CONTRIBUTIONS TO THE EVALUATION OF THE PRODUCTIVITY OF PERMANENT GRASLANDS FROM THE AREA OF BRATCA (BIHOR COUNTRY)

Ioana-Teodora STANCIU[1], Gerko KOTYESZ [1], Balasz HEGYI[1] IULIA CĂIMAN[1], Alina-Ștefania STANCIU[2#]

1 MA of the University of Oradea, Faculty of Environmental Protection, 26 Gen. Magheru St., 410048 Oradea, Romania
2 University of Oradea, Faculty of Environmental Protection, 26 Gen. Magheru St., 410048 Oradea, Romania

RESEARCH ARTICLE

Abstract
This paper presents a case study on the evaluation of the productivity of permanent grasslands in the Bratca 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 Bratca commune are quite varied, and the most representative types were studied, namely Agrostis capillaris - Festuca rubra and Nardus stricta-Festuca rubra . The meadows dominated by Agrostis capillaris - Festuca rubra exhibit the highest productivity, with a yield of 19.87 t/ha of green fodder and a stocking rate of 1,45 LU/ha. This is followed by the Nardus stricta-Festuca rubra meadows, with slightly lower yields of 16.87 t/ha of green fodder and a stocking rate of 0,90 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: green fodder, floristic survey, grasslands, stocking rate
#Corresponding author: as1stanciu@yahoo.com

INTRODUCTION

Permanent grasslands contribute approximately 50% to the balance of fibrous and succulent fodder, the rest being provided through successive crops**.** Animal products derived from the utilization of fodder obtained from grasslands (milk, meat, cheese) are recognized for their superior quality compared to those obtained from cultivated feed such as silage maize. These ecosystems have a significant environmental impact, being capable of storing large amounts of carbon. It is estimated that Romania's permanent grasslands can sequester approximately 23 million tons of CO_2 annually, thus playing an essential role in mitigating climate change.

Additionally, they function as natural water reservoirs and contribute to the formation of springs. Permanent grasslands in Romania cover approximately 4.9 million hectares, placing the country fifth in Europe, after France, the United Kingdom, Spain, and Germany. These grasslands represent nearly 33% of all agricultural land and constitute a strategic national resource, both in terms of the quantity and quality of fodder they provide, and their ecological role, contributing to the protection and aesthetic value of the natural environment.

The distribution of these areas extends across the entire country, from lowlands such as the Danube Delta and the Romanian Plain to altitudes of over 2,500 meters, on the high plateaus of the Carpathians. Due to this altitudinal diversity, the conditions under which grasslands develop vary considerably from a physico-geographical, climatic, and hydrological standpoint, as well as in terms of soil nature, depth, and physical-chemical properties (ROTAR, VIDICAN 2003; VÎNTU et al., 2004).

Given the difficulty of determining green mass production in pastures using the classical method, a new approach based on floristic surveys with a percentage assessment of the species in the grass cover has been proposed (Maruşca, 2019). Currently, livestock farming systems based on the use of grasslands must respond to an increasing demand for fodder, due to the challenges posed by climate change (Maruşca et al., 2014). The forage production of these areas must align with the growing requirements for meat and milk, particularly because the region has large livestock populations. The permanent grasslands analyzed are located in Bratca commune, Bihor

County, and are associated with the *Agrostis capillaris - Festuca rubra* and *Nardus stricta - Festuca rubra* phytocoenoses. From a geomorphological perspective, Bratca is situated in the Alpine-Carpathian Geosynclinal Province, within the Western Carpathians Region, the Apuseni Mountains Subregion, and specifically in the Pădurea Craiului and Bihor Mountains District (Vlădeasa Massif). The terrain configuration is undulated and dissected (rugged), with only occasional flat areas. The altitude ranges between 340 m and 1,250 m, with an average altitude of around 830 m.

