CONTRIBUTIONS TO THE EVALUATION OF THE PRODUCTIVITY OF PERMANENT GRASSLANDS FROM THE MUNICIPALITY AREA OF HIDIȘELUL DE SUS (BIHOR COUNTY)

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RESEARCH ARTICLE

Abstract
This paper presents a case study on the evaluation of the productivity of permanent grasslands in the Hidișelul de Sus commune (Bihor County), based on a floristic survey. This study is important for the economic characterization, improvement, rational use, and enhancement of the nutritional value of these grasslands. The permanent grasslands in Hidișelul de Sus commune are quite varied, and the most representative types were studied, namely *Agrostis capillaris* - *Festuca rubra* and *Agrostis capillaris* - *Agropyron repens*. The meadows dominated by *Agrostis capillaris* and *Agropyron repens* exhibit the highest productivity, with a yield of 23.36 t/ha of green fodder and a stocking rate of 1.94 LU/ha. This is followed by the *Agrostis capillaris* - *Festuca rubra* meadows, with slightly lower yields of 18.87 t/ha of green fodder and a stocking rate of 1.57 LU/ha. The data provided by this study are useful for characterizing the pastoral potential of these grasslands in the context of improving and rationally utilizing the pastoral land.

Keywords: grasslands, green mass production, nutritional value, stocking rate, floristic survey
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INTRODUCTION

Taking into account the difficulty of determining the green mass production of pastures using the classical method, a new approach based on a floristic survey, with a percentage assessment of the species in the grass cover, has been proposed (Marușca, 2019). Currently, livestock farming systems based on the use of grasslands must meet growing feed demands. The forage production from these areas must align with the increasing requirements for meat and milk, as well as with the challenges posed by climate change (Marușca et al., 2014).

The grasslands under study are located in the Hidișelul de Sus commune, Bihor County. The permanent grasslands in the study area are predominantly composed of *Agrostis capillaris*, *Festuca rubra*, and *Agropyron repens*. The study area is part of the larger geomorphological unit: the Western Piedmont, Piatra Craiului district. Geologically, the territory of Hidișelul de Sus commune lies on formations of Pleistocene age, overlaid by Quaternary deposits. The parent rocks that formed and shaped the soils in the hilly area are non-carbonate clays, carbonate clays, loams, marls, cemented sandstones (very weakly carbonated or non-carbonated), while in the micro-meadow areas, heterogeneous colluvial deposits are present (Berchez &Stanciu,2021). The general capacity of the grasslands to support plant production is good. Physical characteristics include a high fine sand content of over 70%, and low silt and clay content. The air occupying the non-capillary pores, which are well-represented in relation to the capillary pores (the volume of capillary pores is directly proportional to the sand content), with very low specific heat and thermal conductivity, leads to rapid heating and cooling at the surface, with deeper horizons remaining cool.

The main soil type in the study area is eutricambosoil.

MATERIAL AND METHOD

For the percentage assessment of species in the grass cover (AD – abundance-dominance), the Braun-Blanquet scale was used, which has the following values: +-0.5%; 1-5.0%; 2-17.5%; 3-37.5%; 4-62.5%; 5-87.5% (Cristea et al., 2004).

Considering that there are significant differences between the abundance-dominance scores, with up to a 25% difference between scores 4 and 5, 3 and 4, and 20% between scores 2 and 3, a new formula was adopted to transform the AD intervals into percentage participation, taking into account the general frequency (K) of each species, as presented in the works by Marușca, 2019; Marușca et al., 2020; Păscuț & Marușca, 2020; Marușca & Păscuț, 2022.

Floristic relevés were carried out at the most representative points, with GPS coordinates, altitude, exposition, slope, landform, herbaceous vegetation cover, and woody vegetation cover provided for each relevé. The species are ordered in the table presenting the floristic composition for each type of pasture, starting with *Poaceae*, *Fabaceae*, and other families. In the study of the floristic composition of these grasslands, relevés with an area of 100 m² were used.

After transforming the phytocoenological scores into percentages, the forage quality index (F) and the useful phytomass index (M) (Păcurar & Rotar, 2014; Marușca, 2019; Marușca, 2021; Marușca et al., 2019; Marușca et al., 2020) are assigned to each species in the floristic relevé. The forage quality index (F) has the following values: F1-F3 (harmful species), F4-F9 (species with forage value). The values for the forage phytomass index (M) range from M1-M9 for species with useful phytomass, and M0 for species with F1-F3 values.

