

**THE ECOLOGICAL AND AGRONOMIC STUDY OF SOME
GRASSLANDS PHYTOCENOSSES FROM THE SITE NATURA
2000ROSCI0002 APUSENI**

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Abstract

The Natura 2000 site ROSCI0002 Apuseni is located in the central area of the Apuseni Mountains, in the perimeter of the Apuseni Natural Reserve. The site has an area of 75876.5 ha, includes 38 habitats and 38 species with conservation value. An important habitat from the 38 of the ROSCI0002 Apuseni site is habitat 6520 - Mountain hay meadows, which has an area of 14 64.84 ha. This habitat is particularly important from a conservation point of view because 109 species of flora and fauna of interest have been identified. The global conservation status of the habitat 6520 - Mountain hay meadows is unfavorable-inadequate, thus improving the conservation status through sustainable management is required. To be able to develop maintenance and use works, the present phytocenoses must first be known. In habitat 6520, 4 distinct grassland types were identified, as follows: Festuca rubra – Agrostis capillaris grassland type, Agrostis capillaris – Festuca rubra grassland type, Agrostis capillaris – Anthoxanthum odoratum grassland type and Trisetum flavescens grassland type. The most frequent type of grassland was Festuca rubra – Agrostis capillaris (26 stations), followed by Agrostis capillaris – Festuca rubra (21 stations), and the other two types of grassland had a weaker presence (each in 5 stations). A series of improvement works are recommended on this grassland, such as: removal of woody vegetation, control of leeches, collection of stones, mowing at the time that favors biodiversity (after July 1) with light machinery (up to 250 kg), fertilizing with 10 t/ha of manure, once every 2-3 years and drying the grass on the ground to promote seed spreading.

Keywords: NATURA 2000 ROSCI0002, management of habitats.

INTRODUCTION

The Natura 2000 site ROSCI0002 Apuseni is located in the central area of the Apuseni Mountains, in the perimeter of the Apuseni Natural Reserve. The site has an area of 75876.5 ha, includes

38 habitats and 38 species with conservation value (https://natura2000.eea.europa.eu/?data_id=dataSource_7-Layman_sites_2246%3A12572&page=Page-1&views=Feature_Info_Sites_View_Species). This Natura 2000 site

overlaps 96% over the ROSPA0081 Munții Apuseni - Vlădeasa site (92859.8 ha). An important habitat from the 38 of the ROSCI0002 Apuseni site is habitat 6520 - *Mountain hay grassland*, which has an area of 14648.84 ha (<https://slink.ro/Pwr70>). The latest scientific studies show that 109 species of flora and fauna of conservation interest have been identified in *habitat 6520* (<https://slink.ro/Pwr70>). The global conservation status of the habitat 6520 *Mountain hay meadows* is unfavorable-inadequate. According to the management plan, the conservation objective for this habitat type is to improve the conservation status through sustainable management. Habitat 6520 present in the Apuseni Park is a background habitat, with a vast areal extension, dominating the landscape. The grassland phytocoenoses of habitat 6520 in the Apuseni Park mostly belong to the *Festuco rubrae - Agrostietum capillaris* Horvat 1951 association with a wide spread in the mountains of Central Europe, with fewer areas being covered by the phytocoenoses of the associations *Poo - Trisetetum flavescentis* (Knapp 1951) Oberd. 1957; *Trisetetum flavescentis* (Schröter) Brinkmann 1907 and *Anthoxantho-Agrostietum capillaris* Silinger 1933. The habitat includes both hayfields and pastures (Marușca et al., 2021; Marușca et al., 2022). Of the total grassland area of 6520 *Habitat*, approximately 55% is used for grazing and 45% for hay production. The hayfields are mostly used through a mixed system, with

summer mowing and extensive autumn grazing (Brinkmann et al., 2009; Păcurar et al., 2009; Rotar et al., 2010). This type of management has generated over time semi-natural grasslands with a high biodiversity (Rotar et al., 2012, Reif et al., 2005; Reif et al., 2008). The grasslands of the ROSCI0002 Apuseni site were and are considered semi-natural grassland of high nature value (HNV) according to PAC (MADR 2022, pp 9-10). They were and are subsidized through the National Rural Development Program (PNDR) 2014-2020 and the National Strategic Plan (PNS) 2023-2027. Even in these conditions the objective of the work was to identify the main types of grassland in ROSCI0002 Apuseni and their characterization from an ecological and agronomic point of view.

MATERIAL AND METHOD

The research activity took place in the Apuseni Natural Park, in the southern area of the site ROSCI 0002 Apuseni within the Project "Development of tools for adaptive management of natural capital in protected areas Apuseni Natural Park ROSCI 0002 Apuseni and ROSCI 0016 Buteasa" POIM, Axis 4 (2021-2022), SMIS code 122643. The research was carried out in the territory of 5 municipalities (Arieseni, Girda de Sus, Scarisoara, Albac and Horea), where only the meadows were studied. The research focused both on meadows used only by mowing, and those used mixed (mowing+grazing).

Stand conditions of phytocenoses were described based on the following parameters: altitude

(m), slope (%), exposure, land use, general cover (%), wooden vegetation cover (%), stubs (%), rocks (%), stones (%), landslides (%), erosion (%). The floristic composition was interpreted using an improved Braun-Blanquet scale with subdivisions (Păcurar and Rotar, 2014). Sward fodder value was calculated based on species quality score on a scale from 1 (poor) to 9 (excellent), after Dierschke and Briemle (2002), as modified by Păcurar and Rotar (2014). Sward fodder value was performed on a scale from 1 (poor sward, quality dominated by toxic species) to 9 (excellent) after Păcurar and Rotar (2014). Data regarding the share of economic groups (*Poaceae*, *Cyperaceae* - *Juncaceae*, *Fabaceae* and other botanical families - OFB), species number were processed by analysis of variance.

Plant resistance against mechanical interference, such as mowing, grazing and crushed materialized by value indicator (from 1-9) after Dierschke and Briemle (2002), and the names of appropriate species depending on the category disturbance were taken after Păcurar and Rotar (2014). Analysis of the spectra provides information on seasonal conditions, grassland management, grassland quality and the level of anthropogenic influence. The interpretation of the spectra contributes significantly to the explanation of the phenomena that occur at the level of phytocenoses and to the elaboration of the measures of use and conservation. The ecological spectrum provides

information on the ecological character (behavior) of grassland phytocenoses (the general preference of grassland systems) and the number of species by ecological category. The agronomic spectrum provides information on the behavior of grasslands phytocenoses to agronomic factors and to the way of use. The analysis of agronomic factors is important to be able to intuit the way in which the grassland is used and the intensity of use, to identify the plant species with negative effects on the animals and the vegetation of the grasslands, to establish the agronomic value of the phytocenosis and its inclusion in the class and category of grasslands (Păcurar, 2020). At the same time, in the case of use by grazing, the load of animals corresponding to the agronomic value can be recommended.

RESULTS AND DISCUSSIONS

In the perimeter of Arieseni, Gârda de Sus, Scărișoara, Albac and Horea communes (Alba County; Apuseni Mountains), the following types of grassland have been identified:

- type of grassland *Festuca rubra* – *Agrostis capillaris*;
- type of grassland *Agrostis capillaris* – *Festuca rubra*;
- type of grassland *Agrostis capillaris* – *Anthoxanthum odoratum*;
- the grassland *Trisetum flavescens* type.

The type of grassland *Festuca rubra* – *Agrostis capillaris* was identified in 26 place. This phytocenosis is present on a land with an average slope of 8-10% and South-South-East exposure. The general vegetation coverage of the phytocenosis is 90%, the average

cover with woody vegetation is 4-6% (table 1). In the floristic composition of the *Festuca rubra* – *Agrostis capillaris* grassland type, Poaceae have the largest share in the sward, with an average participation of 46.92%. Plants from other botanical families (AFB) are present at a coverage of 31.44%, species from the Fabaceae family have a coverage of 8.42%, and plants from the Cyperaceae – Juncaceae family at 0.9%. Among the Poaceae, in addition to the dominant species, there are also *Trisetum flavescens*, with a 4% share and *Anthoxanthum odoratum*, with 2.83% coverage. Among the plants from other botanical families, *Alchemilla vulgaris* stands out, with 2.52% participation in the sward (table 2). Following the ecological spectral, it is found that the *Festuca rubra* – *Agrostis capillaris* phytocenosis is mesoxerophilic (Up=4.8), moderately acidophilic (Rp=5.7) and oligomesotrophic (Np=4.2; table 3). From an agronomic point of view, the *Festuca rubra* – *Agrostis capillaris* phytocenosis is medium tolerant to mowing (Cp=6.4), medium tolerant to grazing (Pp=5.4)

and moderately tolerant to crushing (Sp=4.8).

The VF (pastoral value) is 5.5, which means that the grassland falls into the 5th class, medium category and supports a load of 0.61-0.80 LU/ha (table 3).

