

Rare and Endemic Plants in the Southern Mountain Ecosystems of Albania, their Threats and Diversity

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Abstract

The study highlights flora and vegetation richness in the mountain ecosystems in Southern Albania, focusing mainly on Çika, Këndërvica, and Tomorri Mts. The data are collected in more than 100 relevés during field trips, carried out in periods of intensive vegetation. It shows the presence of 11 endemic taxa, 23 nearendemics and more than 60 Balkan endemics. Two new species for science are described recently (*Gymnospermium maloi* Kit Tan & Shuka and *Campanula aureliana* Bogdanovi, Rešetnik, Brullo & Shuka) and some others are confirmed about 100 years after (*Sesleria albanica* Ujhelyi and *Stachys sericophylla* Halacsy). Main threats, especially for the endemics and rare taxa of the southern region of Albania, are presented in this study, with recommendations for future steps. Some Natura2000 habitats are identified and a relevance of different habitat types like EUNIS, and Syntaxonomic classifications are linked together. The main aim of this study was the identification and presentation of floristic and vegetation values of this wide natural ecosystem and putting them into the function of science. The results indicate the area as the richest in the country, due to the insignificant influence of human factor and diversity of climate and terrestrial elements.

Key words: endemics, ecosystem, diversity, flora, habitats

1. Introduction

Southern mountain ecosystems included in this study, represent the main mountain ranges like Nemërçkë-Dhembel-Bureto; Shëndëlli-Lunxheri-Bureto; Mali i Gjerë-Mali i Pusit-Këndërvica, Acroceraune mountain range and Tomorri Mt. The area is very diverse and interesting, as it is dissected by deep valleys and high peaks, where the anthropogenic impact is very small. In addition, Llogora and Tomorr Mts. are part of the protected areas network in the country. The entire area is well known for a variety of relief forms and immediate hypsometric elevations, originated from the inner and central geotectonic areas, and it is composed mainly of calcareous rocks of different ages. These geographical features, the Ionian Sea influence, as well as the presence of Vjosa, Drino and Shushica rivers are determinant factors for the variety of flora and vegetation of this wide mountainous ecosystem.

The area is characterized by Mediterranean climate, but in high altitudes it reflects elements of the mountain climate. The Mediterranean elements are more visible in all mountain ranges faced to the Ionian Sea, due to the sea influence; meanwhile they get weaker walking towards Këndërvica and especially

Tomorri Mt. This change in climate elements is reflected in qualitative differences in flora and vegetation for these two mountains. For the entire ecosystem the winter is freezing cool, so that even in summer there is snow in some peaks of the area [26].

The high diversity of climate and territory elements reflects high biodiversity, variety of habitat types and ecosystems in the area. We can mention many streams, rivers, Mediterranean scrubs, broad leaf, coniferous and mixed forests, Mediterranean and subalpine stony meadows, pastures etc. Of special interest is the presence of red list taxa, including endemics, near endemics, relicts and those with different values of usage.

Mountain ranges and valleys combine clearly with each other, like the situation between Vjosa and Drino valleys (with Papingi peak, 2485 m and Çajupi peak 2156 m) Shushica valley (east of Çika Mt., 2045 m) and the mountain range Tomorr – Kulmak – Mican (2415 m, 2379 m). In the upper Kurvelesh, there is not a mountain range, but a wide highland, which is intersected in different directions by deep streams and canyons, as in the situation of Këndërvica Mt. (2122m) and its surroundings (Bënça valley - Këndërvica Mt.). Of great interest are the glacial

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forms of the relief (circus, grooves etc.), present in the entire natural ecosystem [31].

There are very few publications for this area, either by Albanian botanists, [28] “*Flora e Shqipërisë*”, [10] “*Flora ekskursioniste e Shqipërisë*”, [27] “*Drurët e Shkurret e Shqipërisë*”, [47, 6, 33, 20, 40, 36] etc. or foreign botanists, like [2, 3, 4, 23, 1, 25, 24, 15]. For Tomorri Mt. we mention [25, 4, 5], whereas for Çika Mt. only few data exist [25].