For the grasslands in the Hidișelul de Sus commune area, the grazing season lasts for 185 days. The botanical nomenclature used for the identified species follows the work of Sârbu et al. (2013).

RESULTS AND DISCUSSIONS

The study of permanent grasslands in the area of Hidișelul de Sus commune (Bihor County) highlights two main types of grasslands: *Agrostis capillaris–Festuca rubra* and *Agrostis capillaris–Agropyron repens*. This study was conducted in 2023, with a total of 15 relevés, 7 in *Agrostis capillaris–Festuca rubra* grasslands and 8 in *Agrostis capillaris–Agropyron repens* grasslands. The *Agrostis capillaris–Festuca rubra* grassland type is found on slopes with varying exposures (N, NE, S, SE, SW, E), at altitudes ranging from 210 to 290 m, and with slopes of 5-18 degrees (Table 1). The herbaceous vegetation corresponding to this type of grassland has a high cover (92-100%) and is dominated by *Agrostis capillaris* (44.64%) and to a lesser extent by *Festuca rubra* (13.93%).

In the *Poaceae* family, species present in these grasslands include *Lolium perenne*, *Phleum pratense*, *Festuca pratensis*, *Dactylis glomerata*, *Festuca arundinacea*, *Arrhenatherum elatius*, *Poa pratensis*, *Cynosurus cristatus*, *Agropyron repens*, *Holcus lanatus*, *Anthoxanthum odoratum*, *Festuca rupicola*, *Festuca valesiaca*, all of which have high forage quality, as well as *Botriochloa ischaemum*, *Calamagrostis epigejos*, and *Setaria pumila*, which have no forage value.

The Fabaceae family is represented by *Trifolium repens*, *Trifolium campestre*, *Trifolium pratense*, *Trifolium medium*, *Trifolium arvense*, and *Lotus corniculatus*, which have good forage value but low percentage coverage (2%). Species with good forage quality and consistency in these grasslands include *Achillea millefolium*, *Agrimonia eupatoria*, *Cichorium intybus*, *Fragaria vesca*, *Hieracium pilosella*, *Pimpinella saxifraga*, and *Plantago lanceolata*. However, their coverage in these grasslands is low (3.43%). Toxic and harmful species for livestock are also present in these grasslands, such as *Eryngium campestre*, *Euphorbia cyparissias*, *Carduus acanthoides*, *Tanacetum vulgare*, *Rumex conglomeratus*, and *Sambucus ebulus*.

