Original Paper

Changes in floristic composition of grassland affected by the different exploitation intensity

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The aim of the work was to analyze the influence of different intensity of grassland exploitation on the development of floristic composition. The experiment was carried out in 2017 and 2018 in the Žirany village (SW Slovakia) characterized by a mild climate with an average annual temperature of 9 °C. Before the experiment was established, the grassland was used for sheep grazing and dominated by *Lollium perenne* L. The monitoring period was 2017 and 2018. The experimental crops were mown 2× (variant 4), 3× (variant 3) and 4× (variant 2). We established also control variant (variant 1) which was not mowed and fertilized, as well. The floristic composition was evaluated before each cut. It follows from the results obtained at the beginning of the monitoring in 2017, grass species (*Lollium perenne* L., *Poa trivalis* L., *Poa pratensis* L.) predominantly prevailed and they maintained their dominant position during the whole vegetation period in 2017. Furthermore, other meadow herbs (*Achillea millefolium* L., *Cerastium arvense* L.) were found in higher proportion. Legumes were found in a lesser extent. In 2018, we reduced the proportion in the botanical groups of other meadow herbs and leguminous plants. Conversely, grasses increased their share compared to 2017. The cover has been reduced mainly in variant 3 (3× mowed) and variant 2 (2× mowed).

Keywords: floristic composition, mowing management, grasses, legumes, other meadow herbs, permanent grassland

1 Introduction

Grasslands exist and have been used by man since the very beginning of human existence (Gibson, 2009). Their overall meaning is characterized by a range. They account for approximately 26% of the total land area and 80% of the agricultural land. Most of these stands are located in developing countries, where they are particularty important for the livehood of approximately one billion poor people. They form a fodder base for grazing animals and thus a number of high quality foods (Boval and Dixon, 2012). At present, numbers of livestock declining in the Slovak Republic. For example, the beaf cattle numbers have decreased by more than 19.000 and in sheep the drop was over 22.000 individuals from 2014 to 2016. So it can be stated that finding of more ways to use the produced biomass is becoming more and more interesting. Alternative ways of using biomass as a source of energy are becoming increasingly prominent (Pollák et al., 2013). In addition to producing features, grasslands also include a large number of non-productive features, such as the creation of a biological diversity reserve, cultural and recreational use, but they also serve as a potential carbon capture to reduce greenhouse gas emissions (Boval and Dixon, 2012). Grasslands have the potential and play a key role in the mitigation of greenhouse gases, especially in global carbon storage and its further sequestration (O'Mara, 2012). Soil and grasslands capture about 34% of the world's terrestrial carbon, which is vital for providing a variety of ecosystem services such as climate regulation (Eze et al. 2018). The aim of the paper is to analyze the influence of different intensity of grassland exploitation for the development of floristic composition. We take into account lower demand for phytomass, intensification management and its impact on grassland.

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2 Material and methods

The experiment with various/different? intensity of exploitation was established in the cadastral area of the Žirany village at an altitude of 210 m n. m. (SW Slovakia). At the locality, the soil type of fluvisol prevails with a weakly acidic to acidic soil reaction. The chemical composition of the soil samled in experimental plots is presented in Table 1.

From an agroclimatic point of view, the area is located in a temperate zone on the continental and Atlantic-continental border. Long-term annual average o fair temperature is 9 °C and annual rainfall average is 600 mm (Economic and social development program, 2014).

Permanent grassland was used for sheep grazing prior to the experiment. From the floristic point of view, grasses predominated, and the largest species present is the sole *Lolium perenne* L. The field trial was based on a block of four retrials. The test area was limited and each variant was established in plot size 2 × 3 m.

We have watched out the following variants in the experiment:

Variant 1 – Variant 1 – original stand, not fertilized, unmowed, abandoned, sampling for production detection was done at the time of seed maturation.

Variants 2, 3, 4:
Fertilization

N (120 kg/ha) – 80 kg N/ha in the spring at the time of greening of vegetation, 40 kg N/ha after the first cut, P (40 kg/ha) – full dose in time of greening of vegetation in spring, *K* (80 kg/ha) – full dose in time of greening of vegetation in spring.

