



PLANT SPECIES OF COMMUNITY INTEREST IDENTIFIED IN THE CĂLIMANI-GURGHIU MOUNTAINS (MUREȘ COUNTY, ROMANIA)

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Abstract: The aim of this study was to verify in the field the existing information about chorology, to select the category of endangered plants and to highlight the main populations of valuable species. The territory under study is located in the Călimani-Gurghiu Mountains, the area belonging to Mureș County. For each species of community interest data were recorded about the systematics of species, the area, the population, the area of habitat/habitats suitable for species, the conservation status and the general trend of conservation status, abundance. As a result of this field research, nine plant species of community interest were identified (*Angelica palustris*, *Arnica montana*, *Campanula serrata*, *Galanthus nivalis*, *Iris aphylla*, *Lycopodium alpinum*, *L. annotinum*, *L. clavatum*, *L. complanatum*). These species belong to phytocenosis framed into 8 types of Natura 2000 habitats of community interest (6520, 6430, 6230*, 7140, 8220, 9410, 9130, 91V0). The general trend of conservation status is unfavourable-inadequate, the populations of the species of community interest are predominantly in a good and very good state of preservation, but in the future the populations are expected to decrease. Besides species of community interest, within the study area 30 plant species important in phyto-geographical terms and rare species present in the national red lists were identified.

Key words: species of community interest, conservation status, population, Călimani-Gurghiu Mountains.

Introduction

The conservation of biodiversity is a well defined, complex process that is underpinned by an international and national legislative framework.

The objectives of this study were to verify in field the existing information about chorology (Oroian 1998, Oroian & Giurgiu 2003, Oprea 2005, Sămărghițan 2005), to select the category of the endangered plants and to highlight the main populations of valuable species, their spread in the study area and presence in Natura 2000 habitat types.

The territory under study is the mountainous area of Mureș County, Călimani-Gurghiu Mountains, and partially overlaps the two protected areas: The Natural Park

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Mures Gorge between Toplița and Deda and the Natura 2000 site ROSCI0019 Călimani-Gurghiu.

The study includes research results materialized in the identification and analysis of the conservation status of nine plant species of community interest.

Previous studies in the area mention the presence of these species (Nyárády, 1931, Săvulescu, red.pr. 1952-1976, Oroian 1998, Oroian & Giurgiu 2003, Oprea 2005, Sămărghișan 2005) in several localities but populational studies on these plants were not published.

Material and methods

The inventory of the flora in the studied area was made using the “itinerant transects” model so the area would be covered throughout (Cristea et al. 2004).

For each species of community interest were recorded data such as: species systematic, area, population, area of habitat/habitats suitable for species, the conservation status and the general trend of conservation status, conservation measures, factors that isolate populations and future prospects, abundance (Mihăilescu et al. 2015).

The evaluation of the conservation status was done by applying the method known as the “semaphore method” (Combroux & Schwoerer 2007). There are no previous studies published regarding the population size. Because of that, the evaluation of the conservation trend namely the decrease of populations was made taking in consideration previous personal field research and the authors’ experience.

The name of the species was given in accordance to Ciocârlan (2009) and Sârbu et al. (2013).

The habitat types are coded according to the Interpretation Manual of Natura 2000 Romanian Habitats [Gafta & Mountford (eds.) 2008] and according to Habitats in Romania (Doniță et al. 2005).

In determining endangered, rare or vulnerable species, National Red Lists (Boșcaiu et al. 1994, Dihoru & Dihoru 1994, Oltean et al. 1994, Dihoru & Negrean 2009) were consulted, as well as the latest version of zoological categories published in the *European red list of vascular plants* (Bilz et al. 2011).

Results and discussion

Of the investigated area, nine species of community interest were identified: *Angelica palustris* (Besser) Hoffm., *Arnica montana* L., *Campanula serrata* (Kit. ex Schult.) Hendrych, *Galanthus nivalis* L., *Iris aphylla* L., *Lycopodium alpinum* L., *Lycopodium annotinum* L., *Lycopodium clavatum* L., *Lycopodium complanatum* L..

