

THE ANTHROPOGENIC POTENTIAL IMPACT ON FLORA IN GHIȚU-MOLIVIȘ AREA (ARGEȘ COUNTY)

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Abstract. This paper is an analysis of the vascular flora based on personal observations and data from botanical literature of Ghițu-Moliviș area. In Arefu village program there is a planned tourism development regarding the infrastructure (ski slope, hotel, motel, hostel, restaurant, cottages), the construction of holiday homes and apartments with complementary functions related to technical infrastructure and access roads, the creation of a hydroelectric power generation, service, storage spaces with adjacent investment (sport equipment rental centres), the recreation areas, sports fields and green spaces.

Keywords: potential impact, flora, Ghițu-Moliviș.

Rezumat. Potențialul impactului antropic asupra florei în zona Ghițu-Moliviș (județul Argeș). Lucrarea face o analiză a florei vasculare pe baza observațiilor personale și a datelor din literatura botanică a zonei Ghițu-Moliviș, întrucât în programul de dezvoltare al comunei Arefu se prevăd, în special, dezvoltarea infrastructurii specifice turismului (pârtie de schi, hotel, motel, pensiuni, restaurant, cabană), construcțiilor de case de vacanță și de locuințe, cu funcțiunile complementare aferente, infrastructurii tehnico-edilitare și a căilor de acces, înființarea unei zone de generare de energie hidroelectrică, de prestări servicii, spații de depozitare cu investiții adiacente (centre de închiriere echipament sportiv), zona de recreere, terenuri de sport, spații verzi.

Cuvinte cheie: potențial impact, flora, Ghițu-Moliviș.

INTRODUCTION

Arefu village is situated in the north-west of Argeș county and includes the Upper Argeș Valley and Vidraru Lake, Frunții and Ghițu Mountains.

According to its geographical location, the territory administrated by the municipality is:

- In the bio-geographical alpine region,
- In the Southern Carpathians,
- In the European Central Region including its floristic Carpathian type,
- In specific regions for high mountain pastures and mountain forests (DONIȚĂ *et al.*, 2005).

The area covered by this Urban Plan of Mount Ghițu includes most of the northern side and lower portions of the slopes from north-west and north-east and it is covered by deciduous forests mixed with resin forests and pastures. Over Ghițu-Moliviș territory there is Natura 2000 ROSCI0122 - site of Community importance in Făgăraș Mountains, as it was declared by the Order of the Ministry of Environment and Sustainable Development no. 1964/2007. In this site, the analysed area occupies a reduced part (PUZ Environmental Report on the "Creation of general infrastructure and tourism activities in the specific climatic area - Moliviș Ghițu", Arefu village, Argeș County, 2007).

The site ROSCI0122 from Făgăraș Mountains was declared of Community interest - for the habitats mentioned in the Law 92/43/EEC on the conservation of natural habitats, plants and animal species - and the conservation requires the designation of special areas of habitat, those that require strict protection and those whose removal from the wild and exploitation are likely to be subject to management measures. In Argeș county, the site area covers the following locations: Arefu (89%), Berevoiești (<1%), Brăduleț (7%), Lerești (38%), Nucșoara (85%), Rucăr (55%), Sălătrucu (62%), Valea Mare-Pravăș (4%). On the above mentioned territory there is also a very important reserve of Argeș County: "Moliviș" Peaty, with an area of about 82.50 hectares, less studied and unused from the touristic point of view. The suggested site includes the highest and wildest sector of the Romanian Carpathians, with one of the largest glacial and periglacial relief extensions, with an extensive suite of unique landscapes, with specific environmental conditions due to the geological diversity, to the pedological and climate diversity reflected in very high biodiversity of the area (Standard Sheet from Piedmont Făgăraș ROSPA0098). Habitats are very varied, starting from the meadow ones (alders, old willow thickets - with largely continuous and compact areas), shrubs, forest ecosystems, both alpine and subalpine. In this massif there are also representative fragments of virgin and natural forests -now practically inexistent in Europe - which polarize a special land biodiversity, providing a priceless national wealth. Within the site there are nowadays more protected areas among which we mention the nature reserves of Alpine meadow in Făgăraș Mountains between Suru and Podragu, Moldoveanu - Capra Alpine meadow, Bâlii Valley, Vâlsan Valley, Arpâsel, etc. Among flora species of European interest, on Ghițu Moliviș territory we mention: *Eleocharis carniolica*, *Liparis loeselii*, *Campanula serrata*.