Valuable publications on rare flora, endemics, near endemics and their threats for the southern region of the country are done only during the last two decades, where we mention [11, 22, 35, 38, 40, 42, 44] etc.

Within that frame the main purpose of the study undertaken is the identification and presentation of floristic and vegetation values of this wide natural ecosystem and putting them into the function of science.

2. Material and methods

The field work is carried out in different transects, realized mainly during periods of intensive vegetation, May – October, 2007 – 2014. Each station is selected based on homogenous physical features, vegetation structure and dominant taxa. The relevés are mainly focused on the most representative flora and habitats. We have performed more than 100 relevés of the size between 4-200 m², according to the type of vegetation and data related to ecology, altitude, rock type, slope, exposure, plant height and density as well as human impact are recorded.

For the identification and plant nomenclature we have followed Albanian Flora publications [28, 10],

publications from neighboring countries [29, 46, 43] etc., others with special contributions for the area [4, 23, 3, 25, 22, 38, 30] as for the habitats and vegetation units we have followed [8, 9, 7, 12, 13, 32, 34]. Most of the collected species are deposited in the Botanical Garden and in the National Herbarium of the Faculty of Natural Sciences.

3. Results and discussions

Rare and endangered species in the southern mountain ecosystems

The area of our study represents an area of interest in terms of floristic richness, although it is considerably visited from Albanian and foreign botanists who have already identified 11 Albanian endemics. Only in the recent three years, two new species *Campanula aureliana* Bogdanovi, Rešetnik, Brullo & Shuka [5] and *Gymnospermium maloi* Kit Tan & Shuka [45] are identified and published as new endemic species for the country.

Nonetheless, for four of the species discovered many years ago (*Onosma mattirolii* Bald., *Noccaea cikaea* F.K Meyer, *Sesleria albanica* Ujhelyi and *Stachys sericophylla* Halacsy) there are no additional data since their first description. Another species, *Viola acrocerauniensis* Erben [14], has been published only the recent years and DNA analyses are needed to differentiate it from its closed relative *Viola epirota* [19, 21]. The identification of 11 endemic taxa in Këndërvica-Çika and Tomorri mountains (out of 33 endemic species of entire Albania) places this area among the richest in Albanian endemics (Tab.1). Their distribution in the study area is shown in the Fig.1.

Table 1: Endemic species recorded in the area of study

Taxa	Location
<i>Astragalus autranii</i> Bald.	Tomorr
<i>Aubrieta albanica</i> F.K.Meyer	Këndërvicë, Nemërçkë
<i>Campanula aureliana</i> Bogdanovi, Rešetnik, Brullo & Shuka	Tomorr
<i>Carduus cronicus</i> Boiss. et Heldr. subsp. baldacci	Çikë-Llogora, Këndërvicë
<i>Gymnospermium maloi</i> Kit Tan & Shuka	Këndërvicë, Picar, Çajup
<i>Hypericum haplophyloides</i> Bald.	Llogara
<i>Noccaea cikaea</i> F.K.Meyer	Çikë-Llogora
<i>Onosma mattirolii</i> Bald.,	Tomorr
<i>Sesleria albanica</i> Ujhelyi	Çikë-Llogora
<i>Stachys sericophylla</i> Halacsy.	Çikë
<i>Viola acroceraunensis</i> Erben.	Çikë-Llogora ¹

¹11 endemic species which are found by the working group during field trips in the study area are listed in this table. Location refers to the name of the station where they are found.