In the *Festuca rubra* – *Agrostis capillaris* phytocenosis, were identified 6 toxic species (*Colchicum autumnale*, *Euphorbia cyparissias*, etc.) with a total coverage of 2.8%, a species harmful to animal products (*Rumex acetosella* – 0.02%), 12 species with very low fodder value and harmful to grassland vegetation (*Nardus stricta*, *Calluna vulgaris* etc.), which have a total participation of 6.8% in the sward. There are also 45 ballast species, with a total coverage of 15.7%, 16 average forage species (*Agrostis capillaris*, *Anthylis vulneraria*, etc.), with a total participation of 31.4% in the sward, 11 good forage species (*Arrhenatherum elatius*, *Lathyrus pratensis* etc.), with a total share of 27.4%, and species with excellent fodder value are represented by *Dactylis glomerata* and *Festuca pratensis*, with a total coverage of 0.8%.

Table 1

Stationary conditions of *Festuca rubra* – *Agrostis capillaris* grassland type

Altitude (m)	1023
Slope (%)	8-10
Exhibition	S-SE
Mode of use	Meadows
Grassland type	<i>Festuca rubra</i> – <i>Agrostis capillaris</i>
Overall coverage (%)	90
Woody vegetation cover (%)	4-6
Anthills (%)	4-6

Table 2

The floristic composition of the *Festuca rubra* – *Agrostis capillaris* grassland type

Ecological factors					Agronomic factors					Anthropogenic factors		Species	ADm	K
B	T	U	R	N	C	P	S	S O	V F	H	U R			
HT	x	x	x	4	6	5	5	n	6	2 - 4	3	<i>Agrostis capillaris</i>	15.18	V
HT	x	x	5	x	7	5	5	n	4	2 - 4	2	<i>Anthoxanthum odoratum</i>	2.83	V
HT	6	5	7	7	6	3	3	n	8	3 - 4	2	<i>Arhenatherum elatius</i>	0.02	I
HT	8	x	x	3	4	4	4	n	5	2 - 3	2	<i>Briza media</i>	1.94	V
HT	5	5	x	4	7	7	7	n	7	2 - 3	2	<i>Cynosurus cristatus</i>	1.46	V
HT	x	5	x	6	8	4	6	n	9	3 - 4	3	<i>Dactylis glomerata</i>	0.60	III
HT	x	x	3	2	4	4	4	n	4	2 - 3	1	<i>Danthonia decumbens</i>	0.06	I
HT	x	x	2	3	3	4	4	n	4	2 - 3	2	<i>Deschampsia flexuosa</i>	0.12	I
HT	x	6	x	6	6	4	6	n	9	2 - 4	2	<i>Festuca pratensis</i>	0.23	II
HT	x	5	x	x	9	7	6	n	7	5	3	<i>Festuca rubra</i>	19.51	V
HT	5	4	x	4	6	4	4	n	6	2 - 3	2	<i>Holcus lanatus</i>	0.62	III
HT	x	x	2	2	3	5	5	n	3	2 - 4	1	<i>Nardus stricta</i>	0.31	I
HT	x	5	x	x	9	8	8	n	8	3 - 5	3	<i>Poa pratensis</i>	0.06	I
HT	x	x	x	6	7	5	4	n	7	3	2	<i>Trisetum flavescens</i>	4.00	V
POACEAE													46.92	
HT	x	4	8	3	4	4	4	n	6	2 - 3	1	<i>Anthylis vulneraria</i>	1.08	III
ChLT	5	x	4	2	3	5	4	n	3	2 - 3	1	<i>Genista tinctoria</i>	0.15	I
H	5	4	4	2	4	8	7	n	3	2 - 3	1	<i>Genistella sagittalis</i>	2.02	III
HA	5	6	7	6	5	2	3	n	7	2 - 4	2	<i>Lathyrus pratensis</i>	0.02	I
HT	x	4	7	4	6	4	4	n	7	2 - 4	3	<i>Lotus corniculatus</i>	0.71	V
HS	5	4	8	x	7	4	6	n	8	3 - 5	3	<i>Medicago lupulina</i>	0.04	I
TT	5	4	x	6	6	4	4	n	7	3 - 4	2	<i>Trifolium campestre</i>	0.10	I
HT	x	3	8	2	5	4	4	n	6	2 - 3	1	<i>Trifolium montanum</i>	0.21	I

HT	7	2	8	6	3	4	3	n	6	2 - 3	3	<i>Trifolium pratense</i>	2.31	V
ChRs	x	x	x	6	8	8	8	n	8	3 - 5	3	<i>Trifolium repens</i>	1.33	V
HA	x	5	x	6	6	1	2	n	6	3 - 4	2	<i>Vicia cracca</i>	0.46	IV
FABACEAE													8.42	
HT	5	7	3	3	4	4	4	n	3	2 - 3	1	<i>Carex nigra</i>	0.02	I
HT	4	x	4	4	4	5	5	n	4	2 - 3	1	<i>Carex pallescens</i>	0.27	III
HT	x	4	3	2	5	5	5	n	4	2 - 4	2	<i>Luzula campestris</i>	0.62	IV
CYPERACEAE ȘI JUNCACEAE													0.90	
HT	5	4	7	3	7	4	5	n	4	-	-	<i>Achillea distans</i>	0.15	II
ChRs	x	4	x	5	7	4	5	n	6	2 - 4	3	<i>Achillea millefolium</i>	1.04	V
-	-	-	-	-	-	-	-	-	-	-	-	<i>Ajuga genevensis</i>	0.04	I
H	4	6	X	6	6	4	2	n	6	3	1	<i>Alchemilla vulgaris</i>	2.52	IV
H	X	4	3	3	5	4	4	n	4	2 - 3	1	<i>Anthennaria dioica</i>	0.02	I
HRs	4	5	3	2	4	4	4	4	4	2 - 3	1	<i>Arnica montana</i>	0.87	III
HRs	4	6	8	5	3	7	3	n	4	2	1	<i>Astrantia major</i>	0.06	I
HRs	6	4	x	4	4	2	4	n	4	2 - 3	1	<i>Betonica officinalis</i>	0.04	I
ChLT	X	X	1	1	2	5	4	n	3	2 - 3	1	<i>Calluna vulgaris</i>	0.04	I
HRs	5	5	7	4	5	2	2	n	4	2 - 3	2	<i>Campanula patula</i>	0.38	IV
-	-	-	-	-	-	-	-	-	-	-	-	<i>Campanula serata</i>	0.04	I
H	X	4	X	2	3	8	7	n	3	2 - 3	1	<i>Carlina acaulis</i>	0.40	IV
-	-	-	-	-	-	-	-	-	-	-	-	<i>Centaurea mollis</i>	0.12	I
HRs	4	5	5	3	5	2	2	n	4	2 - 3	1	<i>Centaurea phrygia</i>	2.83	V
-	-	-	-	-	-	-	-	-	-	-	-	<i>Centaureum erythraea</i>	0.02	I
HT	x	5	x	5	8	4	4	n	4	3 - 5	3	<i>Cerastium holosteoides</i>	0.17	II
-	-	-	-	-	-	-	-	-	-	-	-	<i>Cirsium erysithales</i>	0.10	I
HRs	5	5	x	8	4	9	2	n	3	4 - 5	3	<i>Cirsium vulgare</i>	0.10	I
GRs	5	6	7	x	5	9	3	n	1	2 - 3	1	<i>Colchicum autumnale</i>	0.98	III
HRs	5	5	6	5	6	2	2	n	4	3 - 4	3	<i>Crepis biennis</i>	1.04	IV
HRs	5	4	7	2	3	4	4	n	4	2 - 3	2	<i>Dianthus carthusianorum</i>	0.17	II
-	-	-	-	-	-	-	-	-	-	-	-	<i>Equisetum sylvestris</i>	0.02	I
-	-	-	-	-	-	-	-	-	-	-	-	<i>Erygeron annuus</i>	0.02	I
-	-	-	-	-	-	-	-	-	-	-	-	<i>Eryngium campestre</i>	0.02	I
H	X	4	8	X	4	8	7	n	1	2 - 4	2	<i>Euphorbia cyparissias</i>	0.04	I
TRs	x	5	x	3	5	6	5	n	3	2 - 4	1	<i>Euphrasia rostkoviana</i>	0.75	III
												<i>Filipendula hexapetala</i>	0.02	I
HT	x	5	x	3	7	3	3	n	4	2 - 3	3	<i>Galium mollugo</i>	0.13	II
HT	5	4	7	3	5	4	4	n	5	2 - 3	2	<i>Galium verum</i>	0.04	I
H	3	5	X	2	3	2	2	1	4	2 - 3	1	<i>Gentiana lutea</i>	0.04	I
H	2	4	2	2	4	2	3	n	4	2 - 3	5	<i>Geum montanum</i>	0.04	I
H	X	5	2	6	3	3	3	n	4	2 - 3	1	<i>Gnaphalium sylvaticum</i>	0.02	I
GRs	x	7	8	3	4	3	2	n	4	2 - 3	1	<i>Gymnadenia conopsea</i>	0.48	IV

