Effect of cutting date on quality of red clover forage

S. Vasiljevic[1], S. Katic[1], V. Mihailovic[1], B. Cupina[2], D. Milic[1], A. Mikic[1], Dj. Karagic[1] and I. Pataki[1]
[1]*Institute of Field and Vegetable Crops, Maksima Gorkog 30, 21000 Novi Sad, Serbia and Montenegro, Email: sanjava@ifvcns.ns.ac.yu,* [2]*Faculty of Agriculture, Trg Dositeja Obradovica 8, Novi Sad, Serbia and Montenegro*

Keywords: red clover, *Trifolium pratense* L., cutting date, phenological phase, forage quality

Introduction Development stage or plant age is an important factor determining the chemical composition and quality of red clover forage (Ignjatovic *et al*., 2001). In early spring, young red clover plants have large leaf mass, high contents of moisture, protein and minerals and a low fibre content. In the course of the growing season, under the effects of long days and high temperatures, the plant undergoes morphological changes: leaves grow more slowly, the stem elongates, dry matter yield increases and quality drops, especially digestibility and the contents of protein and minerals.

Materials and methods A trial with five red clover varieties (Junior, Diana, Milvus, K-17, Kolubara) was established in 1998 in the experiment field of the Institute of Field and Vegetable Crops. The size of the basic experimental unit was 5 m^2, and the seeding rate was 15 kg/ha. In the plant's`second year samples were taken at three phenological phases (budding, beginning of flowering and full flowering) in each of three growth cycles (cuts) to study effects on quality as assessed by proximate analysis.

Results Table 1 shows that the red clover genotypes did not differ significantly from one another in the measured variables. Significant and expected differences were found between individual phenological phases (Table 1) and between cuts (Table 2). In each period, from budding to the beginning of flowering and from the beginning of flowering to full flowering, crude protein content fell by 2.2%. According to Džamic *et al*. (1970), who studied lucerne, the crude protein content is highest at the time of the second cutting (Table 2). In this study, the crude fibre content increased considerably, by about 5%, from budding to the beginning of flowering, which was in agreement with Popov (1971) (cited by Vuckovic, 1999). The ash content tended to go down with age.

Table 1 Chemical composition of red clover cut at different development stages

Variety	Phenological phase											
	Budding				Beginning of flowering				Full flowering			
	CP	CF	EE	Ash	CP	CF	EE	Ash	CP	CF	EE	Ash
Junior	21.1	21.3	1.9	9.3	18.4	25.8	1.5	9.1	16.4	27.6	1.9	8.0
Diana	20.8	21.7	1.8	9.3	19.0	25.9	1.6	8.7	16.7	27.6	1.7	7.7
Milvus	21.0	21.3	1.7	7.9	18.0	26.8	1.8	8.2	16.3	28.1	1.6	7.8
K-17	21.1	21.1	1.7	9.3	19.7	28.0	1.7	9.9	16.4	29.1	1.6	8.1
Kolubara	20.6	20.5	2.1	9.0	18.5	25.3	1.8	8.5	16.4	27.2	2.0	7.2
Average	20.9	21.2	1.9	8.9	18.7	26.3	1.7	8.9	16.4	27.9	1.8	7.8
LSD 0.05	1.5	2.4	0.7	0.6	2.5	3.6	0.7	1.4	1.7	3.0	0.5	1.7
0.01	2.1	3.5	1.0	0.9	3.6	5.3	1.0	2.1	2.5	4.4	0.7	2.5

Table 2 Contents of crude protein and crude fibre in red clover as affected by cut and by development stage

Development stage	Crude protein (%)			LSD		Crude fibre (%)			LSD	
	Cut 1	Cut 2	Cut 3	0.05	0.01	Cut 1	Cut 2	Cut 3.	0.05	0.01
Budding	20.1	21.5	21.2	1.1	1.6	20.8	20.9	21.9	1.9	2.7
Begin flowering	17.9	18.8	19.4	1.9	2.8	24.8	26.9	27.3	2.8	4.1
Full flowering	16.2	17.7	15.4	1.3	1.9	23.1	26.1	34.6	2.3	3.4

Conclusions These results demonstrated that the main quality parameters of red clover (crude protein and crude fibre) depended more on the phenological phase and the time of cutting than on genotype.

References

Džamic M., T. Stojisavljevic, I. Delic. & R. Curcic (1970). Prilog proucavanju kolicine i bioloske vrednosti aminokiselina i proteina u pojedinim otkosima lucerke. *Arhiv za poljoprivredne nauke*, 80, 3-16.

Ignjatovic S., J. Vucetic, Z. Lugic & B.Dinic (2001). Effect of growth stage on macro and trace elements content in red and white clover. *Journal of Scientific Agricultural Research*, 62, 309-316.

Vuckovic S. (1999). Forage Crops. Agricultural Research Institute SERBIA, Belgrade, p. 197.