MATERIAL AND METHODS

The analysis of vascular flora of Făgăraș Mountains was compiled from personal and laboratory research and from the study of botanical literature. The taxonomic nomenclature was adopted in accordance with the CIOCÂRLAN (2009). A large proportion is represented by the cormophytes identified and published by ALEXIU, 2008 and STANCU, 2005. The vascular flora is analysed in this paper taking into account the systematic categories, the bioforms, the

geoelements, the ecological indices (the soil moisture, the temperature and the soil reaction) and the zoological categories.

RESULTS

The systematic analysis: In the Ghițu-Moliviș area there have been identified 479 species, grouped into 70 families. The families with the greatest number of species (347 species in total), are: Asteraceae, Poaceae, Caryophyllaceae, Cyperaceae, Orchidaceae, Ranunculaceae, Brassicaceae, Fabaceae, Rosaceae, Scrophulariaceae, Apiaceae, Lamiaceae, Salicaceae, Primulaceae, Campanulaceae, Saxifragaceae, Juncaceae. Other 132 species are grouped in 53 families (Fig. 1).

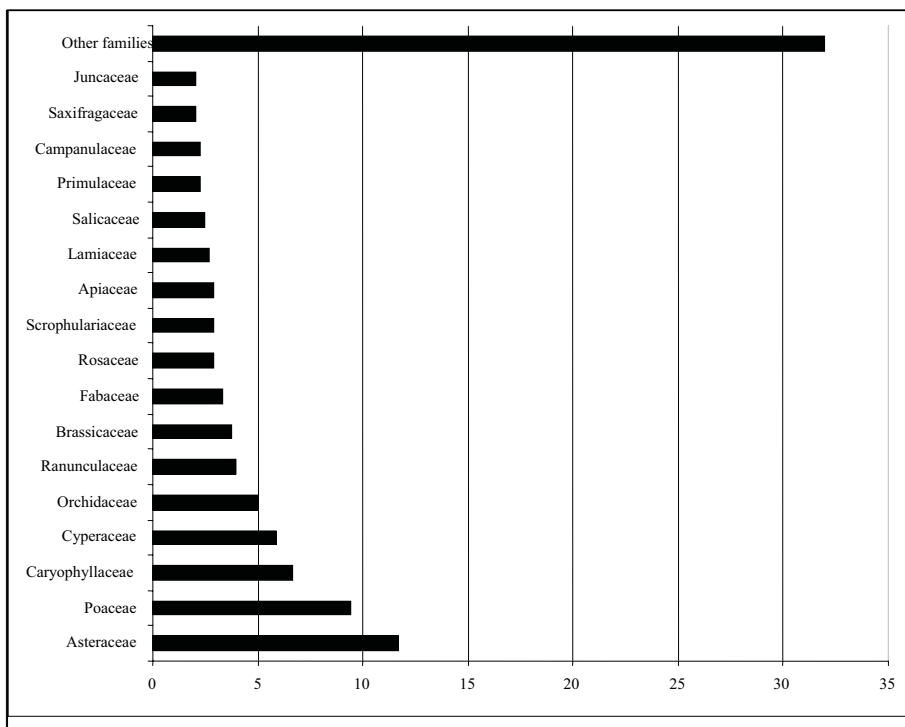


Figure 1. Taxonomic analysis of Ghițu-Moliviș flora.
 Figura 1. Analiza taxonomică a florei din zona Ghițu-Moliviș.

Bioforms analysis: The largest group of plants in the studied area is formed by the hemicryptophytes (308 species / 64%), followed by geophytes (59 species / 13%) and phanerophytes (43 species / 9%). High percentage of hemicryptophytes indicates that the researched territory belongs to temperate climate regions. The therophytes presence shows the existence of anthropogenic activities in the investigated area. Camephytes (44 species / 9%) highlights the extent of territory to the subalpine floor of Ghițu Mountains (Fig. 2).

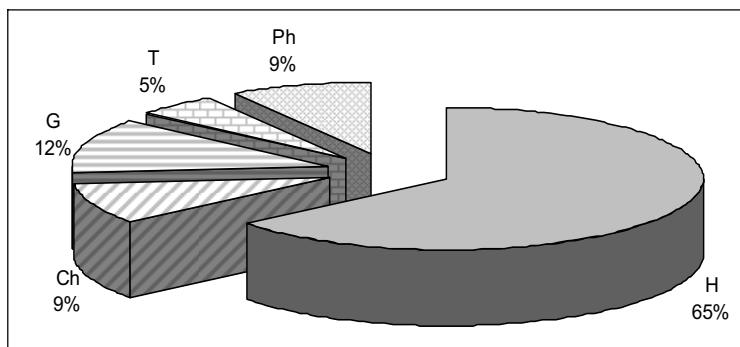


Figure 2. Bioforms percentage on Ghițu-Moliviș territory.
 Figura 2. Ponderea bioformelor în teritoriul Ghițu-Moliviș.

