

CAMPANULA SERRATA IN THE NATURA 2000 ROSCI0047 NEMIRA PEAK SITE

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Key words: *Campanula serrata*, Natura 2000, Nemira Peak

INTRODUCTION

According to the Natura 2000 Standard Data Form, the site ROSCI 0047 Nemira Peak is characterized by the following geographical coordinates:

N 46° 13' 17"

E 26° 20' 22"

The total area of the site is 3509 hectares.

The highest point within this region is reaches 1646 m, and the lowest point of the site is 699 m. The Nemira Peak Site (Figure 1) has an average altitude of 1260 m.

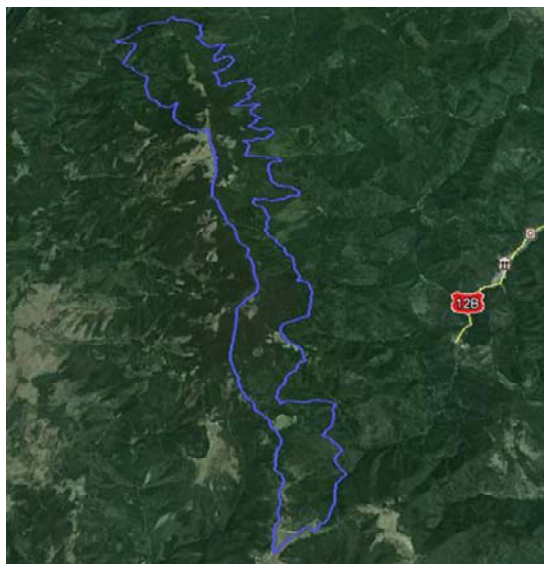


Figure 1. Nemira Peak Site (source: Natura 2000 Viewer)

Scientific Name of the Species: 1. *Campanula serrata* (Sult.) Hendrych (Ord. *Asterales*, Fam. *Campanulaceae*).

Synonymous: *Campanula napuligera* Schur; *Campanula pulla* Baumg. Enum. Stirp. Transs. I (1816) 147 et auct. Transs. – *C. hostii* Schur Sertum (1852) 47 et Enum. l.c. 445 – *C. lanceolata* Andrae in Bot. Zeit. VIII (1850) 327 – *C. scheuchzeri* Auct. Rom., transs. Et bucov. – *C. pseudolanceolata* – auct. Non Pant (1882) Exs. FRE nr 294 – Ic: Pl 14, fig. 1-6; Pl 15, fig. 2-4.

Folklore name: campanula

Preservation status

1. The Habitats Directive – The Directive of the European Council no. 92/43 EEC, Annex II.
2. The Law no. 462/2001 regarding the status of the protected natural areas, and the preservation of natural habitats, of wild flora and fauna.
3. O.U.G. no. 57/2007, modified and completed – regarding the status of the protected natural areas, and the preservation of natural habitats, of wild flora and fauna.

Description of the species

The species belongs to the *Campanulaceae* family, frequently found in the old bibliographical references by the name of *C. napuligera*.

- herbaceous plant, perennial, its height ranges from 20 to 60 cm;
- the root is merely thickened in the proximity of the collet area;
- the leaves are rather numerous, narrow-lanceolated, small and distanced crenate-serrated margins, sometimes whole margins; basal stem leaves and the ones on the sterile shoots are frequently absent while the plant is in bloom.
- the flowers are small, bell-shaped, blue, in rich inflorescences, campanulate corolla, rich inflorescences.
- fruit: capsule.

Habitat

Frequent from the Fagus level until the alpine level, in meadows and bushes;

- in associations included in *Campanulo - Juniperetum*, *Potentillo - Nardion*.
- 91Q0 west Carpathian forests of *Pinus sylvestris* on lime layer.
- 6230 – species from the meadows with *Nardus stricta* (silicious layer)
- HdR: 3608 – south-eastern Carpathian meadows of *Scorzonera rosea* and *Festuca nigrescens*;
- 3609 – south-eastern Carpathian meadows with *Nardus stricta* and *Viola declinata* (corresponding to the association *Viola declinatae - Nardetum*).
- 6520 – mountain meadows; - HdR: 3801 – south-eastern Carpathian meadows with *Trisetum flavescens* and *Alchemilla vulgaris*.

