

Mineral content in forage and dairy cow health

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Seminar 2009-05-14

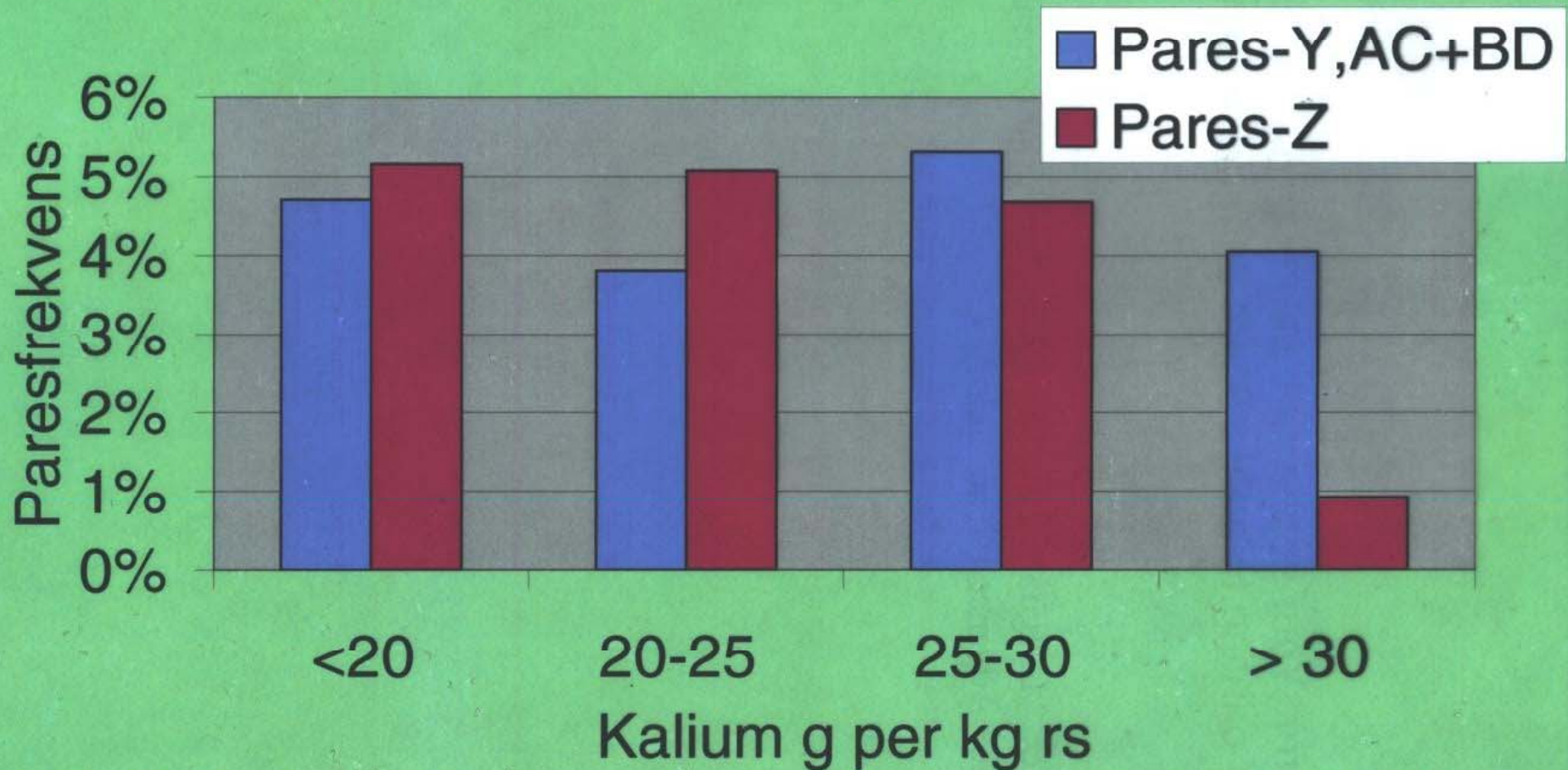
My interest in minerals and animal health a long history

- Beginning of 1980th, why did the change from hay to silage making result in feet and leg problems?
- 1984-86 a farm survey with analysis of hay, 1rst and 2nd cut of silage on 35 farms.
- Tiernobyle and subsides of potassium fertilizer.
- 1988 visit at Cornell and discussion about minerals and health with L.E Chase resulted in a puzzle with forage analysis and data about Vet. Treatments on the 35 farms.
 - More treatments on farms with high potassium. Often more severe problems if both high potassium and crude protein or high $K/(Ca+Mg)$
- 1990-95 some smaller farm studies.

