

## Potassium content and the balance between potassium and other minerals and crude protein in forage can have a big impact on dairy cow health

H. Eriksson

Department of Agricultural Research for Northern Sweden, SLU-Robacksdalen, Box 4097, 90403 Umea, Sweden, Email: Hary.eriksson@njv.slu.se

**Keywords:** mineral balance, dairy cow, health

**Introduction** Preliminary studies indicated that the mineral balance in forage may affect dairy cow health. A bigger study covering the four most northern counties in northern Sweden was conducted. The objective of this study was to compare data on harvested forage with farm data on milk yield and animal health.

**Materials and methods** Analysis from one year's forage cuts were investigated and used if potassium, calcium, magnesium and phosphorous had been tested. These data from different farms were combined with their production and health records from the official milk recording scheme for the following feeding year. If more than one analysis was available, the herd records were combined with the analysis with the highest potassium content. It was possible to combine forage and animal data from 487 farms with 15601 cows.

**Results** Statistical analysis (SAS) showed significant relationships between potassium content in forage and mastitis ( $r^2=0.07$ ) and significant relationships between mastitis and milk yield ( $r^2=0.05$ ). The data set was split into two parts - above and below the mean value 6.2 g Ca/ kg DM (min=2.3, max=14.7). This was done because inspection of the data indicated that in one region treatments for milk fever showed a declining pattern with increasing potassium, while the opposite tendency applied in the other regions. The major differences between the regions were in forage calcium content. On average, farms with less than 6.2 g Ca/kg DM had more treatments for lactation-related health disorders than farms with more than 6.2 g. (Table 1) Increasing milk yield with increasing potassium content in forage can also be seen in Table 1. Separate regression tests of K, P, Ca/P, K/Mg, K% x CP% or K/(Ca+Mg) indicated that the levels noted in Table 2 were associated with reduced need of treatments for health disorders. The farms were grouped according to the number of analyses that were in the optimal range indicated in Table 2. The highest score was five, with no farms' analysis being in the optimal range for all six assessments. Farms with no forage analysis in the optimal range had the highest number of treatments and the treatment need was reduced with increasing number of analyses in the optimum range (Table 3).

**Table 1** Total treatments (as % of number of cows) for all noted health disorders and mastitis and milk yield in relation to potassium and calcium content in forage

Potassium, g/ kg DM	<20		20-25		25-30		>30	
Calcium, g/ kg DM	<6.2	>6.2	<6.2	>6.2	<6.2	>6.2	<6.2	>6.2
Total treatments	52.8	48.7	52.5	53.9	60.8	57.2	65.1	54.9
Mastitis treatments	26.2	24.6	26.3	28.2	34.1	28.0	35.0	34.7
Milk yield, ECM kg/ cow	8239	7971	8459	8442	8643	8552	9006	8882

**Table 2** Forage analysis intervals associated with reduced number of treatments for health disorders

Ca, g /kg DM	K, g/kg DM	P, g/kg DM	K/Mg	Ca/P	K/(Ca+Mg)	K% x CP% (3%K x 15% crude protein=45)
< 6.2	14-24	2.8-3.0	17-22	1.2-2.0	2.0-3.0	22-32
> 6.2	24-27	2.8-3.2	16-22	2.9-3.2	2.5-3.0	33-41

**Table 3** Treatments (as % of number of cows) for health disorders in relation to analyses in optimum range

No. analyses in optimal range	0	1	2	3	4	5	6
<6.2 g Ca = % treatments	59.2	48.4	43.6	39.6	38.0	32.8	-
Std	45	26	26	26	21	19	-
>6.2 g Ca = % treatments	48.4	45.4	39.9	34.5	29.1	26.4	-
Std	34	29	19	16	20	3	-

**Conclusions** This study provides evidence of an association between forage mineral analysis and cow health. Forage mineral analysis will help in formulating supplementary feeds.