H	5	3	7	3	2	6	5	n	4	2 - 3	1	<i>Helianthemum nummularium</i>	0.08	I
HS	3	5	4	2	5	6	6	n	4	3 - 4	2	<i>Hieracium aurantiacum</i>	0.25	III
HS	x	4	x	2	4	7	7	n	4	2 - 4	2	<i>Hieracium pilosella</i>	0.17	II
HRs	x	6	3	2	3	3	3	n	4	2 - 3	1	<i>Hypericum maculatum</i>	1.04	IV
HR	6	x	6	4	2	3	3	4	4	2 - 3	1	<i>Hypochaeris maculata</i>	0.02	I
-	-	-	-	-	-	-	-	-	-	-	-	<i>Laserpitium latifolium</i>	0.12	I
HR	x	5	x	5	7	7	7	n	5	3 - 4	3	<i>Leontodon autumnalis</i>	2.48	V
H	X	4	X	3	6	3	4	n	5	3 - 4	2	<i>Leucanthemum vulgare</i>	1.60	V
TT	x	x	7	2	4	4	3	n	4	2 - 3	1	<i>Linum catharticum</i>	0.02	I
HRs	5	6	x	x	4	2	2	n	4	2 - 3	2	<i>Lychnis flos-cuculi</i>	0.04	I
HRs	x	8	x	x	3	2	2	n	4	2 - 4	1	<i>Lysimachia vulgaris</i>	0.02	I
HRs	3	x	8	2	4	4	3	4	4	-	-	<i>Phyteuma orbiculare</i>	0.04	I
HRs	x	4	8	4	5	4	2	n	4	2 - 5	2	<i>Picris hieracioides</i>	0.02	I
HRs	x	6	7	7	5	3	2	n	5	2 - 3	1	<i>Pimpinella major</i>	1.58	IV
HR	x	x	x	x	7	6	6	n	6	2 - 4	3	<i>Plantago lanceolata</i>	1.15	V
HR	x	4	8	3	4	8	8	n	5	2 - 4	2	<i>Plantago media</i>	0.60	III
H	6	3	8	2	4	4	4	n	4	2 - 3	1	<i>Polygala comosa</i>	0.19	II
HT	x	5	3	2	4	4	4	n	4	2 - 3	1	<i>Polygala vulgaris</i>	0.31	III
H	4	7	5	5	6	4	5	n	4	3 - 4	2	<i>Polygonum bistorta</i>	0.10	I
HT	x	x	x	2	3	4	5	n	5	2 - 3	1	<i>Potentilla erecta</i>	0.44	III
HR	x	4	8	3	5	5	5	n	4	2 - 3	2	<i>Primula veris</i>	0.06	I
HS	x	x	4	x	9	8	8	n	4	3 - 4	2	<i>Prunella vulgaris</i>	0.29	III
G	5	X	3	3	3	7	2	n	1	2 - 3	2	<i>Pteridium aquilinum</i>	0.04	I
HRs	x	x	x	x	6	5	6	n	4	3 - 4	2	<i>Ranunculus acris</i>	0.50	V
GRs	6	4	7	3	6	5	4	n	4	2 - 4	2	<i>Ranunculus bulbosus</i>	0.02	I
TRs	x	x	x	3	5	8	3	n	3	2 - 3	1	<i>Rhinanthus minor</i>	2.08	V
HRs	x	x	x	x	6	4	2	n	4	3 - 4	2	<i>Rumex acetosa</i>	1.06	V
HT	5	4	2	2	7	4	4	n	2	2 - 5	2	<i>Rumex acetosella</i>	0.02	I
-	-	-	-	-	-	-	-	-	-	-	-	<i>Rumex alpinus</i>	0.04	I
-	-	-	-	-	-	-	-	-	-	-	-	<i>Salvia verticillata</i>	0.02	I
HRs	5	4	8	2	5	3	4	n	4	2 - 3	1	<i>Scabiosa columbaria</i>	0.67	IV
-	-	-	-	-	-	-	-	-	-	-	-	<i>Scorzonera rosea</i>	0.04	I
-	-	-	-	-	-	-	-	-	-	-	-	<i>Scorzoneroides autumnalis</i>	0.04	I
HRs	5	3	7	3	4	2	2	n	4	2 - 3	2	<i>Silene nutans</i>	0.12	II
HT	x	x	7	6	4	2	2	n	4	3 - 4	2	<i>Silene vulgaris</i>	0.02	I
HS	x	4	4	x	4	5	5	n	1	2 - 4	2	<i>Stellaria graminea</i>	0.48	IV
HR	x	5	x	6	8	7	7	n	7	3 - 5	3	<i>Taraxacum officinale</i>	0.17	II
ChL T	x	4	5	6	4	4	4	n	3	2 - 3	2	<i>Thymus pullegioides</i>	0.77	IV

HRs	5	4	7	6	6	2	2	n	5	3 - 4	2	<i>Tragopogon pratensis</i>	0.12	II
-	-	-	-	-	-	-	-	-	-	-	-	<i>Traunsteinera globosa</i>	0.04	I
HRs	3	7	7	6	5	7	2	4	1	2 - 3	1	<i>Trollius europaeus</i>	0.62	II
ChLS	x	x	2	3	1	8	9	n	3	2 - 3	2	<i>Vaccinium myrtillus</i>	0.10	I
ChLS	x	4	2	1	1	9	9	n	3	2 - 3	1	<i>Vaccinium vitis- idaea</i>	0.12	I
HRs	x	7	x	6	3	7	2	n	1	2 - 4	2	<i>Veratrum album</i>	0.63	II
-	-	-	-	-	-	-	-	-	-	-	-	<i>Verbascum nigrum</i>	0.02	I
ChRs	x	4	x	6	7	6	6	n	4	2 - 4	2	<i>Veronica chamaedrys</i>	0.13	II
HS	x	3	5	6	8	7	7	n	4	3 - 5	2	<i>Veronica serpyllifolia</i>	0.02	I
HT	5	x	x	6	4	2	2	n	4	2 - 3	1	<i>Viola canina</i>	0.04	I
-	-	-	-	-	-	-	-	-	-	-	-	<i>Viola declinata</i>	0.04	I
HT	5	x	x	6	5	4	4	n	4	3 - 5	2	<i>Viola tricolor</i>	0.17	II
OFB													31.4	

Note: B - bioform, T - temperature, U - humidity, R - soil reaction, N - trophicity, C - mowing tolerance, P - tolerance to grazing, S - tolerance to crushing, VF - fodder value, H - hemerobia, UR - urbanophilia, SO - zoological category

Table 3

The ecological and agronomic spectrum of the *Festuca rubra* – *Agrostis capillaris* grassland type

Ecological indicators	Ecological spectrum										VIMnp
	1	2	3	4	5	6	7	8	9	x	VIMp
U _{np}	0.0	1.0	5.0	29.0	20.0	8.0	5.0	1.0	0.0	24.0	4.7
U _p	0.0	2.3	0.6	11.9	31.6	6.5	1.8	0.0	0.0	30.2	4.8
R _{np}	1.0	7.0	8.0	6.0	5.0	2.0	16.0	13.0	0.0	35.0	5.4
R _p	0.0	0.7	3.0	3.5	6.5	1.1	5.0	5.8	0.0	59.4	5.7
N _{np}	2.0	21.0	19.0	9.0	6.0	20.0	2.0	1.0	0.0	13.0	3.9
N _p	0.2	8.0	10.3	18.7	4.9	14.3	1.6	0.1	0.0	27.0	4.2
Agricultural indices	Agronomic spectrum										VIMnp
	1	2	3	4	5	6	7	8	9	x	VIMp
C _{np}	2.0	3.0	14.0	23.0	17.0	15.0	11.0	5.0	3.0	0.0	5.0
C _p	0.2	0.1	5.8	7.8	11.3	24.3	13.4	2.3	19.9	0.0	6.4
P _{np}	1.0	13.0	9.0	31.0	12.0	5.0	10.0	9.0	3.0	0.0	4.7
P _p	0.5	4.7	5.6	14.2	24.5	2.4	25.2	6.9	1.2	0.0	5.4
S _{np}	0.0	20.0	13.0	25.0	13.0	8.0	8.0	4.0	2.0	0.0	4.3
S _p	0.0	12.1	6.8	12.2	22.3	22.4	6.8	2.3	0.2	0.0	4.8
VF _{np}	6.0	1.0	12.0	45.0	7.0	9.0	7.0	4.0	2.0	0.0	4.4
VF _p	2.8	0.0	6.8	15.7	6.8	24.6	26.0	1.4	0.8	0.0	5.5
The legend											
u	moisture		C	mowing		Peak	feed value				
R	soil reaction		p	pasture		e.g	unweighted (depending on the number of species)				
N	soil trophicity		S	crushed		p	weighted (depending on species coverage)				

The type of grassland *Agrostis capillaris* – *Festuca rubra* was identified in 21 place. This phytocenosis

is present on a land with an average

slope of 8-10% and Western exposure. The general vegetation coverage of the phytocenosis is 90%, the average coverage with woody vegetation is 2-4%, (table 5). In the floristic composition of the *Agrostis capillaris* – *Festuca rubra* grassland type, Poaceae have the largest share in the sward, with an average participation of 46.77%. Plants from other botanical families (AFB) are present at a rate of 33.67%, species from the Fabaceae family have a coverage of 6.07%, and plants from the Cyperaceae – Juncaceae family at 0.98%. Among the Poaceae, in addition to the dominant species, there are also *Anthoxanthum odoratum*, with a weight of 3.19% and *Trisetum flavescens*, with 2.88% coverage. Among the plants from other botanical families, the following species stand out: *Centaurea phrygia*, with 3.36% and *Thymus pullegioides*, with 2.36% participation in the sward (table 5).

Following the ecological spectra, it is found that the *Agrostis capillaris* - *Festuca rubra* phytocenosis is mesoxerophilic ($U_p=4.7$), moderately acidophilic ($R_p=5.1$) and oligomesotrophic ($N_p=4.1$).