Ecology

Photophilic plant with a low tolerance for shadow areas.

Grows on dry land, with a moderate acid pH, very low content of nitrogen.

Blooming period: July-September.

Spread

In Europe: Czech Republic, Slovak Republic, Poland, Romania, Western Russia. Endemic.

In Romania: Gutâi Mountains, Maramureş Mountains, Rodnei Mountains, Suhard Mountains, Obcinele Bucovinei, Câmpulung - Moldovenesc, Giumalău – Rarău Mountains, Stânişoarei Mountains, Suceava Plateau, Ceahlău Mountains, Bicăz Canyon, Hăşmaşu Mare Mountains, Sabasa Valley (Piatra Neamţ), the mountains from Natura 2000 site – Nemira Peak, Gurghiului Mountains, Harghitei Mountains, Ciucului Mountains, Călimani Mountains, Vrancei Mountains, Penteleu, Siriu, M-ţii Ciucaş, Postăvaru, Piatra Mare, Prahova Valley, Ialomiţa Valley, Piatra Craiului Mountains, Bucegi Mountains, Făgăraş Mountains, Sibiu, Sadului Valley, Dâmboviţei Valley, Cozia Mountain, Olăneşti, Căpâţanii Mountains, Luncavăţ Valley, Parâng, Sureanu Mountains, Vâlcan Mountains, Retezat, Ţarcu – Godeanu Mountains, Muntele Mic, Poiana Mărului, Domogled - Valea Cernei, Teşna Valley, Semenice Mountains, Rusca Peak, Apuseni Mountains, Găina Mountain, Trascăului Mountains, Muntele Mare, Bihor Mountains, Vlădeasa, Pădurea Craiului Mountains, Plopiş Mountains.

MATERIAL AND METHODS

- GPS, compass
- photo camera
- field determinator and work sheets
- field maps containing the site limits

The field identification and the assessment of the preservation status will be done for the species *Campanula serrata*, in the site ROSCI 0047 Nemira Peak; In view of identifying the intended species, there were observed transects, in the characteristic habitats of this species. There were focussed (by means of a GPS) the populations belonging to this species important to the community, the areas and habitats suited for this plant.

The measurements and GPS recordings in field respected a data structure that allowed the automatic upload/stocking in the GIS database. There were investigated sample areas (botanical surveys) within the regions in which this species was identified that provided the estimate on the population size and the preservation status of *Campanula serrata* (considering the accompanying species, as well).

RESULTS AND DISCUSSIONS

The distribution of this species in the protected area is cited in the floristic list in the paper *Flora și*

vegetația Munților Nemira (Mititelu D., Barabaş N., 1994).

The distribution in the Nemira Peak site (based on the field observations from North to South).

The meadows of the mountain peaks Farcu Mic, Farcu Mare, Nemira Mică, Țiganca, Nemira Mare, the meadows between Șandru Peak, Culmea Slănic and the water stream Romeo, Cenghea meadow, the meadows surrounding the Ghepar Peak, in the *Nardus* and *Caluna* associations on the Mereni Grazing Ground. It is present in all the meadows and bushes in the reservation, in some areas it is almost extinct.

There are seldom more than 3-5 individuals/100 m² as a cause of intensive depasturation. It is absent in the timbered meadows between the Nemira Moors and Țiganca Peak, and from the Slănic river basin meadows.

The regions where the species *Campanula serrata* was identified are described as it follows:

Observation point no. 1

- **Habitat 6230** – Alpine meadow with *Nardus*, with a wide variety of plant species, silicious substrate. Situated in the Northern area of the Nemira Peak site.

