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# Innovative Phytosociological Method for the Inventory of Vegetation Types and AMP in a Municipality Scale

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**Abstract-** Albania is a south-western Balkan country, strategically positioned on the Adriatic and Ionian Sea inside the Mediterranean Sea. It belongs in developing countries. The total area is c.a. 28,748 km<sup>2</sup> (97.7% land and 2.3% water). Albania is characterized for its biological diversity and abundance of contrasting ecosystems and habitats. More than 60% of the area is covered by forests, pastures and natural vegetation. Nowadays important reforms are happening on the forestry sector in terms of decentralization and ownership of forest administration from the state to local government (municipalities), in order to fulfill the strategy for a sustainable management of natural resources and poverty eradication. To do successfully that it is very important to inventory and establish a database of natural resources and services at municipality level. Legally, inventory of medicinal plant must to be repeated each ten years, but this is not respected strictly since 1988 because high cost and time consuming. The establishment of an innovative method, for the inventory aromatic and medicinal plants (AMP), of high effectiveness and less time consuming, is the main focus of this paper. There are using for this purpose remote sensing techniques and phytosociological principles (Braun Blanquet sensu strictu).

**Key Words** – AMP, Inventory, Municipality, Phytosociology, Remote sensing.

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## I. INTRODUCTION

Aromatic and medicinal plants (AMP) are an important natural resource in Albania for economic development and poverty reduction, especially in remote areas. Currently Albania is ranked among the major Mediterranean countries for the export of medicinal and aromatic plants such as: Common sage (*Salvia officinalis* L.), Winter savory (*Satureja montana* L.), Wild marjoran (*Origanum vulgare* L.), Iron-wort (*Sideritis raeseri* Boiss. & Heldr.), Dog rose (*Rosa canina* L.), Wilder apple-tree (*Malus sylvester* Miller.), Cowslip (*Primula veris* L.), Common Juniper (*Juniperus communis* L.), Prickly juniper (*Juniperus oxycedrus* L.), etc. Medicinal plants (fruits, vegetables, herbs, etc.) are a source for a wide variety of natural Products, but unfortunately the unsustainable use of forests and natural resources still continues, while the economic needs and the efforts for prosperity and development are increasing in Albania. Meantime over-harvesting is defined as the primary risk for medicinal plants. The main factors that have led to flora damage can be summarized in: (i) destruction of habitats, (ii) land use changes in forestry, (iii) direct impact on economic activities, (iv) introduction of non-native invasive species.

Legally, inventory of medicinal plant must to be repeated each ten years, but this is not respected strictly since 1988, because the high cost and time consuming. Natural resource inventory (NRI), which serves as an index of natural resources, is an expensive process to conduct and the results need to be available as soon as possible following data acquisition. It provides baseline documentation for the measuring, sustainable management and evaluating resource protection issues. As such, efforts are ongoing to make the inventory faster, better, and cheaper, by research, to gain efficiencies in sample design and processing.

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Transferring process of the natural resources from the central government to local administrative unit, which is happening in Albania, makes imperative the inventory of these resources and the maintenance of a dynamic data base. Natural Resource Inventory can be adopted as part of a master plan and serves as the first step to protect and preserve the natural resources within the municipality.

Plant communities play an important role in sustainable management by maintaining biodiversity and conserving the environment [16].

The purpose of this study is to set up an innovative methodology for the plant resource inventory within the territory of the municipality of Skrapar (as a case study) in order to provide a more detailed information on the current state of AMP.

The inventory of renewable natural resources is a complex enterprise and the preparation of information is a considerable investment to be carried out. To improve the accuracy of the information and to decrease time and costs, the remote sensing techniques and phytosociological principles are used in this inventory.

The remote sensing capabilities to generate and mapped information about natural resources are well documented and GIS technique is well known for the unique power of data retention, analysis and management [3]. The interpretation of the images is defined as an examination of the images in order to determine the objects and to judge their significant value [8]. Different space presentations have led to a number of spatial methods for describing the structure and spatial model. For each application should be selected, interpreted, analyzed and evaluated in accordance with the context of the study and the given thematic classification [11]. Scientists have paid special attention to efforts to develop sensors, visual and digital image processing algorithms to extract relevant biophysical vegetation information from remote sensing data.

Phytosociological studies (Braun Blanquet *sensu strictu*) are essential for protecting the natural plant communities and biodiversity as well as understanding the changes experienced in the past and continuing on into the future. Quantitative analysis, especially quantitative classification methods and ordination techniques, has been widely used to indicate the ecological relationships between vegetation and environment [30]. Species richness for each plant community was calculated as the average number of species per stand. Moreover, floristic studies are not only important to know the variety of plants present in an area, but also socio-economically significant.

## II. MATERIAL AND METHODS

Quantitative analysis, especially quantitative classification methods and ordination techniques, has been widely used to indicate the ecological relationships between vegetation and environment [30].

### 2.1. Study Area

The study area is located in South-East Albania, between the coordinates: north (512765.92 E; 4454985.41 N), South: (509936.72 E; 4430201.79 N); East (520743.74 E; 4444693.05 N); and West (490459.64 E; 4449448.81 N). The total area of Skrapari's Municipality is c.a. 83.140 ha. The altitude achieve from 400 m to 1593 m over the sea level. It is characterized by a mountainous terrain and a wide altitudinal stretch from the typical Mediterranean evergreen sclerophyllous forest and shrub vegetation belt (Bogove) up to high

mountainous vegetation (dwarf and grass species) ever-blistering Mediterranean forests of the xerofite scrubland to the high mountain pastures (Tomorri Mountain). Study area is characterized also by geologic and soil variability. Climate is an essential factor in terms of the spread of vegetation types. Significantly, the climate is represented by the rainfall/temperature report. Based on the ration between the average perennial monthly rainfall (P) and the average perennial monthly temperatures (T), the drought index of Bagnouls-Gausson [2] is estimated and presented.  $IG = P/T$  (Fig. 1). When IG is  $\leq 2$  means drought period (Fig. 1).



Fig. 1. Thermo-Pluviometric diagram of Bagnouls-Gausson

The main economic activities on this municipality are the agriculture, husbandry and medicinal plants. Methodologically the study is carried out in three main phases [23].

## 2.2. Pre-Evaluation Phase

This phase consisted into the collection of a wide archive material related to the subject matter as well as the measuring data, orientation, mapping ortho-photos, space imageries and so on. For this purpose there are used up to date publications. [18], [4, 5], [19], [15], [27, 28], [1].

To do the pre-evaluation assessment of the vegetation the remote sensing technique is used. A coordinative grid (1 x 1 km) (Fig. 2a) was established (in total 830 points). SENTINE-2 images and ortho-photos are used for the identification of LCCS3 [10], Land use, classification of forest types (FOREST EUROPE) [9] and dynamic stages [22]. Field investigation points through simply randomly statistical method are selected (Fig. 2b).

Regarding SENTINEL-2 imagery, the color bands that determine the vegetation types, in summer (when the broadleaves forests are green) and in winter (when broadleaves forests lose leaves) are created. In this case, land cover types and forest categories are defined by Pixels.

In order to determine the interaction between environmental factors and plant communities, 156 points are determined randomly (Fig. 2b), in terms of phytosociological method, from the coordinative grid, for further field verification and measurements.