From an agronomic point of view, the *Agrostis capillaris* – *Festuca*

rubra phytocenosis is medium tolerant to mowing ($C_p=6.1$), medium tolerant to grazing ($P_p=5.2$) and medium tolerant to crushing ($S_p=5.4$).

The VF (pastoral value) is 5.4, which means that the grassland falls into the 5th class, medium category and supports a load of 0.61-0.80 LU/ha.

In the *Agrostis capillaris* – *Festuca rubra* phytocenosis, were identified 8 toxic species (*Colchicum autumnale*, *Euphorbia cyparissias* etc.), with a total weight of 1%, 2 species harmful to animal products (*Eryngium campestre* and *Rumex acetosella* – 0.2%), 12 species with very low fodder value and harmful to grassland vegetation (*Nardus stricta*, *Calluna vulgaris* etc.), which have a total participation of 9.1% in the sward. There are also 38 ballast species, with a total coverage of 19.9%, 18 average forage species (*Agrostis capillaris*, *Anthylis vulneraria*, etc.), with a total participation of 33.3% in the sward, 8 good forage species (*Cynosurus cristatus*, *Lotus corniculatus*, etc.), with a total share of 21%, and species with excellent fodder value are represented by *Dactylis glomerata* and *Festuca pratensis*, with a total coverage of 1.1% (table 6).

Table 4

Stationary conditions of *Festuca rubra* – *Agrostis capillaris* grassland type

Altitude (m)	987
Slope (%)	8-10
Exhibition	V
Mode of use	Meadows
Grassland type	<i>Agrostis capillaris</i> – <i>Festuca rubra</i>
Overall coverage (%)	90
Woody vegetation cover (%)	2-4
Anthills (%)	4-6

Table 5

The floristic composition of the *Agrostis capillaris* – *Festuca rubra* grassland type

Ecological factors					Agronomic factors					Anthropogenic factors		Species	ADm	K
B	T	U	R	N	C	P	S	S O	V F	H	U R			
HT	x	x	x	4	6	5	5	n	6	2 - 4	3	<i>Agrostis capillaris</i>	20.20	V
HT	x	x	5	x	7	5	5	n	4	2 - 4	2	<i>Anthoxanthum odoratum</i>	3.19	IV
												<i>Briza media</i>	1.05	III
HT	5	5	x	4	7	7	7	n	7	2 - 3	2	<i>Cynosurus cristatus</i>	1.19	V
HT	x	5	x	6	8	4	6	n	9	3 - 4	3	<i>Dactylis glomerata</i>	0.48	III
HT	x	x	3	2	4	4	4	n	4	2 - 3	1	<i>Danthonia decumbens</i>	0.33	II
HT	x	7	x	3	5	7	4	n	3	2 - 4	2	<i>Deschampsia caespitosa</i>	0.02	I
HT	x	x	2	3	3	4	4	n	4	2 - 3	2	<i>Deschampsia flexuosa</i>	0.43	II
HT	x	6	x	6	6	4	6	n	9	2 - 4	2	<i>Festuca pratensis</i>	0.64	II
HT	x	5	x	x	9	7	6	n	7	5	3	<i>Festuca rubra</i>	14.64	V
HT	5	4	x	4	6	4	4	n	6	2 - 3	2	<i>Holcus lanatus</i>	0.98	III
HT	x	x	2	2	3	5	5	n	3	2 - 4	1	<i>Nardus stricta</i>	0.60	II
HT	x	5	x	x	9	8	8	n	8	3 - 5	3	<i>Poa pratensis</i>	0.14	II
HT	x	x	x	6	7	5	4	n	7	3	2	<i>Trisetum flavescens</i>	2.88	V
POACEAE													46.77	
HT	x	4	8	3	4	4	4	n	6	2 - 3	1	<i>Anthyllis vulneraria</i>	0.10	I
H	5	4	9	3	3	7	-	n	1	2 - 4	2	<i>Coronilla varia</i>	0.02	I
ChLT	5	x	4	2	3	5	4	n	3	2 - 3	1	<i>Genista tinctoria</i>	0.95	II
H	5	4	4	2	4	8	7	n	3	2 - 3	1	<i>Genistella sagittalis</i>	0.86	III
HT	x	4	7	4	6	4	4	n	7	2 - 4	3	<i>Lotus corniculatus</i>	0.57	IV
TT	5	4	x	6	6	4	4	n	7	3 - 4	2	<i>Trifolium campestre</i>	0.10	I
HT	x	3	8	2	5	4	4	n	6	2 - 3	1	<i>Trifolium montanum</i>	0.12	II
HT	7	2	8	6	3	4	3	n	6	2 - 3	3	<i>Trifolium pratense</i>	1.93	V
ChR	x	x	x	6	8	8	8	n	8	3 - 5	3	<i>Trifolium repens</i>	1.07	V

s														
HA	x	5	x	6	6	1	2	n	6	3 - 4	2	<i>Vicia cracca</i>	0.36	III
FABACEAE													6.07	
HT	5	7	3	3	4	4	4	n	3	2 - 3	1	<i>Carex nigra</i>	0.02	I
HT	4	x	4	4	4	5	5	n	4	2 - 3	1	<i>Carex pallescens</i>	0.38	IV
HT	x	4	3	2	5	5	5	n	4	2 - 4	2	<i>Luzua campestris</i>	0.52	V
HT	x	x	3	4	4	5	4	n	4	2 - 3	2	<i>Luzula luzuloides</i>	0.02	I
HT	x	5	3	3	6	4	4	n	4	2 - 3	1	<i>Luzula multiflora</i>	0.02	I
CYPERACEAE ȘI JUNCACEAE													0.98	
HT	5	4	7	3	7	4	5	n	4	-	-	<i>Achillea distans</i>	0.55	III
ChR s	x	4	x	5	7	4	5	n	6	2 - 4	3	<i>Achillea millefolium</i>	1.71	V
-	-	-	-	-	-	-	-	-	-	-	-	<i>Aconitum lycoctonum</i>	0.02	I
H	4	6	X	6	6	4	2	n	6	3	1	<i>Alchemilla vulgaris</i>	0.76	III
HRs	4	5	3	2	4	4	4	4	4	2 - 3	1	<i>Arnica montana</i>	0.26	I
HRs	6	4	x	4	4	2	4	n	4	2 - 3	1	<i>Betonica officinalis</i>	0.12	II
ChL T	X	X	1	1	2	5	4	n	3	2 - 3	1	<i>Calluna vulgaris</i>	0.14	I
-	-	-	-	-	-	-	-	-	-	-	-	<i>Campanula abietina</i>	0.05	I
HRs	5	5	7	4	5	2	2	n	4	2 - 3	2	<i>Campanula patula</i>	1.29	IV
HRs	x	x	x	2	4	4	4	n	4	2 - 3	2	<i>Campanula rotundifolia</i>	0.02	I
-	-	-	-	-	-	-	-	-	-	-	-	<i>Campanula serata</i>	0.05	I
H	X	4	X	2	3	8	7	n	3	2 - 3	1	<i>Carlina acaulis</i>	0.38	III
HRs	4	5	5	3	5	2	2	n	4	2 - 3	1	<i>Centaurea phrygia</i>	3.36	V
HT	x	5	x	5	8	4	4	n	4	3 - 5	3	<i>Cerastium holosteoides</i>	0.21	III
HRs	6	4	8	5	4	5	5	n	5	3 - 5	3	<i>Cichorium intybus</i>	0.07	I
-	-	-	-	-	-	-	-	-	-	-	-	<i>Cirsium erysithales</i>	0.02	I
GRs	5	6	7	x	5	9	3	n	1	2 - 3	1	<i>Colchicum autumnale</i>	0.17	I
HRs	5	5	6	5	6	2	2	n	4	3 - 4	3	<i>Crepis biennis</i>	1.07	V
HRs	5	4	7	2	3	4	4	n	4	2 - 3	2	<i>Dianthus carthusianorum</i>	0.07	I
-	-	-	-	-	-	-	-	-	-	-	-	<i>Echium vulgare</i>	0.02	I
GRs	x	7	x	3	6	8	4	n	1	2 - 3	1	<i>Equisetum palustre</i>	0.02	I
H	7	3	8	4	2	4	3	n	2	2 - 4	2	<i>Eryngium campestre</i>	0.02	I
H	X	4	8	X	4	8	7	n	1	2 - 4	2	<i>Euphorbia cyparissias</i>	0.02	I
TRs	x	5	x	3	5	6	5	n	3	2 - 4	1	<i>Euphrasia rostkoviana</i>	0.31	III
-	-	-	-	-	-	-	-	-	-	-	-	<i>Filipendula hexapetala</i>	0.43	II
H	X	5	X	6	3	4	4	n	4	2 - 3	2	<i>Fragaria vesca</i>	0.12	II
HT	x	5	x	3	7	3	3	n	4	2 - 3	3	<i>Galium mollugo</i>	0.43	IV
HT	5	4	7	3	5	4	4	n	5	2 - 3	2	<i>Galium verum</i>	0.02	I
GRs	x	7	8	3	4	3	2	n	4	2 - 3	1	<i>Gymnadenia conopsea</i>	0.26	III

