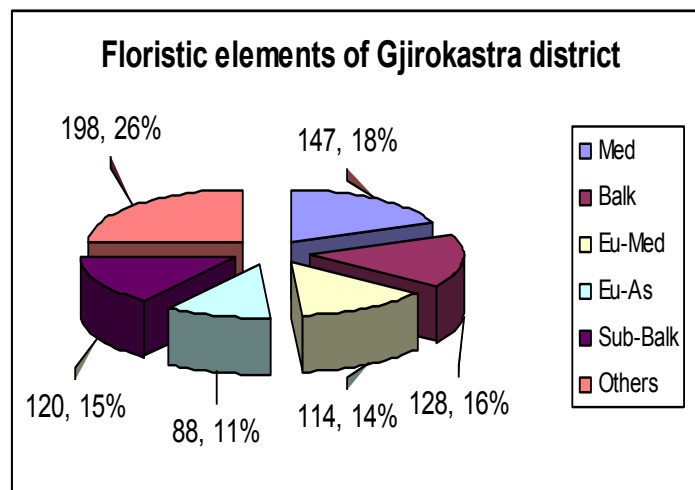
**The Vrisera-Koshovicë-Murganë** area includes all the territories inside the basin of the upper part of the Drino Valley. This area contains most of the orchid species that grow in the district of Gjirokastra and the area in which all vegetation zones lying on a vertical plan are present (Sotira). It is especially known for the forest of the spruce tree of Macedonia, patches of beech formations, the black pine, as well as holm oak formations, horse chestnut and century old oak trees.

**The Selcka Pass – Nemërcka Mountain** includes the whole territory from the remote Suhë-Selckë-Poliçan Pass and the South-West oriented slopes of the Nemërcka Mountain up to the Papingu or Light peak. This area is known for rare and endangered species as well as for a variety of habitats. The endemic genera of *Stachys sericophylla* Halacsy, the rare genera of *Solenanthus albanicus* (Degen) Deg., *Centaurea graeca* Griseb., *Herniaria parnassica* subsp. *parnasica*., *Campanula albanica* Watesek, *Tulipa sylvestris* L., *Minuartia pseudosaxifraga* (Mattf.) Greuter & Burdet, *Silene (Heliosperma) pusilla* subsp. *tymphaea* Greuter, *Trinia glauca* subsp. *pindica* Hartvig, *Cerastium decalvans* subsp. *leontopodium* (Stoj. & Stefanov) Niketić, *Viola epirota* (Halacsy) Raus etc. grow here.

Besides what was said above, the results of the field records during various transects, indicate a vast richness in not only in species but also in genera found in the district of Gjirokastrë. The 795 species and subspecies recorded in the district of Gjirokastrë by us or other authors are distributed in 313 genera which belong to 65 families. Out of 313 genera, most of them are represented by 1 to 4 species or subspecies and exactly: 179 genera are represented by one plant species, 60 genera by 2 species, 26 genera by 3 species and 15 genera by 4 species. The other 33 genera represent a total of 354 species and consist of 5 to 14 species.