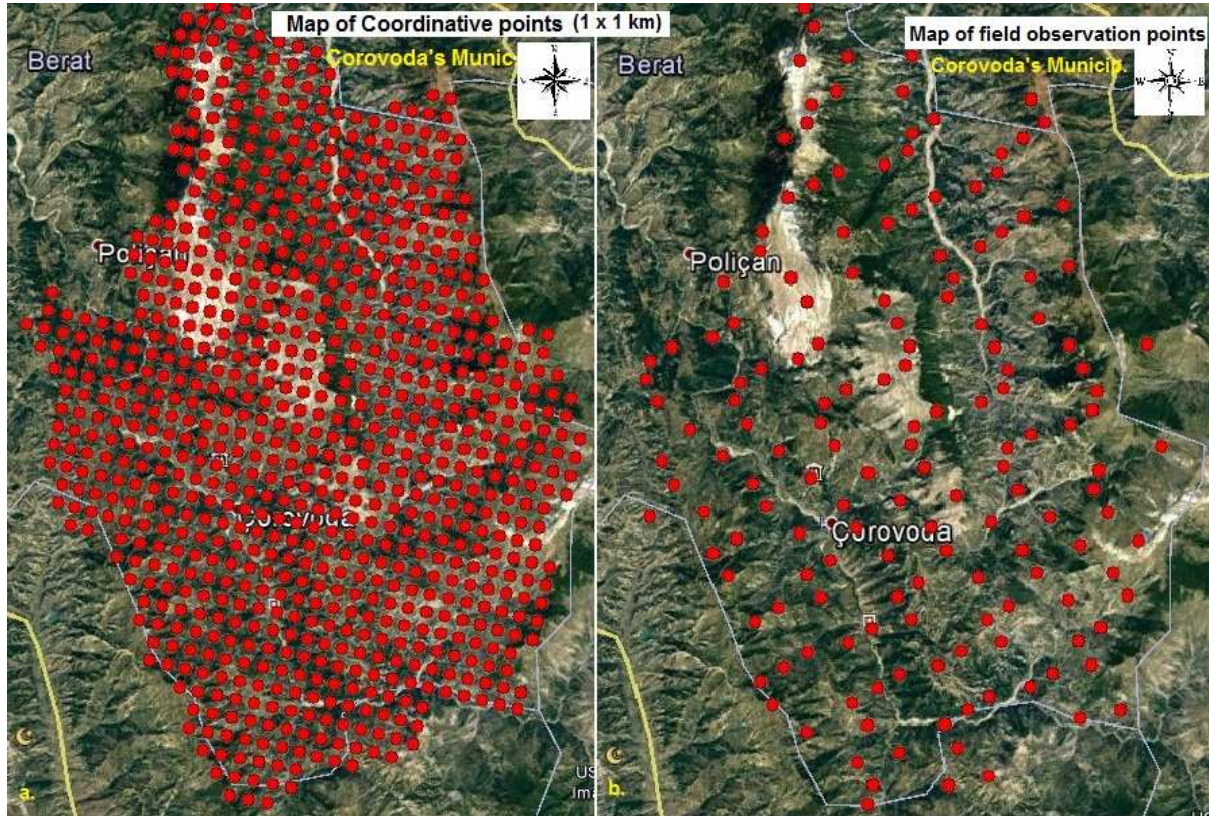


Fig. 2. Coordinative grid (1x1km) and point selected randomly for field investigation

### 2.3. Analytic Phase Of Data Collection

This study attempts to establish an optimal sampling technique for biodiversity and medicinal plant assessment. Two data base are created in order to collect, conserve and manipulate data for evaluation and reporting. For the general data about LCCS3, Forest Types, Dynamic stages etc. an ACCESS data base is established and provided to the Municipality (Fig. 3).

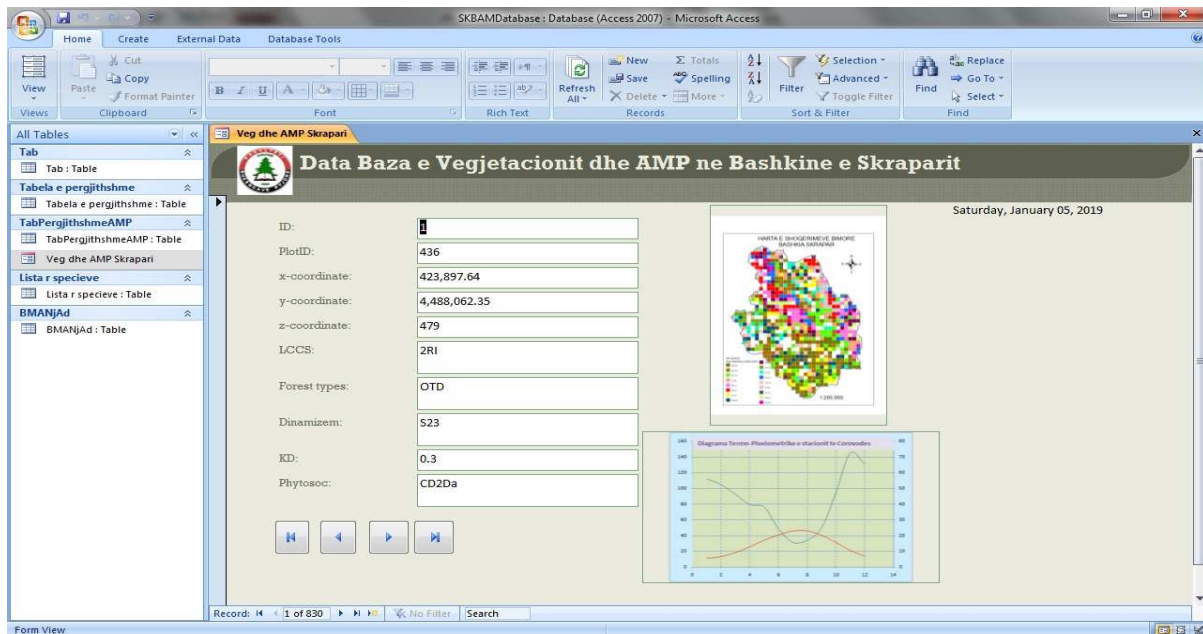


Fig. 3. Data base for general information about the vegetation types (ACCESS)

The data collected on the relèves are recorded at TURBOVEG program (vegetation archive)[12]. The abundance-dominance index (A-D), per each present species in the relève, is estimated, using Braun Blanquet scale [6]. The determination of the biological forms per each specie on the relève is made according to the classification used in the TURBOVEG program [24, 25]. TURBOVEG allow to transfer data to other statistical programs as is the case of JUICE 7.0 [26]. From JUICE 7.0 data can be imported from the TURBOVEG 2.0 database. JUICE 7.0 represents one application for statistical analysis, editing, presentation, classification and analysis of phytosociological tables. In 1994 TURBOVEG was accepted as a standard computer package for EVS (Fig. 4). Currently it has been installed in about 25 countries all over Europe and beyond [12].

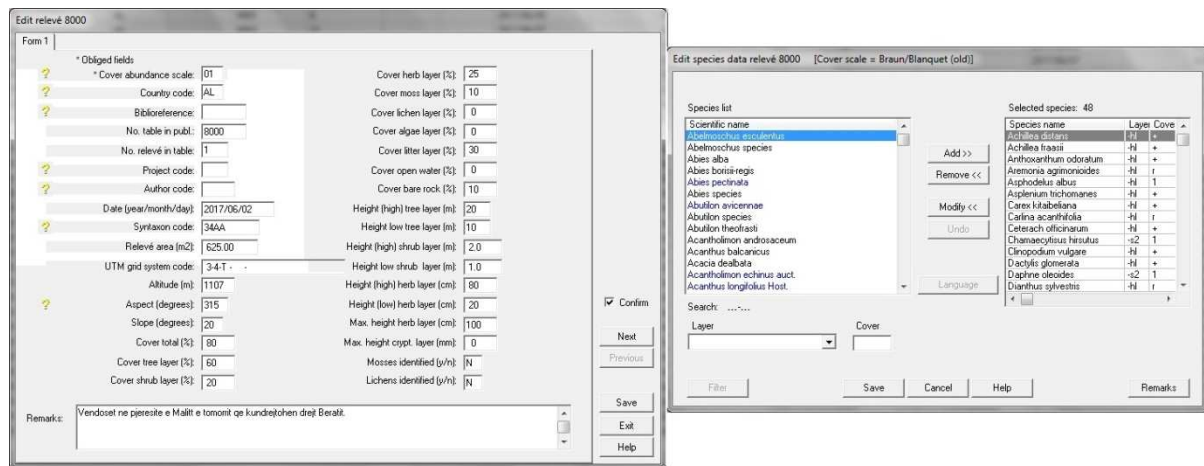


Fig. 4. TURBOVEG a standard computer package for European Vegetation Survey (EVS).

Vegetation relèves were recorded by using the Braun-Blanquet seven-degree scale of abundance and dominance (A-D) [6]. The releves size is calculated based on the “mimnimal area” and all the floristic list is inventoried using A-D index (Braun Blanquet sensu strictu). A total of 167 releves are inventoried and entered them into the TURBOVEG database [12].

#### 2.4. Synthetic phase of data elaboration

Data elaboration from the general data base (Remote sensing) with Pivot Table is done. There are calculated areas per Land layer Cover (LCSS3), Forest types (FOREST EUROPE), Plant associations (Braun Blanquet sensu strictu) and Dynamic stages per vegetation series. The territory of Corovoda’s Municipality per LCCS3 and Forest type, as on the graph below is divided (Fig. 5):

For the purpose of the phytosociological classification, the concept of association has been formulated as an abstract and basic entity, defining the necessary attributes of a specific plant assemblage. From a qualitative point of view, the association represents a plant community with a concrete species composition (floristic criterion), having spatially isotropic structure (physiognomic criterion of homogeneity), confined to a certain position in environmental space (ecological criterion) [Braun Blanquet, Diersch 1994].