HS	3	5	4	2	5	6	6	n	4	3 - 4	2	<i>Hieracium aurantiacum</i>	0.21	III
HS	x	4	x	2	4	7	7	n	4	2 - 4	2	<i>Hieracium pilosella</i>	0.86	IV
HRs	x	6	3	2	3	3	3	n	4	2 - 3	1	<i>Hypericum maculatum</i>	2.05	V
HR	6	x	6	4	2	3	3	4	4	2 - 3	1	<i>Hypochaeris maculata</i>	0.05	I
-	-	-	-	-	-	-	-	-	-	-	-	<i>Laserpitium latifolium</i>	0.02	I
HR	x	5	x	5	7	7	7	n	5	3 - 4	3	<i>Leontodon autumnalis</i>	2.33	V
H	X	4	X	3	6	3	4	n	5	3 - 4	2	<i>Leucanthemum vulgare</i>	1.33	V
-	-	-	-	-	-	-	-	-	-	-	-	<i>Linaria vulgaris</i>	0.02	I
TT	x	x	7	2	4	4	3	n	4	2 - 3	1	<i>Linum catharticum</i>	0.02	I
HRs	5	6	x	x	4	2	2	n	4	2 - 3	2	<i>Lychnis floos - cuculi</i>	0.05	I
HRs	x	8	x	x	3	2	2	n	4	2 - 4	1	<i>Lysimachia vulgaris</i>	0.02	I
HRs	x	6	7	7	5	3	2	n	5	2 - 3	1	<i>Pimpinella major</i>	1.76	IV
HR	x	x	x	x	7	6	6	n	6	2 - 4	3	<i>Plantago lanceolata</i>	0.79	V
HR	x	4	8	3	4	8	8	n	5	2 - 4	2	<i>Platago media</i>	0.21	III
H	6	3	8	2	4	4	4	n	4	2 - 3	1	<i>Polygala comossa</i>	0.17	II
HT	x	5	3	2	4	4	4	n	4	2 - 3	1	<i>Polygala vulgaris</i>	0.07	I
H	4	7	5	5	6	4	5	n	4	3 - 4	2	<i>Polygonum bistorta</i>	0.02	I
HT	x	x	x	2	3	4	5	n	5	2 - 3	1	<i>Potentilla erecta</i>	0.43	III
HS	x	x	4	x	9	8	8	n	4	3 - 4	2	<i>Prunella vulgaris</i>	0.31	IV
G	5	X	3	3	3	7	2	n	1	2 - 3	2	<i>Pteridium aquilinum</i>	0.26	I
HRs	x	x	x	x	6	5	6	n	4	3 - 4	2	<i>Ranunculus acris</i>	0.76	III
GRs	6	4	7	3	6	5	4	n	4	2 - 4	2	<i>Ranunculus bulbosus</i>	0.02	I
TRs	x	x	x	3	5	8	3	n	3	2 - 3	1	<i>Rhinanthus minor</i>	1.52	V
HRs	x	x	x	x	6	4	2	n	4	3 - 4	2	<i>Rumex acetosa</i>	1.60	V
HT	5	4	2	2	7	4	4	n	2	2 - 5	2	<i>Rumex acetosella</i>	0.14	I
-	-	-	-	-	-	-	-	-	-	-	-	<i>Rumex alpinus</i>	0.02	I
H	7	3	8	3	-	-	-	n	4	3 - 4	2	<i>Sacbiosia ochroleuca</i>	0.02	I
-	-	-	-	-	-	-	-	-	-	-	-	<i>Salvia verticilata</i>	0.02	I
HRs	6	4	8	3	4	4	5	n	5	-	-	<i>Sanguisorba minor</i>	0.02	I
HRs	5	4	8	2	5	3	4	n	4	2 - 3	1	<i>Scabiosa columbaria</i>	0.45	III
-	-	-	-	-	-	-	-	-	-	-	-	<i>Scorzoera rosea</i>	0.02	I
-	-	-	-	-	-	-	-	-	-	-	-	<i>Scrozoneroide</i> <i>autumnalis</i>	0.02	I
HRs	5	3	7	3	4	2	2	n	4	2 - 3	2	<i>Silene nutans</i>	0.38	II
HS	x	4	4	x	4	5	5	n	1	2 - 4	2	<i>Stellaria graminea</i>	0.36	IV
HR	x	5	x	6	8	7	7	n	7	3 - 5	3	<i>Taraxacum officinalis</i>	0.43	II
ChLT	x	4	5	6	4	4	4	n	3	2 - 3	2	<i>Thymus pullegioides</i>	2.36	V
HRs	5	4	7	6	6	2	2	n	5	3 - 4	2	<i>Tragopogon pratensis</i>	0.24	III
HRs	3	7	7	6	5	7	2	4	1	2 - 3	1	<i>Trollius europaeus</i>	0.02	I
ChLS	x	x	2	3	1	8	9	n	3	2 - 3	2	<i>Vaccinium myrtillus</i>	1.36	III
ChLS	x	4	2	1	1	9	9	n	3	2 - 3	1	<i>Vaccinium vitis - idaea</i>	0.57	II

HRs	x	7	x	6	3	7	2	n	1	2 - 4	2	<i>Veratrum album</i>	0.10	I
-	-	-	-	-	-	-	-	-	-	-	-	<i>Verbascum nigrum</i>	0.07	I
ChRs	x	4	x	6	7	6	6	n	4	2 - 4	2	<i>Veronica chamaedrys</i>	0.12	II
ChRs	x	4	2	6	4	4	4	n	4	2 - 3	1	<i>Veronica officinalis</i>	0.02	I
OFB													33.67	

Note: B - bioform, T - temperature, U - humidity, R - soil reaction, N - trophicity, C - mowing tolerance, P – tolerance to grazing, S – tolerance to crushing, VF – fodder value, H – hemerobia, UR – urbanophilia, SO – sozological category

Table 6

The ecological and agronomic spectrum of the *Agrostis capillaris* –
Festuca rubra grassland type

Ecological indicators	Ecological spectrum											VIMnp
	1	2	3	4	5	6	7	8	9	x	VIMp	
U _{np}	0.0	1.0	5.0	28.0	18.0	6.0	7.0	1.0	0.0	22.0	4.7	
U _p	0.0	1.9	0.7	12.8	26.9	5.4	0.5	0.0	0.0	37.3	4.7	
R _{np}	1.0	6.0	9.0	6.0	4.0	2.0	12.0	12.0	1.0	35.0	5.4	
R _p	0.1	3.1	3.6	3.1	8.9	1.1	5.1	3.4	0.0	57.1	5.1	
N _{np}	2.0	19.0	22.0	10.0	6.0	16.0	1.0	0.0	0.0	12.0	3.7	
N _p	0.7	8.5	10.7	24.8	5.4	11.6	1.8	0.0	0.0	22.0	4.1	
Agronomic indices	Agronomic spectrum											VIMnp
	1	2	3	4	5	6	7	8	9	x	VIMp	
C _{np}	0	1	2	2	1	1	2	0	0	0	4.6	
C _p	0	22.25	1	3	0.5	0.5	5.5	0	0	0	3.2	
P _{np}	0	1	3	0	1	0	2	1	1	0	5.2	
P _p	0	0.5	23.25	0	0.5	0	5.5	2.5	0.5	0	4.2	
S _{np}	0	1	4	2	0	0	2	0	0	0	4.0	
S _p	0	0.5	23.75	1	0	0	7.5	0	0	0	3.9	
VF _{np}	2	1	1	3	1	1	1	0	0	0	3.7	
VF _p	3	0.5	22.25	6	0.5	0.5	0.5	0	0	0	3.1	
The legend												
U	moisture	C	mowing	Peak				feed value				
R	soil reaction	P	pasture	n.p				unweighted (depending on the number of species)				
N	soil trophicity	S	crushed	p				weighted (depending on species coverage)				

The type of grassland *Agrostis capillaris* – *Anthoxanthum odoratum* was identified in 5 place. This phytocenosis is present on a land with an average slope of 12-14% and North-West exposure. The general vegetation coverage of the phytocenosis is 90%, the average coverage with woody vegetation is 3-4%, (table 7). In the floristic composition of the grassland type *Agrostis capillaris* – *Anthoxanthum odoratum*.

Poaceae have the largest share in the sward, with an average participation of 48.30%. Plants from other botanical families (OFB) are present at a rate of 35.10%, species from the Fabaceae family have a coverage of 4.10%, and plants from the Cyperaceae – Juncaceae family at 0.9%.

Among the Poaceae, in addition to the dominant species, there are also *Trisetum flavescens*, with a weight of 3.50% and *Festuca rubra*, with 3% coverage. Among the plants from other botanical families, the following species stand out: *Leontodon autumnalis*, with 6.20% and *Centaurea phrygia*, with 4% participation in the sward (table 8).

Following the ecological spectra, it is found that the *Agrostis capillaris* - *Anthoxanthum odoratum* phytocenosis is mesoxerophilic (Up=4.7), strongly acidophilic (Rp=4.9) and oligomesotrophic (Np=4.1).

From an agronomic point of view, the phytocenosis of the *Agrostis capillaris* – *Anthoxanthum odoratum* type is moderately tolerant to mowing (Cp=6), moderately tolerant to grazing (Pp=4.9) and moderately tolerant to crushing (Sp=4.8).

The VF (pastoral value) is 4.9, which means that the grassland falls into class IV, the mediocre category and supports a load of 0.41-0.60 LU/ha.