Besides the nine species of community interest, within the study area, a number of 30 plant species important in phyto-geographical terms and rare, endangered species listed in national red lists were identified.

***Angelica palustris* (Besser) Hoffm.** (Ann. IIb, IVb, Habitat Directive) (Fig. 1). This plant is a biennial or perennial species that prefers moist soils rich in nitrogen. It is a relict species in eutrophic wetlands (Dihoru & Negrean 2009).

Angelica palustris can be found in meadows and wet meadows, wetlands, thickets, eutrophic bogs and at the edges of humid forests. The species is rare in the hornbeam and spruce belts (boreal) (Săvulescu, red.pr. 1956, Sârbu et al. 2013).

The species is mentioned in bibliography on the studied territory at Ciobotani (Oroian, 1998), Toplița (Nyárády 1931, Săvulescu, red.pr. 1956), Mureș Gorge (Oroian et al. 2005). We have no knowledge, so far, of population-based studies, but the presence of the species has been reported on several occasions in the study area. In the studied area there were identified, in some observation points, both vegetative individuals (about 3 individuals / m²) and individuals in the first year of vegetation. Populations were relatively small, up to 10 vegetative individuals (in the inventory points).

In the studied area the species was identified in 10 locations: in Ghurghiului river basin near Lăpușna (Pârâul Negru valley) and Ibănești (Fâncel), also in Mureș Gorge near Răstolița (Costeasa Valley, Vișa Valley) Stânceni and Ciobotani.

The specimens were identified in three types of Natura 2000 habitats:

- 6430 Hydrophilous tall-herb fringe communities of plains and of the montane to alpine levels. On the observation points, in the species composition of this habitat we noticed following species: *Filipendula ulmaria*, *Mentha longifolia*, *Cirsium oleraceum*, *Lythrum salicaria*, *Lycopus europaeus*, *Calamagrostis pseudophragmites*, *Urtica dioica*;
- 7140 Transition mires and quaking bogs with accompanying species: *Carex rostrata*, *Calla palustris*, *Galium uliginosum*, *Lysimachia vulgaris*, *Myosotis scorpioides*, *Lycopus europaeus*, *Valeriana officinalis*, *Deschampsia caespitosa*, *Lythrum salicaria*, *Salix cinerea*;
- On the edge of habitat 6520 Mountain hay meadows in the observation point besides *Angelica palustris* species such as *Trisetum flavescens*, *Poa pratensis*, *Lythrum salicaria*, *Salix cinerea* were identified.

Potential threats estimated in the field are related to water supply and soil moisture levels. These threats could be very important as *Angelica palustris* is a species that requires high level of groundwater, even puddles. If these conditions are influenced by various abiotic human activity, decreased soil moisture levels lead to changes in the floristic structure of phytocenoses of the habitat where the individuals of species vegetate and staff population decline.

The main threats, but also anthropogenic pressure observed on populations of *Angelica palustris* are the expansion of agriculture and changing land into arable land.

Field observations on populations and the human factors (pressure / threats) shows that, six populations are in a good state of conservation, but is expected to decrease the populations in the future.

The last years drought and low rainfall, in the Călimani-Gurghiu Mountains (described by locals as one not seen in last 60 years), affected drastically the populations of *Angelica palustris*, by diminishing the moisture level in the soil and therefore, we expect future decreasing of the six populations in a good state of conservation.

Even though four populations show signs of decreasing they are in a very good state of preservation.

***Arnica montana* L.** (Ann. IVb, Habitat Directive) prefers moderately acidic soils poor in nutrients (oligotrophic). Typical habitats, where this species is found, are mountain meadows generally used in a mixed system (mowing and grazing). It can be found in the squat bushes at the edge of peatlands. The vertical distribution of the

species stretches from the montane level to the subalpine level and rarely in alpine level (Săvulescu, red.pr. 1964, Sârbu et al. 2013).