The phytosociological analysis of the vegetation in the territory of the municipality of Skrapar was done according to the method of Braun Blanquet [6]. Numerical vegetation analysis was done with the help of the TWISPAN program [13, 14]. The systematic interpretation was based on the European Vegetation Classification [21]. Ecological characterization was carried out through Ellenberg's ecological indicators,

Raunkier's biological form [24, 25] and SHANNON-WEAVER [13, 14]. Data editing and relè analysis were managed in the JUICE 7.0 program [26] a multivariate statistical program package [19, 20]. Only vascular plants were considered, as other plant groups play an insignificant role in the studied vegetation. We calculated relative Euclidean (chord) distance for square-rooted percentage cover data and applied the  $\beta$ - flexible clustering method with  $\beta = -0.25$ . Five clusters at the highest hierarchical level are accepted, which roughly corresponded to the following phytosociological syntaxons (Appendix 1,2). By the floristic list of each plant community using A-D index, medicinal plants and their coverage as well as potential production are identified.

### III. RESULTS AND DISCUSSION

From the elaboration of general data (remote sensing) resulted as follow (Fig. 5):

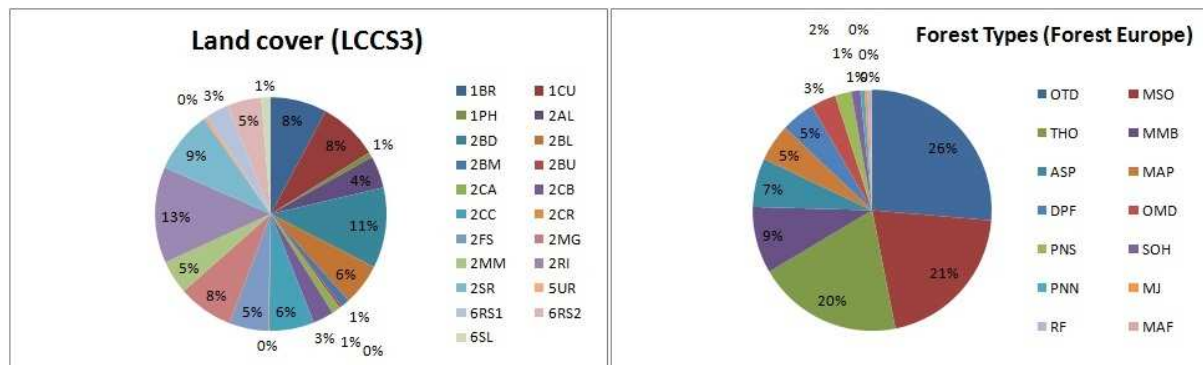


Fig. 5. Area distribution for LCSS3 and Forest Types (EEA)

From the inventory of the plants withing releves and phytosociological analyses resulted:

Regarding  $\alpha$  biodiversity, territory of the municipality is reach in floristic species because the location, morphological and edaphic variability and very large distribution in altitude (from 400 to 1593 m over the sea level). During the field work there are inventoried 647 vascular plants, distributed in 111 families, as Fabaceae (59), Compositae (56), Poaceae (56), Lamiaceae (43), Rosaceae (33), Brassicaceae (25), Scrophullariaceae (24), Caryophyllaceae (20), Ranunculaceae (19), Rubiaceae (12), Campanulaceae (11), Liliaceae (11) etc. A high variability represents  $\alpha$  biodiversity on Biological forms and Chorological forms.

The presence of the species with specific status shows four categories:

**Endemic:** 6 endemic species are located mostly on Tomorri Mountain: *Arabis tomorensis* Markgraf., (Brassicaceae), *Arenaria cikaea* F.K Meyer (Caryophyllaceae), *Astragalus autranii* Bald (Fabaceae), *Campanula aureliana* Bogdanović, Rešetnik, Brullo & Shuka (Campanulaceae), *Euphorbia cikaea* F.K. Meyer (Euphorbiaceae) and *Onosma mattirolii* Bald. (Borraginaceae) [27, 28].

**Sub-endemic:** 12 sub-endemic species as *Arenaria gracilis* W. K. Pl (Caryophyllaceae), *Asperula chlorantha* Boiss. & Heldr. (Rubiaceae), *Campanula hawkinsiana* Hausskn. & Heldr. (Campanulaceae), *Centaurea epirota* Halcsy (Compositae), *Edraianthus australis* (Wettst.) Lakusic (Campanulaceae), *Herniaria parnassica* subsp. *parnassica* Chaudhri (Caryophyllaceae), *Lilium chalcedonicum* L. (Liliaceae), *Nepeta spruneri* Boiss. (Lamiaceae), *Pedicularis graeca* Bunge (Scrophullariaceae), *Pterocephalus perennis* subsp. *bellidifolius* Coulter (Caprifoliaceae), *Valeriana crinii* Orph. ex Boiss. (Valerianaceae) and *Viola albanica* Halacsy (Violaceae) are

identified during the field work [27, 28].

**Balkan and sub-balkan species:** Balkan and sub-Balkan species are an important element of the country's flora [17]. In the studied area we encounter 44 Balkan and 28 sub-Balkan species, which make up respectively about 7.0% and 4.0% of the site flora, and c.a. 29% of the rare and threatened flora list. C.a. 20 of them are also included in the list of endangered species.

**Species with endangerment status.** In this category the species of the red list of Albania, based on IUCN categorization are given [Vangjeli]. There are determined 59 species, which represent 11% of the total determined species. On the graph below the weight for each IUCN category [20] is given.

From the relevés there are identified c.a. 102 medicinal and aromatic species as well as economic value species. As most important and most distributed value species are *Thymus* sp. Div., *Hypericum* sp.div., *Sideritis raeseri*, *Satureja montana*, *Gentiana lutea*, *Achillea millefolium*, *Primula veris*, *Juniperus* sp., *Cholchicum* sp.div., *Plantago* sp., *Salvia officinalis*, *Salvia sclarea*, *Verbascum* sp.div., *Crategus monogyna*, *Rosa cannina*, *Origanum vulgare*, *Rubus* sp., *Sambucus nigra*, *Erythraea centaurium*, *Centaurea cyanus*, *Mentha pipereta*, *Matricaria cammomila*, *Papaver rhoeas*, *Malva sylvestris*, *Urtica dioica* [28, 27].

$\gamma$  biodiversity, based on the phytosociological methodology and analyse, the vegetation types (Braun Blanquet *sensu strictu*) is defined. On the table and figure below the space distribution and area size for each vegetation types is presented. Using Juice 7.0 [26], twenty-one plant communities are identified, as on the syntetic table, using European Vegetation Classification [29]. Not all vegetation types are classified up to association level because the limited areas of its distribution. For the syntaxonomic nomenclature to the alliance, order and class levels, European Vegetation Classification is used [21]. See synoptic table on the appendixes 3 of paper.

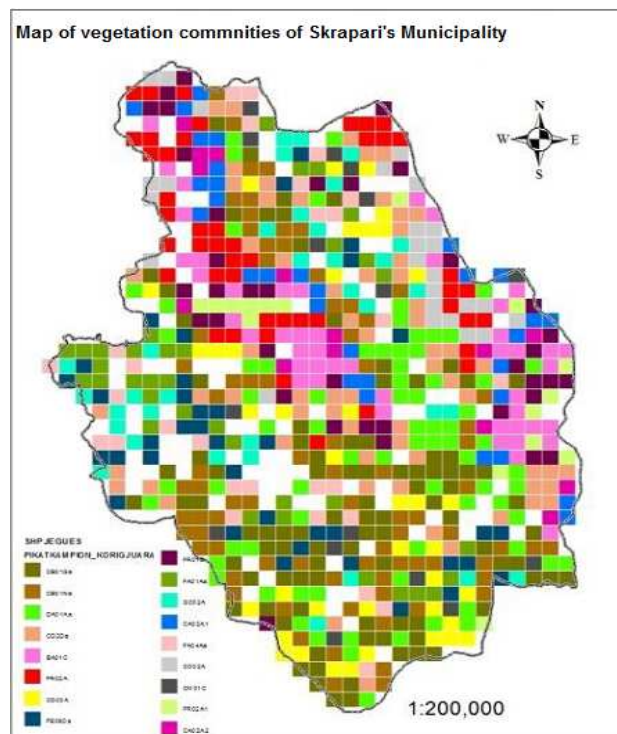


Fig. 6. Map of the plant communities (Braun Blanquet)

Distribution per plant community on the graph below is presented.