The soil cover in the Bratca area was determined based on Forest Management Plans – Remeți Forest District, provided by Romsilva Bihor (as Bratca is part of the Remeți Forest District). Thus, the Bratca area is characterized by a high diversity of soils belonging to the following classes: Protisols, Chernisols, Cambisols, Luvisols, Spodisols, and Stagnosols. The Cambisol class is represented in the field by two soil types: districambosol and eutricambosol. In our relevés, the most commonly encountered soil type is the districambosol. Districambosol – Soils with an ochric or umbric A horizon (Ao, Au) followed by an intermediate cambic horizon (Bv), with color values and chromas greater than 3.5 (when moist), at least on the faces of structural aggregates starting from the upper part. They exhibit dystrophic properties, from the surface and at least into the upper part of the B horizon. They may present an O horizon, a Bv horizon with Al_2O_3 accumulation, and andic properties of intensities or at depths that do not allow classification as andosols. (Berchez & Stanciu, 2017; Berchez & Stanciu, 2021).

MATERIAL AND METHOD

For the percentage assessment of species in the grass cover (AD – abundance-dominance), the Braun-Blanquet scale was used, with the following values: + = 0.5%; 1 = 5.0%; 2 = 17.5%; 3 = 37.5%; 4 = 62.5%; 5 = 87.5% (Cristea et al., 2004). Given the significant differences between abundance-dominance scores—up to 25% between scores 4 and 5, as well as between 3 and 4, and 20% between scores 2 and 3—a new formula for transforming AD intervals into percentage participation was adopted, taking into account the general frequency (K) of each species, according to the works of Maruşca (2019), Maruşca et al. (2020), Păşcuţ & Maruşca (2020), and Maruşca & Păşcuţ (2022).

Floristic relevés were carried out at the most representative locations, 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 of each pasture type, starting with Poaceae, Fabaceae, and followed by other families. Composition in economic categories was made according to Csedő et al. (1980), Ciocârlan (2009), Oroian (1995), and Pop (1982).

In the study of the floristic composition of these grasslands, relevés with an area of 100 m^2 were used. After converting the phytocoenological scores into percentages, each species in the relevé was assigned a forage value index (F) and a useful phytomass index (M) (Păcurar & Rotar, 2014; Maruşca, 2019; Maruşca, 2021; Maruşca et al., 2019; Maruşca et al., 2020). The forage value index (F) includes the following values: F1–F3 for harmful species, and F4–F9 for species with forage value. The values for the useful phytomass index (M) range from M1–M9 for species with usable biomass, and M0 for species classified as F1–F3.

For the grasslands in the Bratca commune area, the grazing season lasts for 185 days. The botanical nomenclature used for the identified species follows the work: *Plante vasculare din România. Determinator ilustrat de teren* by Sârbu et al. (2013). Composition in economic categories was made according to Csedő et al. (1980), Ciocârlan (2009) and Pop (1982).

RESULTS AND DISCUSSIONS

The permanent grasslands in the area of Bratca commune (Bihor county) highlight two main types of grasslands: Festuca rubra - Agrostis capillaris and Nardus stricta - Festuca rubra. The study of the vegetation cover was carried out in 2023-2024, with a total of 18 surveys, 9 in grasslands with Agrostis capillaris–Festuca rubra and 9 in grasslands with Nardus stricta – Festuca rubra. The Agrostis capillaris–Festuca rubra grassland type is found on slopes with variable exposures (E, NE, NW, W, SW), at altitudes between 480-880 m, and with slopes of 5-12 degrees (Table 1). The herbaceous vegetation corresponding to

this type of meadow has a high plant cover (90-100%) and is dominated by *Agrostis capillaris* (44.60%) and to a lesser extent by *Festuca rubra* (35.00%).

