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Preliminary survey of the synanthropic plant communities of the Muránska Planina National Park

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Abstract: Within the study of non forest vegetation in the Muránska Planina National Park during the years 2003 and 2004 also the synanthropic vegetation was analysed. 55 ruderal and segetal communities from the classes *Stellarietea mediae*, *Polygono-Poetea annuae*, *Artemisietea vulgaris*, *Galio-Urticetea*, *Epilobietea angustifolii* and *Molinio-Arrhenatheretea* were found. The most of them were concentrated at the periphery zone of the National Park. The most frequent synanthropic communities inside the National Park were trampled communities and nitrophilous fringe communities. Among the five neophyte dominated communities the *Bunias orientalis*-community was the wide spread in the south-east part of the National Park.

Keywords: Muránska planina National Park, ruderal communities, segetal communities, invasive species, neophytes.

Introduction

In the 19-th century the actual territory of the Muránska Planina National Park belonged to the domain of the Coburg's family. Reve Ľudovít Greiner in a great measure contributed to the conservation of forests in this area in natural status. The first project of the special territory conservation of the Muránska planina Mts proposed Pavel Sillinger in 1938. 38 years later, in the year 1976 the Muránska Planina Protected Territory was appointed, and finaly in the 1-st October 1997 the Muránska Planina National Park was established.

Territory of the Muránska Planina National Park is approximately limited by villages Tisovec, Muráň, Muránska Huta, Červená Skala, Závadka nad Hronom, Beňuš, and Pohronská Polhora. In comparison with the previous Protected Territory the outside protected zone was reduced. Actual area of the Muránska Planina National Park is 20 318 ha, protected zone 21 698 ha. Elevation ranges from 400 m a. s. l. (valley of the Muránka river) to 1439 m a. s. l. (Fabova hoľa Mt.). The highest mountain of all territory (together with the protected zone) is Stolica Mt. (1476 m a. s. l.). The Muránska Planina National Park belongs to the subprovince Inside West Carpathians, and reaches geomorphological units Spišško-gemerský kras, Stolické vrchy and Horehronské podolie. Phytogeographically this territory belongs to the region of West-Carpathian flora (*Carpaticum occidentale*), subregion *Praecarpaticum*. Central part of the territory (Tisovský kras Karst and Muránska planina Mts) presents individual phytogeographical district Muránska planina, the rest belongs to the district Slovenské rudohorie (FUTÁK 1980, MAZÚR & LUKNIŠ 1978).

The Muránska Planina National Park represents one of the best preserved area in the Slovakia. In consequence of inaccessibility and remoteness of this region the natural or nature-close ecosystems with unusually high geoekobiodiversity were preserved there. Karst plain of the Muránska planina Mts presents the fundamental part of the territory. Variousness of the area attracted many botanists. They concentrated mainly to the investigation of vascular plants. The vegetation was analysed in recent time. Review of botanical research of the Muránska planina Mts was published by Turis (1999).

During the last 20 years the research of flora and vegetation of the Muránska planina Mts has been more systematic. In the last five years it was realised in series of projects: project VEGA 7457/20 (in years 2000 – 2002) „Analysis of status of components of biological diversity in the Muránska Planina National Park" (flora and selected groups of fauna were analysed); project VEGA 0045/03 (in years 2003 – 2005) „Plant communities of the Muránska Planina National Park. 1. Non forest communities". Within the last project also synanthropic vegetation was studied for the first time. In the next project the forest vegetation will analysed. In this period the numerous botanical articles were published.

Material and methods

During vegetation periods of years 2003 and 2004 in the Muránska Planina National Park synanthropic vegetation was analysed. 169 phytocoenological relevés were obtained and classified in harmony with the methods of Zürich-Montpelliér school (BRAUN-BLANQUET 1964), based on preliminary association tables. Nomenclature of taxa follows MARHOLD & HINDÁK (1998), nomenclature of syntaxa follows JAROLÍMEK et al. (1997) and ELLMAUER & MUCINA (1993).

Results

Synanthropic plant communities from the Muránska Planina National Park were ordered within the six classes:

(Behind the name of community the number of relevés is added)

I. *Polygono-arenastri-Poetea annuae* Rivas-Martínez 1975 corr. Rivas-Martínez et al.1991

Polygono arenastri-Poetalia annuae R. Tx. in Géhu et al. 1972 corr. Rivas Martínez et al.1991

Matricario matricarioidis-Polygonion arenastri Rivas-Martínez 1975 corr. Rivas-Martínez et al. 1991

1. *Matricario-Polygonetum arenastri* T. Müller in Oberd. 1971 (7)
2. *Poëtum annuae* Felföldy 1942 (1)
3. *Matricaria discoidea*-community (3)