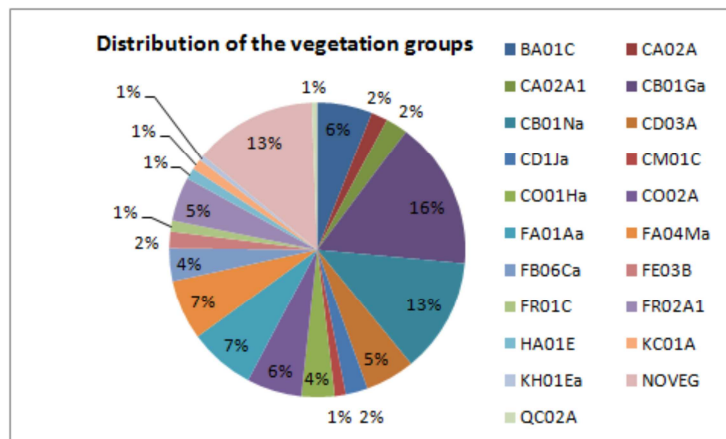


Fig. 7. Distribution per plant community (Braun Blanquet)

From the phytosociological analyse, biodiversity point of view, results that most richest vegetation groups are Juniperion nanae Fk 1960, Pinion pallasianae Korzhenevsky 1998, Seslerio – Pinetum leucodermis Vangjeli 1984, Pistacio lentisci-Juniperetum oxycedri Allegrezza, Biondi, Formica & Ballelli 1997, Cytision oromediterraneo-scoparii Rivas-Mart. et al. 2002, Arbuto- Quercetum ilicis Br Bl 1938 etc., as on the graph below is presented.

Skrapari’s Municipality vegetation of must to be considered very reaches in medicinal plants, a big potential for economic development and poverty eradication on the remote areas. From the phytosociological analzse, based on the floristic cortege and per each plant community, the table of medicinal plants is edited on the appendixes 4 and 5.

#### IV. CONCLUSIONS

Phytosociological method can be used efficiently as the methodological tool for the inventory of vegetation, natural resources (AMP) and evaluation of the biodiversity.

The territory of Skrapary Municipality is very rich related to  $\alpha$  biodiversity, numbering 647 vascular plants, distributed in 111 families. A high variability represents  $\alpha$  biodiversity on the Biological forms, Chorological forms and in species with specific status like endemisms (6 species), Sub endemisms (12 species), Balkanic (44 species), sub balkanic (28 species) and endangerment species based on IUCN categorisation (59 species).

The territory of Skrapary Municipality related to  $\gamma$  biodiversity so far, numbering twenty-one plant communities or vegetation groups, due to the big differences in altitude, variability of the soils and the high climate and micro-climate variability. meet 102 medicinal, aromatic and food interest species, which can contribute to the economic development and poverty eradication of the people living in remote areas of this Municipality.

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**Research and teaching** on the Faculty of Forestry Sciences, General Botany, Systematic of Plant and Plant sociology, Classification of Forest associations, International Project Management, Biodiversity and Nature Conservation and Forest and Protected Area Management.  
**Participation:** on c.a. 40 projects and as speaker on 75 scientific conferences  
**Publication:** 21 books (mostly texts), 72 scientific articles, mostly on the international publications.

## APPENDIX

**APPENDIX 1: PHYTOSOCIOLOGIC TABLE OF VEGETATION COMMUNITIES OF SKRAPARI'S MUNICIPALITY**

**APPENDIX 2: PERCENTAGE SYNOPTIC TABLE WITH FIDELITY PHI COEFF. A (20 COLUMNS)**

**APPENDIX 3: SYNOPTIC TABLES OF PLANTS COMMUNITIES**

**APPENDIX 4: AMP PER PLANT COMMUNITY (BRAUN BLANQUET)**

**APPENDIX 5: PERCENTAGE OF AMP PER PLANT COMMUNITIES – SYNOPTIC TABLE**



























Table with columns for species names and numerical data. Species include Acer campestre, Stachys germanica, Petrorhagia saxifraga, etc. The data consists of various symbols and numbers representing different parameters for each species.

• "Result Generated by Program"

**Appendix 2: Percentage synoptic table with fidelity Phi coeff. A (20 columns)**

Group No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
No. of relevés	2	1	1	8	11	1	3	1	2	4	2	5	8	1	27	58	9	9	1	3
<i>Veratrum nigrum</i>	100.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Achillea holosericea</i>	70.3	---	---	14.6	---	---	---	---	---	---	---	---	14.6	---	---	---	---	---	---	---
<i>Thalictrum minus</i>	81.4	---	---	---	---	---	---	---	---	---	39.9	---	---	---	---	---	---	---	---	---
<i>Sedum ochroleucum</i>	70.3	---	---	---	---	---	---	---	---	---	---	43.1	---	---	---	---	---	---	---	---
<i>Festuca paniculata</i>	70.3	---	---	---	---	---	---	---	---	---	---	43.1	---	---	---	---	---	---	---	---
<i>Scutellaria alpina</i>	70.3	---	---	---	---	---	---	---	---	---	---	43.1	---	---	---	---	---	---	---	---
<i>Jovibarba heuffelii</i>	70.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Cotoneaster nebrodensis</i>	70.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Asperula aristata</i>	46.1	---	---	19.2	14.7	---	---	---	---	---	---	---	26.7	---	---	---	---	---	---	---
<i>Chamaecytisus hirsutus</i>	52.6	---	---	---	---	---	---	---	---	---	25.1	31.2	23.1	---	---	---	---	---	---	---
<i>Achillea fraasii</i>	49.4	---	---	---	---	---	---	---	---	---	---	---	23.2	---	---	---	---	---	---	---
<i>Geranium cinereum</i>	57.0	---	---	---	---	---	---	---	---	---	---	34.2	25.6	---	---	---	---	---	---	---
<i>Cynoglossum germanicum</i>	57.0	---	---	---	---	---	---	---	---	---	27.4	53.1	---	---	---	---	---	---	---	---
<i>Euphorbia herniariifolia</i>	81.4	---	---	17.9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Rumex nepalensis</i>	49.4	---	---	---	---	---	---	---	---	---	---	30.3	---	---	---	---	---	---	---	---
<i>Rhamnus saxatilis</i>	49.4	---	---	---	---	---	---	---	---	---	---	30.3	---	---	---	---	---	---	---	---
<i>Senecio thapsoides</i>	81.4	---	57.4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Thymus striatus</i>	33.7	---	---	30.5	23.7	---	26.1	---	---	---	---	---	---	---	---	---	---	9.8	---	---
<i>Poa alpina</i>	---	70.5	---	23.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Inula oculus-christi</i>	---	49.5	---	---	---	---	---	---	---	---	---	---	---	---	3.3	---	---	30.8	---	---
<i>Nepeta spruneri</i>	---	70.5	---	23.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Vaccinium myrtillus</i>	---	49.5	---	33.0	---	---	---	---	---	---	---	20.1	---	---	---	---	---	---	---	---
<i>Asplenium ruta-muraria</i>	---	70.5	70.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Phleum hirsutum</i>	---	---	100.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Polypodium vulgare</i>	---	---	100.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Edraianthus graminifolius</i>	---	---	100.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Amphoricarpos neumayeri</i>	---	---	100.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Crepis baldaccii</i>	---	---	100.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Onosma visianii</i>	---	---	100.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Valeriana montana</i>	---	---	100.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Aubrieta gracilis</i>	---	---	100.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Bombycilaena erecta</i>	---	---	100.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Arabis alpina</i>	---	---	70.5	23.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Pteroccephalus perennis subsp.bellid</i>	---	---	57.4	---	32.6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Juniperus communis subsp.nana</i>	14.9	23.8	---	49.6	32.0	---	26.1	---	---	---	---	5.9	---	---	---	---	---	---	---	---
<i>Galium degenii</i>	---	---	44.1	61.8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Cardamine carnosa</i>	---	---	34.6	47.3	16.3	---	17.9	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Asperula doerfleri</i>	---	---	---	86.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Minuartia recurva</i>	---	---	---	79.2	6.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Astragalus autranii</i>	---	---	---	69.6	39.1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Cerastium grandiflorum</i>	---	---	---	65.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Trinia glauca</i>	---	---	---	69.6	20.3	---	31.0	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Saxifraga marginata</i>	---	---	---	60.5	16.3	---	17.9	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Valeriana bertisceae</i>	---	---	---	55.8	20.6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Sedum hispanicum</i>	---	---	---	51.1	18.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Hypericum richeri subsp.grisebachii</i>	---	---	---	49.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Edraianthus species</i>	---	---	---	49.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Anthylis montana subsp.jacquini</i>	---	---	---	49.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Sedum hispanicum</i>	---	---	---	49.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Crepis alpestris</i>	---	---	---	51.1	30.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Bellardiochloa violacea</i>	---	---	---	69.8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Trisetum flavescens</i>	---	---	---	53.3	13.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Festuca bosniaca</i>	20.3	---	---	65.1	13.3	---	15.4	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Veronica thessalica</i>	---	---	32.5	69.0	14.7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Linaria alpina</i>	---	---	32.5	69.0	14.7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Saxifraga paniculata</i>	---	---	26.6	56.1	37.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Viola albanica</i>	---	---	37.1	51.1	6.2	37.1	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Valeriana crinii</i>	---	---	29.2	73.1	21.8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Saxifraga grisebachii</i>	---	---	27.8	69.6	29.7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---