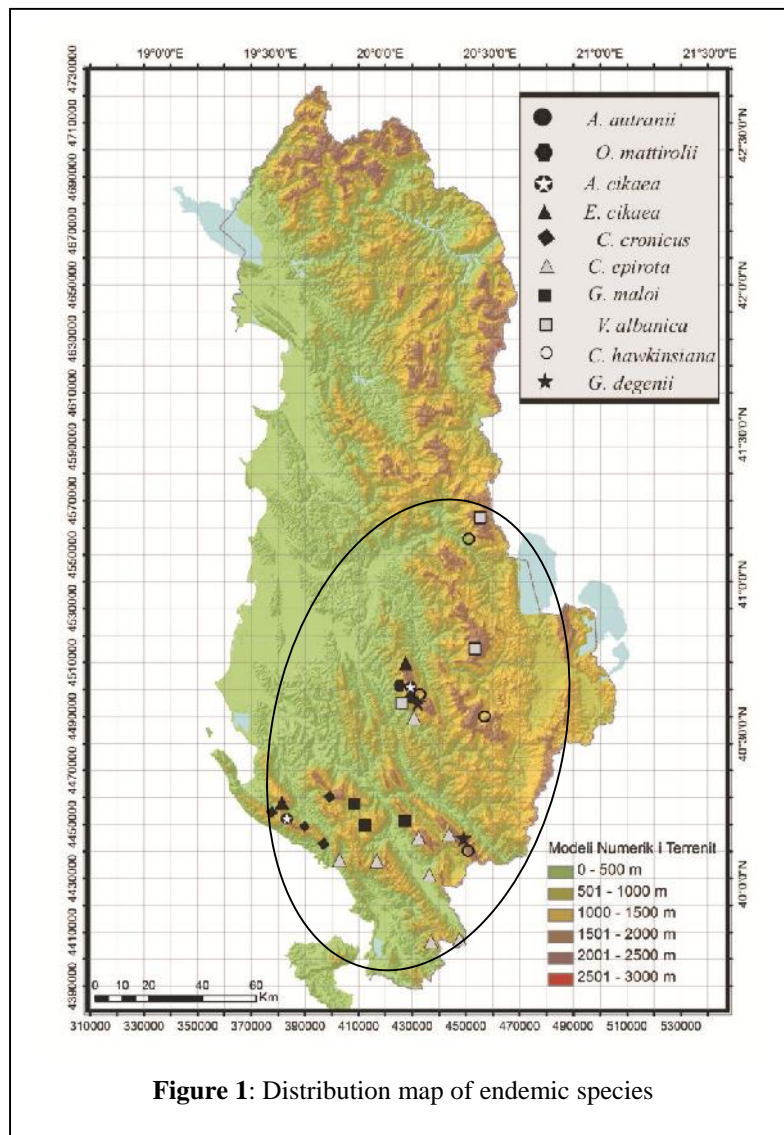


Figure 1: Distribution map of endemic species

40 sub endemic species (Tab. 2) of Southern region of Albania are recorded in these mountain ecosystems, which share their habitat of growing with adjacent parts of Greece and in few cases with FYR Macedonia and Montenegro. Among them we mention *Viola albanica* Halacsy, *Alkanna corcyriensis* Hayek, *Campanula hawkinsiana* Hausskn. & Heldr., *Centaurea epirota* Halcsy, *Edraianthus australis* (Wettst.) Lakušic, *Lilium chalcedonicum* L., *Valeriana crinii* Orph. ex Boiss., *Centaurea nicolai* Bald., *Edraianthus horvatii* Lakuši, *Laserpitium ochridanum* Micevski [35, 42, 41] etc.

Cerastium smolikanum Hartvig, *Edraianthus horvatii* Lakuši, and *Laserpitium ochridanum* Micevski are three new the new species for the Albanian flora [35, 39, 40] that occur in Dry and Valamara Mt, or in the line between Mediterranean and Alpine region. The same position refers to *Aristolochia elongata* (Duchartre) Nardi which initially was known as endemic species of Greece but

on 7 May 2009 and 12 April 2010 its presence was recorded for Albania in Gjergjevica Valley [37].

The area also hosts many species which recently are reported as new for Albanian flora as it is the case of *Colchicum triphyllum* Kunze in Cajupi Mt. on 18.04.2012, which on the other hand extends the distribution area of this species, now even in Albania [21]. Another new species recorded for Albania is also *Orobanche lavandulaceae* Rchb. on June 2006 in the Valley of Zagorie [20].