- Altitude -1345 m,

- Exposure - NE

- Species that were identified during the 2013 pasturage. *Agrostis capillaris* (even spread on 60-80% of the meadow surface), *Festuca rubra* (over 5% of the surface), *Nardus stricta*, *Achillea colina*, *A. distans* (almost 5% of the surface), *Thymus pulegioides*, *Veronica chamaedrys*, *Poa pratensis*, *Alchemilla xanthochlora*, *Prunella grandiflora*, *Trifolium alpestre*, *Cruciata pedemontana*, *Cerastium sylvaticum*, *Leontodon autumnalis*, *Campanula serrata* (very rare, 1-2 individuals/ 100 m²) (Figure 2), *Viola declinata*.

- Indesirable species - *Rumex alpinus* (acoperire 10 - 20%) (Figure 3), *Deschampsia caespitosa*, *Urtica dioica*.

- Threats - location of sheep yards in new regions, covered by gramineous plants

- Preservation improvements: we recommend a sustainable moderate pasturage.



Figure 2. *Campanula serrata* in Farcu Mic



Figure 3. Area covered by *Rumex alpinus* due to excessive pasturage from the previous years (Farcu Mic)

Observation point no. 2

Habitat 6230 – Alpine meadow of *Nardus* (Figure 5), rich in plant species, on a silicious substrate. The same type of vegetation was identified close to a detritus (between Farcu Mare and Nemira Mică) with the coordinates: N 53°30' 66" and E 26°12' 54". The sheep yards are absent, *Campanula serrata* (Figure 4) is almost extinct, several individuals were found next to the touristic route by the forest, on one of the slopes, close to a building belonging to a sheepyard.



Figure 4. *Campanula serrata* – Farcu Mare



Figure 5. Habitat 6230 – Alpine meadows with *Nardus stricta* (Farcu Mare)

Observation point no. 3

The *Nardus* association has a 4-5 ha on the Northern peak of the Nemira Mică, at 1503 m, the coordinates being N 53°14' 50" and E 26°01' 562". The identified species were: *Nardus stricta* (covering more than 80% from that area), *Agrostis capillaris*, *Juniperus nana*, *Festuca rubra*, *Potentilla erecta*, *Deschampsia caespitosa*, *Vaccinium myrtillus* (covering more than 10%), *Thymus pulegioides*.

-The vegetation is affected by excessive pasturage, this delays the evolution to bushes

-*Campanula serrata* (Figure 6) is merely extinct.



Figure 6. *Campanula serrata* – Observation point no 3 – Nemira Mică

Observation point no. 4

Location: Nemira Mică. Surface: about 15 Ha.

The grassy layer is dominated by *Nardus* on silicious substrate. The mix of vegetation is due to the shrubs of *Juniperus sibirica*, about 1 - 5 on each 100 m², there are some areas in which they cover up to 30% of the soil surface. The young spruces of 2-3 m in height, more frequent in the lower limit of the mountain valley, were cut off. It has been noticed, therefore, a positive management regarding the maintenance of pasturages in the Natura 2000 site – Nemira Peak.

The identified species were: *Nardus stricta* (dominant), *Viola declinata*, *Juniperus sibirica*, *Scorzonera rosea* (1 individual every 100 m²) (Figure 8), *Thymus pulegioides*, *Festuca rubra*, *F. nigrescens*, *Hieracium pilosella*.

Invasive species: Deschampsia caespitosa (rather rarely).

Alterations – pasturage

Identified habitat 6230 – Mountain meadows of *Nardus* rich in species on silicious layers.

- Recommendations - decrease the number of animals (one small sheepyard is enough for the entire peak between Farcu Mic and Nemira Mare; the other sheepyards may be placed at lower altitudes, outside the protected area).

Campanula serrata is very rare in this region, almost extinct.



Figure 7. *Campanula serrata* – Observation place 4 – Nemira Mică



Figure 8. *Scorzonera rosea* – habitat 6230 - Nemira Mică



Figure 8. Observation point no. 4 – Nemira Mică

Observation point no. 5

Habitat 6230 (Nardus on silicious substrate)
Location: upstream the Bărzăuța spring (Gura Țigăncii)

Surface: 3 ha

N 53°11' 04" and E 26°01' 932",

The Picea seedlings are present on more than 90 % of the meadow. The empty regions on the Nemira Peak have been deforested in order to maintain the pasturage areas. There were identified rare herbaceous species since mid 19th century (by J. Szabo before 1840, and by D. Brandză before 1870)

Species - *Viola declinata* (Figure 10), *Nardus stricta*, *Juniperus sibirica*, *Scorzonera rosea*,

Thymus pulegioides, *Festuca rubra*, *Festuca nigrescens*, *Hieracium pilosella*, *Alchemilla xanthochlora*, *Taraxacum officinalis*.