Table 1

Floristic composition of the *Agrostis capillaris-Festuca rubra* grasslands

No. relevées	1	2	3	4	5	6	7	K	Participation P (%)	Indices	
Altitude (m.s.m.)	210	215	290	280	210	220	260				
Exposition	NE	N, NE	NE	SV	E-SE	E	S				
Slope (°)	5-8	15-18	10-12	8-10	8-10	8-10	10-15				
Area (m ²)	100	100	100	100	100	100	100				
GPS coordonates Lat. N	46.94085	46.92604	46.91787	46.94177	46.94718	46.97797	46.93435				
Long. E	22.00883	22.05477	22.04120	22.06661	22.03665	22.05922	22.05258				
General coverage (%)	100	100	100	100	100	100	100				
Grass vegetation cover (%)	94	97	95	92	98	99	100				
Woody vegetation cover (%)	27	25	10	4	3	9	2				
Pastoral value (VP)	Very Good	Very Good	Very Good	Very Good	Very Good	Very Good	Good				
Molehills (%)	6	-	5	8	2	1	-			F	M
0	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
Poaceae											
Agrostis capillaris	3	4	3	3	3	4	3	V	50	7	5
Festuca rubra	2	1	2	2	2	1	2	V	11.3	7	6
Anthoxanthum odoratum	+	1	+	1	+	+	+	V	2.8	5	3
Cynosurus cristatus	+	+	+	+	+	+	+	V	0.5	7	4
Festuca arundinacea	+	+	+	+	+	+	·	V	0.5	8	9
Lolium perenne	1	+	1	+	+	+	+	V	2.8	9	8
Poa pratensis	+	+	+	+	+	+	·	V	0.5	8	6
Botriochloa ischaemum	·	+	+	+	·	+	2	IV	6.3	3	0
Festuca valesiaca	·	+	+	1	1	·	+	IV	2	5	3
Agropyron repens	+	·	+	·	·	+	·	III	0.3	6	7
Calamagrostis epigejos	+	1	+	·	·	·	·	III	1.4	3	0
Cynodon dactylon	+	·	+	·	·	+	+	III	0.3	6	2
Phleum pratense	·	·	+	·	+	+	·	III	0.3	9	8
Arrhenatherum elatius	·	·	+	·	+	·	·	II	0.2	8	8
Brachypodium pinnatum	·	·	+	·	+	·	·	II	0.2	5	7
Danthonia decumbens	·	·	·	+	+	·	·	II	0.2	4	3
Festuca rupicola	·	·	·	1	+	·	·	II	0.8	5	5
Holcus lanatus	·	·	+	·	·	+	·	II	0.2	6	6
Setaria pumila	·	·	+	+	·	·	·	II	0.2	3	0
Dactylis glomerata	·	·	·	·	·	+	·	I	0.1	9	8
Festuca pratensis	·	·	·	·	·	+	·	I	0.1	9	8
Fabaceae											
Trifolium repens	+	+	+	+	+	+	+	V	0.5	8	5
Trifolium campestre	+	+	+	+	·	+	+	V	0.5	7	2
Lotus corniculatus	+	+	+	+	+	+	+	V	0.5	8	6
Dorycnium pentaphyllum	·	·	+	+	+	+	1	IV	2	3	0
Ononis spinosa	+	·	+	+	+	+	·	IV	0.4	3	0
Trifolium pratense	+	+	·	+	+	·	·	III	0.3	8	7
Trifolium medium	+	+	+	·	·	·	·	III	0.3	6	4
Trifolium arvense	·	·	·	+	·	·	·	I	0.1	4	2
Other families											
Achillea millefolium	+	+	+	+	+	+	+	V	0.5	6	4
Agrimonia eupatoria	+	+	+	+	+	+	+	V	0.5	3	0
Cichorium intybus	+	+	+	+	+	+	+	V	0.5	5	6
Fragaria vesca	+	+	+	·	+	+	+	V	0.5	5	1
Hieracium pilosella	+	+	+	+	+	+	+	V	0.5	4	1
Pimpinella saxifraga	+	+	+	+	+	+	+	V	0.5	5	3
Plantago lanceolata	+	+	+	+	+	+	+	V	0.5	6	1
Thymus glabrescens	+	+	+	+	+	+	+	V	0.5	3	0
Bellis perennis	+	+	+	·	·	+	+	IV	0.4	5	1
Daucus carota	·	+	+	·	+	+	+	IV	0.4	6	5
Juncus effusus	1	+	·	+	1	1	·	IV	2	3	0
Potentilla erecta	+	·	+	+	+	·	+	IV	0.4	5	2
Ranunculus polyanthemos	+	+	·	·	+	+	+	IV	0.4	4	4
Xeranthemum cylindraceum	·	·	+	1	+	+	+	IV	2	3	0
Carex hirta	+	+	·	·	·	+	·	III	0.3	3	0
Carlina vulgaris	·	·	+	+	+	·	+	III	0.3	3	0
Erigeron annuus	+	+	·	·	·	+	·	III	0.3	3	0
Galium verum	+	·	+	+	+	·	·	III	0.3	5	4
Geranium pusillum	·	·	+	·	+	+	·	III	0.3	3	0
Hypochaeris radicata	+	·	+	·	+	·	·	III	0.3	3	0
Juncus tenuis	+	·	·	+	+	·	·	III	0.3	3	0
Leontodon autumnalis	·	·	+	·	+	+	·	III	0.3	5	3
Urtica dioica	+	·	+	·	·	+	·	III	0.3	5	7