The majority of endemic species is located in Tomorri and Çika Mts., but these two stations are also distinguished because of high presence of species of different origin, compared with the higher numbers of near endemics recorded in the Nemerçka and Çajup Mts, and along Vjosa and Drini Valleys. Many Mediterranean species occur there, whereas in high altitudes, especially in East and North slopes, alpine plants are present. Of special importance we mention the alpine species *Linaria alpina* (L.) Mill, *Scabioza*

graminifolia L. and *Veronica thessalica* Benthams, which reach their South-Western limits in Tomorri Mt. [17]

With quite conservation interest, are two other endemic species, *Sesleria albanica* and *Stachys sericophylla* which have been neglected for the

Albanian flora. The first species was confirmed only a year before [11] on the Acroceraune mountain range and the second one was rediscovered in the Nemerçka Mt [38], a different place from Çika Mt where it was stated in the Flora of Albania Volume 3.

Table 2: Near endemic species recorded in the Southern mountainous ecosystems in Albania

Taxa	Chorotype	Areal in Albania
<i>Alkanna corcyriensis</i> Hayek	S/end (Al, Gr)	Çikë, Bregdet, Kardhiq
<i>Aristolochia elongata</i> (Duchartre) Nardi	S/end (Al, Gr)	Gjergjevica Valley
<i>Asperula chlorantha</i> Boiss. & Heldr.	S/end (AL,GR)	Tomorr- Çajup,
<i>Athamanta macedonica</i> (L) Spreng. subsp <i>albanica</i> Alst. et Sand.	S/end (AL,GR)	Çajup,
<i>Bellevialia hyacinthoides</i> (Bertol.) K. Persson	S/end (AL,GR)	Hills around Saranda
<i>Campanula hawkinsiana</i> Hausskn. & Heldr.	S/end (AL,GR)	Tomorr, Nemërçkë, Gjergjevicë, Shebenik
<i>Centaurea epirota</i> Halcsy	S/end (AL,GR)	Tomorr, Nemërçkë, Mali i Gjerë, Murganë, Çajup, Mali i Kudhësit
<i>Centaurea nicolai</i> Bald.	S/end (AL,MN)	Qafa e Shëngjergjit
<i>Cerastium smolikanum</i> Hartvig	S/end (AL,MN)	Valamarë
<i>Centaurea zuccariniana</i> DC.	S/end (AL,GR)	Sopot, Lugina e Vjosës
<i>Edraianthus australis</i> (Wettst.) Lakusic	S/end (AL,GR)	Tomorr, Nemërçkë
<i>Edraianthus horvatii</i> Lakuši	S/end (AL,MC)	Mali i Thatë, Çajup
<i>Crepis turcica</i> Degen & Bald.	S/end (AL,GR)	Vjosa valley
<i>Crocus boryi</i> Gay.	S/end (AL,GR)	Drinos valley, Riviera coast
<i>Crocus hadriaticus</i> Herbert	S/end (AL,GR)	Vjosa Valley
<i>Cymbalaria microcalyx</i> subsp. <i>minor</i> Greuter	S/end (AL,GR)	Kardhiq
<i>Galanthus regina-olgae</i> Orph. subsp. <i>regina-olgae</i>	S/end (AL,GR)	Këndërvicë, Çikë, Mali i Picarit
<i>Galanthus regina-olgae</i> Orph. subsp. <i>vernalis</i> Kamari	S/end (AL,GR)	Syri i Kalter and Picari
<i>Helleborus cyclophyllus</i> Boiss.	S/end (AL,GR)	Tragjas
<i>Herniaria parnassica</i> Heldr. et Sart. subsp. <i>parnassica</i> Chaudhri	S/end (AL,GR)	Tomorr, Gjergjevicë, Valamarë
<i>Laserpitium ochridanum</i> Micevski	S/end (AL,MK)	Mali i Thatë
<i>Lilium chalcedonicum</i> L.,	S/end (AL,GR)	Tomorr,, Çikë, Gjergjevicë, Llogora, Jorgucat
<i>Malcolmia bicolor</i> subsp. <i>graeca</i> Boiss. & Spruner	S/end (AL,GR)	Llogora, Çikë,
<i>Minuartia pseudosaxifraga</i> (Mattf.) Greuter & Burdet	S/end (AL,GR)	Nemërçkë
<i>Minuartia stellata</i> Maire & P.	S/end (AL,GR)	Çajup
<i>Nepeta spruneri</i> Boiss.	S/end (AL,GR)	Tomorr, Nemërçkë, Mali i Thatë, Gjergjevicë, Badëlonjë
<i>Pedicularis graeca</i> Bunge	S/end (AL,GR)	Murganë, Bureto, Nemërçkë, Çajupi, Ostrovicë, (over 1700 m), Tomorr (app. 1800m)
<i>Pterocephalus perennis</i> subsp. <i>bellidifolius</i> Coulter	S/end (AL,GR)	Tomorr, Çikë, Gjergjevicë, Çajup
<i>Ptilotrichum ciclocarpum</i> subsp. <i>pindicum</i> Hartvig.	S/end (AL,GR)	Tomorr, Nemërçkë
<i>Scabiosa epirota</i> Halacsy et Bald.	S/end (AL,GR)	Sopot

