The Influence of the Grassland Management on Fodder Quality

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Key words : fodder quality , permanent grassland , fertilization , quantity of protein

Introduction A wide body of both practical and technical research has underlined the role of fertilizers , floral composition , local conditions and grassland management on productivity and fodder quality , this research has given insights into new technologies which may improve the fodder quality of permanent grasslands (Jeangros B . , Scehovic J . , 1996 ; Pozdisek P . et al . , 2005 ; Vîntu V . et al . , 2003) .

Materials and methods The experiment was undertaken on a *Festuca rubra L* . and *Nardus stricta L* grassland located in the *Picea excelsa* belt , Campulung-Moldovenesc area , Suceava district , Carpathian Mountains . The location is at 770 m altitude , with an average annual temperature of 6.5 ℃ and an annual rainfall of 710 mm , set on a land with a slope of 15-17% , northeastern exposure . The soil type is eumezobazic brown , with a 10-12 ppm mobile phosphorus content (P_{AL}) and 290-354 ppm mobile potassium content (K_{AL}) , within the 0-20 cm layer .
The experiment was a single factor type , using a randomized block design , with four replications . It was carried out in order to observe the effect of organic and mineral fertilizers in doses of 10-30 t/ha . The organic fertilizer was provided through the use of well fermented cattle manure , with $N_{30\text{-}50}P_{30}$ used as the mineral fertilizer , both used in order to determine their relationship on fodder quality and raw protein quantity . The following fertilization variants were observed : V_1 - control (unfertilized) ; V_2 - 10 t ha^{-1} manure annually + $N_{30}P_{30}$; V_3 - 10 t ha^{-1} manure annually + $N_{30+20}P_{30}$; V_4 - 20 t ha^{-1} manure once at two years + $N_{30}P_{30}$; V_5 - 20 t ha^{-1} manure once at two years + $N_{30+20}P_{30}$; V_6 - 30 t ha^{-1} manure once at three years + $N_{30}P_{30}$; V_7 - 30 t ha^{-1} manure once at three years + $N_{30+20}P_{30}$. The manure and the phosphorus were applied in early spring , with the nitrogen either applied in one dose (at the beginning of the vegetative growth , N_{30}) or in two doses (N_{30} at the beginning of the vegetative growth and N_{20} after the first haymaking) . Harvesting was made in hay stock mode , at dominant graminees' ear-flower formation . The measurements for raw crude protein (CP) , crude fiber content (CF) , ash content , digestible protein contents (IEDP and INDP) were determined during the vegetation cycle I , using dry matter (d .m .) .

Results The differentiated fertilization with cattle manure and reduced quantities of mineral fertilizers , in addition to mowing at an optimal time , determined the modification of the floral composition by increasing the valuable and the leguminous species' ratio in the vegetal carpet , thereby improving fodder quality (Table 1) . Thus , the crude protein content increased from 106 .2 g kg^{-1} d .m . for the control to 112 .3—133 .7 g kg^{-1} d .m . for the variants using mineral and organic fertilization (20 t ha^{-1} manure once at two years + $N_{30+20}P_{30}$, respectively 30 t ha^{-1} manure once at three years + $N_{30}P_{30}$) . The crude fiber content measured values between 251 .8—289 .3 g kg^{-1} d .m . , and the ash content , between 81 .6—97 .7 g kg^{-1} d .m .

Table 1 *The influence of grassland management on fodder quality and raw protein quantity .*

Fertilization variants	CP (g kg^{-1} d .m .)	Ash (g kg^{-1} d .m .)	CF (g kg^{-1} d .m .)	IEDP (g kg^{-1} d .m .)	INDP (g kg^{-1} d .m .)	CP (kg ha^{-1})
Control	106 .2	81 .6	273 .4	45 .73	61 .64	433 .4
10 t ha^{-1} manure annually + $N_{30}P_{30}$	121 .6	85 .8	255 .3	46 .12	70 .25	640 .6
10 t ha^{-1} manure annually + $N_{30+20}P_{30}$	116 .5	86 .3	257 .8	45 .90	67 .27	617 .2
20 t ha^{-1} manure once at 2 years + $N_{30}P_{30}$	117 .4	89 .7	262 .1	45 .76	67 .54	653 .1
20 t ha^{-1} manure at 2 years + $N_{30+20}P_{30}$	112 .3	86 .7	265 .2	45 .72	64 .82	661 .1
30 t ha^{-1} manure once at 3 years + $N_{30}P_{30}$	133 .7	97 .7	251 .8	45 .97	76 .24	784 .8
30 t ha^{-1} manure at 3 years + $N_{30+20}P_{30}$	119 .3	91 .8	289 .3	45 .71	68 .47	764 .2

Conclusions Rational fertilization and optimal time use of the *Festuca rubra* L . and *Nardus stricta* L . permanent grasslands assure a quality fodder and a crude protein increase of 183 .8—351 .4 kg ha^{-1} compared to the control .

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