0	1	2	3	4	5	6	7	8	9	10	11
Verbena officinalis	·	·	·	+	+	+	·	III	0.3	4	4
Ambrosia artemisiifolia	·	·	+	·	·	+	·	II	0.2	3	0
Centaurium erythraea	+	·	·	+	·	·	·	II	0.2	3	0
Dipsacus laciniatus	+	·	·	·	·	·	+	II	0.2	3	0
Erigeron canadensis	+	+	·	·	·	·	·	II	0.2	3	0
Filago vulgaris	·	·	+	·	+	·	·	II	0.2	3	0
Filipendula vulgaris	·	·	+	·	·	+	·	II	0.2	5	4
Leontodon hispidus	+	·	·	·	·	·	+	II	0.2	5	3
Prunella vulgaris	+	·	+	·	·	·	·	II	0.2	4	2
Teucrium chamedrys	+	·	+	·	·	·	·	II	0.2	3	0
Centaurea phrygia	·	·	·	+	·	·	·	I	0.1	3	0
Cruciata glabra	·	·	·	·	·	+	·	I	0.1	3	0
Erodium cicutarium	·	·	+	·	·	·	·	I	0.1	3	0
Juncus inflexus	·	·	·	·	·	+	·	I	0.1	3	0
Lysimachia nummularia	·	·	·	·	·	+	·	I	0.1	3	0
Mentha longifolia	·	·	·	·	·	·	+	I	0.1	4	6
Polygala vulgaris	·	·	·	·	+	·	·	I	0.1	4	1
Sanguisorba minor	·	·	+	·	·	·	·	I	0.1	6	3
Scabiosa ochroleuca	·	·	+	·	·	·	·	I	0.1	3	0
Viola tricolor	·	·	·	+	·	·	·	I	0.1	3	0
Shrubs, subshrubs and invasive young trees											
Cornus sanguinea	+	+	+	+	+	+	·	V	0.5	3	0
Crataegus monogyna	+	+	+	+	+	+	+	V	0.5	3	0
Prunus spinosa	1	2	1	+	+	1	+	V	9	3	0
Rosa canina	1	+	+	+	+	+	+	V	2.8	3	0
Rubus sulcatus	1	1	+	+	+	+	+	V	2.8	3	0
Populus tremula	1	1	+	+	·	+	·	IV	2	3	0
Carpinus betulus	1	1	+	+	·	·	·	III	1.4	3	0
Ligustrum vulgare	+	·	+	·	·	+	·	III	0.3	3	0
Pyrus pyraster	+	+	+	·	·	·	·	III	0.3	3	0
Robinia pseudoacacia	·	·	+	+	+	+	·	III	0.3	3	0
Cornus mas	·	·	·	·	·	+	·	I	0.1	3	0
Euonymus europaeus	·	·	+	·	·	·	·	I	0.1	3	0
Malus sylvestris	·	+	·	·	·	·	·	I	0.1	3	0
Toxic and harmful plants											
Carduus acanthoides	+	+	+	+	+	+	+	V	0.5	2	0
Eryngium campestre	1	1	1	+	1	1	1	V	2.8	3	0
Euphorbia cyparissias	1	+	1	+	1	+	1	V	2.8	1	0
Tanacetum vulgare	·	·	+	·	·	+	·	II	0.2	3	0
Rumex conglomeratus	·	·	·	+	·	·	·	I	0.1	2	0
Sambucus ebulus	·	·	+	·	·	·	·	I	0.1	3	0

The localities and date where the relevées were carried out: 1, 5 - Hidișelul de Jos (15.08.2023); 2, 7 - Hidișelul de Sus (17.08.2023); 3 - Mierlău (20.08.2023); 4,6 - Sîntelec (18.08.2023);
Where: F – fodder quality indices; M – production indices; K – constancy; AD values **(**Abundance-Dominance**)***:* +-0.5%; 1-5.0%; 2-17.5%; 3-37.5%; 4-62.5%; 5-87.5%.

In these grasslands, some woody species, including shrubs, saplings, and invasive tree seedlings (13.13%), also penetrate, with the most representative being *Prunus. spinosa, Rubus sulcatus*, *Rosa canina*, *Crataegus monogyna*, *Cornus sanguinea*, *Populus tremula*, *Carpinus betulus*, *Pyrus pyraster*, *Robinia pseudoacacia*. (figure 1).

a. **b.**

Figure 1 ***Agrostis capillaris-Festuca rubra*** **grasslands, with woody shrubby vegetation (a – Hidișelul de Jos, relevée No. 1, b – Hidișelul de Sus, relevée No. 2)**

The *Agrostis capillaris* and *Agropyron repens* grasslands were identified in the area of Hidișelul de Sus commune on slopes with different exposures (N, NE, S, SW), at altitudes ranging from 155 to 225 m on gently sloping terrain (0-8 degrees) (Table 2). The herbaceous vegetation has high cover (97-100%), with the dominant species being *Agrostis capillaris* (46.86%), followed by *Agropyron repens* (25%).