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<i>Scutellaria rubicunda</i> , subsp. <i>rubicunda</i> Hornem.	S/end (AL,GR)	Qorre
<i>Silene caesia</i> Sibth. et Sm.	S/end (AL,GR)	Çika
<i>Silene chephallenia</i> Heldr	S/end (AL,GR)	Këndërvicë, down to Salari village, Bënçë, Kardhiq
<i>Silene ungeri</i> Fenzl in Unger	S/end (AL,GR)	Llogora (South Albania)
<i>Solenanthis albanicus</i> (Degen) Deg.,	S/end (AL,GR)	Dhëmbel, Çajup, Nemërçkë,
<i>Trinia glauca</i> subsp. <i>pindica</i> Hartvig,	S/end (AL,GR)	Nemërçkë
<i>Valeriana crinii</i> Orph. ex Boiss.	S/end (AL,GR)	Çikë, Tomorr, Gramoz
<i>Vincetoxicum huteri</i> Vis. & Ascherson.	S/end (AL,GR)	Bureto
<i>Viola albanica</i> Halacsy	S/end (AL,GR)	Tomorr, Shebenik, Valamarë
<i>Viola epirota</i> (Halacsy) Raus	S/end (AL,GR)	Murganë, Bureto, Çajup, Nemërçkë, Këndërvicë ²

There are different factors which pose frequent threat to many of the species encountered in these mountains, mainly because of habitat destruction. Such factors are similar in other areas of the country and among them we list tourism development (Llogora, Cajup), road construction and rock extraction (Tomorr), deforestation (Çikë, Tomorr, Shebenik, Valamare) and overgrazing (especially in Këndërvicë, Gramoz). On the other hand, industrial and medicinal use of some plants like *Sideritis raeseri* Boiss. et Heldr., *Salvia officinalis* L., *Hypericum perforatum* L., *Origanum vulgare* L., *Satureja Montana* L., *Juniperus communis* L. and *J. oxycedrus* L. is leading to deterioration of their status, and their inclusion in the national red lists, due to uncontrolled and not standardized collection [18].

The floristic elements into the European context

The origin of the Flora in the upper parts of these mountains is probably from the last glacial epoch, in mid-late Pleistocene, around 430 thousand years before [16]. During the field trips we have identified the presence of remaining floristic elements of this period in Tomorri (2300 m) and Qorre (1900 m) Mts., which are similar to those of Timfi and Nemerçkë mountains. This is reflected not only in the morphology of eastern slopes of these mountains, but also in the relict species of that period, like *Amphoricarpos autariatus* subsp. *bertisceus* Ble i & E. Mayer, *Pinus heldreichii* Christ, *Aesculus hippocastanum* L., *Buxus sempervirens* L., *Ilex*

aquifolium L., *Quercus ithaburensis* subsp. *macrolepis* (Kotschy) Hedge & Yalt and *Taxus baccata* L., present nowadays in these stations.