In the *Poaceae* family, species present in these grasslands include *Festuca rubra, Agrostis capillaris, Festuca pratensis, Arrenatherum elatius, Bromus arvensis, Danthonia decumbens, Phleum pratensis, Poa annua, Cynosurus cristatus, Anthoxanthum odoratum, Holcus lanatus, Agropyron repens, Briza media, Brachipodium pinnatum, Lolium perenne, Agrostis rupestris, Vulpia myuros, Nardus stricta, etc* all of which have high forage quality, as well as *Deschampsia flexuosa, Botriochloa ischaemum*, *Calamagrostis epigejos.*

The *Fabaceae* family is represented by *Trifolium pratense, Trifolium perenne, Trifolium campestre, Trifolium hybridum, Lotus corniculatus, Trifolium pannonicum, Lotus corniculatus Medicago lupulina etc.*

A fairly large share is given to species from other botanical families, which occupy over 30% of the vegetation cover: *Campanula persicifolia, Daucus carota, Gallium verum, Achillea colina*, *Hieracium pillosella, Prunella vulgaris, Arnica montana, Gentiana praecox, Polygala vulgaris, Euphrasia stricta, Tragopogon orientalis, Luzula campestris, Crepis bienis, Veronica chamaedrys,Gallium mollugo, Potentilla reptans, Taraxacum officinalis, Pimpinella saxifraga, Gentiana cruciata, Thymus dacicus, Achillea millefolium Leontodon hispidus, Stellaria graminea Thymus pulegioides Rumex acetosa Cerastium holosteoides Prunella vulgaris, etc.* Toxic and harmful species for livestock are also present in these grasslands, such as *Eryngium campestre*, *Euphorbia cyparissias*, *Carduus acanthoides*, *Tanacetum vulgare*, *Rumex conglomeratus*, *Rumex acetosa*, *Ranunculus polyanthemus, etc.*

Table 1

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

Bio.	E.f.	U.	T.	R.	2n	Nr. releveului	1	2	3	4	5	6	7	8	9	K	ADm
						Altitudinea (m.s.m.)	480	880	700	680	650	550	680	700	790		
						Acoperire vegetaţie (%)	100	92	100	90	100	100	100	100	100		
						Expoziţia	SV	E	V	N	V	V	N	NE	NV		
						Panta (°)	5	8	10	-	2	10	12	5	10		
						Suprafaţa (m²)	100	100	100	100	100	100	100	100	100		
H	Cp-Bo	3	0	0	D, P	As. *Festuca rubra*	2	1	4	3	1	1	2	3	2	V	35
H	Cp-Bo	0	0	0	P	As. *Agrostis capillaris*	4	4	2	2	4	4	4	2	4	V	54,6
						Cynosurion											
H	E	3	3	3	D	*Cynosurus cristatus*	·	+	·	+	·	+	+	·	+	III	0,32
H	Eua	3,5	0	0	P	*Phleum pratense*	·	+	+	+	+	·	·	·	+	III	0,36
H	Eua	3,5	0	0	P	*Trifolium repens*	·	+	·	+	·	·	+	·	+	III	0,24
H	Ec	2,5	0	0	D	*Carlina acaulis*	·	·	·	·	·	+	·	·	·	II	0,2
H	Eua	3	3	4	P	*Gentiana cruciata*	+	·	·	·	·	·	·	·	·	II	0,12
H	Eua	3	0	0	D, P	*Leontodon autumnalis*	+	+	+	·	·	+	·	+	·	II	0,26
H	E	3	2,5	0	D	*Bellis perennis*	·	+	·	+	·	·	·	·	+	I	0,08
						Arrhenatheretalia											
H	Eua	3	0	0	P	*Achillea millefolium*	+	+	+	·	1	+	+	+	+	V	0,62
H	Eua	2,5	0	0	D	*Leontodon hispidus*	·	+	·	·	·	+	+	+	+	V	0,4
H	Eua	2,5	0	0	P	*Lotus corniculatus*	+	1	+	+	+	+	+	+	+	V	0,62
H	Eua	3	0	3	D	*Galium mollugo*	·	·	+	·	·	+	+	+	+	III	0,28
H	Eua	3,5	3	0	D	*Holcus lanatus*	·	+	·	+	+	+	+	+	·	III	0,28
H	Eua	2,5	2	3	D	*Stellaria graminea*	·	+	·	·	+	·	+	+	+	III	0,24
Ch	Ec	2,5	3	3	D, P	*Thymus pulegioides*	·	·	+	+	·	1	·	+	·	III	0,6
H	Eua	3	0	0	D	*Leucanthemum vulgare*	·	·	·	·	+	+	+	+	·	III	0,28
H	Eua	2,5	3	4	D	*Campanula glomerata*	+	+	·	+	·	·	·	·	·	II	0,16
H	Eua	3	0	4	P	*Dactylis glomerata*	·	·	+	+	·	·	·	+	·	II	0,18
H	E	2,5	3	0	D, P	*Knautia arvensis*	+	·	·	+	·	·	·	·	·	II	0,16
Th-TH	E	3	3	0	D	*Trifolium campestre*	·	·	·	·	+	+	·	+	·	II	0,16
TH	Eua	3,5	3	3	D	*Carum carvi*	·	·	+	·	·	·	·	·	·	I	0,1
TH-H	Eua	2,5	3	0	D	*Daucus carota* ssp. *carota*	+	·	·	·	+	·	·	·	·	I	0,06
Th-TH	Eua	2,5	3	4	D, P	*Medicago lupulina*	·	·	·	·	·	·	·	·	·	I	0,06
H-Ch	Eua	3	0	0	P	*Veronica chamaedrys*	·	·	·	+	·	·	·	·	+	I	0,1

