



Forage Management for Dry Cows

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The problem

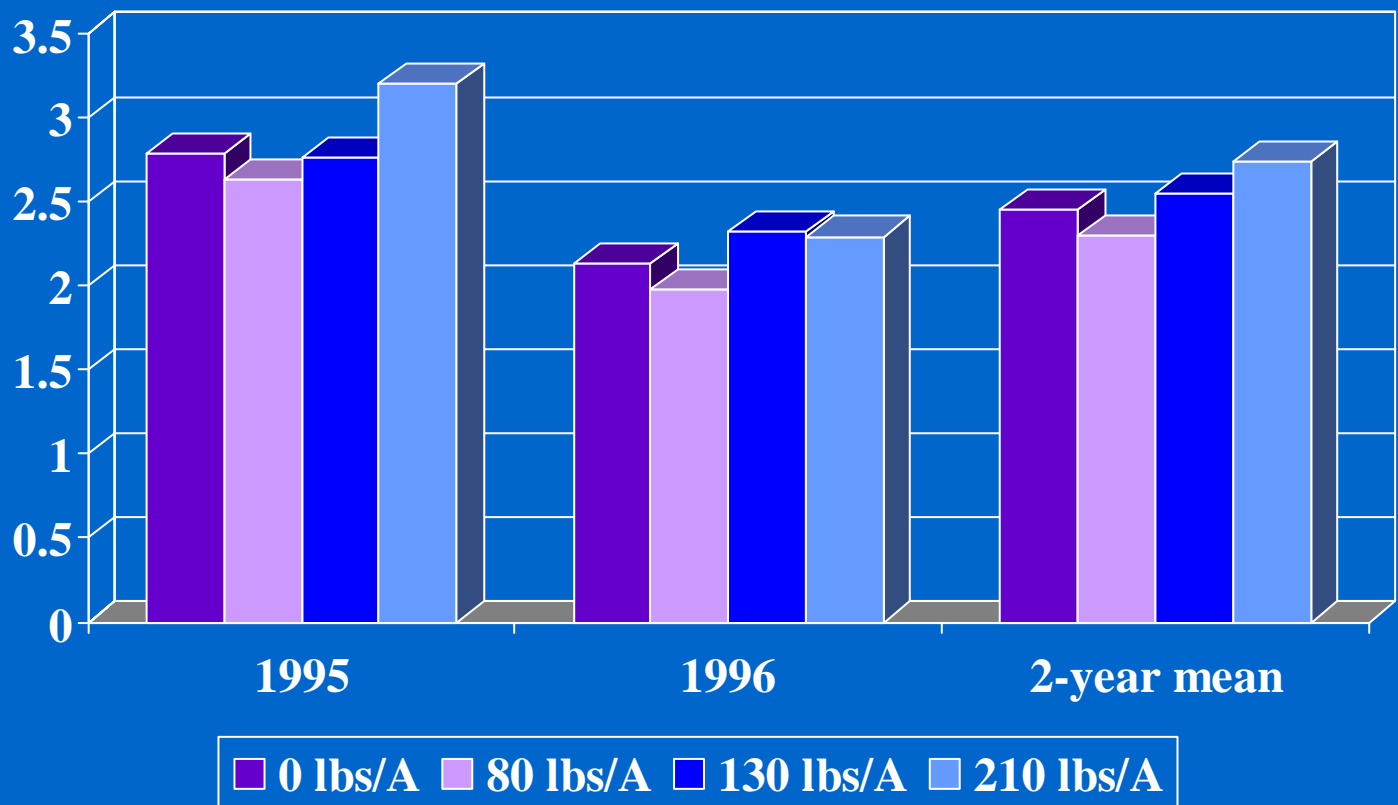
- Prefresh dairy cows (2-3 weeks before calving) need a ration low in potassium (K), preferably 2.0% or less. Grasses are normally 2.5 to 3.0% K.
- Dairy farms bring several kg of K onto the farm as feed and fertilizer for every kg they ship off as milk, cull livestock, etc.
- Most fields on dairy farms are too high in K to produce low K forages.

The problem, continued...

- The root systems of grasses are much more efficient than alfalfa and corn at extracting K from the soil.
- The same soil K level that would starve alfalfa can produce very good yields of 2.5% K grass.
- Producing low K grass requires a plan!