Geoelements analysis: Amid flowers Eurasian origin (27%), interferes European species (17%), circumpolar (14%) and Central Europe (9%). A significant proportion of species is of a Carpathian origin (9%) with representatives such as *Aconitum lycoctonum* ssp. *moldavicum*, *Aquilegia transsilvanica* (threatened endemic taxa), *Achillea oxyloba*

ssp. *schurii* (European taxon threatened), *Hepatica transsilvanica* (threatened endemic), *Ranunculus carpaticus*, *Papaver alpinum* ssp. *corona-sancti-stephani* (European taxon threatened), *Dianthus glacialis* ssp. *gelidus* (threatened endemic), *D. henteri* (threatened endemic), *D. spiculifolius* (threatened endemic taxa), *D. tenuifolius* (threatened endemic taxa), *Silene dinarica* (threatened endemic), *Sempervivum montanum* ssp. *carpaticum* (globally threatened taxa), *Chrysosplenium alpinum*. Carpatho-Balkan species (8%) are represented by *Tozzia alpina* ssp. *carpatica* (a threatened European taxon), *Campanula patula* ssp. *abietina* (European taxon threatened), *Silene lerchenfeldiana*, *Saxifraga carpatica* (Red List vulnerable taxon Romania), *Potentilla aurea*, *Rhododendron myrtifolium* (Red List vulnerable taxon Romania), *Pulmonaria rubra*, *Symphytum cordatum*, *Festuca drymeia*. Alpical species of the Carpathians (5%), remember, *Minuartia austriaca*, *Viola alpina*, *Draba kotschyi*, *Cardamine resedifolia* etc., few items are included in other categories (11%), which have a low share of representation (Fig. 3).

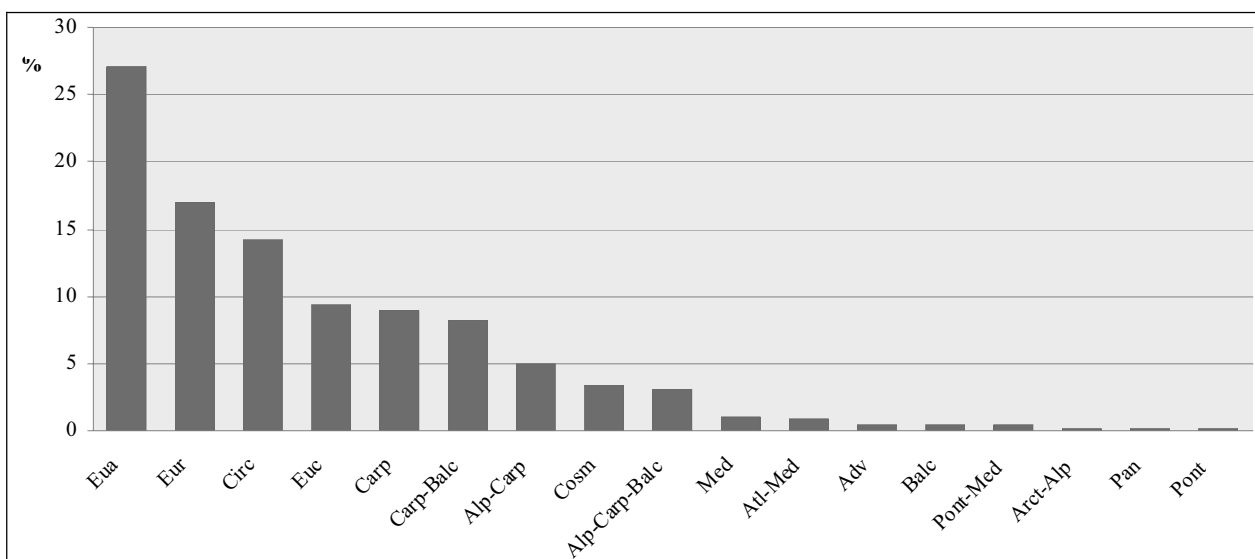


Figure 3. Spectrum of geoelements in the area Ghițu-Moliviș.
 Figura 3. Spectrul geoelementelor în arealul Ghițu-Moliviș.

Sozological analysis: In the mentioned area there are some species classified as Vulnerable (V): *Lycopodium complanatum*, *Dianthus henteri*, *Draba kotschyi*, *Phyteuma confusum*, *Primula farinosa*, *Ranunculus glacialis*, *Androsace chamaejasme*. There are also quoted taxa threatened even at European level (*Achillea oxyloba* ssp. *schurii*, *Papaver alpinum* ssp. *corona-sancti-stephani*, *Tozzia alpina* ssp. *carpatica*, *Campanula patula* ssp. *abietina*) or even at a global level like *Sempervivum montanum* ssp. *carpaticum*.