Alterations - overpasturage

Campanula serrata is very rare, the individuals are small; this species is merely extinct in this area.



Figure 9. *Campanula serrata* – Observation point 5



Figure 10. *Viola declinata*

Observation point no. 6

Location: Șaua Nemirei

The surface on which *Campanula serrata* was identified - 30 Ha, of which 10 ha is covered with *Vaccinium* (habitat 4060), intensely pasturaged, and 20 ha of *Nardus* (habitat 6230).

The other species are more rare. *Campanula serrata* is very rare.



Figure 11. *Campanula serrata* within the habitat 6230 (observation point no. 6)

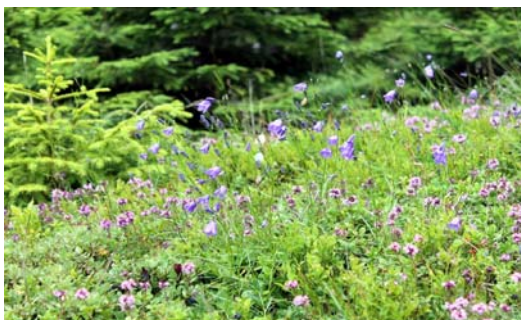


Figure 12. *Campanula serrata* within the habitat 4060 (observation point no. 6)

Observation point no. 7

Location: Islaz Mereni towards the Ghepar Peak, N 46°07' 11" and E 26°20'23",

Altitude: 1226 m

Habitat 4030: small dry bushes, European of *Calluna* group

Surface: about 3 ha.

Identified species: *Calluna vulgaris* (20%) (Figure 14), *Vaccinium myrtillus* (20%), *V. vitis-idaea*, *Nardus stricta* (about 50%), *Festuca nigrescens* 5%, *Potentilla montana*, *P. erecta*, *Campanula serrata* extremely rare (a few individuals stamped by animals per each ha).

There are no invasive species.

Threats: Overpasturage lead to a short vegetation of 15- 20 cm in height.



Figure 13. *Campanula serrata*—observation point 7



Figure 14. *Calluna vulgaris* on Ghepar Peak – habitat 4030

Observation point no. 8

Habitat 4030 - European dry shrubs

Location: Islaz Mereni, close to the Ghepar Peak N 46°08' 03" and E 26°20' 41",

Altitude: 1271 m

Coverage: shrubs 30 %

Dominant species: *Calluna vulgaris*

On a surface of 25 m² there were identified: *Potentilla erecta*, *Festuca nigrescens*, *F. rubra*, *Hieracium pilosella*, *Vaccinium myrtillus*, *V. vitis-idaea*, *Nardus stricta*, *Campanula serrata*—extremely rare. The invasive species were absent.

The vegetation height is rather low (10-30 cm) caused by overpasturage



Figure 15. *Campanula serrata* within the observation point no 8

Observation point no. 9

Habitat 4030 - European dry shrubs

Surface: 5-10 ha. *Calluna vulgaris* covers 20-30% at the forest margin. *Nardus stricta* covers 80 - 90% of the peak.

Location: Islaz Mereni upstream the Ghepar Peak

Identified species: *Calluna vulgaris*, *Nardus stricta*, *Vaccinium myrtillus*, *V. vitis-idaea*, *Campanula serrata*, *Festuca rubra*, *Potentilla erecta*, *Thymus pulegioides*, *Festuca nigrescens*, *Agrostis capillaris*. *Campanula serrata* is encountered in a very small number of individuals.

It is a region of intense pasturage.



Figure 16. *Campanula serrata* – observation point no. 9

Observation point no. 10

Habitat 4030 – dry European shrubs

Location: the meadow between the peaks Ghepar and Cenghiu, N 46°08' 50" and E 26°20' 44".