Mowing

Variant 2 – mowed 4× (1st mowing at the time of stalking, 2nd mowing after 45 days from the first, 3rd mowing after 45 days from the second and 4th mowing after 45 days from the third mowing).

Variant 3 – mowed 3× (1st mowing at the time of hay-mowing maturity, 2nd mowing after 60 days from first mowing and 3rd mowing after 60 days of mowing second).

Variant 4 – mowed 2× (1st mowing in hay-mowing maturity, 2nd mowing after 90 days since first mowing).

Characteristic of used fertilizers

N – LAD 27 nitrogen fertilizer containing 27% nitrogen and 4.1% total MgO, approximately 7% CaO total and 2% CaO water soluble in granular form.

P – Superphosphate 19% P_2O_5 in granular form.

K – Potassium sulfate 50% K_2O in granular form.

Floristic evaluation of each stand was done by the Regal Reduced Projective Dominance method (Regal, 1956). According to Jaccard´s qualitative similarity index (IS_J), we calculated the correlation of floristic composition according to relationship (Moravec et al., 1994).

$$IS_J = \frac{C}{A + B - C} \times 100$$

where:

A – number of species in frame A
B – number of species in frame B
C – number of common species

3 Results and discussion

The changes that occur are a reflection of the different doses and combinations of applied fertilizers, but also the frequency of use (Klapp 1971). The different exploitation system, especially the frequency of cutting, influenced the representation of individual botanical groups in variants. According to Jančovič and Vozár (2014), due to the greater number of cuts, changes in the content of organic and mineral substances are caused. However, they can see these changes as positive. Krajčovič (2004) considers setting the correct date of the first mowing as a priority and very important. Due to the different intensity of use and fertilization of grasslands, there are various changes in their floristic composition.

The changes in the floristic composition of the monitored stand in 2017 to 2018 are shown in Figure 1. The control was the original crop, which was not fertilized and cut, thus in no way managed and subject to natural changes over the years.

In the variants used, grasses accounted for the highest proportion of all plant species and their value increased in the annual average of mowing due to fertilization and mowing in all monitored variants. The biggest difference was found in variant 3, where the average proportion of grasses increased from 43.2% (2017) to 87.0% (2018). The

Table 1 Agrochemical composition of the soil before the start of the experiment (year 2017)

Element	N	P	K	Ca	Na	Mg	C_{ox}	pH
Unit of measure	mg/kg						%	
	2,457.84	27.73	192.49	1,186.32	55.56	88.53	2.69	5.78

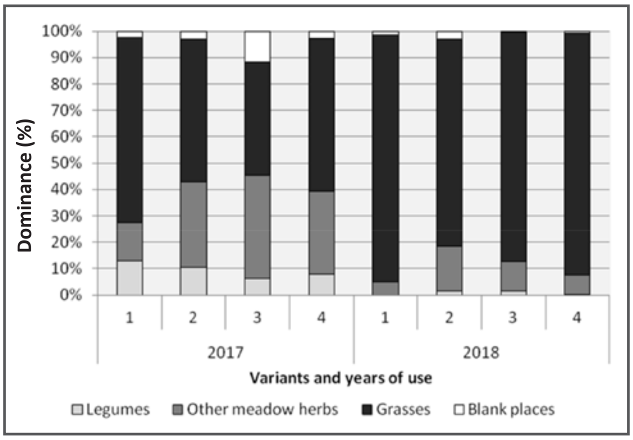

Figure 1 Year average values of floristic group composition of grassland (%)

lowest difference was recorded in variant 1, where the average annual cover increased from 70% (2017) to 93.5% (2018). A high proportion of grass was mainly *Lolium perenne* L., which in 2017 had the highest proportion of grass in variant 2 in the 2nd mowing, which was during this period 4× mowed (51.5%). In 2018, it was up to 68% in the 2nd mowing. The second dominant grass was *Poa trivialis* L., which in 2017 reached an average share of 7.5% (variant 4) in the first cut in 2018 to 45.5% (variant 4). Acordingly, *Poa pratensis* L. was an another widespread grass. The species achieved the highest proportion in the 1st mow of the variant 3 (38.0%) during initial year 2017 and in the 3rd mow of the variant 3 in 2018 (44%).