The immediate hypsometric elevation from the sea level, up to 2000 m, of Acroceraune mountain range, the influence and moderating role of Vjosa and Osumi valleys in Këndërvica and Tomorri Mts., as well as the variability of the substrate of the entire area (dominated by calcareous), create ideal conditions for a rich and diverse flora. These floristic values are enhanced by the presence of many species with distant bio geographical connections, such as the Arctic-Siberian and Asian floristic elements, represented by *Gymnospermium maloi* (Kit Tan & Shuka) in Këndërvica Mt., East-Asian and NE American elements, represented by *Aesculus hippocastanum* L. in Llogora, as well as the currents from Asia Minor and Middle East, represented in Tomorri and Valamarë Mts. by *Morina persica* W. In any case, we do not skip the presence of many other floristic elements, like the Mediterranean ones, which are the most present, as well as the Alpine, Kuakasic, Euro-Asiatic, Greek-Anatolian, Illyrian, Central and East European floristic elements.

Vegetation

The data related to the vegetation of the area is summarized in the table below (Tab. 3), as an attempt to define the relevance and relations between the different classification systems.

It is quite evident that the vegetation is representative of the four phytoclimatic belts of the country, mostly represented by Mediterranean sclerophyllous shrubs, deciduous woodlands (oak and beech forests), coniferous (mountain pines and fir), as well as pastures and rocky slopes vegetation.

² 23 Near endemic species which are found by the working group during field trips in the study area are listed in this table. Location refers to details of the area where they are found.

Table 3: Vegetation data of the natural ecosystem and classification system connection

Physiognomic groups	Syntaxonomic units	EUNIS	Natura 2000	Corine	Res.4	Distribution
Maquis	Quercetea/-etalia/-ion ilicis <i>Orno-Quercetum ilicis</i> <i>Erica-Arbutus</i> comm.	F5.213.	9300 5200	32.313	-	Bënçë, Tomorr, Shushicë valley, Nivicë-Progonat, Lekdush, Kapinovë
Phrygana	Cisto-Micromerietea / -etalia / <i>Corydothimion</i> Pistacio lentisci- Rhamnetalia alaterni / <i>Oleo-Ceratonion</i> <i>/Cocciferetum</i>	F6.23 F6.21	5400		-	Shushicë valley, Llogara J. (low altitudes)
Dry semi natural pastures	Thero-Brachypodietea / -etalia / <i>Brachypodion</i>	E1.332	6220	34.5	E1.33	Warm exposures of Shushica valley, SW of Tomorri mountain
Oak forests	Quercetea/ -etalia pubescenti petraea/ <i>Quercion confertae</i> , <i>Carpinion orientalis</i>	G1.75 G1.78	91M0? 9280 9250	-41.76 41.1B -41.78	G1.7	Brataj-Vranisht, Tomorr, Lekdush-Nivicë
Hornbeam formations	Quercetea / -etalia pubescenti petraea / <i>Carpinion orientalis</i> (<i>Ostryo-Carpinion</i>)	G1.7C22	??	41.82	G1.7	Tomorr, Lekdush-Nivicë
Plane tree formations	Nerio-Tamaricetea/ Platanetalia orientalis/ <i>Platanion orientalis</i>	G1.381	92C0	44.71	G1.38	Bençë valley, Shushica valley, Tomorr?
Willow formations	Salicetea purpurea / Salicetalia purpureae/ <i>Salicion albae</i>	G1.112 F9.11	92A0 3240	44.141 24.224 x 44.112	G1.11 F9.1	Bënçë valley, Shushica valley, Tomorr? Relevant mountain streams
Hazel groove	<i>Tilio-Acerion?</i> <i>Carpino-Ostryetum</i>	G1.A	9170, 9180		-	Lekdush-Nivicë, Zaloshje?
Chestnut formations	Quercetea pubescentis/-etalia pubescentis/ <i>Melito-Quercion</i> mixed with <i>Carpinion orientalis</i>	G1.7D1	9260	41.9	G1.7	Nivicë
Formations with yew	Daphno – Festucetea/-etalia/ <i>Stipo – Morinion / Juniperetum foetidissima</i>	?	9560*	42.A4	-	Tomorr
Beech forests	Fagetea sylvatica/-etalia sylvaticae/ <i>Aremonio-Fagion</i>	G1.6	9130, 91KO	41.13	G1.6	Tomorr,
Pine forests (with <i>P. nigra</i>)	Quercea pubescentis–etalia pubescentis/ <i>Abieto-Pinion, Ostryo-Carpinion...</i>	G3.52 G4.D	9530	42.6	G3.52	Llogara
<i>Pinus heldreichii</i> formations	Erico-Pinetea / -etalia/ <i>Pinion heldreichii</i>	G3.61	95A0	42.71	G3.6	Çikë, Tomorr
Fir forests (<i>Abies borisii-regis</i>)	Quercetea pubescentis/-etalia pubescentis <i>/Quercion-frainetto</i> and <i>Ostryo-Carpinion</i>	G4.6	9270	41.1A	-	Llogara, near Këndrevicë
Dry and mesophyll grasslands	Molinio-Arrhenatheretea <i>/Arrhenatheretalia/ Cynosurion cristati, Arrhenatherion</i>	E2.1 E.2, E2.33	6510, 6520?	38.2, 38.3?	-	Tomorr, Këndrevicë
Mountain pastures on calcareous	Daphno – Festucetea/-etalia/ <i>Stipo pulcherrima –</i>	F7.4 E4.437?	? 4090	31.7	-	Tomorr