II. *Stellarietea mediae* R. Tx., Lohmeyer et Preising in R. Tx. ex von Rochow 1951

Violenea arvensis Hüppe et Hofmeister ex Jarolímek et al. 1997

Centaureetalia cyani R. Tx., Lohmeyer et Preising in R. Tx. ex von Rochow 1951

Caucalidion lappulae (R. Tx. 1950) von Rochow 1951

4. *Lathyro tuberosi-Adonidetum aestivalis* Kropáč et Hadač in Kropáč et al. 1971 (1)
5. *Euphorbio exiguae-Melandrietum noctiflori* G. Müller 1964 (2)

Atriplici-Chenopodietalia albi R. Tx. (1937) Nordhagen 1940

Scleranthion annui (Kruseman et Vlieger 1939) Sissingh in Westhoff et al. 1946

6. *Apera spica-venti-Mentha arvensis*-community (1)

Spergulo-Oxalidion Görs in Oberd. et al. 1967

7. *Euphorbio-Galinsogetum ciliatae* Passarge 1981 (1)

Panico-Setarion Sissingh in Westhoff et al. 1946

8. *Echinochloo-Setarietum pumilae* Felföldy 1942 corr. Mucina 1993 (1)

Sisymbrienea Pott 1992

Sisymbrietalia J. Tx. in Lohmeyer et al. 1962

Atriplicion nitentis Passarge 1978

9. *Chenopodietum stricti* (Oberd. 1957) Passarge 1964 (1)

Other communities of the order *Sisymbrietalia*

10. *Geranium pussilum*-community (1)
11. *Myosotis arvensis*-community (1)
12. *Thladianta dubia*-community (1)
13. *Viola saxatilis*-community (4)

III. *Artemisietea vulgaris* Lohmeyer et al. in R. Tx. ex von Rochow 1951

Onopordetalia acanthii Br.-Bl. et R. Tx. ex Klika et Hadač 1944

Dauco-Melilotion Görs 1966
14. *Echio-Melilotetum* R. Tx. 1947 (1)
15. *Tanaceto-Artemisietum vulgaris* Sissingh 1950 (5)
Arction lappae R. Tx. 1937
16. *Arctio-Artemisietum vulgaris* Oberd. et al. ex Seybold et T. Müller 1972 (2)
17. *Hyoscyamo-Conietum maculati* Slavnić 1951 (2)
18. *Urtico urentis-Chenopodietum boni-henrici* R. Tx. 1937 (1)
Agropyretalia repentis Oberd. et al. 1967
Convolvulo-Agropyrion repentis Görs 1966
19. *Falcario vulgaris-Agropyretum repentis* T. Müller et Görs 1969 (1)
Other communities of the class *Artemisietea vulgaris*
20. *Anchusa officinalis*-community (2)
21. *Cirsium arvense*-community (1)
22. *Pastinaca sativa*-community (4)
23. *Poa compressa*-community (1)
24. *Saponaria officinalis*-community (1)

IV. *Galio-Urticetea* Passarge ex Kopecký 1969
Lamio albi-Chenopodietalia boni-henrici Kopecký 1969
Galio-Alliarion (Oberd. 1957) Lohmeyer et Oberd. in Oberd. et al. 1967
25. *Sambucetum ebuli* Felföldy 1942 (6)
26. *Alliario-Chaerophylletum temuli* Lohmeyer 1949 (2)
27. *Geo urbani-Chelidonietum maji* Jarolímek et al. 1997 (2)
Impatienti noli-tangere-Stachyion sylvaticae Görs ex Mucina 1993
28. *Urtico-Parietarietum officinalis* Segal in Mennema et Segal ex Klotz 1985 (1)
29. *Epilobio-Geranietum robertiani* Lohmeyer ex Görs et Th. Müller 1969 (1)
Aegopodion podagrariae R. Tx. 1967
30. *Anthriscetum sylvestris* Hadač 1978 (3)
31. *Arctio-Rumicetum obtusifolii* Passarge 1959 (4)
32. *Aegopodio-Geranietum pratensis* Hadač 1978 (6)
33. *Sisymbrietum strictissimi* Brandes in Mucina 1993 (2)
34. *Chaerophylletum aromatici* Neuhäuslová-Novotná et al. 1969 (5)
Carduo-Urticion dioicae Hadač ex Hadač in Hadač et al. 1969
35. *Geranio phaei-Urticetum dioicae* Hadač et al. 1969 (6)
Convolvuletalia sepium R. Tx. 1950
Senecionion fluviatilis R. Tx. 1950
36. *Aster lanceolatus*-community *s* (1)
37. *Bunias orientalis*-community (7)
38. *Carduus crispus*-community (2)
39. *Chaerophyllum hirsutum*-community (6)
40. *Cruciata laevipes*-community (1)
41. *Fallopia japonica*-community (1)
42. *Impatiens glandulifera*-community (2)

43. *Solidago canadensis*-community (2)
44. *Urtica dioica*-community (11)