						Molinio-Arrhenatheretea											
H	Eua	0	0	0	D, P	*Anthoxanthum odoratum*	·	+	+	·	·	+	+	+	+	IV	0,4
H	Ec	3	2,5	3	D	*Centaurea phrygia*	+	·	+	·	·	+	+	+	·	IV	0,32
TH	E	3	2,5	3	D, P	*Campanula patula*	·	+	+	·	+	·	+	+	+	IV	0,32
H	Cp-Bo	3	3	0	P	*Prunella vulgaris*	+	·	+	+	+	+	+	+	+	IV	0,34
H	Eua	0	0	0	D	*Plantago lanceolata*	·	+	+	·	·	+	·	·	+	III	0,3
H	Cosm	3	3	0	D	*Rumex acetosa*	·	+	·	+	+	·	+	+	·	III	0,22
H-TH	Eua	3	0	0	D	*Trifolium pratense*	·	+	+	+	+	·	·	·	+	III	0,24
H-Ch	Cosm	3	0	0	P	*Cerastium holosteoides*	·	·	·	·	+	·	+	·	+	II	0,2
H	Cosm	4,5	3	3	P	*Juncus effusus*	·	·	·	·	·	+	+	+	+	II	0,18
H	Eua-C	2,5	3	3	D	*Ranunculus polyanthemos*	·	·	·	·	·	·	+	·	+	II	0,14
Th	E	0	3	0	P	*Bromus commutatus*	·	·	·	·	·	·	·	·	·	I	0,02
H	Ec	3,5	3	3	P	*Centaurea nigrescens*	+	+	·	·	·	·	·	·	·	I	0,1
Th	Eua	3	3	2	P	*Centaurium erythraea*	+	·	·	·	·	+	·	·	·	I	0,08
H-TH	Eua	2,5	3,5	4,5	D	*Cichorium intybus*	+	·	+	·	·	·	·	·	·	I	0,1
G	E	3,5	3	4	D	*Colchicum autumnale*	·	·	+	·	·	·	·	·	·	I	0,06
H-G	Cosm	0	0	0	P	*Convolvulus arvensis*	+	·	·	·	·	·	·	·	·	I	0,04
G	Eua	0	0	0	P	*Dactylorhiza maculata*	·	·	·	+	·	·	·	·	·	I	0,02
H	Eua	3,5	0	0	D	*Festuca pratensis*	·	·	·	·	+	·	·	·	·	I	0,04
H	Eua	4	3	0	P	*Molinia caerulea*	·	·	·	·	·	·	·	·	·	I	0,08
H	Cp	3	0	0	P	*Poa pratensis*	·	·	·	·	·	·	·	·	·	I	0,08
H	Eua	4	3	0	P	*Rumex crispus*	+	·	·	·	·	·	·	·	·	I	0,06
H	E	3,5	3	4	D	*Trifolium hybridum*	+	·	·	·	·	·	·	·	·	I	0,08
TH	Eua	2,5	3	0	D	*Viola tricolor* ssp. *tricolor*	·	·	·	·	·	·	·	·	·	I	0,1
						Festuco-Brometea											
H	Eua	2,5	2,5	0	P	*Galium verum*	+	·	+	·	·	·	·	+	·	IV	0,34
H	Eua	3	3	0	P	*Hypericum perforatum*	+	1	·	+	+	·	+	+	·	III	0,46
Ch	Eua	2	2	2	D, P	*Veronica officinalis*	·	+	·	·	+	+	·	+	·	II	0,34
H	Cp-Bo	3,5	3	3	P	*Carex pallescens*	·	·	·	·	·	·	·	·	·	I	0,08
G	Ec	3	2	3	P	*Dactylorhiza sambucina*	·	·	·	+	·	·	·	·	·	I	0,02