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<i>Morinion/</i>						
Calcareous rocky slopes vegetation	Aslpenietea trichomanis/Potentilletalia speciosa	H3.2	8210	62.1	-	Këndrevicë, Tomorr, Llogara-Çikë
	Androsacetalia vandelli	H3.1	8220, 8240*	62.2 62.3		
Screes	Thlaspietea rotundifolii) / Drypetalia spinosae / <i>Silenion caesia</i> ?,	H2.4	8140	61.41	-	Tomorr, Këndrevicë, Akrokeraune
	<i>Campanulion hawkinsian</i> ?	H2.6		61.42 ³		

In most cases, we have easily identified the relevance of habitats in Natura 2000 and EUNIS classification levels (for ex. Plane tree formations, Hazelnut grove, Pine forests etc.), but in some other cases it is very vague and oriented mostly by intuition (Oak forests etc.). The reason of such difficulties and subjectivity is because Albania, like many neighboring countries, has not officially implemented Natura 2000, which means lack of updated/published information, and on the other hand, the work started for the Emerald and other similar projects (Corine Biotopes etc.) focusing on natural habitats is not finished yet. Additionally, the phytosociologic literature is also very limited, especially for this area.

Screes are among the most interesting habitats in which, taking into consideration the data collected in Tomorri Mt., we identified several species of *Silenion caesia* or *Campanulion hawkinsiana* and *Galion degenii*, which are not cited before for our country; hence further research is needed. Also, the grassland communities of the *Stipo-Morinion* are of special interest, as they are relatively rare or threatened.

Two habitats listed in the table (9560*/42A4, 8240*) represent priority habitats according to Natura 2000 classification, which means that serious attention is needed for their protection and preservation. In the same way, many others are included in the Resolution no. 4, also protected according to Bern Convention. Among them we mention G3.52 (coniferous with *P. nigra*), G1.6 (Beech forests with *F.sylvatica*) and some of higher levels, like G1.7 (Oak forests, hornbeam formations), G3.6/1 (*Pinus leucodermis* forest), G1.38 (Plane trees), G1.11 (Willow forests). Being important to Albanian biodiversity and economy, these habitats must be preserved as national richness. Many of them, especially woodland and grassland habitats are very damaged or overexploited, thus threatening or destroying the natural environment

of the floristic taxa, especially of endemics. Also there are many activities which risk /threaten the long term existence of the plant biodiversity such as stone quarry, uncontrolled religious activities, overgrazing, deforestation etc. Better protection of these habitats should be organized at least in the protected areas, Tomorri and Llogora National Parks, object of this study.