In the studied area, the species was identified in one point, several sporadic individuals. Although in the observation point no orchids species were found we framed the phytocoenosis in the habitat 6230*, according to Gafta & Mountford (2008). Besides the target species in this observation point can note: *Nardus stricta*, *Festuca rubra*, *Agrostis capillaris*, *Viola canina*, *Hieracium pilosella*.

The main pressures and threats targeting both the species' habitat and the dynamics of effective population size are related to land use by abandoning land (in particular the lack of mowing) and intensive sheep grazing.

The conservation status of the identified population is unfavourable-bad.

***Campanula serrata* (Kit.) Hendrych** (Ann. IIb, IVb, Habitat Directive) (Fig. 2) is a mesophilic, oligotrophic-mesotrophic moderate acidophile species (Sârbu et al. 2013). It is a Carpathian floristic element (endemic) and considered a common species that occurs in grasslands, bushes, debris from beech level to alpine one, in *Potentilla ternatae-Nardion* alliance respectively *Molinio-Arrhenatheretea* class (Sârbu et al. 2013).

The bibliographic data mention the presence of this species in Gurghiu Mountains (Fl.R.P.R. IX, 1964), Piatra Orșova (Sămărghițan 2005), Scaunul Domnului-spruce forest fringe (Höhn 1998). Also, in his PhD thesis, Giurgiu (1981) noted this species in Beheci, on Nirajul Mare and Nirajul Mic Valleys (Brădățel, Poiana Țigle, Poiana Coța Mică).

In the study area, the species was found in 14 locations: Scaunul Domnului, Meștera-Stânceni (Borta), Gudea Mare, near Lăpușna and in hydrographic basin of Sovata River (Platoul Repaș, Poiana Rusu, Poiana Cerepeș).

The species is rare in the territory under study and in the 14 observation points mainly vegetative individuals have been identified.

In some observation points, the identified populations were well developed, including vegetative individuals (5-10 / 1m² to 50-150 / 1m²). In other observation points the abundance of individuals was much lower (5 individuals / 1 m²). In the points with compact populations also generative individuals have been identified (15/5 m²). We mention that no data estimating the population size of this species in the studied area were published.

In the study area the species occur most frequently in 6520 Mountain hay meadows habitat, but we also found it in 6230* Species-rich *Nardus* grasslands, on silicious substrates in mountain areas habitat (3 observation points).

For the populations that grow in 6520 habitat (11 populations) the most frequent species in the inventory points are: *Agrostis capillaris*, *Festuca rubra*, *Nardus stricta*, *Lotus corniculatus*, *Potentilla erecta*, *Viola canina*, *Alchemilla xanthochlora*.

In the composition of phytocoenosis belonging to 6230* habitat, besides *Campanula serrata*, the following species were noted: *Nardus stricta*, *Festuca rubra*, *Agrostis capillaris*, *Viola canina*, *Hieracium pilosella*, *Hypericum maculatum* in the observation points.

The main pressures/threats that affect the habitat of this species and also the effective population size are connected to the land use. Both abandoning land (especially the lack of mowing) and the intensive grazing of sheep have a negative

effect on the conservation status of the species. These threats could lead to decay and replacement of habitats and affecting long-term perpetuation of the species individuals.

Based on the field observation of pressures, threats and the dynamics of effective population size we conclude that six populations are in a very good state of conservation with a stable future trend of population size, seven populations are in a good state of conservation but is expected to decrease the size population in the future and one population (the one identified on Scaunul Domnului) is in a unfavourable-bad state of conservation and the size of population is declining. For this population a negative impact has the tourism which affected also the habitat of species.

***Iris aphylla* L.** (Ann. IIb, IVb, Habitat Directive) (Figs. 3,4) is a xerophilous, eurithermic species that can be found in dry grasslands, thermophilic forest glades, bushes, sandy-rocky places, sunny limestone cliffs, grassy slopes of the hills to the subalpine belt (Săvulescu, red.pr. 1966, Sârbu et al. 2013).