Ecological analysis: In order to characterize the flora there were taken into account three edafo-climatic factors: humidity (U), temperature (T) and soil reaction (R). In the investigated area, the flora is characterized by preference for mesophilic environment, mesothermal, low-acid-neutrophilia (Fig. 4).

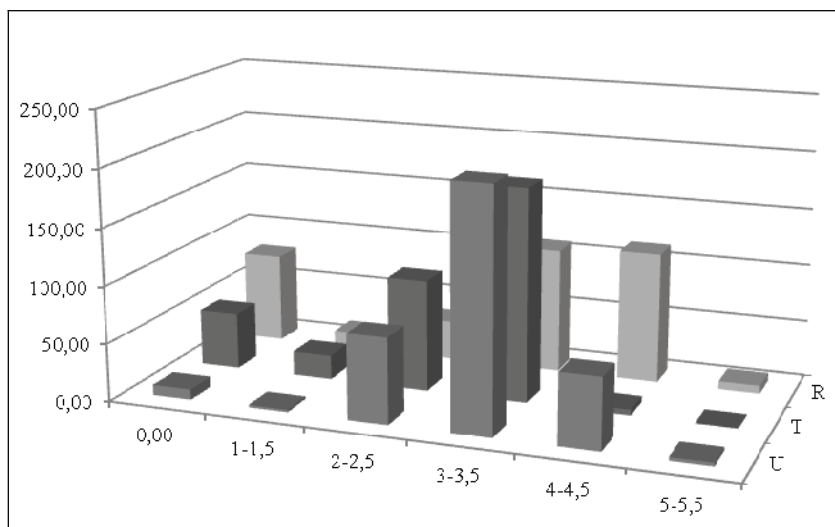


Figure 4. The number of environmental groups in the area Ghițu-Moliviș.
 Figura 4. Ponderea categoriilor ecologice în arealul Ghițu-Moliviș.

DISCUSSIONS

To minimize the risks on the flora, it is necessary to observe the period of execution of the objectives that led to the AUP (Area Urban Plan) and an accurate compliance with the subsequent projects that will underpin the execution. Measures proposed to prevent, reduce and offset any adverse environmental effects of implementing the AUP (Area Urban Plan):

- The protected vegetation in locations where construction work will be carried out will be identified before the construction works, and there will be solutions - given by authorized personnel - to protect it; it is recommended that monitoring be done by working with a biologist / botanist;

- It will be necessary to restore vegetation through ecological reconstruction, by covering with characteristic humus to allow specific vegetation restoration; complete ban of planting on green areas some allochthonous species with invasive features;

- In areas where total or partial soil removal is inevitable, it is recommended a rehabilitation of the area with a mixture of native species like: *Festuca*, *Trifolium* - in any case with no unknown or allochthonous species; there should be lawn mowing and anthropogenic impact will be limited.

Given the fact that AUP (Area Urban Plan) has as a final destination the organization of tourism in ecological conditions, with the enhancement of the biodiversity in the area, with measures of environmental protection through specific infrastructure (water networks, establishment of sewerage, sewage treatment, waste management with selective collection), we consider that, after the implementation of Area Urban Plan, which will take into account the environmental report measures proposed by the **Environment Report** of reducing the impact and compensation for adverse effects, there will be a reduced anthropogenic pressure on the environment factors like: air, water and soil / subsoil, biodiversity, so that the effective implementation of specific objectives of AUP will be higher than the negative effect on soil and biodiversity by occupying with buildings.

CONCLUSIONS

Although many ecological studies are needed for knowledge of flora, we can say that it was taken the first step in this direction. The analysis provides an overview of the studied area, which can provide basic data for future projects. In the investigated area there have been identified 479 species, grouped in 233 genera and 70 families. Plant species diversity is high, hemicryptophytes being predominant, followed by geophytes, phanerophytes and camephytes.

The particular note of the study is the presence of Carpathian endemic species such as *Silene zawadzki*, *Dentaria glandulosa*, *Thymus bihoriensis*, *Melampyrum saxosum*, *Pedicularis baumgarteni*, *Festuca nitida* ssp. *flaccida*. It is remarked the presence of threatened taxa in Europe (*Achillea oxyloba* ssp. *schurii*, *Papaver alpinum* ssp. *corona-sancti-stephani*, *Tozzia alpina* ssp. *carpatica*, *Campanula patula* ssp. *abietina*) or even at global level as for *Sempervivum montanum* ssp. *carpaticum*.

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Received: March 31, 2012
Accepted: July 26, 2012