The average proportion of leguminoses was reduced year-on-year in all the observed variants (Figure 1). The biggest difference in the annual average of mowing was found in variant 1, where the average value of legumes matter decreased from 13% (2017) to the trace amount (2018). The lowest decrease was recorded in variant 3, where the average proportion of legumes decreased from 6.3% (2017) to 1.5% (2018). *Trifolium repens* L. (15%, variant 2) and *Lotus corniculatus* L.) (2.5%, variant 3) reached the highest proportion of all other species in the 3rd mowing in 2017. However, the proportion of these species notable decreased in 2018. The largest occurrence of *Trifolium repens* L. was found in the 1st mowing of the variant 2 (1.5%), while the *Lotus corniculatus* L. share decreased to up 0.5% in the 3rd mowing of the variant 3.

Similar as in the case of legumes, the average proportion of other meadow herbs was reduced by at least half in all evaluated variants. The largest difference in the annual average of weights was found in variant 3, where the average coverage of herbs decreased from 39% (2017) to 11.2% (2018). The smallest decrease was in the original crop (variant 1). There, the average proportion of herbs decreased from 14.5% (2017) to 5.0% (2018). Within those meadows plant species,the most common was *Achillea*

Table 2. Variant 1 – floristic composition and its changes for years 2017–2018 (%)

S.N.	*Name*	Year 2017	Year 2018
		1st cut	1st cut
Legumes			
1.	*Trifolium fragiferum* L.	–	r
2.	*Trifolium repens* L.	13,0	r
3.	*Trifolium aureum* Pollich	r	–
4.	*Lotus corniculatus* L.	r	r
5.	*Vicia sativa* L.	r	r
6.	*Vicia tetrasperma (L.)* Schreb.	r	r
	Together	13,0	r
Other meadow herbs			
7.	*Carduus acanthoides* L.	r	–
8.	*Cichorium intybus* L.	r	–
9.	*Stellaria graminea* L.	r	r
10.	*Daucus carota* L.	r	r
11.	*Cirsium arvense* (L.) Scop.	r	1,5
12.	*Taraxacum officinale* auct. non Weber	r	–
13.	*Convolvulus arvensis* L.	r	0,5
14.	*Achillea millefolium* L.	11,0	2,5
15.	*Cerastium arvense* L.	2,5	0,5
16.	*Plantago lanceolata* L.	r	–
17.	*Veronica chamaedrys* L.	–	r
18.	*Veronica verna* L.	1,0	–
Together		14,5	5,0
Grasses			
19.	*Festuca rubra* L.	r	–
20.	*Festuca pratensis* Huds.	0,5	–
21.	*Festuca ovina* L.	r	–
22.	*Poa pratensis* L.	30,0	6,0
23.	*Poa trivialis* L.	1,5	42,5
24.	*Lolium perenne* L.	24,5	1,5
25.	*Arrhenatherum elatius* subsp. *elatius*	3,0	11,5
26.	*Alopecurus pratensis* L.	7,5	27,5
27.	*Elymus repens* (L.) Gould	0,5	2,0
28.	*Elymus caninus* (L.) L.	–	r
29.	*Dactylis glomerata* L.	r	0,5
30.	*Bromus hordeaceus* L.	2,5	2,0
31.	*Phleum pratense* L.	–	r
32.	*Trisetum flavescens* (L.) P. Beauv.	r	–
Together		70,0	93,5
Blank places		2,5	1,5

r – rarus, trace occurrence, less than 1%. S.N. – serial number

millefolium L. and *Cerastium arvense* L., which in individual variations occurred in the initial year 2017 in higher quantities than in 2018. In 2017, *Achillea millefolium* L. reached the highest value in the 3rd mowing of variant 3 (52.5%), while in 2018 only 9%. *Cerastium arvense* L. had the highest share in the variant 3 in (7%) in 2017 whereas the highest value only of 0.5% was recorded in 2018.