H	E	3	0	3	D	*Luzula campestris*	·	·	·	+	+	·	·	+	·	I	0,1
H	Eua	2,5	3	2	P	*Viola canina*	·	·	·	·	·	·	·	1	·	I	0,24
						Querco-Fagetea											
H	Eua	3	2	2	D, P	*Cruciata glabra*	·	·	·	·	·	·	+	+	+	III	0,24
MPh	Eua	3	2	2	P	*Betula pendula*	·	+	·	+	·	+	+	·	·	II	0,18
mPh	E	2	3	4	D	*Pyrus pyraster*	·	+	·	·	·	·	·	·	+	II	0,2
G	Cosm	3	3	0	P	*Pteridium aquilinum*	·	·	+	·	+	+	·	·	·	II	0,3
MPh	Eua	3	2	2	D, P	*Populus tremula*	·	·	·	·	·	·	·	·	·	I	0,04
H	Ec	4	2,5	4	D	*Aconitum vulparia*	·	·	·	+	·	·	·	·	·	I	0,06
H	Eua	3	3	0	D	*Campanula persicifolia*	·	·	·	·	·	·	·	+	·	I	0,1
H-G	Cosm	2	3	2	P	*Rumex acetosella*	·	·	·	·	·	·	·	·	·	I	0,06
H	Eua	3	3	0	P	*Trifolium medium*	·	·	·	·	·	·	+	·	·	I	0,1
						Rhamno-Prunetea											
mPh	E	2,5	3	3	D	*Crataegus monogyna*	·	+	·	·	·	+	·	·	+	III	0,26
nPh	E	2	3	3	P	*Rosa canina*	+	+	·	·	·	·	·	·	+	III	0,24
mPh	Eua	2	3	3	P	*Prunus spinosa*	·	·	·	·	·	·	·	·	+	II	0,12
mPh	E	3	3	3	D	*Corylus avellana*	·	·	·	·	·	·	+	·	·	I	0,06
mPh	Eua	3	3	3	D, P	*Salix capraea*	·	+	·	+	·	·	·	·	·	I	0,06
H	Eua	2,5	3	3	D	*Origanum vulgare*	+	·	·	·	·	·	·	·	·	I	0,04
TH-H	Eua	2	3	4	P	*Verbascum nigrum*	·	·	·	·	·	·	·	+	+	I	0,1
						Epilobietea angustifolii											
nPh	Ec	3,5	3	2,5	P	*Rubus sulcatus*	+	+	·	·	·	+	·	·	+	II	0,2
H	Eua	3	2,5	0	D	*Fragaria vesca*	·	·	·	·	·	+	·	·	+	I	0,08
H	Eua	3,5	3	3	P	*Senecio germanicus*	·	·	·	·	·	·	·	·	·	I	0,04
						Vaccinio-Piceetea											
nPh	Cp-Bo	0	2	1	D	*Vaccinium myrtillus*	·	+	·	2	·	·	·	+	·	I	0,78
H	Cp-A-a	2	0	1	P	*Deschampsia flexuosa*	·	·	·	·	·	·	·	2	·	I	0,78
H	E	2,5	2,5	2	D	*Luzula luzuloides*	·	+	·	·	·	·	·	·	·	I	0,08
						Variae Syntaxa											
mPh	Cp-Bo	2	0	0	D	*Juniperus communis*	·	+	·	·	·	+	+	·	+	III	0,28
mPh	E	3,5	3	4	D	*Malus sylvestris*	·	·	·	·	·	·	+	·	·	II	0,14
H	Ec	4	2	4	P	*Gentiana asclepiadea*	·	1	+	·	·	·	+	+	+	II	0,34
nPh	Ec	2,5	3	0	P	*Cytisus nigricans*	·	·	·	·	·	·	·	+	·	I	0,04