<i>Corylus avellana</i>	---	---	---	---	---	---	---	55.3	---	---	9.0	---	---	2.6	---	---	---	---
<i>Malus sylvestris</i>	---	---	---	---	---	27.3	---	74.3	---	---	---	---	---	---	---	---	---	---
<i>Polygonatum multiflorum</i>	---	---	---	---	---	---	---	70.3	---	---	---	---	---	---	---	---	---	---
<i>Campanula persicifolia</i>	---	---	---	---	---	---	---	70.3	---	---	---	---	---	---	---	---	---	---
<i>Lamiaeum galeobdolon</i>	---	---	---	---	---	---	---	70.3	---	---	---	---	---	---	---	---	---	---
<i>Ilex aquifolium</i>	---	---	---	---	---	---	---	70.3	---	---	---	---	---	---	---	---	---	---
<i>Lathyrus niger</i>	---	---	---	---	---	---	---	70.3	---	---	---	---	---	---	---	---	---	---
<i>Lactuca muralis</i>	---	---	---	---	---	---	---	70.3	---	---	---	---	---	---	---	---	---	---
<i>Sambucus nigra</i>	---	---	---	---	---	---	---	70.3	---	---	---	---	---	---	---	---	---	---
<i>Neottia nidus-avis</i>	---	---	---	---	---	---	27.4	81.1	27.4	---	---	---	---	---	---	---	---	---
<i>Poa nemoralis</i>	---	---	---	---	---	---	---	56.8	---	---	---	---	---	---	---	---	---	---
<i>Atropa belladonna</i>	---	---	---	---	---	---	---	74.3	34.2	---	---	---	---	---	---	---	---	---
<i>Galium odoratum</i>	---	---	---	---	---	---	30.3	66.1	30.3	---	---	---	---	---	---	---	---	---
<i>Salix elaeagnos</i>	---	---	---	---	---	---	---	49.5	---	---	---	---	---	---	---	---	---	---
<i>Calamagrostis gigantea</i>	---	---	---	---	---	---	---	49.5	---	---	---	---	---	---	---	---	---	---
<i>Polygonatum odoratum</i>	---	---	---	---	---	---	---	49.5	---	---	---	---	---	---	---	---	---	---
<i>Laburnum alpinum</i>	---	---	---	---	---	---	---	49.5	---	---	---	---	---	---	---	---	---	---
<i>Laburnum alpinum</i>	---	---	---	---	---	---	---	49.5	---	---	---	---	---	---	---	---	---	---
<i>Sorbus aucuparia</i>	---	---	---	---	---	---	---	49.5	---	---	---	---	---	---	---	---	---	---
<i>Lonicera implexa</i>	---	---	---	---	---	---	---	49.5	---	---	---	---	---	---	---	---	---	---
<i>Rubus hirtus</i>	---	---	---	---	---	---	---	49.5	---	---	---	---	---	---	---	---	---	---
<i>Sambucus racemosa</i>	---	---	---	---	---	---	---	49.5	---	---	---	---	---	---	---	---	---	---
<i>Abies alba</i>	---	---	---	---	---	---	---	49.5	---	---	---	---	---	---	---	---	---	---
<i>Laburnum alpinum</i>	---	---	---	---	---	---	---	49.5	---	---	---	---	---	---	---	---	---	---
<i>Lonicera xylosteum</i>	---	---	---	---	---	---	---	49.5	---	---	---	---	---	---	---	---	---	---
<i>Frenanthes purpurea</i>	---	---	---	---	---	---	---	49.5	---	---	---	---	---	---	---	---	---	---
<i>Rhamnus alpinus subsp.fallax</i>	---	---	---	---	---	---	---	49.5	---	---	---	---	---	---	---	---	---	---
<i>Cardamine bulbifera</i>	---	---	---	---	---	---	---	56.8	39.9	---	---	---	---	---	---	---	---	---
<i>Daphne mezereum</i>	---	---	---	---	---	---	43.6	62.0	20.3	25.0	---	30.7	---	---	---	---	---	---
<i>Fagus sylvatica</i>	18.1	---	---	---	---	---	---	39.5	56.2	39.5	22.1	4.2	---	---	---	---	---	---
<i>Doronicum columnae</i>	14.3	---	---	---	---	---	---	32.6	46.4	14.3	40.4	19.9	23.0	---	---	---	---	---
<i>Ajuga reptans</i>	---	---	---	---	---	27.8	---	39.5	56.2	39.5	22.1	4.2	---	---	---	---	---	---
<i>Vincetoxicum hirsutaria</i>	---	---	---	---	---	---	---	---	34.2	---	---	---	---	9.9	---	---	---	---
<i>Alyssum bertolonii</i>	---	---	---	---	---	---	---	---	70.5	---	---	---	---	---	---	---	---	---
<i>Polystichum lonchitis</i>	---	---	---	---	---	---	---	---	70.5	---	---	---	---	---	---	---	---	---
<i>Scutellaria columnaea</i>	---	---	---	---	---	---	---	---	70.5	---	---	---	---	---	---	---	---	---
<i>Erica herbacea</i>	---	---	---	---	---	---	---	---	70.5	---	---	---	---	---	---	---	---	---
<i>Genista hassertiana</i>	---	---	---	---	---	---	---	---	70.5	---	---	---	---	---	---	---	---	---
<i>Festucopsis serpentini</i>	---	---	---	---	---	---	---	---	70.5	---	---	---	---	---	---	---	---	---
<i>Cardamine graeca</i>	---	---	---	---	---	---	---	---	70.5	---	---	---	---	---	---	---	---	---
<i>Juniperus foetidissima</i>	---	---	---	---	---	---	---	---	70.5	---	---	---	---	---	---	---	---	---
<i>Festuca rhaetica</i>	---	---	---	---	---	---	---	---	70.5	---	---	---	---	---	---	---	---	---
<i>Verbascum nigrum</i>	---	---	---	---	---	---	---	---	70.5	---	---	---	---	---	---	---	---	---
<i>Daphne mezereum</i>	---	---	---	---	---	---	---	---	70.5	---	---	---	---	---	---	---	---	---
<i>Carpinus betulus</i>	---	---	---	---	---	---	---	34.2	49.4	---	---	---	---	---	---	---	---	---
<i>Cotoneaster nebrodensis</i>	---	---	---	---	---	---	---	---	49.4	30.3	---	---	---	---	---	---	---	---
<i>Carlina acaulis</i>	---	---	33.0	---	---	---	---	---	34.2	---	---	---	---	---	---	---	13.4	---
<i>Rhamnus alpinus subsp.fallax</i>	---	---	---	---	---	---	---	---	39.9	24.0	17.9	---	---	---	---	---	---	---
<i>Linaria peloponnesiaca</i>	32.6	---	1.2	---	---	---	---	---	32.6	52.0	10.6	23.0	---	---	---	---	9.0	---
<i>Abies borisii-regis</i>	---	---	---	---	---	---	---	---	39.9	50.5	---	---	---	---	---	---	---	---
<i>Heracleum sphondylium</i>	46.1	---	---	---	---	---	---	---	---	57.9	19.2	32.5	---	---	---	---	---	---
<i>Onosma mattirolii</i>	25.1	---	---	---	---	---	---	---	---	48.8	37.1	---	---	---	---	---	---	---
<i>Achillea distans</i>	---	---	---	---	---	---	---	---	---	50.5	17.9	---	---	---	---	---	---	---
<i>Teucrium montanum</i>	---	---	---	---	---	---	---	---	---	23.2	61.8	7.8	---	---	---	---	6.7	---
<i>Stachys alopecuros</i>	39.9	---	---	---	---	---	---	---	---	50.5	---	---	---	---	---	---	---	---
<i>Carex kitaibeliana</i>	25.1	---	---	---	---	---	---	---	---	---	48.8	23.1	37.1	---	---	---	---	---
<i>Pinus leucodermis</i>	18.1	---	---	1.5	---	---	---	---	---	18.1	63.0	36.9	---	---	---	---	---	---
<i>Corydalis ochroleuca</i>	25.1	---	---	---	---	---	---	---	---	---	48.8	37.1	---	---	---	---	---	---
<i>Dianthus petraeus</i>	---	---	---	---	---	---	---	---	---	---	66.4	37.1	---	---	---	---	---	---
<i>Geranium macrorrhizum</i>	---	---	---	---	---	---	---	39.5	41.0	39.5	49.4	---	27.8	---	---	---	---	---
<i>Galium lucidum</i>	14.3	---	---	---	---	10.1	---	---	---	---	52.0	29.2	23.0	---	---	---	---	---
<i>Ranunculus oreophilus</i>	34.2	---	---	---	---	---	---	---	---	---	43.1	14.6	---	---	---	---	---	---
<i>Scabiosa columbaria</i>	13.2	---	0.3	---	---	---	---	---	---	---	15.5	---	---	32.3	---	---	---	---
<i>Rhamnus saxatilis</i>	---	---	---	---	---	---	---	---	---	---	44.1	---	---	---	---	---	---	---
<i>Corydalis ochroleuca</i>	---	---	---	---	---	---	---	---	---	---	44.1	---	---	---	---	---	---	---
<i>Moltkia petraea</i>	---	---	---	---	---	---	---	---	---	---	44.1	---	---	---	---	---	---	---