- Forage analysis from the forage harvests 1997 and animal health data for the following feeding season base for a bigger study dealing with data from 487 farms and more than 15600 cows
- Significant relationships between milk yield and treatments as well as between content of K, Ca and Mg in forage and animal health.

But why another relationship between Milk fever and potassium in Jämtland (z) than in other counties?

Figur 2. Paresfrekvens i förhållande till kalium i grovfoder i Y,AC+BD jämfört med Z.



The risk for Milk fever is depending on both K and Ca levels in the feed ration. US Research results by Goff.

Number of cows with milk fever in different feeding groups

In feed ration dm	1,1% K	2,1% K	3,1% K	Effect of Calcium
0,5 % Ca	0 of 10	4 of 11	8 of 10	12 of 31
1,5 % Ca	2 of 10	6 of 9	3 of 13	11 of 32
Effect of Potassium	2 of 20	10 of 20	11 of 23	

- My study showed less vet. Treatments during the lactation period on farms with more than 6.2 g Ca / kg dm (average) than on farms with lower Ca content.
- But fewer treatments for health disorders depending of the feeding during the dry period on farms with less than 6.2 g Ca.

Mineral content and balances that seemed to have positive effects on the dairy cow health. (low

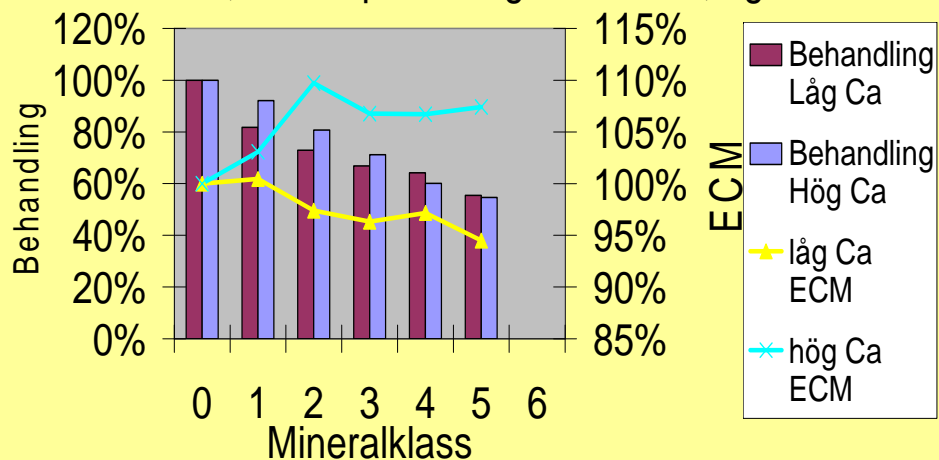
Ca $\leq 6,2$ g/kg ts)