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%.

Table 1

Floristic composition of the *Nardus stricta-Festuca rubra* grasslands

Bio.	E.f.	U.	T.	R.	2n	Nr. releveului	1	2	3	4	5	6	7	8	9	K	ADm
						Altitudinea (m.s.m.)	680	700	700	800	800	700	650	650	600		
						Acoperire strat ierbos (%)	95	95	95	100	95	95	95	100	100		
						Acoperire strat muscinal (%)	-	-	-	25	40	60	-	-	20		
						Expoziţia	-	S	V	V	N	N	S	SV	SV		
						Panta (º)	-	5	5	5	25	5	20	5	10		
						Suprafaţa (m²)	100	100	100	100	100	100	100	100	100		
H	Cp-Bo	3	0	0	D, P	As. *Festuca rubra*	1	1	+	2	1	4	+	3	1	V	19,7
H	E	0	0	1,5	D	As. *Nardus stricta*	4	4	5	4	3	1	5	2	4	V	58,9
						Potentillo-Nardion, Nardetalia											
H	Eua	4	3	2	D	*Hypericum maculatum*	+	+	·	+	+	+	+	·	+	IV	0,39
H	Atl-M	3	3	3	P	*Genistella sagittalis*	1	1	+	·	·	·	·	1	·	III	1,72
H	Cp-Bo	3,5	3	3	P	*Carex pallescens*	+	·	+	·	·	·	+	·	·	II	0,17
H	Eua	3	3	3	P	*Polygala vulgaris*	+	·	·	·	·	·	·	+	·	II	0,11
H-Ch	Cp-Bo	3	1	2,5	P	*Antennaria dioica*	·	·	·	·	·	+	·	·	·	I	0,06
						Nardo-Callunetea											
H	Eua	0	0	0	P	*Potentilla erecta*	+	1	+	+	1	·	+	+	+	V	1,44
H	E	0	3	2	P	*Danthonia decumbens*	+	+	+	+	·	+	·	·	+	IV	0,33
H	E	3	0	3	D	*Luzula campestris*	+	+	+	+	·	+	+	·	·	IV	0,33
H	E	2,5	0	0	D, P	*Hieracium pilosella*	·	+	+	·	·	+	·	+	·	III	0,22
Ch	Eua	2	2	2	D, P	*Veronica officinalis*	+	+	·	+	·	+	+	·	·	III	0,28
H	Eua	2,5	3	2	P	*Viola canina*	1	+	·	·	·	+	+	·	1	III	1,28
H	Eua	4	2,5	3	P	*Carex ovalis*	·	·	·	·	·	·	·	+	·	I	0,06
H	Cp-Bo	2,5	3	2,5	D, P	*Hieracium umbellatum*	+	·	·	·	·	·	·	·	·	I	0,06
Ch	Cosm	3	3	1	P	*Lycopodium clavatum*	·	·	·	·	+	·	·	·	·	I	0,06
						Molinio-Arrhenatheretea											
H	Cp-Bo	0	0	0	P	*Agrostis capillaris*	+	+	+	+	·	·	+	·	+	IV	0,33
H	Eua	3	0	0	P	*Achillea millefolium*	+	+	+	·	·	·	·	+	+	III	0,28
H	Eua	0	3	0	D, P	*Briza media*	+	+	·	·	·	·	·	+	+	III	0,22
TH	E	3	2,5	3	D, P	*Campanula patula*	+	+	·	·	·	·	·	+	+	III	0,22
H	Ec	3	2,5	3	D	*Centaurea phrygia*	+	+	·	·	·	·	·	+	+	III	0,22
H	Eua	3,5	3	0	D	*Holcus lanatus*	+	+	·	·	·	·	+	+	+	III	0,28
H	Cosm	3	3	0	D	*Rumex acetosa*	+	+	·	·	·	+	+	+	·	III	0,28
H	Eua	4	3	0	D	*Succisa pratensis*	+	+	+	·	+	·	·	+	·	III	0,28
H	Eua	0	0	0	D, P	*Anthoxanthum odoratum*	+	·	·	+	·	·	·	+	·	II	0,17
H	Eua	3	0	3	D	*Galium mollugo*	+	+	+	·	·	·	·	·	·	II	0,17
H	Eua	3	0	0	D	*Leucanthemum vulgare*	+	+	·	·	·	·	·	·	+	II	0,17
H	Eua	0	0	0	D	*Plantago lanceolata*	+	·	·	·	·	·	·	+	+	II	0,17

