

## Revitalisation of ruderal grassland

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### Introduction

In mountainous area of Slovakia we investigated and impact of different frequencies of mowing on botanical composition and withdrawal nutrient from soil under over-fertilised grassland. Incorrect folding, temporary midden and sporadic grazing later have led to conversion of semi-natural grassland into ruderal one.

### Materials and Methods

#### Botanical composition

38 plant species recorded before experiment establishment  
14 species were identified as weedy plant

Examples of weedy plants:

*Cirsium arvense*  
*Elytrigia repens*  
*Galium aparine*  
*Chenopodium album*  
*Sinapis arvensis*  
*Urtica dioica*

#### Nutrient concentration in the soil (rendzina)

Cox	Nt	P	K
g/kg	g/kg	mg/kg	mg/kg
49.3	5.5	54.3	808.7

#### Treatments

**C** – control – without mowing  
**M1** – mowing once a year  
**M2** – mowing twice a year  
**M2/1** – alternate mowing twice- and once a year management

### Results

Botanical composition in the initial year 2006 (Figure1) and after 4 years of mowing interventions (Figures 2-4)

Amounts of nutrients:

Remained in ecosystem (blue numbers)

Depleted from ecosystem (red numbers) Table 1

Plant species occupancy of weedy vs. non-weedy Table 2

Table 1 Nutrients withdrawal - four-year average (kg/ha)

Treatment	N	P	K	Ca	Mg
<b>C</b>	63.1	10.4	87.2	31.7	12.1
<b>M1</b>	55.5	9.8	84.0	23.8	10.1
<b>M2</b>	64.0	11.8	88.9	27.1	12.2
<b>M2/1</b>	65.4	12.4	102.8	29.4	11.1

Figure 1 Botanical composition in the initial year 2006

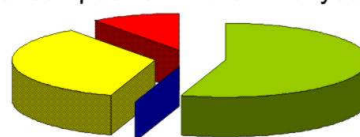


Figure 2 Botanical composition of ruderal grassland after 4 years of **once**-a-year utilization

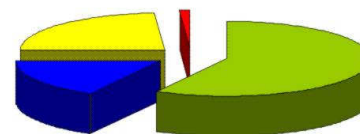


Figure 3 Botanical composition of ruderal grassland after 4 years of **twice**-a-year utilization

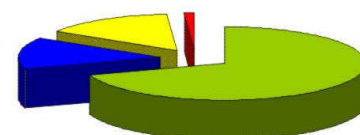
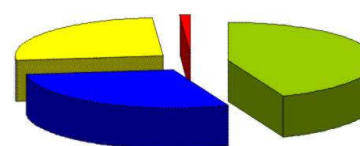


Figure 4 Botanical composition of ruderal grassland after 4 years of **alternate** mowing utilization



Grasses Legumes Herbs Bare ground

Table 2 Area occupied (%) by weedy (W) vs. non-weedy (NW) plant species

Treatment	Year	Weedy	Other	No. of W	No. of NW
C	2006	49	41	13	38
M1	2009	8	91	5	27
M2	2009	3	96	5	35
M2/1	2009	6	93	5	38

### Conclusion

Alternate management of mowing twice and once a year was found to be most effective management for botanical composition improvement. This approach was characterised by the highest rates of soil nutrients replenishing and an appearance of plant species *Euphrasia rostkoviana* as indicator of nutrient-poor grassland stand, as well.