In the *Agrostis capillaris* – *Anthoxanthum odoratum* phytocenosis, were identified 4 toxic species (*Stellaria graminea*, *Euphorbia cyparissias*, etc.), with a total weight of 0.8%, a species harmful to animal products (*Rumex acetosella* – 0.1%), 9 species with very low fodder value and harmful to the vegetation of the grassland (*Carlina acaulis*, *Calluna vulgaris* etc.), which have a total participation of 6.2% in the sward. At the same time, 25 ballast species were identified, with a total coverage of 36%, 13 medium forage species (*Agrostis capillaris*, *Anthylis vulneraria*, etc.), with a total participation of 36% in the sward, 8 good forage species (*Cynosurus cristatus*, *Lotus corniculatus*, etc.), with a total share of 8.3%, and species with excellent fodder value are represented by *Dactylis glomerata* and *Festuca pratensis*, with a total coverage of 0.4% (table 9).

Table 7

Stationary conditions of *Agrostis capillaris* – *Anthoxanthum odoratum* grassland type

Altitude (m)	993
Slope (%)	12-14
Exhibition	N-V
Mode of use	Meadows
Grassland type	<i>Agrostis capillaris</i> – <i>Anthoxanthum odoratum</i>
Overall coverage (%)	90
Woody vegetation cover (%)	3-4
Anthills (%)	3-4

Table 8

The floristic composition of the *Agrostis capillaris* – *Festuca rubra* grassland type

Ecological factors					Agronomic factors					Anthropogenic factors		Species	ADm	K
B	T	U	R	N	C	P	S	S O	V F	H	U R			
HT	x	x	x	4	6	5	5	n	6	2 - 4	3	<i>Agrostis capillaris</i>	22.25	V
HT	x	x	5	x	7	5	5	n	4	2 - 4	2	<i>Anthoxanthum odoratum</i>	18.45	V
-	-	-	-	-	-	-	-	-	-	-	-	<i>Briza media</i>	0.20	II
HT	5	5	x	4	7	7	7	n	7	2 - 3	2	<i>Cynosurus cristatus</i>	0.10	I
HT	x	5	x	6	8	4	6	n	9	3 - 4	3	<i>Dactylis glomerata</i>	0.20	II
HT	x	x	2	3	3	4	4	n	4	2 - 3	2	<i>Deschampsia flexuosa</i>	0.10	I
HT	x	6	x	6	6	4	6	n	9	2 - 4	2	<i>Festuca pratensis</i>	0.20	II
HT	x	5	x	x	9	7	6	n	7	5	3	<i>Festuca rubra</i>	3.00	V
HT	5	4	x	4	6	4	4	n	6	2 - 3	2	<i>Holcus lanatus</i>	0.10	I
HT	x	5	x	x	9	8	8	n	8	3 - 5	3	<i>Poa pratensis</i>	0.20	II
HT	x	x	x	6	7	5	4	n	7	3	2	<i>Trisetum flavescens</i>	3.50	V
POACEAE													48.30	
HT	x	4	8	3	4	4	4	n	6	2 - 3	1	<i>Anthylis vulneraria</i>	0.10	I
ChLT	5	x	4	2	3	5	4	n	3	2 - 3	1	<i>Genista tinctoria</i>	0.20	II
H	5	4	4	2	4	8	7	n	3	2 - 3	1	<i>Genistella sagittalis</i>	0.20	II
HA	5	6	7	6	5	2	3	n	7	2 - 4	2	<i>Lathyrus pratensis</i>	0.10	I
HT	x	4	7	4	6	4	4	n	7	2 - 4	3	<i>Lotus corniculatus</i>	0.40	IV
HS	5	4	8	x	7	4	6	n	8	3 - 5	3	<i>Medicago lupulina</i>	0.10	I
HT	7	2	8	6	3	4	3	n	6	2 - 3	3	<i>Trifolium pratense</i>	2.10	V
ChRs	x	x	x	6	8	8	8	n	8	3 - 5	3	<i>Trifolium repens</i>	0.90	V
HA	x	5	x	6	6	1	2	n	6	3 - 4	2	<i>Vicia cracca</i>	0.10	I
FABACEAE													4.10	
HT	4	x	4	4	4	5	5	n	4	2 - 3	1	<i>Carex pallescens</i>	0.38	IV
HT	x	4	3	2	5	5	5	n	4	2 - 4	2	<i>Luzula campestris</i>	0.52	V
CYPERACEAE ȘI JUNCACEAE													0.90	

HT	5	4	7	3	7	4	5	n	4	-	-	<i>Achillea distans</i>	0.80	IV
ChRs	x	4	x	5	7	4	5	n	6	2 - 4	3	<i>Achillea millefolium</i>	2.70	V
H	4	6	X	6	6	4	2	n	6	3	1	<i>Alchemilla vulgaris</i>	0.30	III
HRs	6	4	x	4	4	2	4	n	4	2 - 3	1	<i>Betonica officinalis</i>	0.10	I
ChLT	X	X	1	1	2	5	4	n	3	2 - 3	1	<i>Calluna vulgaris</i>	0.10	I
HRs	5	5	7	4	5	2	2	n	4	2 - 3	2	<i>Campanula patula</i>	0.40	IV
H	X	4	X	2	3	8	7	n	3	2 - 3	1	<i>Carlina acaulis</i>	0.40	IV
HRs	4	5	5	3	5	2	2	n	4	2 - 3	1	<i>Centaurea phrygia</i>	4.00	V
HT	x	5	x	5	8	4	4	n	4	3 - 5	3	<i>Cerastium holosteoides</i>	0.20	II
HRs	5	5	6	5	6	2	2	n	4	3 - 4	3	<i>Crepis biennis</i>	0.40	IV
HRs	5	4	7	2	3	4	4	n	4	2 - 3	2	<i>Dianthus carthusianorum</i>	0.10	I
H	X	4	8	X	4	8	7	n	1	2 - 4	2	<i>Euphorbia cyparissias</i>	0.10	I
TRs	x	5	x	3	5	6	5	n	3	2 - 4	1	<i>Euphrasia rostkoviana</i>	0.10	I
-	-	-	-	-	-	-	-	-	-	-	-	<i>Filipendula hexapetala</i>	0.30	III
H	X	5	X	6	3	4	4	n	4	2 - 3	2	<i>Fragaria vesca</i>	0.20	II
HT	x	5	x	3	7	3	3	n	4	2 - 3	3	<i>Galium mollugo</i>	0.30	III
GRs	x	7	8	3	4	3	2	n	4	2 - 3	1	<i>Gymnadenia conopsea</i>	0.10	I
HS	3	5	4	2	5	6	6	n	4	3 - 4	2	<i>Hieracium aurantiacum</i>	0.30	III
HS	x	4	x	2	4	7	7	n	4	2 - 4	2	<i>Hieracium pilosella</i>	0.20	II
HRs	x	6	3	2	3	3	3	n	4	2 - 3	1	<i>Hypericum maculatum</i>	5.10	V
HR	x	5	x	5	7	7	7	n	5	3 - 4	3	<i>Leontodon autumnalis</i>	6.20	V
H	X	4	X	3	6	3	4	n	5	3 - 4	2	<i>Leucanthemum vulgare</i>	0.80	IV
HRs	x	6	7	7	5	3	2	n	5	2 - 3	1	<i>Pimpinella major</i>	0.40	IV
HR	x	x	x	x	7	6	6	n	6	2 - 4	3	<i>Plantago lanceolata</i>	0.50	V
H	6	3	8	2	4	4	4	n	4	2 - 3	1	<i>Polygala comosa</i>	0.10	I
HT	x	5	3	2	4	4	4	n	4	2 - 3	1	<i>Polygala vulgaris</i>	0.40	IV
HT	x	x	x	2	3	4	5	n	5	2 - 3	1	<i>Potentilla erecta</i>	0.10	I
HS	x	x	4	x	9	8	8	n	4	3 - 4	2	<i>Prunella vulgaris</i>	0.50	V
G	5	X	3	3	3	7	2	n	1	2 - 3	2	<i>Pteridium aquilinum</i>	0.30	III
HRs	x	x	x	x	6	5	6	n	4	3 - 4	2	<i>Ranunculus acris</i>	1.60	IV
TRs	x	x	x	3	5	8	3	n	3	2 - 3	1	<i>Rhinanthus minor</i>	1.70	IV
HRs	x	x	x	x	6	4	2	n	4	3 - 4	2	<i>Rumex acetosa</i>	0.80	IV
HT	5	4	2	2	7	4	4	n	2	2 - 5	2	<i>Rumex acetosella</i>	0.10	I
HRs	5	4	8	2	5	3	4	n	4	2 - 3	1	<i>Scabiosa columbaria</i>	0.70	III
HS	x	4	4	x	4	5	5	n	1	2 - 4	2	<i>Stellaria graminea</i>	0.30	III
ChLT	x	4	5	6	4	4	4	n	3	2 - 3	2	<i>Thymus pullegioides</i>	2.10	V
HRs	5	4	7	6	6	2	2	n	5	3 - 4	2	<i>Tragopogon pratensis</i>	0.30	III
ChL S	x	x	2	3	1	8	9	n	3	2 - 3	2	<i>Vaccinium myrtillus</i>	0.90	V
ChLS	x	4	2	1	1	9	9	n	3	2 - 3	1	<i>Vaccinium vitis - idaea</i>	0.50	V