Milking cows

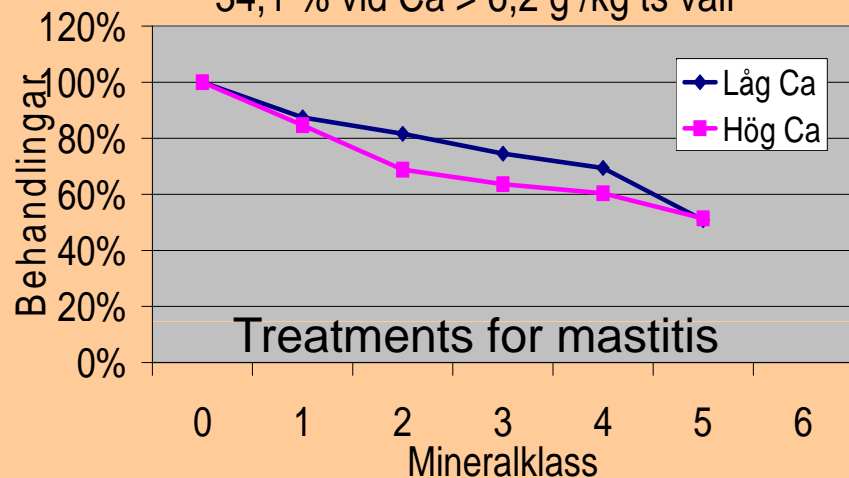
Dry cows

	Low Ca	High Ca	Low Ca	High Ca
K, g/kg ts	19-25	24-27	19-23	15-20
K/Mg	17-22	16-22	23-40	7-17
K% x Rp%	22-32	33-41	10-16	14-18
K/(Ca+Mg)	2,0-3,0	2,5-3,1	2,7-2,8	1,5-1,6
P, g/kg ts	2,8-3,0	2,5-3,0	2,3-2,8	1,6-2,0
Ca/P	1,2-2,0	2,9-3,2	2,5-2,6	1,9-2,1

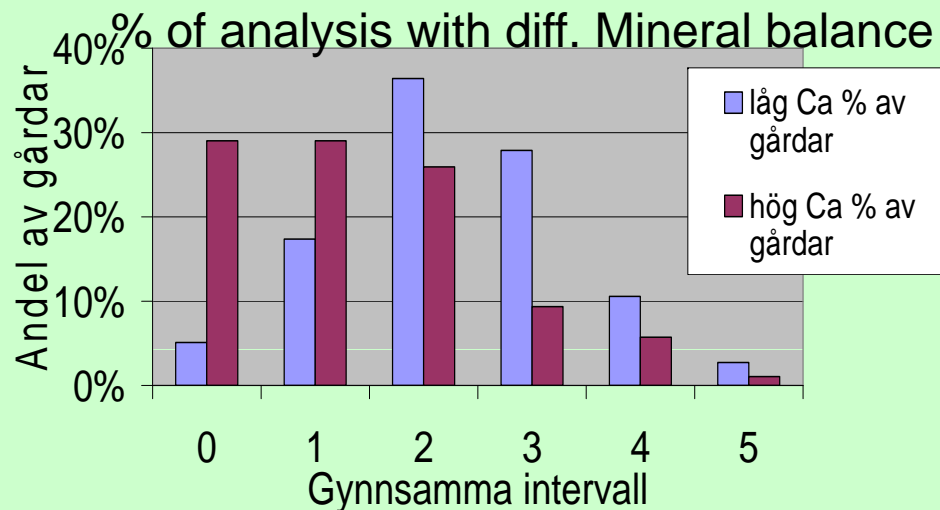
Total behandlingsfrekvens och kg ECM beroende på vallfodrets mineralklass. 100%= 59,2 % resp 8675 kg vid Ca < 6,2 g och 48,4 % resp 7980 kg vid Ca > 6,2 g



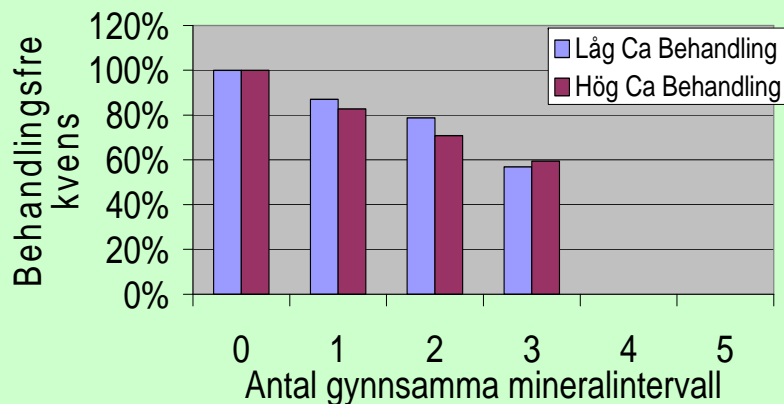
Behandlingar för mastit beroende på vallfodrets mineralklass. 100%= 35,9 % per ko vid Ca < 6,2g och 34,1 % vid Ca > 6,2 g /kg ts vall



