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New patterns in selected communities of synathropic vegetation in the Malá Fatra mountains

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Abstract: The paper provides short overwiev on three selected plant communities, *Prunello-Ranunculetum repentis*, *Rumicetum alpini*, *Urtica dioica-(Galio-Urticetea)*, compared in two research periods. First data set was gathered in 1995-1996 and second one in 2003, both on area of the Malá Fatra mountains. Frequency, vegetation structure and composition of selected communities were compared. Higher frequency was observed for *Prunello-Ranunculetum repentis* in 2003, especially its penetrating trend towards to the highest altitude on study area. Communities *Rumicetum alpini* and *Urtica dioica-(Galio-Urticetea)* did not show any important changes in number of new stands. Small changes were observed in structure and species composition of *Urtica dioica-(Galio-Urticetea)*.

Keywords: synanthropic vegetation, *Molinio-Arrhenatheretea*, *Galio-Urticetea*, the Malá Fatra mountains, dispersion.

Introduction

I studied synanthropic vegetation on area of the Kriváňská Malá Fatra during vegetation period 1995 – 1996. The study was repeated on selected three plant communities in vegetation period 2003. The results of both research periods were compared and addressed following questions: Do plant communities build similar structure and composition on same study plots? Do plant communities spread in new places within the Malá Fatra mountains? The purpose of paper is to present part of phytosociological study of synanthropic vegetation and its dispersion on area of the National Park Malá Fatra.

Study area

The range of the Malá Fatra mountains is situated in the north-western part of Slovakia. It is divided by the Váh River in two patrs: the Lúčanská Fatra and the Kriváńska Fatra. For the purpose of the research the area of the Kriváńská Fatra was selected. Geology of the Malá Fatra Mountains is very diverse (granites, quartzites, dolomites etc.). Mean annual temperature is 8 – 12 ℃ during vegetation period. Precipitation are highly varied too, the minimum value of precipitation is measured in February, maximum in July. The snow cover lies 80-130 days per year (PAGÁČ, VOLOŠČUK 1983).

Material and methods

I collected 189 phytosociological relevées in 1995-1996 from study area. Phytosociological relevées were recorded according to the Braun-Blanquet principles (MORAVEC et al. 1994). According to analyses in TURBO(VEG) (HENNEKENS 1995), 2 clasess were found: *Molinio-Arrhenatheretea*, with 3 ranks and *Galio-Urticetea*, with 2 ranks (DEMIANOVÁ 1997). Nomenclatory followed MUCINA (1993).

In 2003 I selected 3 plant communities from the original study: *Prunello-Ranunculetum repentis* from class *Molinio-Arrhenatheretea* and *Rumicetum alpini*, *Urtica dioica-(Galio-Urticetea)* from class *Galio-Urticetea*. I recorded data on dispersal of selected communities and gathered phytosociological relevées on same plots like in period of 1995-1996 and compared both research periods.

Short description of selected communities

1. ***Prunello-Ranunculetum repentis*** ELIÁŠ1980

Diagnostic species: *Plantago major* (dom.), *Taraxacum officinale* agg., *Trifolium repens*, *Trifolium pratense*.

Pattern of community ranges from open up to closed low vegetation. Together with dominat species *Plantago major*, there are present species with similar ecological demands: *Taraxacum officinale* agg., *Trifolium repens*, *Trifolium pratense*, *Agrostis stolonifera*, *Potentilla anserina*, *Poa annua*. In moss layer the most often occurring species are *Barbula unguiculata*, *Brachythecium rutabulum* and *Ceratodon purpureus*.

Characteristic feature of community stands is mechanical damage, usually in form of trampling (trafic, touring, building). According to this fact this community colonizes roadsides, touristic paths, places around chalets and guideposts, parking places, space between tracks on sporadic used roads. This community prefers light-textured soil and winter gritting. The community lines most of roadsides and touristic paths within the Malá Fatra mountains.

2. ***Rumicetum alpini*** BERGER 1922 em. BR.-BL. 1972

Diagnostic species: *Rumex alpinus* (dom.), *Urtica dioica*, *Deschampsia caespitosa*, *Stellaria nemorum*, *Alchemilla vulgaris* agg., *Hypericum maculatum*.

Species poor community with strong dominant *Rumex alpinus*. Species *Urtica dioica, Deschampsia caespitosa* and *Stellaria nemorum* accompagne this dominant. Moss layer is usually poor developed or missing, without any dominant species. Community is well developed around old folds, pastures or livestock sheds. This places are saturated by nitrogen compounds what contributes to compatible conditions for developing of this community. Next types of stands with optimal living conditions are slope depressions with sufficiency of water, nutrients and radiation.