This species is mentioned in previous studies made in the area (Haltrich 1982, Oroian 1995). The species was identified in three inventory points at Stânceni (Leu Mountain). In the three viewpoints the species is abundant. *Iris* populations are stable, including a large number of individuals and they are in a very good state of preservation. As the rocky slopes that were identified *Iris* populations were fenced with wire mesh designed to protect the E578 road against falling rocks, estimation of population size was carried out taking into account the experience of the authors.

The species individuals were identified in phytocoenosis belonging to 8220 Siliceous rocky slopes with chasmophytic vegetation habitat. Beside the target species in the inventory points following species were recorded: *Asplenium trichomanes*, *Asplenium viride*, *Cystopteris fragilis*, *Thymus dacicus*, *Libanotis montana*, *Sedum maximum*, *Sempervivum marmoreum*, *Poa nemoralis*, *Spiraea chamaedryfolia*.

Because the populations are located on the side of road E578 they are relatively accessible. The main anthropic factor affecting the species is tourists or locals collecting the flowers during anthesis or even whole plants with rhizomes, for ornamental purposes.

Field observations on population size and on the human factors (pressures / threats) shows that the population is stable and in a very good state of preservation.

***Galanthus nivalis* L.** (Ann. IVb, Habitat Directive) (Figs. 5, 6). Snowdrop is a mesophilic species that prefers moist, sandy, loamy, moderately acidic soils. It can be found through forests, glades, thickets and meadows, from lowlands to alpine areas. It occurs frequently in deciduous forests or occasionally in coniferous forests, meadows, pastures, thickets, or near water courses. In Romania, except Dobrogea region, this plant is widespread (Săvulescu, red.pr. 1966, Sârbu et al. 2013, Mihăilescu et al. 2015). In the studied area the species was identified at Sălard (two points), Gălăoaia, Andreneasa, Orșova Pădure, Ibănești, Gura Fâncel, Brădețel.

The *Galanthus nivalis* populations were recorded in three types of Natura 2000 habitats: 9410 Acidophilous *Picea* forests of the montane to alpine levels (*Vaccinio-Piceetea*), 9130 *Asperulo-Fagetum* beech forests, 91V0 Dacian Beech forests (*Symphyto-Fagion*). Among the species recorded alongside *Galanthus nivalis* we mention: *Picea abies*, *Fagus sylvatica*, *Hieracium transsylvanicum*, *Corylus avellana*, *Daphne mezereum*, *Luzula sylvatica*, *Anemone nemorosa*, *Erythronium dens-canis*, *Pulmonaria rubra* etc.

The main threat factor is the anthropic factor namely gathering for ornamental purpose or trading.

Concerning the conservation status, the field observations show that the populations are decreasing but they are in an average or good state of conservation.

***Lycopodium alpinum* L.** (Ann. IVb, Habitat Directive) (Fig. 7) is an oligotrophic, mesophilic species encountered sporadically in spruce level – juniper level, in meadows and thickets in communities of alliance *Potentilla ternatae-Nardion* and order *Piceetalia excelsae* (Sârbu et al. 2013).

The species was identified at Răstolița on Iod Valley at altitudes between 1154-1220 m. Six observation points were set. These specimens were identified in the phytocoenosis belonging to 6230* Species-rich *Nardus* grasslands, on silicious substrates in mountain areas habitat, the association *Viola declinatae-Nardetum* Simon 1966.

The species identified on the observation points are the ones characteristic to this habitat type: *Nardus stricta*, *Festuca rubra*, *Agrostis capillaris*, *Viola canina*, *Hieracium pilosella*, *Hypericum maculatum*, *Carex pallescens*, *Cruciata glabra*, *Hieracium aurantiacum*, *Polygala vulgaris*, *Potentilla ternata*.