Significant changes were also observed in the evaluation of blank places in all variants, but especially in the variant 3 (3×mowed), where the share decreased from an average of 11.5% to 0.3%.

At the beginning of the observation in 2017, the floristic composition of the individual variants of the experiment was relatively similar showing values in interval 46.43–76.47% (Table 2). In general, the lowest similarity was achieved comparing the variant 1 with the remaining variants where only one value reached a level higher than 50.00% (the variant 1 compared to the variant 4; 53.57%). Lower values were also observed comparing variants 1 and 3 (48.28%).

After a year of intensive use and fertilization, the differences in the similarity index (IS_J) of the species composition slightly decreased – the stands were homogenized in their floristic composition (Table 3). The biggest difference was found in variants 2 and 4 (56.25%). The largest year-to-year changes in floristic stand similarity were found between variants 3 and 4 (76.47% in 2017 versus 52.63% in 2018). We believe these results showed that a more significant intervention in the species composition is caused mainly by the different intensity of mowing.

Table 3 Variant 2 – floristic composition and its changes for years 2017 – 2018 (%)

S.N.	Name	Year 2017				Year 2018			
		1st cut	2nd cut	3rd cut	4th cut	1st cut	2nd cut	3rd cut	4th cut
Legumes									
1.	*Trifolium fragiferum* L.	–	–	r	0,5	–	–	–	r
2.	*Trifolium pratense* L.			r	r	–	–	–	–
3.	*Trifolium repens* L.	15,0	12,0	9,0	2,0	1,5	0,5	1,0	1,0
4.	*Lotus corniculatus* L.	1,0	1,0	1,5	0,5	r	0,5	0,5	1,0
5.	*Vicia sativa* L.	–	–	–	–	r	–	–	–
6.	*Vicia tetrasperma* (L.) Schreb.	r	–	–	–	0,5	–	r	r
Together		16,0	13,0	10,5	3,0	2,0	1,0	1,5	2,0
Other meadow herbs									
7.	*Carduus acanthoides* L.	1,0	2,0	3,0	2,5	0,5	1,0	r	r
8.	*Helianthemum nummularium* L.	–	–	–	–	–	–	–	2,0
6.	*Picris hieracioides* L.	–	–	r	–	–	–	1,0	r
7.	*Stellaria media* (L.) Vill.	–	–	–	–	1,0	–	–	r
8.	*Stellaria graminea* L.	1,5	r	–	4,0	3,5	4,5	1,5	3,0
9.	*Hieracium pilosella* L.	–	r	–	–	–	r	–	–
9.	*Daucus carota* L.	–	r	r	–	r	0,5	0,5	2,5
10.	*Chenopodium album* L.	–	–	–	–	–	–	r	–
11.	*Centaurea cyanus* L.	–	2,0	–	–	–	–	–	–
12.	*Selinum carvifolia* (L.) L.	–	–	–	–	–	r	–	–
13.	*Cirsium arvense* (L.) Scop.	–	r	r	–	–	r	r	r
14.	*Cirsium palustre* (L.) Scop.	–	–	–	–	r	–	–	–
15.	*Taraxacum officinale* L.	0,5	r	0,5	r	r	r	r	0,5
16.	*Convolvulus arvensis* L.	r	r	r	–	–	2,0	1,0	1,5
17.	*Achillea millefolium* L.	19,0	22,5	42,0	25,0	5,0	4,0	13,5	14,0
18.	*Cerastium arvense* L.	2,5	r	r	r	1,5	r	r	r
19.	*Plantago lanceolata* L.	r	r	0,5	0,5	–	–	r	0,5