<i>Rosa arvensis</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Asparagus acutifolius</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Calicotome villosa</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Cotinus coggygria</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Medicago lupulina</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Blackstonia perfoliata</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Salvia verticillata</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Sporobolus species</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Knautia albanica</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Crupina vulgaris</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Hypericum perforatum</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Echium vulgare</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Erigeron acer</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Rubus canescens</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Galium mollugo</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Coronilla elegans</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Clematis vitalba</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Pinus halepensis</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Dactylis glomerata</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Aegilops ovata</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Anagallis foemina</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Misopates orontium</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Rosa arvensis</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Calystegia sepium</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Veronica austriaca</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Osyris alba</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Cistus incanus</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Primula vulgaris</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Abelmoschus esculent</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Hypericum perforiatum</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Phlomis fruticosa</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Anemone hepatica</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Viburnum tinus</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Arrhenatherum elatius</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Genista tinctoria</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Micromeria cristata</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Dorycnium hirsutum</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Brachypodium ramosum</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Phlomis fruticosa</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.6	---	---	---	---	---		
<i>Linum bienne</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	18.2	---	---	---	---	---	
<i>Acer platanoides</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	18.2	---	---	---	---	---	
<i>Ajuga genevensis</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	18.2	---	---	---	---	---	
<i>Saponaria officinali</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	18.2	---	---	---	---	---	
<i>Calamintha nepeta</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	18.2	---	---	---	---	---	
<i>Buxus sempervirens</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	18.2	---	---	---	---	---	
<i>Aira elegantissima</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	18.2	---	---	---	---	---	
<i>Acer monspessulanum</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	18.2	---	---	---	---	---	
<i>Acer obtusatum</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	18.2	---	---	---	---	---	
<i>Cytisus villosus</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	9.9	3.1	---	---	---	---	---	
<i>Briza minor</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	9.9	3.1	---	---	---	---	---	
<i>Brachypodium distachyon</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	9.9	3.1	---	---	---	---	---	
<i>Salvia officinalis</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	9.9	3.1	---	---	---	---	---	
<i>Cerastium glomeratum</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	21.1	---	---	---	---	---
<i>Smilax aspera</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	24.9	---	---	---	---	---	---	
<i>Pyracantha coccinea</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	24.9	---	---	---	---	---	---	
<i>Rosa sempervirens</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	24.9	---	---	---	---	---	---	
<i>Daucus carota</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	24.9	---	---	---	---	---	---	
<i>Erigeron acer</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	24.9	---	---	---	---	---	---	
<i>Calicotome villosa</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	24.9	---	---	---	---	---	---	
<i>Calystegia sepium</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	24.9	---	---	---	---	---	---	
<i>Delphinium peregrinum</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	24.9	---	---	---	---	---	---	
<i>Clematis viticella</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	24.9	---	---	---	---	---	---	
<i>Geranium purpureum</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	24.9	---	---	---	---	---	---	
<i>Ranunculus nemorosus</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	23.7	---	---	---	---	---	---
<i>Orchis lactea</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3.3	12.7	---	---	---	---	---	---
<i>Coronilla emerus</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	18.3	---	---	---	---	---	---	---









<i>Satureja montana</i>	10.2	---	18.0	5.3	7.9	---	---	---	---	---	---	11.4	20.8	---	---	8.5	---	---	---	---
<i>Brachypodium sylvaticum</i>	---	---	---	---	---	---	---	13.9	19.8	28.1	19.8	---	---	---	---	44.6	---	---	---	---
<i>Petrorhagia saxifraga</i>	---	21.0	21.0	34.6	19.4	---	36.5	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Brachypodium pinnatum</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	11.1	45.2	16.8	5.2	---	---	---
<i>Euphorbia cyparissias</i>	9.2	---	---	---	---	---	---	---	---	---	23.9	28.8	26.3	---	---	7.8	---	---	---	---
<i>Clinopodium vulgare</i>	5.2	---	---	---	---	---	---	---	---	---	5.2	12.2	29.6	---	---	34.8	---	---	---	---
<i>Helianthemum nummularium</i>	---	---	---	---	---	---	---	---	---	---	---	---	21.0	---	8.5	38.0	---	6.4	---	---
<i>Thymus longicaulis</i>	---	---	---	---	---	---	---	---	---	---	2.6	---	17.2	10.0	5.2	39.2	---	---	---	---
<i>Veronica chamaedrys</i>	---	---	---	---	---	---	---	---	3.9	---	---	---	2.4	26.3	11.2	---	37.5	---	---	---
<i>Teucrium chamaedrys</i>	---	---	---	---	---	---	0.1	---	---	---	---	---	2.7	26.8	11.4	---	44.3	---	---	---
<i>Hieracium cymosum</i>	28.1	---	---	15.7	---	---	---	---	11.8	5.1	11.8	24.0	24.0	---	---	---	---	5.8	---	---
<i>Viola odorata</i>	---	---	---	---	---	---	---	13.9	6.6	---	---	---	14.8	20.2	13.9	1.1	20.1	---	---	---
<i>Origanum vulgare</i>	---	---	---	---	---	---	---	---	---	---	---	---	6.3	---	14.1	23.4	9.5	3.8	---	---
<i>Juniperus communis</i>	14.3	---	---	---	---	---	10.1	23.0	14.3	7.4	32.6	17.0	38.5	---	---	---	---	0.2	---	---
<i>Armeria canescens</i>	30.6	---	---	44.7	35.7	21.6	---	---	---	---	---	15.5	---	---	---	---	---	---	---	---
<i>Lotus corniculatus</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	13.2	---	4.4	34.6	40.8	---
<i>Crataegus monogyna</i>	---	---	---	---	---	---	---	---	---	---	14.8	---	---	18.3	10.5	---	39.8	---	3.8	---
<i>Acinos alpinus</i>	26.1	---	18.4	37.4	42.6	---	32.1	---	---	---	---	21.8	5.7	---	---	---	---	---	---	---
<i>Myosotis sylvatica</i>	13.2	---	---	---	---	---	---	21.6	---	43.6	30.6	37.8	35.8	21.6	---	---	---	---	---	---
<i>Primula veris</i>	---	---	---	---	4.7	---	4.5	15.8	8.4	1.9	8.4	26.8	38.6	15.8	---	---	---	---	---	---
<i>Fragaria vesca</i>	11.0	---	---	---	---	---	---	---	26.7	38.1	26.7	42.7	38.4	18.8	---	---	---	---	---	---
<i>Ceterach officinarum</i>	9.2	16.8	16.8	3.9	6.2	---	---	---	9.2	---	9.2	38.1	33.8	---	---	---	---	---	---	---
<i>Euphorbia amygdaloides</i>	9.5	---	---	---	---	---	---	17.2	24.4	34.7	9.5	38.9	19.5	17.2	---	---	---	---	---	---
<i>Melica ciliata</i>	11.4	---	19.3	---	---	19.3	20.5	---	---	4.7	27.4	43.8	39.5	---	---	---	---	13.0	---	---
<i>Dactylis glomerata</i>	---	---	---	---	---	---	12.5	---	---	---	---	1.7	15.0	---	---	42.1	---	22.1	---	---
<i>Vinca major</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	18.3	---	---	---	---	---

- "Result Generated by Program"



**Appendix 3**

***K – Vegjetacioni i shkembinjv, rrepirave dhe kreshtave***

KC - *Asplenieta trichomanis* (Br.-Bl. in Meier et Br.-Bl. 1934) Oberd. 1977  
KC02 - *Potentilletalia caulescentis* Br.-Bl. in Br.-Bl. et Jenny 1926  
KC01A - *Asplenio scolopendrii-Geranion robertiani* Ferrez 2010