The main pressures and threats while targeting both species' habitat and population dynamics are related to intensive grazing of sheep and ruderalisation. It has found the presence of the species *Veratrum album* in this habitat.

Considering these treats and previous observations in the field we can conclude that the studied populations are in a very good state of preservation but decreasing.

***Lycopodium annotinum* L.** (Ann. IVb, Habitat Directive) (Fig. 8) is an acidophile, oligotrophic, mesophilic to mezo-higrophilic, heliosciaphilic-sciaphilic and calcifugous species.

It is a sporadic species that occurs in beech level - spruce level (up to 1800 m altitude), in bogs, thickets, wet forests, plant communities in *Piceetalia excelsae* order respectively *Vaccinio-Piceetea* class (Sârbu et al. 2013).

Previous publications mention the presence of this species in Călimani and Gurghiu Mountains (Săvulescu, red.pr. 1952), Sălardului Valley (Haltrich 1982), Lunca Bradului-Neagra, Sălard, Răstolița (Oroian 1995), Mureș Gorge (Oroian et al. 2005), Gurghiuului Mountains, Lăpușna, Bătrâna Valley, Secuieu Valley, Creanga Albă Valley (Sămărghișan 2005), Gurghiuului Mountains-Saca (Coldea & Wagner 1997), Mureș Valley sector II (Drăgulescu 1995).

In the study area the species was recorded in 91 observation points located on the valleys of Mureș and Gurghiu rivers tributaries and also on Nirajul Mic and Nirajul Mare rivers. The populations are representatives and occupy large areas especially on tributaries of Gurghiu River, namely Secuieu and Sirod.

The *Lycopodium annotinum* populations lie on the edge of spruce forests belonging to 9410 Acidophilous *Picea* forests of the montane to alpine levels (*Vaccinio-Piceetea*) habitat. The plant species recorded in the inventory points are: *Picea abies*, *Hieracium transsylvanicum*, *Vaccinium myrtillus*, *Huperzia selago*, *Senecio nemorensis*, *Mycelis muralis*, *Leucanthemum waldsteinii*.

The plant associations to which *Lycopodium annotinum* belong in the study area are: *Hieracio rotundati-Piceetum* Pawł. et Br.-Bl. 1939 and *Leucanthemo waldsteinii-Piceetum* Krajina 1933.

Also the species was identified in the 91V0 Dacian Beech forests (*Symphyto-Fagion*) habitat. Besides *L. annotinum* in the inventory point we noticed characteristic species for this habitat such as: *Symphytum cordatum*, *Cardamine glanduligera*, *Pulmonaria rubra*, *Leucanthemum waldsteinii*, *Ranunculus carpaticus*, *Euphorbia carniolica*, *Aconitum moldavicum*.

Lycopodium annotinum is the most prevalent of the identified species of community interest in the study area.

The main anthropogenic factor affecting the species is plant collection for medicinal purposes. Also, the work for improving the forest roads in the area has a negative impact on these populations.

Field observations on effective population size shows that populations are predominantly in a very good (73) and good (17) state of conservation, only one of the studied populations are severely dropping and in an unfavourable-bad conservation status (at Răstolița).

Lycopodium clavatum L. (Ann. IVb, Habitat Directive) (Fig. 9) is an acidophile, oligotrophic, euriphilous, helio-sciaphilic and calcifugous species. It is a sporadic species that occurs from montane level to subalpine belt in thickets, forests edges, spruce fire forests, meadows. (Sârbu et al. 2013)

In the bibliography this species was mentioned in: Călimani Mt., Gurghiu Mt. (Săvulescu, red.pr. 1952), Răstolița-Podirei (Oroian 1995), Gurghiu Valley-Măgura; Gurghiuului Mt. (Măgura Mare Peak); Lăpușna, Bătrâna Valley (Sămărghițan 2005), Mureș Gorge (Oroian et al. 2005), spruce forest on the upper course of Niraj River (Giurgiu 1981).

