Distribution of trace elements in plant parts of red clover (*Trifolium pratense* L.)

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Introduction There is little information on the distribution of minerals in plant parts although factors affecting mineral content in forages have been well investigated (Fleming, 1973; Whitehead *et al*., 1985). The aim of this investigation was to determine the trace mineral content in plant parts of different cultivars of red clover (foreign and domestic) and to assess differences between cultivars. The existence of significant differences between cultivars would indicate the possibility of selecting cultivars to satisfy particular animal requirements for minerals.

Material and methods Six cultivars of red clover (*Trifolium pratense* L.): 2 foreign, Nike and Viola, and 4 domestic, K-9, K-17, K-27, K-39, were sown in 2002 as pure stands in three replicates. Clovers were harvested on 27 May 2003 at the beginning of flowering. Plants were divided into stems, leaves, petioles and flowers. Samples were analysed for trace element content (Fe, Mn, Zn and Cu) by AAS and data subjected to statistical analysis. Because of insufficient amount of sample, the mineral contents of flowers are not reported.

Results Trace element contents in plant parts of 6 red clover cultivars are shown in Table 1. In all cultivars examined leaves were higher in element contents than stems and petioles. The largest differences between plant parts were in Mn. Contenst of Mn in leaves were more than twice those in petioles and even 5 times more than in stems, as reported earlier for Lucerne (Ignjatovic *et al*., 1998). Differences between cultivars in Fe content in leaves were not significant. There were significant differences in the content of Mn and Zn in leaves and petioles between cultivars and no differences were found for these elements in stems. Cultivar K-27 was lowest in Mn in leaves and petioles and highest in stems. Highest Zn was in K-17 in all plant parts. There were significant and very significant differences between cultivars in Cu content in leaves, stems and petioles. Highest Cu content was in K-39, both in leaves and petioles. This cultivar is very rich in Cu, because it also has high proportions of leaves and petioles in the dry matter.

Table 1 Mineral content in plant parts of red clover cultivars (mg/kgDM)

Cultivars	Fe			Mn			Zn			Cu		
	Leaf	Petiole	Stem	Leaf	Petiole	Stem	Leaf	Petiole	Stem	Leaf	Petiole	Stem
Nike	162	141	90	72	34	16	54	28	20	21	14	12
Viola	182	110	96	89	28	16	60	28	19	21	13	10
K-9	172	104	108	80	24	16	56	26	20	18	11	11
K-17	175	126	119	82	26	16	62	29	20	22	16	13
K-27	159	98	78	71	21	17	56	26	19	22	14	13
K-39	180	105	78	78	30	15	59	29	18	24	17	12
Mean	172	114	95	79	27	16	58	28	19	21	14	12
LSD 0.05	25.3	22.5	11.0	2.0	2.2	2.1	2.4	1.5	1.5	1.1	1.0	1.5
0.01	35.5	31.5	15.4	2.8	3.0	3.0	3.4	2.2	2.1	1.5	1.4	2.1

Conclusion There is appreciable variation in mineral content of the cultivars examined. It should be possible to select and develop new cultivars with high and low levels of particular minerals, depending on different needs and animal requirements.

References

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