V. *Epilobietea angustifolii* R. Tx. et Preising in R. Tx. ex von Rochow 1951
Atropetalia Vlieger 1937
Atropion Br.-Bl. ex Aichinger 1933
45. *Origano vulgaris-Brometum benekenii* Fajmonová 1983 (1)
Carici piluliferae-Epilobion angustifolii R. Tx. 1950
46. *Senecietum fuchsii* Kaiser 1926 (2)
47. *Rubetum idaei* Gams 1927 (1)
48. *Epilobio angustifolii-Calamagrostietum arundinaceae* (Šmarda ex Šmarda et al.
1971) Kliment 1995 (1)
49. *Rubo-Chamaenerietum angustifolii* Hadač et al. 1969 (2)

VI. *Molinio-Arrhenatheretea* R. Tx. 1937 em. R. Tx. 1970
Arrhenatheretalia R. Tx. 1931
Cynosurion R. Tx. 1947
50. *Lolietum perennis* Gams 1927 (15)
Plantagini-Prunelletalia Ellmauer et Mucina 1993
Plantagini-Prunellion Eliáš 1980
51. *Prunello-Ranunculetum repentis* Winterhoff 1963 (16)
52. *Juncetum macri* (Diemont et al. 1940) R. Tx. 1950 (3)
Poo alpinae-Trisetetalia Ellmauer et Mucina 1993
Alchemillo-Poion supinae Ellmauer et Mucina 1993
53. *Alchemillo-Poetum supinae* Aichinger 1933 corr. Oberd. 1971 (3)
Potentillo-Polygonetalia R. Tx. 1947
Potentillion anserinae
54. *Potentilla anserina*-community (5)
55. *Ranunculus repens*-community (3)

Discussion

Flora of the Muránska Planina National Park rightfully regarded as the most interesting among floras of other orographic units of Slovakia from the point of view species diversity and presence of various phytogeographical elements. In consequence of broken relief and special geological, soil, elevation and climatic circumstances in this area, the species with very different requirements on ecological conditions grow in close neighbourhood. In the territory of the Muránska Planina National Park 1450 taxa of vascular plants were found. Among them 164 are rare and threatened, 97 are protected, 35 are endemics and subendemics with 3 West Carpathian paleoendemics and several relics (KOCHJAROVÁ et al. 2004). The most important plant of the Muránska Planina National Park presents small shrub, paleoendemic species *Daphne arbuscula*. It occupies mostly unavailable edges of dolomite or limestone walls and rocks.

On the other hand, inseparable component of flora, together with rare and threatened plants, synanthropic plants represent. Their distribution depends mainly on the man activities. Knowledge of synanthropic flora was very scarce in previous period. Similar situation was also in synanthropic vegetation. In the survey of synanthropic vegetation of Slovakia (JAROLÍMEK et al. 1997) were published from the Muránska Planina National Park only four communities: *Epilobio-Geranietum robertiani*, *Phalarido-Petasitetum officinalis*, *Chaerophylletum aromatici* from the class *Galio-Urticetea*, and *Epilobio angustifolii-Calamagrostietum arundinacea* from the class *Epilobietea angustifolii*. In the survey published by HRIVNÁK et al. (2004) seven synanthropic communities were included. Beside those four communities mentioned by JAROLÍMEK et al. (1997), three trampled communities were added: *Poetum annuae* and *Matricario-Polygonetum arenastri* from the class *Polygono-Poetea* and *Lolietum perennis* from the class *Molinio-Arrhenatheretea*. This list of synanthropic communities was also far from completeness.

In spite of high level of conservation in the Muránska Planina National Park, its developed infrastructure offers many suitable habitats for ecesis, developing and spreading of ruderal and segetal communities. Within the protected area we can found several villages with traditional or large field maintenance, abandoned groups of houses in remote places out of the way, shepherd's chalets, railways, railway stations, network of roads and tourist paths, stone-pits and dumps of house waste. Spreading of synanthropic vegetation is supported by many socioeconomical activities, such as exploitation of limestone or ore, cutting of forests, tourism and graze of horses.

The most of synanthropic communities were concentrated at the periphery zone of the National Park. All segetal communities from the subclass *Violenea arvensis* and more thermophile ruderal communities were found only in this zone. The most frequent synanthropic communities inside the National Park were trampled communities, such as *Lolietum perennis*, *Prunello-Ranunculetum repentis*, Potentilla anserina-community, in higher elevations also *Alchemillo-Poetum supinae*, and nitrophilous fringe communities, such as *Sambucetum ebuli*, *Geranio phaei-Urticetum dioicae*, *Chaerophylletum aromatici*, *Aegopodio-Geranietum pratensis*, *Chaerophyllum hirsutum*-community and *Urtica dioica*-community.

Invading neophytes jeopardize the diversity of original natural and seminatural communities in the Muránska Planina National Park. Five neophyte taxa were found there. The most invasive is *Bunias orientalis*. Centre of its distribution is in railway station Muráň with large populations of thousands individuals. It penetrates into the meadow communities (surrounding of town Tisovec) and riparian communities (surrounding of the village Červená skala). It occurs also in the fields.

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