***F – Vegjetacioni i zones Mesdhetare malore***

FR - *Daphno-Festucetea* Quézel 1964  
FR01 - *Daphno-Festucetalia* Quézel 1964  
FR01C - *Stipo pulcherrimae-Morinion persicae* Quézel 1964  
FE - *Cytisetea scopario-striati* Rivas-Mart. 1974  
FE03 - *Spartio juncei-Cytisetalia scoparii* Mucina ordo nov. hoc loco  
FE03B - *Cytision oromediterraneo-scoparii* Rivas-Mart. et al. 2002  
FR02 - *Saturejo spinosae-Scutellarietalia hirtae* Dimopoulos et al. ex Bergmeier 2002  
FR02A - *Astragalion cretici* Bergmeier 2002

***C – Vegjetacioni i zones se pyjeve nemorale***

CA - *Carpino-Fagetea sylvaticae* Jakucs ex Passarge 1968  
CA02 - *Fagetalia sylvaticae* Pawłowski 1928  
CA02A - *Aremonio-Fagion* (Horvat 1950) Borhidi in Török et al. 1989  
CA02A1 - *Asperulo odoratae-Fagetum* Sougnez et Thill 1959  
CA02 - *Fagetalia sylvaticae* Pawłowski 1928  
CA02A - *Aremonio-Fagion* (Horvat 1950) Borhidi in Török et al. 1989  
CB - *Quercetea pubescentis* Doing-Kraft ex Scamoni et Passarge 1959  
CB01 - *Quercetalia pubescenti-petraeae* Klika 1933  
CB01G - *Carpinion orientalis* Horvat 1958  
CB01Ga - *Quercu carpinetum submediterraneum* Wrb. 1954  
CB01N - *Quercion confertae* Horvat 1958  
CB01Na - *Quercu – conferta cerris* (Knapp 1944) Rud 1946  
CD - *Crataego-Prunetea* Tx. 1962 nom. conserv. Propos  
CD02 - *Paliuretalia* Trinajstić 1978  
CD02D - *Buxo-Syringion* P. Fukarek ex Diklić 1965  
CD2Da - *Buxo Juniperetum* Horv. 1954  
CD03 - *Pyro spinosae-Rubetalia ulmifolii* Biondi, Blasi et Casavecchia in Biondi et al. 2014  
CD03A - *Pruno spinosae-Rubion ulmifolii* O. de Bolòs 1954  
CM - *Molinio-Arrhenatheretea* Tx. 1937  
CM01 - *Arrhenatheretalia elatioris* Tx. 1931  
CM01C - *Cynosurion cristati* Tx. 1947  
CO - *Erico-Pinetea* Horvat 1959  
CO02 - *Pinetalia pallasianae-kochianae* Korzhenevsky 1998  
CO02A - *Pinion pallasianae* Korzhenevsky 1998  
CO01 - *Erico-Pinetalia* Horvat 1959 nom. conserv. propos.  
CO01H - *Pinion heldreichii* Horvat 1946  
CO01Ha - *Seslerio – Pinetum leucodermis* Vangjeli 1984.



**F – Vegjetacioni i zones Mesdhetare**

*FA - Quercetea ilicis Br.-Bl. ex A. Bolòs et O. de Bolòs in A. Bolòs y Vayreda 1950*

*FA01 - Quercetalia ilicis Br.-Bl. ex Molinier 1934*

*FA01A - Quercion ilicis Br.-Bl. ex Molinier 1934*

*FA01Aa - Arbuto- Quercetum ilicis Br Bl 1938*

*FA04 - Pistacio -Rhamnetalia alaterni Rivas-Mart. 1975*

*FA04A - Ericion arboreae Rivas-Mart. 1987*

*FA04Aa – Pistacio lentisci-Juniperetum oxycedri Allegrezza, Biondi, Formica & Ballelli 1997*

*FB - Ononido-Rosmarinetea Br.-Bl. in A. Bolòs et Vayreda 1950*

*FB06 - Cisto-Ericetalia Horvatic 1957*

*FB06C – Cisto-Ericion Horvatic 1957*

*FB06Ca – Cisto ericetum arboreae Horvatic 1957*

**H – Pyjet dhe shkurret Aluviale**

*HA - Alno glutinosae-Populetea albae P. Fukarek et Fabijanić 1968*

*HA01 - Populetalia albae Br.-Bl. ex Tchou 1949 nom. conserv. propos.*

*HA01E - Platanion orientalis I. Kárpáti et V. Kárpáti 1961*

**Q - Vegjetacioni Anthropogjenik**

*QC - Chenopodietea Br.-Bl. in Br.-Bl. et al. 1952*

*QC02 - Chenopodietalia Br.-Bl. in Br.-Bl. et al. 1936*

*QC02A - Chenopodion muralis Br.-Bl. in Br.-Bl. et al. 1936.*



Appendix. 4 BAM Per Plant community

Number of relevés: 257

Number of species:

Table with 10 columns of species codes and their corresponding counts across different relevés.

K - Vegetation of rock crevices and screes

KH - Drypidetea spinosae Quézel 1964

KH01 - Drypidetalia spinosae Quézel 1964

KH01E - Campanulion hawkinsianae Quézel 1967

KH01Ea - Sculellario alpina Lamietum pictum Quezel 1973

Table listing species like Achillea holosericea, Thymus striatus, Thymus praecox, Verbascum densiflorum, Hypericum montanum, and Satureja montana with their distribution codes.

KC - Asplenieta trichomanis (Br.-Bl. in Meier et Br.-Bl. 1934) Oberd. 1977

KC02 - Potentilletalia caulescentis Br.-Bl. in Br.-Bl. et Jenny 1926

KC01A - Asplenio scolopendrii-Geranion robertiani Ferrez 2010

Table listing species like Gentiana verna, Valeriana montana, Vaccinium myrtillus, Gentiana lutea, Orchis sambucina, Rumex acetosa, Achillea millefolium, and Primula veris with their distribution codes.

B - Vegetation of the boreal zone

BA - Vaccinio-Piceetea Br.-Bl. in Br.-Bl. et al. 1939

BA01 - Piceetalia excelsae Pawłowski et al. 1928

BA01C - Juniperion nanae Fk 1960

Table listing species like Hypericum richeri, Juniperus communis, Thymus cherleriooides, Colchicum autumnale, Valeriana crinita, Plantago lagopus, Orchis sambucina, Salvia officinalis, Rumex acetosella, Asplenium adiantum-nigrum, Verbascum phlomoides, Orchis mascula, Crataegus heldreichii, Primula vulgaris, Cornus mas, Primula acaulis, Rubus hirtus, and Rosa arvensis with their distribution codes.

F - Vegetation of the mediterranean zone

FR - Daphno-Festucetea Quézel 1964

FR02 - Saturejo spinosae-Scutellarietalia hirtae Dimopoulos et al. ex Bergmeier 2002

FR02A - Astragalion cretici Bergmeier 2002

FR02A1 - Astragaletum cretici Zohary et Orshan 1966

Table listing Sideritis roeseri with its distribution code.



C - Vegetation of the nemoral forest zone
CA - Quercus-Fagetum Br Bl et Vlierg 1937
CA02 - Fagetalia sylvaticae Pawlowski 1928
CA02A - Fagion moesiacaellenicum (Dafis 1973) Ellenberg et Gllavac 1974
CA02A1 - Fagetum montanum hellenicum Dafis 1968

Table with 10 columns and 15 rows listing plant species like Fragaria vesca, Rubus ideaus, Corylus avellana, etc., with associated codes and symbols.

C - Vegetation of the nemoral forest zone
CO - Erico-Pinetum Horvat 1959
CO02 - Pinetalia pallasianae-kochianae Korzhenevsky 1998
CO02A - Pinion pallasianae Korzhenevsky 1998

Table with 10 columns and 7 rows listing plant species like Rhamnus alpinus, Achillea distans, Teucrium montanum, etc., with associated codes and symbols.

C - Vegetation of the nemoral forest zone
CO - Erico-Pinetum Horvat 1959
CO01 - Erico-Pinetalia Horvat 1959 nom. conserv. propos.
CO01H - Pinion heldreichii Horvat 1946
Seslerio - Pinetum leucodermis Vangjeli 1984.

Table with 10 columns and 5 rows listing plant species like Fraxinus ornus, Thymus longicaulis, Primula elatior, etc., with associated codes and symbols.

F - Vegetation of the mediterranean zone
FA - Quercetia ilicis Br.-Bl. ex A. Bolòs et O. de Bolòs in A. Bolòs y Vayreda 1950
FA01 - Quercetalia ilicis Br.-Bl. ex Molinier 1934
FA01A - Quercion ilicis Br.-Bl. ex Molinier 1934

Table with 10 columns and 17 rows listing plant species like aculeatus, Phlomis fruticosa, Teucrium polium, etc., with associated codes and symbols.