The table shows that the vegetation of the studied area is also very diverse; even though this study does not assume to go deep in details. In that frame, we are concentrated mainly in Tomorri National Park, located in the biogeographic border between Mediterranean and Alpine region, which means it has high biodiversity representing these both regions. Meanwhile, in relation to the other areas (Çikë, Këndërvica, the hills near Shushicë and Bënjë-Nivicë rivers), considering also that the field trips and the literature have been very limited, we have been focused only on the physiognomy of the main plant groups.

4. Conclusions

The above mentioned area represent a region of high floristic values especially when considering 11 endemics and 40 near endemics mainly of South Albania and North Greece. Among the Albanian endemics we consider mostly *Astragalus autrani*, *Hypericum haplophyloides*, *Gymnospermium maloi*, *Campanula aureliana*, *Sesleria albanica*, *Stachys sericophylla*. From the near endemics with high conservation interest we can consider *Alkanna corcyriensis*, *Bellevalia hyacinthoides*, *Campanula hawkinsiana*, *Centaurea epirota*, *Centaurea zuccariniana*, *Crocus boryi*, *Crocus hadriaticus*, *Edraianthus horvatii*, *Lilium chalcedonicum*, *Minuartia stellata*, *Minuartia pseudosaxifraga*, *Nepeta spruneri*, *Pedicularis graeca*, *Viola albanica* *Viola epirota* etc..

The area is also rich in balkan endemics, such as *Alkanna pindicola* Hausskn., *Asperula doerfleri* Wettst., *Campanula sparsa* Friv., *Crepis baldacii*

³ The table attempts to show the relevance and relations between the different habitat classification systems and their location within the study area.

Halasey, *Galium degenii* Bald., *Morina persica* W, *Pinus heldreichii* Mill, *Ramonda serbica* Pancic, *Sideritis raeseri* subsp. *raeseri* Boiss. et Heldr, *Noccaea bellidifolia* (Griseb.) F.K.Meyer, *Valantia aprica* (Sibth & Sm) etc. which are of a distinct importance for the biodiversity of the country.

Most of the species are threatened for different reasons and are categorized in the international red lists. We mention *Acer pseudoplatanus* L. (VU-A2c), *Botrychium lunaria* L. (EN-A1b), *Campanula hawkinsiana* Hausskn. & Heldr. (EN-A1b), *Crataegus heldreichii* Boiss. (LR-cd), *Galanthus regina-olgae* Orph. (Vulnerable B2 ab(iii,v)), *Dictamnus albus* L. (VU-A1b), *Juniperus foetidissima* Willd. (EN-A1b), *Ranunculus brevifolius* Ten. (VU-A1b), *Sideritis raeseri* subsp. *raeseri* Boiss. et Heldr. (EN-A1c), *Valeriana crinii* Orph. (VU-A1b), *Veronica thessalica* Benth. (DD). Many species have very limited distribution area (Tomorr, Tomorr-Çikë, Këndërvicë, Tomorr-Nemërçkë, South Albania–NW Greece), like *Astagalus autrani* Bald., etc.

Very important are, also, the species reported for the first time in the area (*Linaria alpine* L., *Edraianthus australis* (Wettst.) Lakusi), or confirmed with additional information (*Astragalus autrani* Bald. etc.), especially to the enlargement—of their distribution area (*Veronica thessalica* Benth., *Noccaea bellidifolia* (Griseb.) F.K. Meyer, *Linaria alpine* L. etc.). Doubtless, for the endemics of F. K. Meyer like *Aubrieta albanica*, *Arenaria cikaea*, *Cardamine tepelensis*, *Edraianthus pubescens*, *Euphorbia cikaea*, *Limonium himariense* and *Noccaea cikaea*, other investigation are necessary to clarify their taxonomic status. Certainly, the best protection of the threatened taxa is inside their natural habitats, where the natural equilibriums are respected. Special attention must be paid to identification and preservation of primary/priority habitats.

Relating to vegetation, the study indicates that it is also very diverse including approximately 27 potential Natura 2000 habitats. Given the actual situation, it is obvious that further botanical studies must continue in the area, especially in Këndërvica and Tomorri Mt., which are less studied and less affected by anthropogenic risks. Detailed studies must be undertaken, also on the vegetation, focusing in the description and appropriate classification of the natural habitats, according to European systems.

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