Continuation of Table 3

S.N.	Name	Year 2017				Year 2018			
		1st cut	2nd cut	3rd cut	4th cut	1st cut	2nd cut	3rd cut	4th cut
20.	*Veronica chamaedrys* L.	–	–	–	–	–	r	–	–
21.	*Glechoma hederacea* L.	r	–	–	r	r	r	r	3,0
Together		24,5	26,5	46,0	32,0	11,5	12,0	17,5	27,0
Grasses									
19.	*Festuca rubra* L.	0,5	4,0	7,5	1,5	–	r	–	–
20.	*Festuca pratensis* Huds.	0,5	0,5	–	1,0	2,0	1,5	–	–
21.	*Festuca ovina* L.	0,5	0,5	0,5	0,5	–	–	–	–
22.	*Festuca arundinacea* Schreb.	–	–	1,0	–	–	–	1,5	4,5
23.	*Poa pratensis* L.	17,5	0,5	–	21,5	27,5	r	28,5	47,0
24.	*Poa trivialis* L.	5,0	r	–	r	20,0	1,0	–	–
25.	*Lolium perenne* L.	33,0	51,5	26,5	38,5	26,0	68,0	30,0	2,5
26.	*Arrhenatherum elatius* subsp. *elatius*	r	r	r	r	r	2,5	1,0	1,0
27.	*Alopecurus pratensis* L.	2,5	0,5	r	r	11,0	2,0	6,5	3,5
	Agrostis capillaris L.	–	0,5	–	–	–	–	–	–
28.	*Elymus repens* (L.) Gould	–	–	0,5	–	–	11,5	12,0	1,0
30.	*Dactylis glomerata* L.	r	r	r	r	r	r	0,5	–
31.	*Bromus hordeaceus* L.	r	r	–	r	r	0,5	–	0,5
32.	*Trisetum flavescens* (L.) P. Beauv.	r	–	–	r	r	r	–	–
Together		59,5	58,0	36,0	63,0	86,5	87,0	80,0	60,0
Blank places		r	2,5	7,5	2	0	0	1,0	11,0

r – rarus, trace occurrence, less than 1%. S.N. – serial number

Table 4 Variant 3 – floristic composition and its changes for years 2017 – 2018 (%)

S.N.	*Name*	Year 2017			Year 2018		
		1st cut	2nd cut	3rd cut	1st cut	2nd cut	3rd cut
Legumes							
1.	*Trifolium fragiferum* L.	–	–	r	–	r	–
2.	*Trifolium pratense* L.	–	r	–	–	–	–
3.	*Trifolium repens* L.	10,5	3,0	1,0	2,0	0,5	0,5
4.	*Lotus corniculatus* L.	0,5	1,0	2,5	r	0,5	0,5
5.	*Vicia sativa* L.	0,5	r	–	0,5	–	–
Together		11,5	4,0	3,5	2,5	1,0	1,0
Other meadow herbs							
6.	*Carduus acanthoides* L.	–	r	–	–	r	0,5
7.	*Cichorium intybus* L.	–	r	–	–	r	–
8.	*Picris hieracioides* L.	–	–	0,5	–	r	r
9.	*Stellaria media* (L.) *Vill.*	–	–	–	3,0	–	–
10.	*Stellaria graminea* L.	1,5	–	–	1,0	0,5	2,5
11.	*Knautia arvensis* (L.) Coult.	r	–	–	–	–	–
12.	*Hieracium pilosella* L.	–	0,5	–	–	–	–
13.	*Capsella bursa-pastoris* (L.) Medik.	r	–	–	–	–	r
14.	*Daucus carota* L.	r	1,0	1,0	r	0,5	0,5