C - Vegetation of the nemoral forest zone







Appendix 5. Percentage of AMP per plant communities – Synoptic table

Percentage synoptic table

Group No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
No. of relevés	1	2	10	1	5	3	1	3	1	3	4	1	10	6	25	59	9	9	1	3

K - Vegetation of rock crevices and screes

KH - Drypidetea spinosae Quézel 1964

KH01 - Drypidetalia spinosae Quézel 1964

KH01E - Campanulion hawkinsianae Quézel 1967

KH01Ea - Sculellario alpina Lamietum pictim Quezel 1973

<i>Achillea fraasii</i>	100	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Veratrum nigrum</i>	100	.	.	.	.	.	.	.	.	.	.	.	.	17	.	.	.	.	.	.	.
<i>Achillea holosericea</i>	100	.	10	.	.	.	.	.	.	.	.	.	10	17	.	.	.	.	.	.	.
<i>Thymus striatus</i>	100	.	50	.	40	33	.	67	.	.	.	.	17	.	3	.	22	.	.	.	

KC - Asplenietea trichomanis (Br.-Bl. in Meier et Br.-Bl. 1934) Oberd. 1977

KC02 - Potentilletalia caulescentis Br.-Bl. in Br.-Bl. et Jenny 1926

KC01A - Asplenio scolopendrii-Geranion robertiani Ferrez 2010

<i>Asplenium ruta-muraria</i>	.	100	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Polypodium vulgare</i>	.	50	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Valeriana bertiscea</i>	.	.	50	.	.	33	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Ceterach officinarum</i>	.	100	30	.	20	33	.	.	.	33	25	.	60	100	.	14	.	.	.	.	

B - Vegetation of the boreal zone

BA - Vaccinio-Piceetea Br.-Bl. in Br.-Bl. et al. 1939

BA01 - Piceetalia excelsae Pawłowski et al. 1928

BA01C - Juniperion nanae Fk 1960

<i>Juniperus communis</i>																					
subsp. nana	100	50	100	100	100	67	100	67	.	.	.	.	.	17	.	.	.	.	.	.	.
<i>Sideritis roeseri</i>	100	100	90	100	100	100	.	100	.	.	.	.	10	33	.	.	.	.	11	.	.
<i>Vaccinium myrtillus</i>	.	50	10	100	.	.	.	.	.	.	.	.	.	17	.	.	.	.	.	.	.
<i>Orchis sambucina</i>	.	.	50	100	40	.	.	33	.	.	.	.	.	.	.	.	.	.	22	.	.

F - Vegetation of the mediterranean zone

FR - Daphno-Festucetea Quézel 1964

FR02 - Saturejo spinosae-Scutellarietalia hirtae Dimopoulos et al. ex Bergmeier 2002

FR02A - Astragalion cretici Bergmeier 2002

FR02A1 - Astragaletum cretici Zohary et Orshan 1966

<i>Hypericum rumeliacum</i>	.	.	50	.	100	100	100	100	.	.	.	.	.	.	.	.	.	.	11	.	.
<i>Orchis mascula</i>	.	.	.	.	60	.	.	100	.	.	.	.	.	17	.	7	.	.	.	.	
<i>Rhamnus fallax</i>	.	.	10	.	20	33	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
<i>Asplenium trichomanes</i>	.	50	.	.	20	.	.	.	.	33	50	.	70	.	.	2	.	11	.	.	
<i>Asplenium adiantum-nigrum</i>	.	50	30	.	20	67	.	.	.	33	.	.	.	.	4	14	.	.	.	.	
<i>Satureja montana</i>	.	50	30	.	40	.	.	.	.	.	.	.	40	50	.	20	.	11	.	.	
<i>Arctostaphylos uva-ursi</i>	.	.	.	.	33	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
<i>Rumex acetosella</i>	.	.	40	.	.	.	100	.	.	.	.	.	.	.	.	2	.	44	.	.	
<i>Verbascum phlomoides</i>	.	.	.	.	.	.	.	67	.	.	.	.	.	.	.	.	.	.	.	.	
<i>Plantago lagopus</i>	.	.	50	.	60	67	100	67	.	.	.	.	.	.	.	2	.	11	.	.	
<i>Achillea millefolium</i>	.	.	30	.	20	67	100	33	.	.	.	.	.	.	.	3	56	89	.	.	
<i>Thymus cherleriooides</i>	.	.	80	100	60	33	100	.	.	.	.	.	33	.	.	.	.	.	.	.	
<i>Gentiana lutea</i>	.	.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
<i>Rumex acetosa</i>	.	.	10	.	20	.	.	.	.	.	.	.	.	.	.	.	.	11	.	.	
<i>Salvia officinalis</i>	.	.	10	.	20	100	.	.	.	.	.	.	.	12	7	.	.	.	.	.	

C - Vegetation of the nemoral forest zone

CA - Querco-Fagetea Br Bl et Vlierg 1937

CA02 - Fagetalia sylvaticae Pawłowski 1928

CA02A - Fagion moesiacaellenicum (Dafis 1973) Ellenberg et Gllavac 1974

CA02A1 - Fagetum montanum hellenicum Dafis 1968

<i>Crataegus heldreichii</i>	.	.	.	.	.	.	.	100	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Malus sylvestris</i>	.	.	.	.	.	.	33	100	.	75	100	.	.	.	.	2	.	.	.	.	
<i>Salvia glutinosa</i>	.	.	.	.	.	.	.	100	67	50	.	.	17	4	8	.	.	.	.	.	
<i>Bellis sylvestris</i>	.	.	.	.	.	.	.	100	.	.	.	20	.	12	37	.	.	.	.	.	
<i>Tussilago farfara</i>	.	.	.	.	.	.	.	100	67	.	.	.	.	12	12	.	11	.	.	.	
<i>Primula officinalis</i>	.	.	.	.	.	.	.	100	33	50	.	20	.	48	41	.	.	.	.	.	
<i>Rubus ideaeus</i>	.	.	.	.	.	.	33	100	100	50	.	30	67	.	.	.	.	.	.	.	
<i>Cornus mass</i>	.	.	.	.	.	.	.	100	.	25	100	30	.	76	61	22	.	.	.	.	
<i>Juniperus communis</i>	.	.	.	.	.	.	33	100	67	50	100	80	67	.	4	.	11	.	.	.	
<i>Fragaria vesca</i>	.	.	.	.	.	.	.	100	100	100	80	100	.	3	.	.	.	.	.	.	
<i>Primula acaulis</i>	.	.	.	.	.	.	.	67	.	.	.	.	.	.	.	.	.	.	.	.	
<i>Rubus hirtus</i>	.	.	.	.	.	.	.	33	25	.	.	.	.	.	.	.	.	.	.	.	
<i>Sorbus aria</i>	.	.	.	.	.	.	.	33	.	.	.	.	.	.	.	.	.	.	.	.	
<i>Sambucus racemosa</i>	.	.	.	.	.	.	.	33	.	.	.	.	.	.	.	.	.	.	.	.	
<i>Helleborus odoratus</i>	.	.	.	.	.	.	.	33	.	.	.	.	.	.	.	.	.	.	.	.	
<i>Rhamnus alpinus</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
subsp. fallax	.	.	.	.	.	.	.	.	33	25	.	10	33	.	.	.	.	.	.	.	
<i>Sambucus nigra</i>	.	.	.	.	.	.	.	33	25	.	.	.	.	.	.	.	.	.	.	.	
<i>Sorbus aucuparia</i>	.	.	.	.	.	.	.	33	25	.	.	.	.	.	.	7	.	.	.	.	

CA02 - Fagetalia sylvaticae Pawłowski 1928

CA02A - Aremonio-Fagion (Horvat 1950) Borhidi in Török et al. 1989

<i>Crataegus monogyna</i>	.	.	.	.	67	.	33	.	.	25	100	80	33	8	68	33	44	.	.	.
<i>Rosa canina</i>	.	.	.	.	.	.	.	.	.	75	100	60	.	32	59	11	56	.	.	.
<i>Atropa belladonna</i>	.	.	.	.	.	.	.	.	100	.	.	.	.	.	.	.	.	.	.	.
<i>Corylus avellana</i>	.	.	.	.	.	.	.	.	75	.	10	.	.	.	5	.	.	.	.	.
<i>Verbascum nigrum</i>	.	.	.	.	.	.	.	.	25	.	.	.	.	.	.	.	.	.	.	.
<i>Rubus ideaeus</i>	.	.	.	.	.	.	.	.	25	.	.	.	.	.	.	.	.	.	.	.
<i>Pyrus amygdaliformis</i>	.	.	.	.	.	.	.	.	.	.	100	.	.	16	8	.	33	.	.	.
<i>Prunus spinosa</i>	.	.	.	.	33	.	33	.	.	.	100	.	.	8	44	11	67	.	.	.

C - Vegetation of the nemoral forest zone

CO - Erico-Pinetea Horvat 1959

CO02 - Pinetalia pallasianae-kochianae Korzhenevsky 1998