HRs	x	7	x	6	3	7	2	n	1	2 - 4	2	<i>Veratrum album</i>	0.10	I
-	-	-	-	-	-	-	-	-	-	-	-	<i>Verbascum nigrum</i>	0.30	III
ChRs	x	4	x	6	7	6	6	n	4	2 - 4	2	<i>Veronica chamaedrys</i>	0.10	I
HT	5	x	x	6	5	4	4	n	4	3 - 5	2	<i>Viola tricolor</i>	0.10	I
OFB													35.10	

Note: B - bioform, T - temperature, U - humidity, R - soil reaction, N - trophicity, C - mowing tolerance, P – tolerance to grazing, S – tolerance to crushing, VF – fodder value, H – hemerobia, UR – urbanophilia, SO – sozological category

Table 9

The ecological and agronomic spectrum of the *Agrostis capillaris* –
Anthoxanthum odoratum grassland type

Ecologic al indicators	Ecological spectrum										VIMnp
	1	2	3	4	5	6	7	8	9	x	VIMp
Unp	0.0	1.0	1.0	21.0	15.0	5.0	2.0	0.0	0.0	17.0	4.6
Up	0.0	2.1	0.1	10.7	16.1	6.1	0.2	0.0	0.0	52.4	4.7
Rnp	1.0	4.0	4.0	6.0	3.0	1.0	7.0	7.0	0.0	29.0	5.2
Rp	0.1	1.6	6.3	1.9	24.6	0.4	2.5	3.3	0.0	47.1	4.9
Nnp	2.0	13.0	11.0	7.0	4.0	14.0	1.0	0.0	0.0	10.0	3.8
Np	0.6	8.4	9.2	23.8	9.5	10.3	0.4	0.0	0.0	25.6	4.1
Agronomic ic indices	Agronomic spectrum										VIMnp
	1	2	3	4	5	6	7	8	9	x	VIMp
Cnp	2.0	1.0	10.0	11.0	10.0	11.0	11.0	3.0	3.0	0.0	5.2
Cp	1.4	0.1	8.7	4.1	8.3	27.3	32.9	1.3	3.7	0.0	6.0
Pnp	1.0	6.0	6.0	21.0	9.0	4.0	6.0	8.0	1.0	0.0	4.8
Pp	0.1	5.3	7.4	11.3	47.3	1.0	9.9	4.9	0.5	0.0	4.9
Snp	0.0	11.0	5.0	18.0	9.0	8.0	6.0	3.0	2.0	0.0	4.6
Sp	0.0	7.2	9.3	9.4	45.6	6.0	7.2	1.6	1.4	0.0	4.8
VFnp	4.0	1.0	9.0	25.0	5.0	8.0	5.0	3.0	2.0	0.0	4.6
VFp	0.8	0.1	6.2	36.0	7.8	28.2	7.1	1.2	0.4	0.0	4.9
The legend											
U	moisture	C	mowing	Peak	feed value						
R	soil reaction	P	pasture	n.p	unweighted (depending on the number of species)						
N	soil trophicity	S	crushed	p	weighted (depending on species coverage)						

The type of grassland *Trisetum flavescens* was identified in 5 place. This phytocenosis is present on a land with an average slope of 6-8% and Southern exposure. The general vegetation cover of the phytocenosis is 92%, the average woody vegetation cover is 1-2% (table 10). In the floristic composition of the *Trisetum flavescens* grassland type, Poaceae have the highest coverage in the sward, with an average participation of 46.65%. Plants from other botanical families (AFB) have a coverage of 38.60%, species from the Fabaceae family have a coverage of 4.80%, and plants from the Cyperaceae – Juncaceae family have a coverage of 0.7%. Among the Poaceae, in addition to the dominant species, *Festuca rubra* also appears, with a coverage of 6.80% and *Dactylis glomerata*, with a coverage of 3.70%. Among the plants from other botanical families, the following species stand out: *Centaurea phrygia*, with 3.60% and *Pimpinella major*, with 3% participation in the sward (table 11). Following the ecological spectra, it is found that the phytocenosis of the *Trisetum flavescens* type is mesoxerophilic (Up=4.9), moderately acidophilic (Rp=5.8) and oligomesotrophic

(Np=4.9).

From an agronomic point of view, the phytocenosis of the *Trisetum flavescens* type is medium tolerant to mowing (Cp=6.3), medium tolerant to grazing (Pp=5) and moderately tolerant to crushing (Sp=4.4).

The VF (pastoral value) is 5.6, which means that the grassland falls into the 5th class, medium category and supports a load of 0.61-0.80 LU/ha. In the phytocenosis of the *Trisetum flavescens* type, were identified 4 toxic species (*Stellaria graminea*, *Colchicum autumnale*, etc.), with a total coverage of 3.7%, 6 species with very low fodder value and harmful to the vegetation of the grassland (*Genistella sagittalis*, *Carlina acaulis* etc.), which have a total participation of 5% in the sward. There are also 25 ballast species, with a total coverage of 20.2%, 17 medium forage species (*Agrostis capillaris*, *Anthyllis vulneraria*, etc.), with a total participation of 18.4% in the sward, 9 good forage species (*Cynosurus cristatus*, *Lotus corniculatus* etc.), with a total share of 37.1%, and species with excellent fodder value are represented by *Dactylis glomerata* and *Festuca pratensis*, with a total coverage of 4.1% (table 12).

Table 10

Stationary conditions of *Trisetum flavescens* grassland type

Altitude (m)	1050
Slope (%)	6-8
Exhibition	S
Mode of use	Meadows
Grassland type	<i>Trisetum flavescens</i>
Overall coverage (%)	92
Woody vegetation cover (%)	1-2
Anthills (%)	1-2

Table 11

The floristic composition of the *Trisetum flavescens* grassland type

Ecological factors					Agronomic factors					Anthropogenic factors		Species	Adm	K
B	T	U	R	N	C	P	S	S O	V F	H	U R			
HT	x	x	x	4	6	5	5	n	6	2 - 4	3	<i>Agrostis capillaris</i>	3.10	V
HT	x	x	5	x	7	5	5	n	4	2 - 4	2	<i>Anthoxanthum odoratum</i>	2.70	IV
-	-	-	-	-	-	-	-	-	-	-	-	<i>Briza media</i>	1.90	IV
HT	5	5	x	4	7	7	7	n	7	2 - 3	2	<i>Cynosurus cristatus</i>	0.80	IV
HT	x	5	x	6	8	4	6	n	9	3 - 4	3	<i>Dactylis glomerata</i>	3.70	V
HT	x	x	3	2	4	4	4	n	4	2 - 3	1	<i>Danthonia decumbens</i>	0.30	III
HT	x	6	x	6	6	4	6	n	9	2 - 4	2	<i>Festuca pratensis</i>	0.40	IV
HT	x	5	x	x	9	7	6	n	7	5	3	<i>Festuca rubra</i>	6.80	V
HT	5	4	x	4	6	4	4	n	6	2 - 3	2	<i>Holcus lanatus</i>	0.20	II
HT	x	5	x	x	9	8	8	n	8	3 - 5	3	<i>Poa pratensis</i>	0.10	I
HT	x	x	x	6	7	5	4	n	7	3	2	<i>Trisetum flavescens</i>	26.65	V
POACEAE													46.65	
HT	x	4	8	3	4	4	4	n	6	2 - 3	1	<i>Anthyllis vulneraria</i>	0.40	IV
H	5	4	9	3	3	7	-	n	1	2 - 4	2	<i>Coronilla varia</i>	0.10	I
H	5	4	4	2	4	8	7	n	3	2 - 3	1	<i>Genistella sagittalis</i>	0.10	I
HA	5	6	7	6	5	2	3	n	7	2 - 4	2	<i>Lathyrus pratensis</i>	0.10	I
HT	x	4	7	4	6	4	4	n	7	2 - 4	3	<i>Lotus corniculatus</i>	0.50	V
HS	5	4	8	x	7	4	6	n	8	3 - 5	3	<i>Medicago lupulina</i>	0.10	I
HT	7	2	8	6	3	4	3	n	6	2 - 3	3	<i>Trifolium pratense</i>	1.70	V
ChRs	x	x	x	6	8	8	8	n	8	3 - 5	3	<i>Trifolium repens</i>	1.40	V
HA	x	5	x	6	6	1	2	n	6	3 - 4	2	<i>Vicia cracca</i>	0.40	IV
FABACEAE													4.80	
HT	4	x	4	4	4	5	5	n	4	2 - 3	1	<i>Carex pallescens</i>	0.30	III
HT	x	4	3	2	5	5	5	n	4	2 - 4	2	<i>Luzula campestris</i>	0.40	IV
CYPERACEAE ȘI JUNCACEAE													0.70	
HT	5	4	7	3	7	4	5	n	4	-	-	<i>Achillea distans</i>	0.70	III
ChRs	x	4	x	5	7	4	5	n	6	2 - 4	3	<i>Achillea millefolium</i>	0.90	V
H	4	6	X	6	6	4	2	n	6	3	1	<i>Alchemilla vulgaris</i>	1.10	III
HRs	4	5	3	2	4	4	4	4	4	2 - 3	1	<i>Arnica montana</i>	1.00	II
HRs	5	5	7	4	5	2	2	n	4	2 - 3	2	<i>Campanula patula</i>	0.50	V
-	-	-	-	-	-	-	-	-	-	-	-	<i>Campanula serata</i>	0.10	I
H	X	4	X	2	3	8	7	n	3	2 - 3	1	<i>Carlina acaulis</i>	0.50	V
HRs	4	5	5	3	5	2	2	n	4	2 - 3	1	<i>Centaurea phrygia</i>	3.60	V