Altitude: 1305 m

Surface: 5 Ha

Identified species: *Calluna vulgaris* (covering 70 - 80% of this area), *Juniperus nana* (covering 20-30% of this area), *Vaccinium myrtillus*, *V. gauthieroides*, *Genista tinctoria*, *Festuca nigrescens*, *Hieracium* sp., *Potentilla erecta*, *Pinus sylvestris*. *Campanula serrata* is very rare, there were identified a few individuals per each ha. The shrub vegetation (of 30-50 cm in height) cover almost 90%.

Unwanted species: *Deschampsia caespitosa* (in a small number of shrubs).

It is the largest shrub area without pasturage (with very few fodder biomass), although it is situated at a pasture margin where the young trees were cut off. It is recommended that it should remain unaltered.



Figure 17. Observation point number 10

Observation point no. 11

- Habitat 4060

- Location: Șandru Peak, 1640 m altitude

- Surface: 2 ha; Shrubs: 20%

- Lichen: 40%, on the rocks deprived of herbaceous vegetation

- List of vascular plants: *Vaccinium myrtillus*, *V. vitis-idaea*, *Juniperus nana*, *Picea abies*, *Hypochoeris uniflora*, *Calamagrostis vilosa*, *Chamaenerion angustifolium*, *Campanula serrata*, *Molinia caerulea*.



Figure 18. *Campanula serrata*

Observation point no. 12

Location: Cenghiu Pasture N 46°09' 58" and E 26°20' 49"

Altitude: 1390 m.

The surface is wider than 10 ha, 90% covered with *Deschampsia caespitosa* and 10% with *Rumex alpinus*.

Campanula serrata is very rare. The other plant species are not frequent, either (*Festuca rubra*, *Agrostis capillaris*, *Picea abies*, *Juniperus sibirica*, and *Nardus stricta*)

This area cannot be included in a high-priority habitat as the biomass is represented by invasive species.



Figure 19. Observation point no. 12

Observation point no. 13

Location: meadows with sheepyards under Culmea Irosului (Șandru Peak towards the Slănic basin).

Altitude: 1372 m; N 46°11'13"; E 26°21'09".

The researched area is of about 10 ha.

The vegetation comprises *Nardus* together with *Agrostis capillaris*, and weed with *Rumex alpinus*.

This region is overpastured, holding many sheepyards; it is part of the protect area in which *Campanula serrata* is almost completely destroyed. Only a few individuals of this species were found.

The situation is intricate as the legally positioned sheepyards depasture all the forest void, and may easily reach Șandru Peak, that require a thorough vegetation preservation (as well as on Țiganca).



Figure 20. Observation point no. 13

Observation point no. 14

Habitat 6230 Alpine meadows of *Nardus*, with a variety of species, on silicious layer

Location: the peak area between Țiganca and Nemira Mare.

Forest end and deforested pasture with *Nardus* and *Vaccinium*.

Altitude: 1470; N 46°14'22", E 26°19'29"

In this area the reservation limit follows the mountain peak, in the forest margin, the pastures are on the western mountain peak and not included in this area (Covasna territory). There were identified about 2-5 individuals of *Campanula serrata* per ha. The number of vascular species: 7-9 / 100 m². The dominant species are *Vaccinium* sp. 30%, *Nardus stricta* 50%, *Agrostis capillaris* and *Festuca rubra* - about 15%. The pasturage is in average limits. Indesirable species: *Deschampsia caespitosa* (very rare). Vegetation height: 10-30 cm. The vegetation has a patch-like appearance.

Observation point no. 15

Nardus vegetation with dry trees – buffer area between the habitat 6230 (mountain meadows of *Nardus*, with various species, on silicious layers) including elements of habitat 6430 (forest ends).

Location – the peak between Țiganca and Nemira Mare – deforested meadow

Forest end and pasture with *Nardus stricta* and *Vaccinium myrtillus*

Altitude: 1508 m; N 46°14'27", E 26°19'32"

Number of vascular species: 8-12 / 100 m².