The species was recorded in 43 observation points at Răstolița (Listeș), Valea Iodului, Stânceni-Meștera, Valea Bistrei, Ilișoara Mică, Ilișoara Mare, Gudea Mare, Gropușoara, Hidegag, Șolea, Țiba Mare, Țiba Mică, Jârca, Scaunul Domnului, Nirajul Mare, Poiana Deniș, Poiana Brădețel, Nirajul Mic, Valea Sebeș, Valea Sovata, Pârâul Mocirlosu, Lăpușna, Fâncel, Bătrâna, Șirodul Mic, Poiana Meștera (Gurghiu), Vârful Zambrinii (Gurghiu).

Lycopodium clavatum populations often occur in the studied area together with *L. annotinum*, in some cases the two species have been recorded in the same observation points. Identified populations are represented by vigorous, well-developed individuals but on relatively small areas, ranging from a few square meters to tens of square meters.

The species was identified in meadows on the edge of spruce forests, mountainous plateaus, in micro-depressions with higher humidity where specific conditions for development of the species are met. The species is present in the studied area in the following habitat types:

- 6520 Mountain hay meadows, the species recorded in observation points alongside *Lycopodium clavatum* are: *Festuca rubra*, *Agrostis capillaris*, *Anthoxanthum odoratum*, *Briza media*, *Viola canina*, *Potentilla erecta*, *Alchemilla xanthochlora*, *Veronica officinalis*, *Tragopogon pratensis* subsp. *orientalis*, *Trifolium repens*, *T. pannonicum*, *Campanula patula*, *Achillea millefolium*, *Thymus pulegioides*, *Stellaria graminea*, *Carlina acaulis*;
- 6230* Species-rich *Nardus* grasslands, on silicious substrates in mountain areas habitat, with the plant associations *Viola declinatae-Nardetum* Simon 1966 and *Hieracio pilosellae-Nardetum strictae* Pop et al. 1988. In their composition, beside de

characteristic species *Nardus stricta*, *Hieracium pilosella*, *Viola canina*, we noticed species characteristic to superior taxa such as: *Alchemilla xanthochlora*, *Carex pallescens*, *Festuca rubra*, *Hypericum maculatum*, *Polygala vulgaris*, *Carex leporina*, *Genista tinctoria*, *Hieracium umbellatum*, *Luzula campestris*, *Potentilla erecta*, *Veronica officinalis*, *Viola canina*;

- 9410 Acidophilous *Picea* forests of the montane to alpine levels (*Vaccinio-Piceetea*) accompanying species in the observation points being: *Picea abies*, *Fagus sylvatica*, *Hieracium transsylvanicum*, *Corylus avellana*, *Daphne mezereum*, *Luzula sylvatica*, *Anemone nemorosa*, *Erythronium dens-canis*, *Pulmonaria rubra*.

The main anthropogenic factor facing the populations is collecting plants for medicinal purposes. Also an important threat / pressure is grazing, especially intensive grazing which leads to depletion of species of phytocoenoses.

Field observations on the effective population size show that the populations are declining but in an average (seven) or good (10) state of preservation. 26 populations are stable and in very good state of preservation.

Lycopodium complanatum L. (Ann. IVb, Habitat Directive) (Fig. 10) is an oligotrophic species, calcifugous, glacial relict in flora of Romania (Sârbu et al. 2013). It is a rare, species that occurs on beech-spruce level in forests and thickets in the following plant communities: *Dicrano-Pinion* and in *Piceion excelsae* (Sanda et al. 2008, Sârbu et al. 2013).

The species was identified in 9 locations at Răstolița (Peșcoasa Mare) Stânceni on Gudea Mare, Nirajul Mic (three points), Poiana Brădețel (two points), Gurghiu-Poiana Căpitâneasa, Secuieiu.

The species is rare in the studied area. The identified populations are characterised by vigorous and well developed individuals but they lay on relatively small area.