Among the species from the Poaceae family with good nutritional value found in this type of grassland, we mention *Festuca pratensis*, *Holcus lanatus*, *Phleum pratense*, *Anthoxanthum odoratum*, *Poa pratensis*, *Arrhenatherum elatius*, *Cynosurus cristatus*, *Festuca arundinacea*, *Lolium perenne*, *Cynodon dactylon*, *Dactylis glomerata*, and *Festuca rubra*, which have a low participation percentage (9.93%).

From the Fabaceae family, the following species are present: *Trifolium repens*, *Trifolium campestre*, *Trifolium pratense*, *Lotus corniculatus*, *Ononis spinosa*, *Trifolium arvense*, *Galega officinalis*, *Vicia cracca*, and *Medicago lupulina*, with a total participation percentage of 3%, which is insignificant for improving the forage quality of these grasslands. Among the species from other families that have high presence and quality indices, *Achillea millefolium*, *Cichorium intybus*, *Plantago lanceolata*, *Potentilla erecta*, *Pimpinella saxifraga*, and *Daucus carota* stand out.

The woody shrubs and invasive tree saplings that penetrate this type of grassland are represented by *Prunus spinosa*, *Rosa canina*, *Rubus sulcatus*, *Crataegus monogyna*, *Rubus caesius*, *Cornus sanguinea*, *Populus tremula*, *Carpinus betulus*, and *Robinia pseudoacacia*.

Table 2

Floristic composition of the *Agrostis capillaris-Agropyron repens* grasslands

No. relevées	1	2	3	4	5	6	7	8	K	Participation P (%)	Indices	
Altitude (m.s.m.)	170	185	180	225	210	180	175	155				
Exposition	-	N-NE	-	S-SV	S	-	-	-				
Slope (°)	-	3-5	-	5-8	3-5	-	-	-				
Area (m ²)	100	100	100	100	100	100	100	100				
GPS coordonates Lat. N	46.95031	46.93861	46.97600	46.93228	46.93143	46.90728	46.89725	46.87119				
GPS coordonates Long. E	22.01465	22.03069	22.06395	22.05180	22.04869	21.98953	21.98760	21.95356				
General coverage (%)	100	100	100	100	100	100	100	100				
Grass vegetation cover (%)	99	98	99	99	98	97	97	100				
Woody vegetation cover (%)	2	7	2	1	7	3	3	8				
Pastoral value (VP)	Very Good	Very Good	Very Good	Very Good	Very Good	Very Good	Very Good	Very Good				
Molehills (%)	1	2	1	1	2	3	3	-			F	M
0	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
Poaceae												
Agrostis capillaris	3	3	3	4	4	3	3	4	V	50	7	5
Agropyron repens	2	3	2	2	2	3	3	2	V	27.5	6	7
Anthoxanthum odoratum	1	+	+	+	+	+	+	+	V	2.8	5	3
Cynosurus cristatus	+	+	+	+	+	+	+	+	V	0.5	7	4
Festuca arundinacea	1	+	+	+	+	+	+	+	V	2.8	8	9
Lolium perenne	1	+	1	+	+	1	+	+	V	2.8	9	8
Dactylis glomerata	+	+	+	·	+	+	1	·	IV	2	9	8
Festuca pratensis	·	+	1	+	+	·	+	+	IV	2	9	8
Phleum pratense	·	+	1	·	+	+	+	·	IV	2	9	8
Poa pratensis	·	+	+	+	+	·	·	+	IV	0.4	8	6
Arrhenatherum elatius	·	+	1	·	·	+	+	·	III	0.3	8	8
Cynodon dactylon	1	·	·	+	+	·	·	+	III	1.4	6	2
Holcus lanatus	+	·	·	·	+	·	+	+	III	0.3	6	6
Botriochloa ischaemum	·	·	·	+	+	·	·	+	II	0.2	3	0
Calamagrostis epigejos	·	+	·	·	·	+	+	·	II	0.2	3	0
Festuca rubra	+	+	·	+	·	·	·	·	II	0.2	7	6
Setaria pumila	·	+	·	·	·	·	·	+	II	0.2	3	0
Fabaceae												
Lotus corniculatus	+	+	+	+	+	+	+	+	V	0.5	8	6
Trifolium pratense	+	+	+	+	·	+	+	+	V	0.5	8	7
Trifolium repens	+	+	1	+	+	+	+	+	V	2.8	8	5
Galega officinalis	·	+	·	·	·	+	·	·	II	0.2	3	0
Medicago lupulina	·	·	·	·	+	+	·	·	II	0.2	8	3
Ononis spinosa	·	·	+	+	·	·	·	+	II	0.2	3	0
Trifolium arvense	·	+	+	·	+	·	·	·	II	0.2	4	2