Dominant species (mozaic-like): *Vaccinium* 80-90 % in the forest margin, *Nardus stricta* about 70% within pastures, *Festuca rubra*, moss 10%. The young spruces are frequent. Apart *Lycopodium annotinum*, *Luzula sylvatica*, are found here etc. *Campanula serrata* is rather rare.

There are no allochthonous species, only a few individuals of *Deschampsia* (lower on the pasture they are more dense, outside the perimeter); usually the pasturage stops on the perimeter line of the reservation as the eastern slope is abrupt and covered by forest (the pasturage should be forbidden between the base of Țiganca and Bălțile Nemirei).



Figure 21. *Campanula serrata* – observation point no

15

Observation point no. 16

Location: close to Șaua (the Gate) Nemirei (inbetween Țiganca and Nemira Mare)

The identified habitat: 6230 Mountain meadows of *Nardus*, with various species, on silicious layer

Altitude 1540 m; N 46°14'49", E 26°19'25"

Dominant species: *Nardus stricta*, *Festuca rubra* and *Agrostis capillaris*

Campanula serrata is very rare, although the pasturage seems to have an optimal number of animals on the respective area.

Allochthonous species: *Deschampsia caespitosa*.

Vaccinium vegetation covers 1-5% of this area.

Observation point no. 17

Habitat 4060: alpine and boreal shrubs

Location: Șaua Nemirei

Altitude: 1588 m; N 46°14'57", E 26°19'28"

Number of vascular species: 9-10 species.

Dominant species: *Vaccinium myrtillus* 70-90% at the outskirts, and 50% within the pasture, *Vaccinium vitis idaea* 1-5%, *Nardus stricta* 5-10%.

Campanula serrata is very rare.

Observation point no. 18

Vaccinium sp. shrubs with *Juniperus nana* (framed within the 4060 habitat of alpine and boreal shrubs).

Location: Nemira Mare

Altitude: 1650 m; N 46°15'24", E 26°19'25"

Number of identified species: 10-12 species.

Dominant species: *Vaccinium gautherioides* - 10%, *V. myrtillus* 70%, *Juniperus nana* 10%, bryophytes 5%.

Campanula serrata was identified in this point as well and displayed a very good regeneration capacity.

Observation point no. 19

Location: Țiganca Peak

- Altitude 1563 m; N 46°13'10" and E 26°20'07"

- Altitude 1622 m; N 46°13'55" and E 26°19'28"

- Altitude 1629 m; N 46°13'51" and E 26°19'32"

- Number of identified vascular species: over 40.

- The shrubs from this mountain are situated on the North-Western slope and on the peak plateau, on a surface of 4 hectare. On the slope *Vaccinium* covers about 50% of the area, *Alnus viridis* 20%, *Picea abies* 10%, *Juniperus nana* 10%, the bryophytes and lichens 3-5%.

- There are no allochthonous species.

- The average height for vegetation is from 30 to 150 cm

- There were identified many individuals of *Campanula serrata*.

It is recommended that the sheepyard passage should not reach the lower part of shrubs.

The threats for this species are: 1 – over pasturage; 2 – the advance of young spruce trees (*Picea abies*) is another menace for the meadow species. Unless regulations to remove those shoots will be enforced,

the habitat will alter its structure and function, the meadow habitat will naturally grow into a forest habitat; 3 – invasive species; 4 – climate and environmental changes; 5 – pollution; 6 – expanding the young spruce trees into the meadow or shrub areas

The management improvements in order to maintain *Campanula serrata* in a suitable preservation state are:

- Pasturage/Over pasturage

The establishment of the pasturage areas and of the maximum sheep number/surface unit depending on each pasture and its degree of degradation. The pasturage should be forbidden until the recovery of the habitats within the pasture areas degraded from a floristic viewpoint, including invasive species. Each pasture should be thoroughly analyzed before going into use. Therefore, the pasture carrying capacity is established.

Locating the areas in which the proposed improvement will be applied: This environmental improvement should be applied in all the pasture areas within the Creasta Nemirei Natura 2000 site. According to field observations, the most menaced pastures are those situated in the regions Farcu, Nemira, Tiganca, □andru.