H	Eua	3	3	0	D	*Stachys officinalis*	+	+	·	·	·	·	·	+	·	II	0,17
TH	Eua	2,5	3	0	D	*Viola tricolor* ssp. *tricolor*	·	·	·	·	·	·	+	·	+	II	0,11
						Vaccinio-Piceetea											
H	Cp-A-a	2	0	1	P	*Deschampsia flexuosa*	+	1	+	1	2	·	+	1	2	V	5,72
nPh	Cp-Bo	3	2	1	D	*Vaccinium vitis-idaea*	+	·	·	+	·	1	·	2	·	III	2,61
H	E	2,5	2,5	2	D	*Luzula luzuloides*	·	·	·	+	+	+	+	·	·	III	0,22
mPh	E	3	2,5	2	D	*Sorbus aucuparia*	·	·	·	·	+	+	·	·	·	II	0,11
nPh	Cp-Bo	0	2	1	D	*Vaccinium myrtillus*	·	·	·	+	2	2	·	·	·	II	3,94
						Festuco-Brometea											
H	E	2	5	5	D	*Dianthus carthusianorum*	·	+	·	·	·	·	·	+	·	II	0,11
H	Eua	2,5	2,5	0	P	*Galium verum*	+	·	·	·	·	·	+	+	·	II	0,17
Ch	Ppn	2	4	0	P	*Thymus glabrescens*	+	+	+	·	·	·	·	·	·	II	0,17
						Variae Syntaxa											
H	Eua	4,5	0	4	P	*Agrostis gigantea*	+	+	+	1	+	·	+	1	·	IV	1,39
H	Cosm	4	0	0	D, P	*Deschampsia caespitosa*	+	·	·	+	·	·	+	+	·	III	0,22
MPh	Eua	3	2	2	P	*Betula pendula*	·	·	·	+	+	·	·	·	+	II	0,17
mPh	Cp-Bo	2	0	0	D	*Juniperus communis*	·	·	·	+	+	·	·	·	·	II	0,11
nPh	Ec	2,5	3	0	P	*Cytisus nigricans*	·	·	·	·	·	+	+	+	·	II	0,17
H	Eua	2	3	0	P	*Calamagrostis arundinacea*	+	·	·	·	+	·	·	·	+	II	0,17
H	Eua	2	2,5	0	P	*Carex montana*	+	·	+	·	·	·	·	·	·	II	0,11
H	Eua	3	2	2	D, P	*Cruciata glabra*	+	+	·	·	·	·	·	·	·	II	0,11
H	Cosm	4	3	0	P	*Dryopteris filix-mas*	·	·	·	·	1	·	·	+	·	II	0,61
H	Ec	4	2	4	P	*Gentiana asclepiadea*	·	·	·	+	+	·	·	·	·	II	0,11
H	Cp	3	3	3	P	*Gnaphalium sylvaticum*	·	·	·	·	+	·	+	·	·	II	0,11
H-Hh	Eua	5	0	0	P	*Lysimachia vulgaris*	+	+	·	·	·	·	·	·	·	II	0,11
Ch	Ec	2,5	3	3	P	*Thymus dacicus*	+	·	+	·	·	·	·	·	·	II	0,11
G	Eua	4	2,5	4	D	*Veratrum album*	+	+	·	·	·	+	·	·	·	II	0,17