0	1	2	3	4	5	6	7	8	9	10	11	12
Trifolium campestre	+	·	·	+	·	·	·	+	II	0.2	7	2
Vicia cracca	·	·	·	+	·	+	+	·	II	0.2	7	6
Other families												
Achillea millefolium	+	+	+	+	+	+	+	+	V	0.5	6	4
Cichorium intybus	+	+	1	+	+	+	+	+	V	2.8	5	6
Daucus carota	·	+	+	+	+	+	+	+	V	0.5	6	5
Pimpinella saxifraga	+	+	+	+	·	+	+	+	V	0.5	5	3
Plantago lanceolata	+	·	+	+	+	+	+	+	V	0.5	6	1
Potentilla erecta	+	·	+	+	+	+	+	+	V	0.5	5	2
Ranunculus polyanthemos	+	+	+	+	+	+	+	+	V	0.5	4	4
Agrimonia eupatoria	·	·	+	+	·	+	+	+	IV	0.4	3	0
Bellis perennis	+	·	+	+	+	·	·	+	IV	0.4	5	1
Carex hirta	1	·	·	+	+	+	+	+	IV	2	3	0
Centaurea phrygia	+	+	+	·	·	+	+	·	IV	0.4	3	0
Erigeron annuus	+	+	·	+	·	+	·	+	IV	0.4	3	0
Filipendula vulgaris	·	+	+	+	·	+	+	+	IV	0.4	5	4
Galium verum	+	+	+	·	+	+	+	·	IV	0.4	5	4
Urtica dioica	+	+	·	+	+	·	+	+	IV	0.4	5	7
Xeranthemum cylindraceum	·	+	·	+	+	·	+	+	IV	0.4	3	0
Ambrosia artemisiifolia	·	+	·	+	+	·	·	+	III	0.3	3	0
Cruciata glabra	+	+	·	·	·	+	+	·	III	0.3	3	0
Dipsacus laciniatus	+	+	·	·	+	+	·	·	III	0.3	3	0
Leontodon hispidus	·	·	+	+	+	·	·	+	III	0.3	5	3
Prunella vulgaris	+	·	·	+	·	·	+	+	III	0.3	4	2
Erigeron canadensis	+	+	·	·	·	+	·	·	II	0.2	3	0
Fragaria vesca	·	·	+	+	·	·	·	+	II	0.2	5	1
Campanula glomerata	·	+	·	·	·	·	·	+	II	0.2	3	0
Carlina vulgaris	·	·	·	+	·	·	·	+	II	0.2	3	0
Verbena officinalis	·	·	·	+	+	·	·	+	II	0.2	4	4
Carum carvi	·	+	·	·	·	·	·	·	I	0.1	6	3
Cirsium canum	·	1	·	·	·	·	·	·	I	0.5	3	0
Leucanthemum vulgare	·	+	·	·	·	·	·	·	I	0.1	5	5
Mentha longifolia	·	+	·	·	·	·	·	·	I	0.1	4	6
Shrubs, subshrubs and invasive young trees												
Crataegus monogyna	+	+	+	+	+	+	+	+	V	0.5	3	0
Prunus spinosa	+	1	+	+	+	+	+	1	V	2.8	3	0
Rosa canina	·	+	+	+	+	+	+	+	V	0.5	3	0
Rubus sulcatus	+	·	+	·	+	+	+	·	IV	0.4	3	0
Populus tremula	·	+	·	·	·	+	+	+	III	0.3	3	0
Carpinus betulus	·	+	·	·	·	·	·	+	II	0.2	3	0
Robinia pseudoacacia	·	+	·	+	1	·	·	·	II	0.8	3	0
Rubus caesius	·	+	·	·	·	·	·	+	II	0.2	3	0
Cornus sanguinea	·	+	·	·	·	+	·	+	II	0.2	3	0
Toxic and harmful plants												
Carduus acanthoides	+	+	+	+	+	+	·	+	V	0.5	2	0
Eryngium campestre	1	·	+	+	+	+	+	+	V	2.8	3	0
Euphorbia cyparissias	+	·	+	+	+	+	+	+	V	0.5	1	0
Artemisia absinthium	·	+	·	·	+	+	+	·	III	0.3	3	0
Cirsium arvense	+	·	·	·	+	·	·	·	II	0.2	3	0
Tanacetum vulgare	·	+	·	·	+	·	+	·	II	0.2	3	0
Xanthium strumarium	·	+	·	·	+	·	·	·	II	0.2	2	0