- The removal of spruce young trees (*Picea abies*) from the pasture areas

Our field trips lead to the observation of pasture areas invaded by spruce young trees. We noticed, as well, some pasture areas in which the spruce young trees and the false helleborine (*Veratrum album*) were cut off. This fact reveals the existence of an actual management in this respect. Our recommendation is to accomplish this issue annually where it is necessary.

Locating the areas in which the proposed improvement will be applied: Meadows in the mountain peak areas: Farcu Mic, Farcu Mare, Nemira Mică, Nemira Mare, Sandru, Tiganca

- Data collection from terrestrial plants, generally speaking/Luare/prelevare de plante terestre, în general

Plant harvesting together with the underground part leads to the disappearance of the plants from that place. This should be restricted as well and fines should be imposed in case of non-compliance. The harvesting of plants including the underground part should be done only with the conservator's approval and just for those plants in a constant population with a favourable preservation status. This should be popularized by means of info panels, flyers, brochures, info campaigns, volunteering.

Locating the areas in which the proposed improvement will be applied: info panels, flyers, brochures, maps, info campaigns, volunteering:

- at the site entrance;
- along the tourist routes;
- within the specially designed tourist stops;

- at the info points, chalets or family hostels within the site area or nearby

Outdoor sports, leisure and recreational activities

The tourist routes and camping places should be permanently maintained so the tourists won't get lost. The tourists should be informed (by means of info panels, brochures, maps) about what is allowed and what is forbidden, and about the legal sanctions in case of non-compliance.

Soil pollution and solid waste (excepting the evacuations); H05.01 – garbage and solid waste

Regarding the solid waste, the best approach is to inform the tourists to pick up their leftovers into plastic bags and carry them to the nearest garbage disposal unit.

In order to avoid the waste gathering we recommend the start up for „Garbage-Free” strategy, successfully applied within the parks and reserves in Western Europe and North America. By means of this program the tourists are informed about the absence of garbage deposit units within the natural site, and this triggers their responsibility to carry their own waste and packages.

Natural system alterations; J01 – fire and fire fighting

The fire prohibition within the site: the tourists should be informed on this issue and about the punitive measures in case of non-compliance.

Locating the areas in which the proposed improvement will be applied: Info panels, flyers, brochures, maps, info campaigns, volunteering:

- at the site entrance;
- along the tourist routes;
- within the specially designed tourist stops;

CONCLUSIONS

Campanula serrata is an important species protected both at the European and the national level. Its identification within the Nemira Peak site enhances the floristic importance of the Natura 2000 site.

The species was identified within the peak areas in three priority habitats of community interest: 6230* Meadows rich in *Nardus* species, on silicious layers of the mountain areas (and of the subalpine areas of continental Europe); 4060 – Alpine and boreal shrubs, and 4030 – Dry European shrubs.

Campanula serrata is encountered on the meadows and the shrubs from the areas: Farcu Mic, Farcu Mare, Nemira Mică, □iganca, Nemira Mare, on the meadows inbetween the peaks Sandru, Culmea Slănic, and Romeo brook, the Cenghea pasturage, the meadows surrounding the Ghepar Peak, on the meadows and the shrubs on the Mereni grazing ground.

There are multiple menaces for this species, some of anthropic, some of natural cause. The species is subjected to various stress factors, such as:

overpasturage, the advancement of spruce seedlings, the harvesting of plants for herbarium collections, pollution, invasive species, drought and reduced rainfall, as well as habitat replacement and deterioration. All these lead to the degradation until the fragmentation and limitation of this species' habitat.

The management improvements that should be applied in view of a sustainable preservation were thoroughly presented within this scientific article. The species should be monitored each year, and after a five-year period there may be established a tendency regarding the preservation status of this species. If all these improvements will be taken into consideration, the preservation status of this species will become favourable.

ABSTRACT

Campanula serrata is one of Romania's valuable plants, that requires special protection according to the actual legislation. This paper aims to analyze this species' distribution within the site, the types of habitats in which the species was identified, the relation between the plant and the environment, the identification of possible threats and the suggesting of some management improvements in view of a sustainable preservation.

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