Fördelning av gårdar med olika antal gynnsamma mineralintervall i mjölkande kornas grovfoder



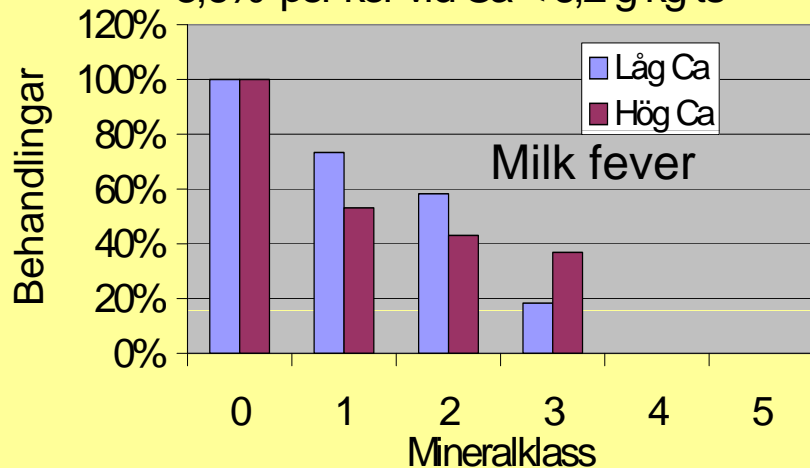
Sintidsberoende störningar beroende på antal gynnsamma mineralintervall i grovfodret. 100 = 23 % behandlingar per ko på hög och 19 % på låg Ca-nivå



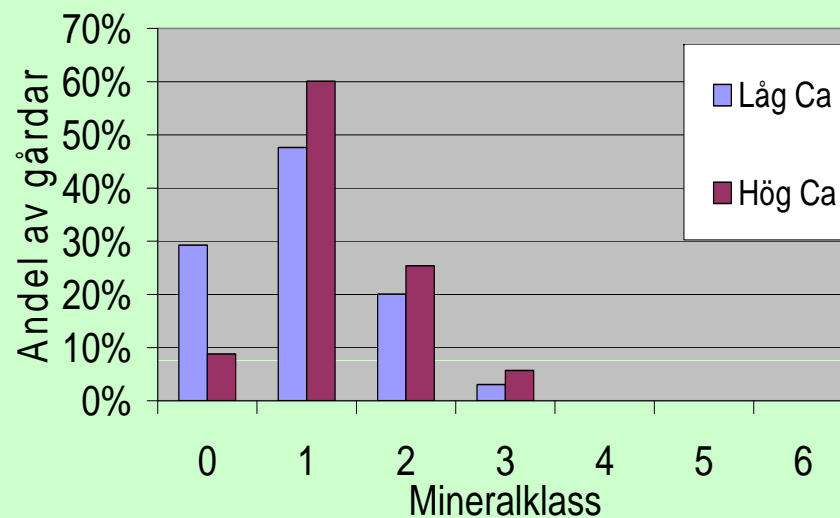
Treatments depending on dry cow feeding



Paresförekomst beroende på mineralklass i sinkornas vallfoder. 100% = 9,1% vid Ca > 6,2 g (Hög) och 5,6% per kor vid Ca < 6,2 g kg ts



