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THE INFLUENCE OF THE PHENOLOGICAL PHASE ON THE FODDER QUALITY OF THE FESTUCA RUBRA AND AGROSTIS CAPILLARIS SPECIES

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Abstract:

F. PRICA, I. ROTAR, N. SIMA, 1999, The influence of the phenological phase on the fodder quality of theFestuca rubra and Agrostis capillaris species In the Cindrel Mountains, respectively in the experimental field of the Institute of Mountainology Cristian – Sibiu, situated at the height of 1300 m, on acid brown soil, we have conducted studies regarding the way the phenological phases (bellows and earing) influence the fodder quality of the two species. We have assessed on the one hand the rough chemical composition and on the other hand, by calculus, the digestibility of organic stuff at the Festuca rubra and Agrostis capillaris species from the wild flora, analysed as whole plants.

Key words: Festuca rubra, Agrostis capillaris, phenological phases, chemical composition, organic substance digestibility, mountain pastures (1300 m).

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The total area of natural grasslands in the Cindrel Mountains amounts to about 31,227 ha out of which 16% are in the northern level (the spruce fir forests), the creeping fescue level (ANGHEL et. al.. 1982). Therefore, the range of Festuca rubra meadow types in these mountains show a productivity varying from average (grazing capacity 200-500 kg/ha live weight) to inferior (grazing capacity 100-300 kg/ ha live weight), providing the most important

part in the nourishment of the ruminants (mainly of the sheep) which graze in this area (PRICA et. al.,1998).

The study of pasture and hay fields productivity requires both the quantitative determination of the crops and, mostly, the latter's analysis from the qualitative point of view. This is the reason why in the present paper we will deal with the chemical composition of the Festuca rubra and Agrostis capillaris species depending on the phenological phase (bellows and earing), but also depending on the technological inputs.

These plant species have a significant participation in the making-up of the vegetal carpet and form pasture types important from the pastoral point of view within the above mentioned series.

Material and Method

The research study presented in this paper is part of a succession of studies we have undertaken in the experimental field of the Institute of Mountainology Cristian – Sibiu, situated at a height of 1300 m in the Paltinis station area.

From the climatic standpoint, the region is characterized by average multiannual temperatures of 4.5° C and average multiannual rainfall of 996 mm., the experiment being placed on ground of approximately 8% inclination and soil of brown acid generic type.

Thus, on the 18th July 1996, there were drawn several samples of biomass, respectively whole plants (the above ground part, 4 cm from the ground) of the Festuca rubra and Agrostis capillaris species in the phenological phase of bellows and earing, with a view to determine their rough chemical composition.

These samples were drawn on the one hand from a variant (V1) called by us witness (the natural pasture) in which no technological factor interfered (fertilization and amendment) and on the other hand from the (V2) variant in which there were applied fertilizers and amendments in the following way: amendments (5 t/ ha Ca CO3) and organic fertilizers (20 t/ ha) once in 1994, early spring; N 100 kg/ ha applied every year (including the year in which the samples were drawn), in spring at the beginning of vegetation; P 40 kg/ ha applied one single time in 1994, early spring, and K 100 kg/ ha applied like N and once with N.

We mention that from the V2 variant, after the harvesting of the two plant species, also a series of samples were formed by mixing equal parts of the Festuca rubra and Agrostis capillaris on phenological phases.

For the determination of the rough chemical composition the classical methods were used.

Results and Discussions

Of the many factors that determine fodder quality, a first assessment of the latter can be obtained by establishing its chemical composition.

Thus, as one can see in table 1, the rough protein percentage is lower in all the cases in the earing phase as compared to the one in the bellows phase. The content of rough protein is conversely correlated to the content of rough cellulose, the latter being lower in the bellows phase and higher in the earing phase (NIEDERMAIER, 1968, RESMERITA et al., 1972, KOTA et al., 1992 and ORLANDI et al., 1996). Also, the technological inputs, especially the presence of nitrogen administered every spring under the form of mineral fertilizers, influence fodder quality, leading to the increase of the rough protein percentage irrespective of the phenological phase (KOTA et al., 1992; RAZEC, 1994).

The other chemical components (the rough ashes, the rough fat, the non-nitrogenous extractives) are not influenced significantly by the phenological phases and the technological inputs.

As for the ratio rough protein/ rough cellulose, only in the case of the V1 variant, earing phase, both at Festuca rubra and Agrostis capillaris we register a ratio favourable to the rough cellulose, and in the other cases this ratio can be considered relatively small. Thus, one can say that too small a content of cellulose can lead to insufficient capitalization of the protein by the animals, due to more intense fodder transit through the digestive tube, which, according to some researchers, represents protein waste (KOTA, 1992).

Referring further on to the influence of the phenological phases on the digestibility of nutritive substances, POPA (1985) shows the existence of a close relation between the quantity of cellulose (X) in the dry substance and the digestibility of organic substances (J), suggesting the following relation for ruminants: J=90-0.85X. Applying this relation on the data obtained by us, we present in table 2 the digestibility of organic stuff.