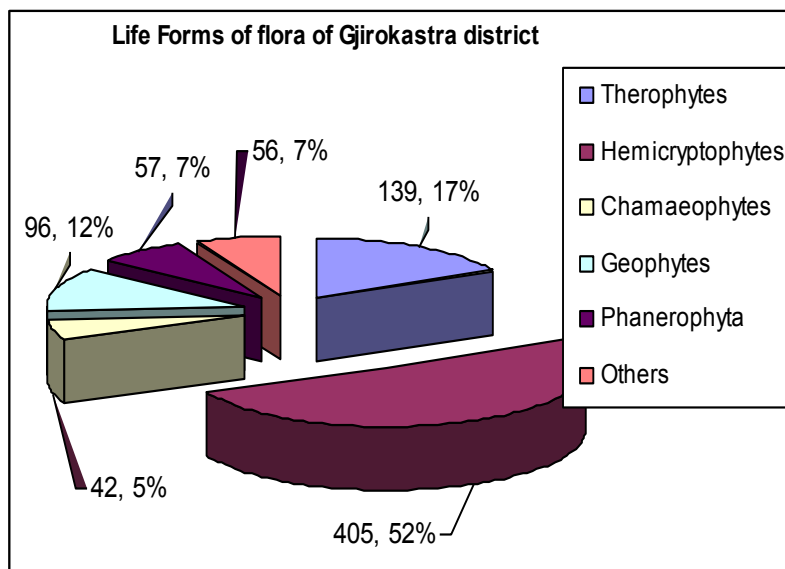
The structure of the species inside the genera shows that 24.83% of the species are included in 176 genera, which makes us think that the flora of Gjirokastrë must be richer than thought. As a matter of fact, the territory under investigation is quite vast as the terrain is mountainous and difficult to reach due to the lack of infrastructure and the too steep slopes (the Nemërcka, Bureto, Cajupi and Murganë Mountains). Lack of water and the massiveness of the forests make the search even more difficult in some of the environments mentioned above. There are 34 other families (with less than 5 species or subspecies) and they are represented by 94 taxa.

The analysis of the floristic spectrum of the species and subspecies recorded in the district of Gjirokastrë indicates that its flora and the plant life is a mixture of about 37 elements of different origin. The Mediterranean element with 147 species or about 18% (fig. 1) has the largest impact in the formation of the flora and the plant life of the district of Gjirokastrë. The Balkan floristic element is the second most common in the plant life of the district with 128 taxa or 16% of the whole flora and the third is the Euro-Mediterranean element with 114 species or subspecies or 14%. The Euro-Asiatic element comes in third place with 88 species or 11%. Of great importance in the formation of the plant life of the district are the sub-Balkan and subendemic elements with respectively 75 and 45 species or 15% of the plants. The other floristic elements include 198 taxons or 26% of the flora of the district.



**Figure 1.** Floristic elements of flora of Gjirokastra district

All the above results testify to the major role of the mediterranean and mediterranean-continental climate (in altitudes of 2000 a.s.l.) in the formation of the plant life of the district. This conclusion is also supported by the prevalence of the mediterranean, euro-mediterranean, Balkan and subBalkan elements that reach a total of 509 taxa or 64 % of the recorded species in Gjirokastra district. Judging by the life forms in the analysis of the plant life of Gjirokastër, we notice the prevalence of the Hemicryptophytes with 405 taxa (fig. 2) or 52% of the general number of the flora of the district, the Therophytes with 139 taxa or 17% and then Geophytes with 96 taxa or 12%, phanerophytes with 57 taxa (7 %) of the general number of the taxa recorded by us or others in the district. The other life forms of flora of Gjirokastra contain ca. 56 taxa or 7 %. The high presence of the herbaceous plants (Hemicryptophytes, Therophytes) is a clear indicator of the geographic, geomorphologic and climatic conditions in the district of Gjirokastër. Only the herbaceous plants are capable of completing their life cycle before the start of the hot and dried summer which is also followed by the lack of precipitation. The high percentage of the Therophytes in itself is also an indicator of the overgrazing (Danserau, 1957) of the ecosystems of this district. On the other hand, the low percentage of the phanerophytes suggests the fact that these ecosystems are being stripped of the high bushy plants and especially of the ligneous ones.



**Figure 2.** The life forms of plant taxa of Gjirokastra district

## Conclusions

The flora of the district of Gjirokaster constitutes a natural value which should be protected and developed. Further studies should be carried out not only to complete the list of the variety of plant life in it, but also to observe its performance in the differing climatic conditions and the result of the human impact on it.

Continual cutting of the bushy and forest formations of the district have deteriorated the condition of the plants and forests, which leads to the extinction of the herbaceous plants and the spread of pionering, invasive plants.

The implementation of new policies which aim at the protection and management of the rare and endangered species of the district is an indispensable duty for the prevention of the loss of the biodiversity of this region.

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