3. ***Urtica dioica-(Galio-Urticetea)***

Diagnostic species: *Urtica dioica* (dom.), *Agropyron repens*, *Dactylis glomerata*.

Species very poor community with *Urtica dioica* which creates the only dominant in vegetation. It is accompained by *Agropyron repens* and *Dactylis glomerata*, rarely by *Lamium maculatum*. Moss layer is well developed, prevaily occur *Brachythecium rutabulum* and genus *Plagiomnium*. This community is ecologically very plastic, occurring from fully insolated stands to shading roadsides.

Results and discussion

Prunello-Ranunculetum repentis

The results from1995-1996 showed that this plant community occurred in the lowest altitude of the Malá Fatra, from 600 to 750 m a.s.l. In higher altitude, above 800 m a.s.l., it slightly disappeared and it was replaced by other communities, very often by pastures from *Cynosurion* alliance. The continuous occurence of this plant community were observed along asphalt roads in lower altitude (to 750 m a.s.l.). Dispersing along the tourist paths was irregular, on a small scale. Surroundings of the guideposts and stopping places were stands with the greatest concentration of this plant communities on tourist paths. At the same time, the possibility of diasphores dispersing was predicted applied to plants with synantropic tendence spread by tourists from these stands towards to higher altitudes (BUREŠ, KRÁLÍK 1977, DEMIANOVÁ 1997).

The same localities were checked in 2003. The occurence of the community was verified on stands studied in previous survey. In addition new stands of this community were found there. Consistent with prediction from 1997, community has been spreading into higher altitude. It was found on the highest point of mountains, the Veľký Kriváň peak (1708 m a.s.l.) and partially along the touristic path to the highest peak. Next new stands were found along touristic path from the Snilovské sedlo to the Poludňový Grúň and at the same time well developed community was found in surrounding of the chalet Chata na Grúni.

New dispersion of *Prunello-Ranunculetum repentis* is probably supported by travel industry increase during last period as one of main factors. This assumption was supported by visitor frequency monitoring. While the daily maximum of tourists in locality of the Veľký Kriváň in 1992 was 510, in 2003 it reached 995 (kol. aut. 2003).

Rumicetum alpini* and *Urtica dioica-(Galio-Urticetea)

Dispersing tendence of both communities was not found after comparing their occurence in 1997 and 2003. Phytosociological relevées were recorded in 2003 again on stands influenced by grazing and housing of livestock. They were gathered on same plot like in 1997 and compared.

Rumicetum alpini does not show any important changes in species composition. It seems that this community is stable in mountains ecosystems (DEMIANOVÁ 1997).

Relevées recorded in 2003 showed higher species number than in 1997 for *Urtica dioica-(Galio-Urticetea)* community. In 1997 I recorded 4 species for relevee, in 2003 number of recorded species was 17. Cover of main dominant *Urtica dioica* decrease in 2003. New species recorded on plot in 2003: *Heracleum sphondylium, Cirsium arvense, Chaerophylum hirsutum, Glechoma hederacea, Cuscuta europea, Vicia sepium, Rumex obtusifolius, Galeopsis tetrahit, Cirsium oleraceum, Ranunculus repens, Arctium lappa, Cruciata laevipes, Daucus carota.*

Present state of the community is probably result of two main factors. On one hand there were several last summers with lower precipitation amount and on the other hand there has been number of decades without livestock grazing and housing (30-40 years). Mentioned reasons could lead to lack of nutriets for dominant *Urtica dioica*. Concequently development of these species worsened and possibility of penetration for other species into these communities was opened. Vegetation cover of dominant was less dense than in 1997. This opening up make possible development of species demanding more radiation.

Conclusion

In touring atractive central part of the Malá Fatra mountains growing number of stands with community *Prunello-Ranunculetum repentis* was observed. Dispersing of this community could bear on increasing travel industry in last period. Communities *Rumicetum alpini* and *Urtica dioica-(Galio-Urticetea)* do not show any important changes in dispersion on study area. Changes were recorded in species composition of *Urtica dioica-(Galio-Urticetea)*. The probable cause is in lacking of livestock grazing and housing and environmental condition change as well.

All conclusions are preliminary at this time. It is apparent that observed vegetation changes are important on long time scale. It is therefore worthy to establish regular research in next vegetation periods in order to learn new patterns in plant communities development.

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