Continuation of Table 4

S.N.	Name	Year 2017			Year 2018		
		1st cut	2nd cut	3rd cut	1st cut	2nd cut	3rd cut
15.	*Chenopodium album* L.	–	–	–	–	r	r
16.	*Potentilla argentea* L.	r	r	–	r	r	r
17.	*Centaurea cyanus* L.	–	r	r	r	r	r
18.	*Selinum carvifolia* (L.) L.	–	–	–	–	–	r
Other meadow herbs							
19.	*Pastinaca sativa* L.	r	0,5	r	0,5	1,5	0,5
20.	*Cirsium arvense* (L.) Scop.	–	r	r	–	r	r
21.	*Taraxacum officinale* L.	r	r	r	r	–	0,5
22.	*Convolvulus arvensis* L.	r	–	r	r	r	r
23.	*Achillea millefolium* L.	18,0	30,0	52,5	4,0	7,0	9,0
24.	*Cerastium arvense* L.	7,0	r	–	0,5	r	r
25.	*Plantago lanceolata* L.	0,5	1,5	2,5	r	1,0	0,5
26.	*Polygonum persicaria* L.	–	–	–	–	–	r
27.	*Glechoma hederacea* L.	–	–	–	r	–	r
Together		27,0	33,5	56,5	9,0	10,5	14,0
Grasses							
28.	*Festuca rubra* L.	1,0	20,5	3,0	0,5	2,5	–
29.	*Festuca pratensis* Huds.	0,5	r	r	0,5	0,5	–
30.	*Festuca ovina* L.	r	–	11,0	0,5	–	–
31.	*Festuca arundinacea* Schreb.	–	r	–	–	–	0,5
32.	*Poa pratensis* L.	38,0	0,5	8,0	r	r	44,0
33.	*Poa trivialis* L.	1,5	–	r	45,0	–	–
34.	*Lolium perenne* L.	9,5	15,5	6,0	11,0	24,0	0,5
35.	*Arrhenatherum elatius* subsp. *elatius*	3,0	1,5	0,5	20,5	28,0	–
36.	*Alopecurus pratensis* L.	4,5	0,5	0,5	6,5	13,5	11,0
37.	*Elymus repens* (L.) Gould	0,5	0,5	0,5	2,0	17,5	27,5
38.	*Elymus caninus* L.	–	–	–	–	0,5	1,0
39.	*Dactylis glomerata* L.	r	r	r	1,5	0,5	0,5
40.	*Bromus hordeaceus* L.	2,0	r	–	r	r	–
41.	*Phleum pratense* L.	–	–	–	–	1,0	r
42.	*Trisetum flavescens* (L.) P. Beauv.	0,5	–	–	r	–	–
Together		61,0	39,0	29,5	88,0	88,0	85,0
Blank places		0,5	23,5	10,5	0,5	0,5	r

r – rarus, trace occurrence, less than 1%. S.N. – serial number

Table 5 Variant 4 – floristic composition and its changes for years 2017 – 2018 (%)

S.N.	Name	Year 2017		Year 2018	
		1st cut	2nd cut	1st cut	2nd cut
Legumes					
1.	*Trifolium fragiferum* L.	–	–	r	–
2.	*Trifolium repens* L.	13,0	1,5	r	r
3.	*Trifolium aureum* Pollich	r	–	–	–
4.	*Lotus corniculatus* L.	0,5	0,5	r	0,5
5.	*Vicia sativa* L.	–	–	r	–
Together		13,5	2	r	0,5
Other meadow herbs					
6.	*Picris hieracioides* L.	–	r	–	–
7.	*Stellaria media* (L.) Vill.	–	–	r	–
8.	*Stellaria graminea* L.	r	–	1,5	0,5
9.	*Daucus carota* L.	r	0,5	r	–
10.	*Centaurea cyanus* L.	–	r	–	–
11.	*Cirsium arvense* (L.) Scop.	r	r	r	0,5
12.	*Taraxacum officinale* L.	r	1,0	r	r
13.	*Convolvulus arvensis* L.	r	1,0	1,0	3,5
14.	*Achillea millefolium* L.	11,5	47,5	2,0	5,5
15.	*Cerastium arvense* L.	1,0	–	–	–
16.	*Plantago lanceolata* L.	r	0,5	–	–
Together		12,5	50,5	4,5	10,0
Grasses					
17.	*Festuca rubra* L.	1,0	8,5	r	–
18.	*Festuca pratensis* Huds.	1,0	–	0,5	–
19.	*Festuca ovina* L.	r	–	r	–
20.	*Festuca arundinacea* Schreb.	–	r	–	1,5
21.	*Poa pratensis* L.	21,5	r	r	14,0
22.	*Poa trivialis* L.	7,5	–	45,5	–
23.	*Lolium perenne* L.	8,0	17,5	11,0	4,0
24.	*Arrhenatherum elatius* subsp. *elatius*	25,0	14,0	25,5	40,5
25.	*Alopecurus pratensis* L.	4,5	0,5	8,0	6,5
26.	*Elymus repens* (L.) Gould	r	1,5	2,0	1,5
27.	*Elymus caninus* (L.) L.	–	–	–	20,0
28.	*Dactylis glomerata* L.	0,5	r	1,5	0,5
29.	*Bromus hordeaceus* L.	5,0	–	0,5	–
30.	*Phleum pratense* L.	–	–	r	–
31.	*Trisetum flavescens* (L.) P. Beauv.	r	–	0,5	–
Together		74,0	42,0	95,0	88,5
Blank places		r	5,5	0,5	1,0