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%.

The *Nardus stricta* and *Festuca rubra* grasslands were identified in the area of Bratca commune on slopes with different exposures (V, N, S, Sv), at altitudes ranging from 600 to 800 m on gently sloping terrain (5-25 degrees) (Table 2). The herbaceous vegetation has high cover (95-100%), with the dominant species being *Nardus stricta* (58,9%), followed by *Festuca rubra* (19,7%). The productions of *Festuca rubra* L. and *Nardus stricta* L. grasslands ranges from 0.75 to 3.75 t/ha DM, respectively grazing capacity ranges between 0.4 to 1.24 LU·ha-1. The effective production is much lower, due to the low degree of grass consumption. The average consumption coefficient is 35-50%, depending on the altitude and the vegetation phase in which the plants are found. The nutritional value of the feed is also low. In relation to dry matter, Nardus stricta pastures contain 4.3-5.3% P.B. and 41-51% U.N. On average, 20-40 kg P.B. and 200-400 U.N. are obtained per year per 1 ha of meadow. Among the species from the Poaceae family found in this type of grassland, we mention *Agrostis tennuis, Agrostis stolonifera, Anthoxanthum odoratum, Arrhenatherum elatius, Briza media, Cynosurus cristatus, Dactylis glomerata, Festuca rubra, Holcus lanatus Nardus stricta, Phleum pratense, Poa pratensis, Trisetum flavescens,etc Legumes found in the vegetation cover have a*

very small percentage of participation: Lotus corniculatus, Trifolium pratense, Trifolium repens. Among the species from other families, *Achillea millefolium, Potentilla erecta, Hieracium spp., Vaccinium myrtillus, Juniperus, Dryopteris filix-mas communis Gentiana asclepiadea, Carex montana, Campanula abietina, Plantago lanceolata, Thymus serpilus, Galium verum, Hieracium aurantiacum, Hypericum perforatum, Veronica chamaedrys* etc. The pastoral value, after species coverage, is 0.2-0.8, and after specific contribution, 3-17. The grazing capacity is a maximum of 0.4 U.V.M./ha. Excessive dominance of Nardus stricta is a sign of ecological degradation (overgrazing or lack of interventions), decreased biodiversity and forage value, and the emergence of weeds and toxic plants if maintenance is not done.

CONCLUSIONS

The permanent grasslands in the Bratca commune area have a low agro-productive variability,with mesophilic, micromesothermic and acido-neutrophilic vegetation. This high variability is due to overgrazing, lack of maintenance work, climate change, harmful plants, shrub invasion, etc.

The grasslands of *Agrostis capillaris* and *Festuca rubra* have good productivity, a very good pastoral value (PV) and a very good production of green biomass (GB), which allows a density rate of 1 - 1.85 UGB/ha.

The *Nardus stricta* and *Festuca rubra* grasslands were identified in the area of Bratca commune on slopes with different exposures and the herbaceous vegetation has high cover, with the dominant species being *Nardus stricta* (58,9%), followed by *Festuca rubra* (19,7%). The productions of *Festuca rubra* L. and *Nardus stricta* L. grasslands ranges from 0.75 to 3.75 t/ha DM, respectively grazing capacity ranges between 0.4 to 1.24 LU·ha-1. The pastoral value, after species coverage, is 0.2-0.8, and after specific contribution, 3-17. The grazing capacity is a maximum of 0.4 U.V.M./ha.

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