Thus, the highest digestibility percentage is notable at the Agrostis capillaris species in the bellows stage, in V2, and the lowest percentage at the Festuca rubra species in the earing phase in V1. These data show the influence of both the phenological phase and the fertilizers (especially those containing nitrogen) on the digestibility of organic stuff, effect noted also by other researchers (PUIA,1984; RAZEC, 1994; ROTAR, 1997 etc.)

Table 1.

The Chemical Composition (% of the SV)

Experim. variants	Plant species	Bellows							Eared						
		Organic subst.	Rough protein	Rough cellulose	Rough ashes	Rough fat	Non-nitrog. extrac-tives	Rough protein/ rough cellul. ratio	Organic subst.	Rough protein	Rough cellul.	Rough ashes	Rough fat	Non-nitro. extrac-tives	Rough protein/ rough cellul. ratio
V1	F. rubra	95.34	14.87	16.91	4.66	3.08	60.48	1:1.13	93.72	11.49	19.80	6.28	3.14	59.29	1:1,72
	A. capillaris	93.04	15.98	17.51	6.96	1.55	58.00	1:1.09	93.59	12.51	19.39	6.41	2.85	58.84	1:1.54
V2	F. rubra	93.52	17.28	15.27	6.48	2.59	58.38	1:0.88	94.46	13.89	18.85	5.54	2.04	59.68	1:1.35
V2	A. capillaris	94.26	19.02	14.57	5.74	2.72	57.95	1:0.76	95.76	16.95	18.43	4.24	2.07	58.31	1:1.08
V2	F. rubra+ A. capillaris	94.82	18.18	15.44	5.18	2.25	58.95	1:0.84	94.51	14.86	17.25	5.49	3.28	59.12	1:1.16

The Digestibility of Organic Stuff (%)

Table 2.

Experimental variants	Plant species	Bellows	Earing
V1	F. rubra	75.62	73.17
V1	A. capillaris	75.11	73.51
V2	F. rubra	77.02	73.91
V2	A. capillaris	77.61	74.33
V2	F. rubra + A. capillaris	76.87	75.33

Conclusions

The phenological phases in the case of the plant species Festuca rubra and Agrostis capillaris of the mountain grasslands wild flora play an important part, determining the proportion of the chemical components, especially that of the rough protein and of the rough cellulose and then of the digestibility of organic stuff, all these being negatively influenced according as the plants proceed into vegetation, irrespective of the presence or absence of technological inputs, in our case amendments, chemical and organic fertilizers.

Influența fenofazei asupra calității furajere a speciilor Festuca rubra si Agrostis capillaris

(Rezumat)

In muntii Cindrelului, respectiv in campul experimental al Instititului de Montanologie Cristian-Sibiu, situat la o altitudin de 1300 m, pe un sol brun acid, s-au intreprins unele studii privind modul in care influenteaza fazele fenologice (burduf si inspicare) calitatea furajera a celor doua specii, determinindu-se pe de o parte compozitia chimica bruta, iar pe de alta parte, prin calcul, digestibilitatea substantei organice, la speciile Festuca rubra si Agrostis capillaris din flora spontana, analizate ca si planta intreaga.

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ECHINACEA SPECIES OF MEDICINAL USE

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Abstract

L. S. MUNTEAN, D. VARBAN, S. MUNTEAN, M. TĂMAŞ, RODICA VARBAN, 1998, Echinacea Species of Medicinal Use (in Engl.) Not. Bot. Hort. Agrobot. Cluj, 1998, XXVIII. Echinacea species come from North America. Preparations of Echinacea pallida Nutt. and Echinacea purpurea (L.) Moench are used in healing many diseases owing to their immunostimulative, antivirus and bacteria, scarifying and anti-inflammatory properties. Echinacea pallida Nutt. displays tap root, linear spear-shaped leaves; Echinacea purpurea (L.) Moench has fasciculate root and oval-lanceolata leaves. Seedling plantation with both species is performed in May and spacings of 50 cm between rows and 30 cm between plants per row. Harvest takes place in the 2-nd year of flowering.

Key words: Echinacea species of medicinal use

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The importance of Echinacea plant species proven by the Indians on the North American continent who had used them for medicinal purpose, was documented rather late by Gilmore in 1919 and Smith, in 1928 (Bauer et al., 1990). They refer mostly to the plants' use in healing wounds, burns, then in the treatment of the mumps, insect bites; then, as disinfectant of the mouth and pharynx and treatment of stomatitis and pharyngitis and as pain-killer in head- and stomach aches; also administered in coughs, colds, measles, and gonorrhoea; also, antidote in snake bites and intoxication. Mostly roots of Echinacea angustifolia & pallida, or juice or mash of fresh plants, or minced were used (Bauer et al., 1990).

The Lloyd Brothers of Cinncinati USA had started in 1894 producing and marketting a tincture of their own extracted from Echinacea pallida to be utilized in diatheses, syphilis, wounds, skin diseases; also, in diphtheria, typhus, cholera in children, septicaemia (Bauer et al., 1990).