r – rarus, trace occurrence, less than 1%. S.N. – serial number

Table 6 Jaccard index IS_J of qualitative similarity 2017

Variant		Common species			
		1	2	3	4
IS_J	1	O	*13	*14	*15
	2	46.43%	O	*10	*10
	3	48.28%	55.56%	O	*13
	4	53.57%	55.56%	76.47%	O
	Species together	28	13	15	14

*number of common species

Table 7 Jaccard index IS_J of qualitative similarity 2018

Variant		Common species			
		1	2	3	4
IS_J	1	O	*10	*12	*12
	2	41.67%	O	*9	*9
	3	46.15%	47.37%	O	*10
	4	52.17%	56.25%	52.63%	O
	Species together	22	12	16	13

*number of common species

At the beginning of the observation, the individual variants were from the quality side (IS_J) similar to 46.43–76.47% (Table 6). In general, the lowest similarity with the remaining variations was achieved by variant 1, where only one value reached a level higher than 50.0% (compared to variant 4; 53.57%). Lower values were also observed when comparing variants 1 and 3 (48.28%).

After a year of intensive use and fertilization, the differences in the similarity (IS_J) of the species composition increased to 41.67–56.25% (Table 7). The biggest difference was between variant 3 and variant 4 (76.47% to 52.63%). The exception where the similarity increased and the difference was reduced between 2 – 4 (56.25%).

These results show that a more significant intervention in the species composition is caused mainly by the different intensity of mowing.

Klimeš et al. (2000), which observed the effect of mowing on a subxerophilic meadow found a significant increase in species wealth. He noted a linear increase in species in the 10-year period. These experiences suggest that, although the mowing of such meadows is a long-term process, it results in favourable results. In our experiment of extensively exploited meadows, due to different intensity of cuttings (2-cut, 3-cut, 4-cut), only grasses increased during the monitored period, other floristic groups such as legumes and other meadow herbs reduced by mowing and fertilization also reduced the share of blank places in the crops. The influence of different intensity of use on species diversity of grassland is not always clear and the results among authors may differ (Michaud et al., 2012, Briňák et al., 2013, Smith et al., 2008). Differences may be caused by different scientific methodologies or, for example, different site conditions (Štýbnarová – Dufek, 2016). In our experiment, the species together has grown in stands (Tables 6 and 7) that have been mowed three times a year (with the same fertilization), which contradicts the results achieved by Gaisler et al., 2011 or Kohoutek et al. In variant 1, which has not been mowed or fertilized more species were detected than in other variants 2, 3, 4.

Conclusions

In the monitored grassland, the impact of various type of management (different number of cuts per year, unmanaged stand) on floristic composition was evaluated. We found that the floristic composition of the stands was influenced by the number of cuttings. In the first year of 2017 grasses was predominant due to mowing and fertilization. Similarly in 2018 grasses reached the highest proportion of all observed plant species. Based on the similarity results, we found that the similarity of the floristic composition of the community was most evident in variant 3 of mowed 3 times and variant 4 which has been mowed 2 times.

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