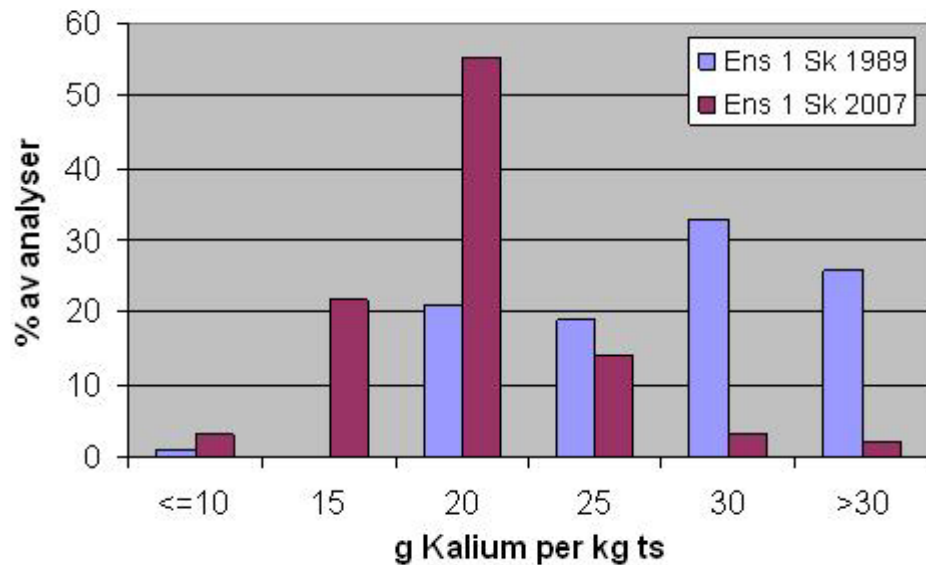
Fördelning av gårdar efter mineralklass och Ca < 6,2 g (Låg) eller > 6,2 g (Hög) i sinkornas vallfoder



After this mineral study

- Almost doubled herd size change from barns for tied cows to free stalls and much higher production.
- Big changes in fertilization with reduced spreading of P and K, but perhaps too much according to forage production?
- And what about changed mineral balance and effects on dairy cow health?
- These questions may perhaps be answered in a new mineral study

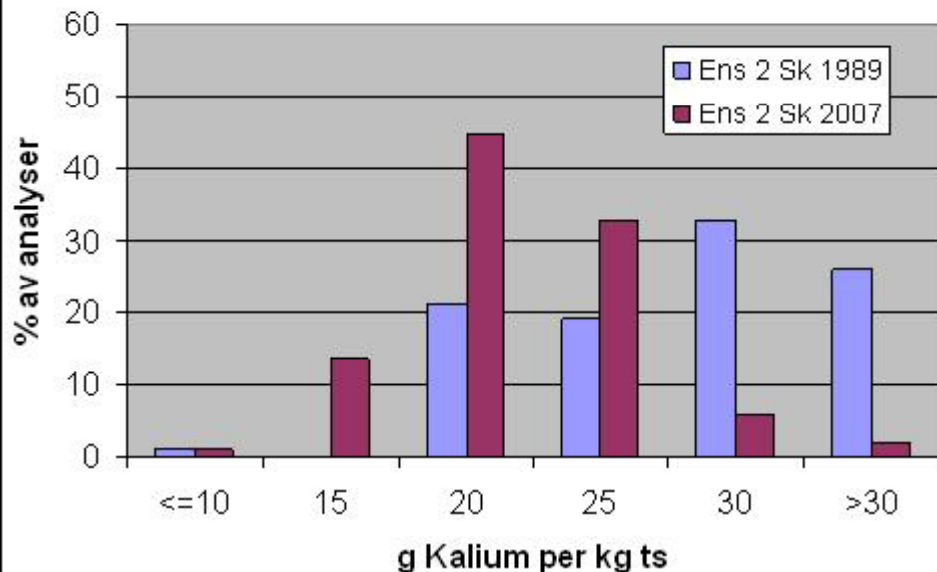
Potassium in 1rst cut



Average 26,6 g k / kg dm 1989
 17,6 g 2007

% of analysis with different Potassium content

Potassium in 2nd cut



Average 25,6 g k / kg dm 1989
 19,6 g 2007

Also less Ca content = less Clover in the harvests 2007

The new mineral study so far

- Results from 119 herds with 6725 dairy cows in Norrmejerier area:
 - Better health on farms with higher Ca content (more clover)
 - 15-22 g K seems to be most positive if $\text{Ca} < 6$ g/ kg dm
 - 18-31 g K seems to be most positive if $\text{Ca} > 6$ g/ kg dm
- Trend towards more treatments with higher Cat Anion Balance (CAB)