HT	x	5	x	5	8	4	4	n	4	3 - 5	3	<i>Cerastium holosteoides</i>	0.80	IV
HRs	6	4	8	5	4	5	5	n	5	3 - 5	3	<i>Cichorium intybus</i>	0.10	I
-	-	-	-	-	-	-	-	-	-	-	-	<i>Cirsium erysithales</i>	0.10	I
GRs	5	6	7	x	5	9	3	n	1	2 - 3	1	<i>Colchicum autumnale</i>	2.60	II
HRs	5	5	6	5	6	2	2	n	4	3 - 4	3	<i>Crepis biennis</i>	2.20	V
HRs	5	4	7	2	3	4	4	n	4	2 - 3	2	<i>Diantus carthusianorum</i>	0.20	II
TRs	x	5	x	3	5	6	5	n	3	2 - 4	1	<i>Euphrasia rostkoviana</i>	1.50	III
H	X	5	X	6	3	4	4	n	4	2 - 3	2	<i>Fragaria vesca</i>	0.10	I
HT	x	5	x	3	7	3	3	n	4	2 - 3	3	<i>Galium mollugo</i>	0.90	V
GRs	x	7	8	3	4	3	2	n	4	2 - 3	1	<i>Gymnadenia conopsea</i>	0.40	IV
HS	3	5	4	2	5	6	6	n	4	3 - 4	2	<i>Hieracium aurantiacum</i>	0.10	I
HS	x	4	x	2	4	7	7	n	4	2 - 4	2	<i>Hieracium pilosella</i>	0.10	I
HRs	x	6	3	2	3	3	3	n	4	2 - 3	1	<i>Hypericum maculatum</i>	2.10	IV
HR	x	5	x	5	7	7	7	n	5	3 - 4	3	<i>Leontodon autumnalis</i>	2.10	IV
H	X	4	X	3	6	3	4	n	5	3 - 4	2	<i>Leucanthemum vulgare</i>	2.10	IV
HRs	x	6	7	7	5	3	2	n	5	2 - 3	1	<i>Pimpinella major</i>	3.00	III
HR	x	x	x	x	7	6	6	n	6	2 - 4	3	<i>Plantago lanceolata</i>	1.30	V
HR	x	4	8	3	4	8	8	n	5	2 - 4	2	<i>Plantago media</i>	1.20	IV
H	6	3	8	2	4	4	4	n	4	2 - 3	1	<i>Polygala comossa</i>	0.20	II
HT	x	5	3	2	4	4	4	n	4	2 - 3	1	<i>Polygala vulgaris</i>	0.20	II
H	4	7	5	5	6	4	5	n	4	3 - 4	2	<i>Polygonum bistorta</i>	0.10	I
HT	x	x	x	2	3	4	5	n	5	2 - 3	1	<i>Potentilla erecta</i>	0.30	III
HS	x	x	4	x	9	8	8	n	4	3 - 4	2	<i>Prunella vulgaris</i>	0.30	III
HRs	x	x	x	x	6	5	6	n	4	3 - 4	2	<i>Ranunculus acris</i>	1.40	IV
TRs	x	x	x	3	5	8	3	n	3	2 - 3	1	<i>Rhinanthus minor</i>	1.20	IV
HRs	x	x	x	x	6	4	2	n	4	3 - 4	2	<i>Rumex acetosa</i>	0.80	IV
-	-	-	-	-	-	-	-	-	-	-	-	<i>Rumex alpinus</i>	0.20	II
HRs	6	4	8	3	4	4	5	n	5	-	-	<i>Sanguisorba minor</i>	0.10	I
HRs	5	4	8	2	5	3	4	n	4	2 - 3	1	<i>Scabiosa columbaria</i>	0.50	V
HS	x	4	4	x	4	5	5	n	1	2 - 4	2	<i>Stellaria graminea</i>	0.40	IV
HR	x	5	x	6	8	7	7	n	7	3 - 5	3	<i>Taraxacum officinale</i>	0.60	II
ChLT	x	4	5	6	4	4	4	n	3	2 - 3	2	<i>Thymus pullegioides</i>	1.20	IV
HRs	5	4	7	6	6	2	2	n	5	3 - 4	2	<i>Tragopogon pratensis</i>	0.30	III
HRs	x	5	x	6	4	8	2	n	5	3 - 5	3	<i>Urtica dioica</i>	0.10	I
ChLS	x	x	2	3	1	8	9	n	3	2 - 3	2	<i>Vaccinium myrtillus</i>	0.50	I
HRs	x	7	x	6	3	7	2	n	1	2 - 4	2	<i>Veratrum album</i>	0.60	II
ChRs	x	4	x	6	7	6	6	n	4	2 - 4	2	<i>Veronica chamaedrys</i>	0.30	III
OFB													38.6	

Note: B - bioform, T - temperature, U - humidity, R - soil reaction, N - trophicity, C - mowing tolerance, P – tolerance to grazing, S – tolerance to crushing, VF – fodder value, H – hemerobia, UR – urbanophilia, SO – zoological category

Table 12

The ecological and agronomic spectrum of the *Trisetum flavescens*
grassland type

Ecological indicators	Ecological spectrum										VIMnp
	1	2	3	4	5	6	7	8	9	x	VIMp
Unp	0.0	1.0	1.0	21.0	18.0	6.0	3.0	0.0	0.0	13.0	4.7
Up	0.0	1.7	0.2	10.4	25.5	9.3	1.1	0.0	0.0	40.3	4.9
Rnp	0.0	1.0	5.0	5.0	4.0	1.0	8.0	9.0	1.0	29.0	5.9
Rp	0.0	0.5	4.0	1.2	7.6	2.2	7.9	4.7	0.1	60.3	5.8
Nnp	0.0	13.0	12.0	6.0	6.0	15.0	1.0	0.0	0.0	10.0	4.0
Np	0.0	6.0	12.7	5.4	6.2	38.7	3.0	0.0	0.0	16.5	4.9
Agronomic indices	Agronomic spectrum										VIMnp
	1	2	3	4	5	6	7	8	9	x	VIMp
Cnp	1.0	0.0	8.0	15.0	10.0	12.0	10.0	4.0	3.0	0.0	5.3
Cp	0.5	0.0	5.6	6.1	13.5	12.6	36.5	6.5	7.2	0.0	6.3
Pnp	1.0	5.0	6.0	22.0	8.0	4.0	7.0	9.0	1.0	0.0	4.9
Pp	0.4	6.7	9.0	15.0	35.1	3.2	11.1	5.4	2.6	0.0	5.0
Snp	0.0	11.0	6.0	14.0	12.0	8.0	6.0	4.0	1.0	0.0	4.6
Sp	0.0	13.0	8.6	34.4	10.6	14.1	4.2	3.0	0.5	0.0	4.4
VFnp	4.0	0.0	6.0	25.0	9.0	8.0	6.0	3.0	2.0	0.0	4.7
VFp	3.7	0.0	5.0	20.2	9.3	9.1	35.5	1.6	4.1	0.0	5.6
The legend											
U	moisture	C	mowing	Peak	feed value						
R	soil	P	pasture	n.p	unweighted (depending on the number of species)						
N	reaction	S	crushed	p	weighted (depending on species coverage)						
	soil										
	trophicity										

CONCLUSION

In ROSCI0002 Apuseni, were identified 4 distinct types of grassland, as follows: *Festuca rubra* – *Agrostis capillaris* grassland type, *Agrostis capillaris* – *Festuca rubra* grassland type, *Agrostis capillaris* – *Anthoxanthum odoratum* grassland type and *Trisetum flavescens* grassland type. The most frequently encountered type of grassland was *Festuca rubra* – *Agrostis capillaris* (26 stations), followed by *Agrostis capillaris* – *Festuca rubra* (21 stations), and the other two types of grassland had a much weaker presence (each in 5 stations).

The pastoral value of these types of grassland does not differ greatly from one another. The lowest fodder value is represented by the type *Agrostis capillaris* – *Anthoxanthum odoratum* (VP = 4.9), and the best fodder value is represented by the type *Trisetum flavescens* (VP = 5.6). A slightly

lower pastoral value is presented by the type *Festuca rubra* – *Agrostis capillaris* (VP = 5.5) and the type *Agrostis capillaris* – *Festuca rubra* (VP = 5.4); When comparing the *Festuca rubra* – *Agrostis capillaris* grassland type and the *Agrostis capillaris* – *Festuca rubra* grassland type there are small differences in floristic composition and greater dominance of either *Festuca rubra* or *Agrostis capillaris* species. Basically, it is the same type of grassland, with the same ecological and agronomic characteristics; A series of improvement works are recommended, such as: removal of woody vegetation, control of leeches, collection of stones, mowing at the time that favors biodiversity (after 1 July) with light machinery (up to 250 kg), fertilization with 10 t/ha of manure, once every 2-3 years and drying the grass on the soil to promote seed spreading.

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