The localities and date where the relevées were carried out: 1 - Hidișelul de Jos (15.08.2023); 2, 4, 5 – Hidișelul de Sus (17.08.2023); 3 - Sîntelec (18.08.2023); 6, 7, 8 - Mierlău (20.08.2023).
Where: F – fodder quality indices; M – production indices; K – constancy; AD values **(**Abundance-Dominance**)**: +-0.5%; 1-5.0%; 2-17.5%; 3-37.5%; 4-62.5%; 5-87.5%.

In these grasslands, a few toxic and harmful species for livestock are also present, namely: *Eryngium campestre* and *Euphorbia cyparissias*., *Carduus acanthoides, Xanthium strumarium, Cirsium arvense, Artemisia absinthium, Tanacetum vulgare* (figure 2).

a.

b.

Figure 2 *Agrostis capillaris-Agropyron repens* grasslands with *Eryngium campestre* and *Euphorbia cyparissias* (a. - Hidișelul de Jos, relevée No. 1; b. - Sîntelec, relevée No. 3)

As a result of the calculations performed at the pasture type level, for the most widespread grasslands in the Hidișelul de Sus commune area, it was found that the *Agrostis capillaris* and *Festuca rubra* grasslands have a pastoral value (PV) of 86.64 (very good), with a green fodder biomass (GFB) production of 18.87 t/ha, supporting a stocking rate of 1.57 LU/ha (Table 3). The most productive grasslands in the studied area are those of *Agrostis capillaris* and *Agropyron repens*, with an excellent pastoral value (PV) of 80.33, a very good green fodder biomass (GFB) production of 23.36 t/ha, and a stocking rate of 1.94 LU/ha.

Table 3

Productivity of grasslands identified in the Municipality area of Hidișelul de Sus

Grassland type	Pastoral value (VP)	Useful phytomass index (IM)	Green mass production (MV) (t/ha)	Cargo with animals (UVM/ha)
Agrostis capillaris-Festuca rubra	86.64 (Very Good)	6.29	18.87 (Good-Very Good)	1.57
Agrostis capillaris-Agropyron repens	80.33 (Very Good)	7.30	23.36 (Very Good)	1.94

CONCLUSIONS

The permanent grasslands in the area of Hidișelul de Sus commune have low agro-productive variability, with a mesophilous, micro-mesothermal, and acid-neutrophilous vegetation.

The most productive grasslands are those of *Agrostis capillaris* and *Agropyron repens*, with a very good pastoral value (PV), very good green biomass production per hectare, and an optimal stocking rate of 1.94 LU/ha for 185 grazing days. Also, the *Agrostis capillaris* and *Festuca rubra* grasslands have very good productivity, very good pastoral value (PV), and very good green biomass (GB) production, which allow a stocking rate of 1.57 LU/ha.

To maintain the high productivity of these grasslands in the future, it is necessary to apply mandatory improvement works, such as clearing shrub vegetation and invasive tree saplings, destroying and leveling ant hills, controlling harmful and toxic plants, and fertilizing with organic and chemical fertilizers.

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