L. complanatum populations were observed on the edge of spruce forest belonging to 9410 - Acidophilous *Picea* forests of the montane to alpine levels (*Vaccinio-Piceetea*) habitat. The species recorded in the observation points are: *Picea abies*, *Hieracium transsylvanicum*, *Vaccinium myrtillus*, *Huperzia selago*, *Senecio nemorensis*, *Mycelis muralis*.

In the study area the species was also found in phytocoenosis framed in 6520 Mountain hay meadows habitat. In the floristic structure of this habitat can meet on the observation points, species such as: *Festuca rubra*, *Agrostis capillaris*, *Cynosurus cristatus*, *Lotus corniculatus*, *Dactylis glomerata*, *Pimpinella saxifraga*, *Anthoxanthum odoratum*, *Cerastium holosteoides*, *Holcus lanatus*, *Trifolium pratense*, *Briza media*, *Carex pallescens*.

The main anthropic factor that affects the population is collecting for medicinal purpose. Also the main pressure/threat is grazing mainly over-grazing. This can lead to an impoverishment of species number in 6520 habitat and to the development of *Nardus stricta* causing a succession to 6230* habitat. These threats lead to a decrease of populations.

In term of conservation status the field observations show that the populations are decreasing and they are in an unfavourable-bad conservation status in two observation points and in seven points the populations are in a good stage of conservation but they are continuously decreasing.

We mention that the population cited from Răstolița-Podirei (Oroian 1995) vanished, probably as a result of collecting for medicinal purpose.

Conclusion

Of the investigated area, nine species of community interest were identified: *Angelica palustris* (Besser) Hoffm., *Arnica montana* L., *Campanula serrata* (Kit. ex Schult.) Hendrych, *Galanthus nivalis* L., *Iris aphylla* L., *Lycopodium alpinum* L., *L. annotinum* L., *L. clavatum* L., *L. complanatum* L..

Among the identified species, the most widespread are *Lycopodium* spp., which occur most frequently on the edge of spruce forests.

These nine species of community interest belong to phytocoenosis framed into eight types of Natura 2000 habitats of community interest (6520 Mountain hay meadows, 6430 Hydrophilous tall-herb fringe communities of plains and of the montane to alpine levels, 6230* Species-rich *Nardus* grasslands, on silicious substrates in mountain areas, 7140 Transition mires and quaking bogs, 8220 Siliceous rocky slopes with chasmophytic vegetation, 9410 Acidophilous *Picea* forests of the montane to alpine levels (*Vaccinio-Piceetea*), 9130 *Asperulo-Fagetum* beech forests, 91V0 Dacian Beech forests (*Symphyto-Fagion*).

The general trend of conservation status is unfavourable-inadequate, the populations of species of community interest are predominantly in a good and very good state of preservation, but in the future the populations are expected to decrease.

Besides species of community interest, within the study area 30 plant species important in phyto-geographical terms and rare species present in the national red lists were identified.

In the observation points 2 alien species were identified (*Erigeron annuus* and *Solidago canadensis*), without a significant impact on the studied species, thus we conclude that the phenomenon of presence and spread of invasive neophytes is restricted.

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Fig. 1. Angelica palustris habitus and characteristic habitat in Gurghiu Valley (photo: M. Sămărghițan)



Fig. 2. Campanula serrata in 6520 habitat (photo: M. Sămărghițan)



Figs. 3, 4. Galanthus nivalis L. (photo: M. Sămărghițan)



Figs. 5, 6. Iris aphylla L. in 8220 habitat (photo: S. Oroian)



Fig. 7. Lycopodium alpinum in 6520 habitat (photo: M. Sămărghițan)



Fig. 8. Lycopodium annotinum (photo: M. Sămărghițan)



Fig. 9. Lycopodium complanatum (photo: M. Sămărghițan)



Fig. 10. Lycopodium clavatum (photo: M. Sămărghițan)