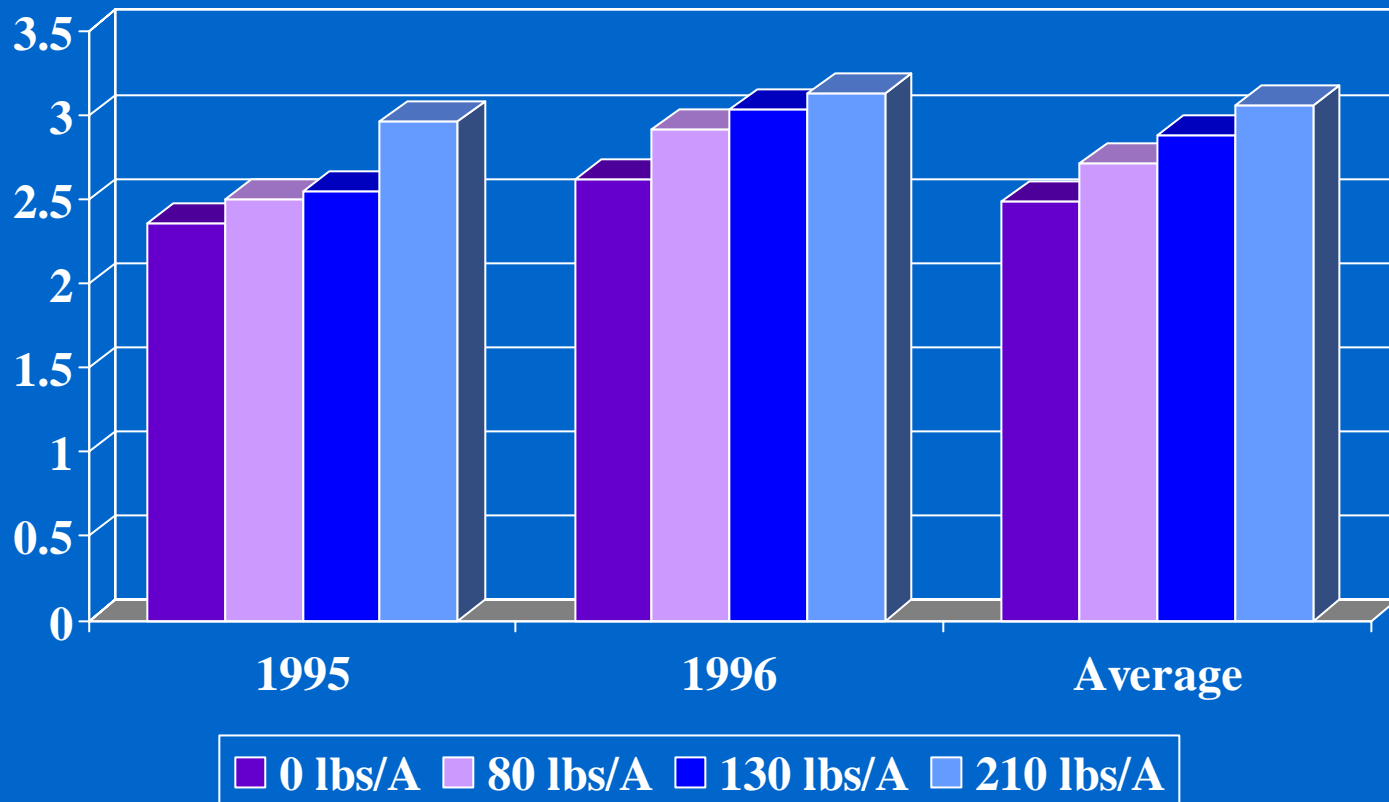
Grass yield vs. K fertilizer rate

Miner Institute, 1995-96, very low soil test K



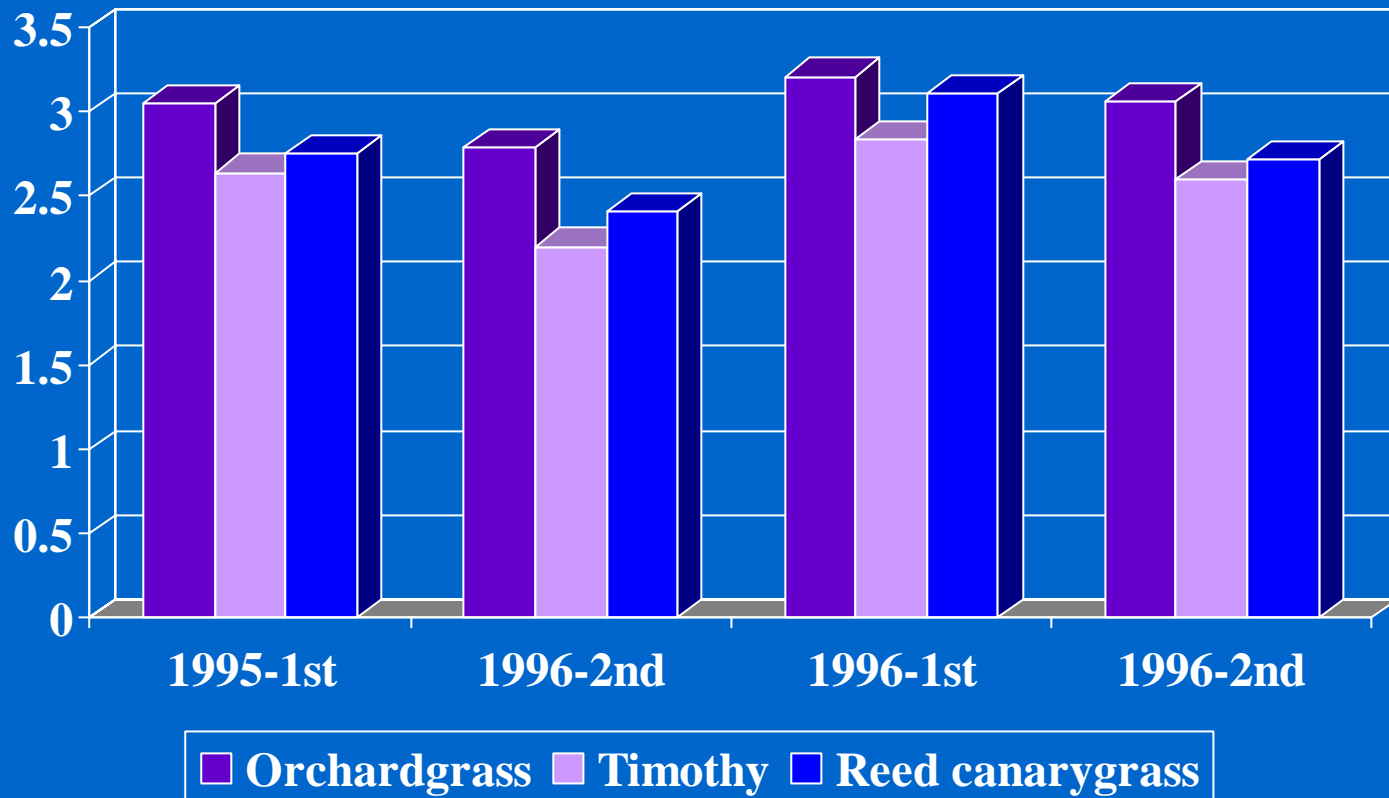
Grass % K vs. K fertilizer rate

Miner Institute 1995-96, very low soil test K



The yield response doesn't even pay for the cost of the 0-0-60.

Grass K concentration vs. species



Recipe for producing low K grasses

- Soil test fields that are candidates for producing low K grasses. Avoid those with a recent manure history—and those close to the barn!
- Timothy, brome grass and reed canarygrass are OK, orchardgrass is not. Tall fescue?
- Choose fields that are medium to low in soil test K, and well enough drained that N can be applied in early spring.

Recipe, continued...

- For the first year or two, apply N (70-80 kg/Ha) in early spring. This will greatly increase yield and protein, and will draw down soil K levels. Apply another 40-50 kg/Ha N after first cut.
- After one or two years, first cut grass should be good for far-off dry cows, and second cut should be low enough in K for prefresh dry cows.
- Grass K concentration is lower under warm, dry growing conditions =second cut grass, not first.

Recipe, continued

- Soil test “dry cow grass” fields every 2-3 years, but don’t apply any manure or K fertilizer, even if recommendations based on soil test call for it.
- Apply manure or K fertilizer only when forage K concentration drops below 1.5%. This will probably take several years.

Harvest management of grasses for dry cows

- Harvest the first cut at heading. Feed this forage to far-off dry cows. Apply N right after first cut.
- Harvest second cut about 45-50 days after first cut, or when there's enough growth to make it worth the trip. Heading of second cut grasses isn't a reliable indicator of quality. Feed this forage to prefresh dry COWS.
- The K in grass silage is more available to cows than the K in dry hay.

Messing with Mother Nature

- After several years of trying to get soil K levels depleted enough to make our dairy nutrition consultants happy, we decided to “work the other side of the street.”

$$(K + Na + 0.15 Mg + 0.15 Ca) - (Cl + 0.25 S + 0.50 P)$$

- Instead of decreasing cations (mainly K), we decided to focus on anions, sulfur (S) and chloride (Cl).

Goal: DCAD less than +350 mEq/kg.

Sulfur research

- By the use of ammonium sulfate we were able to increase forage grass S concentration from 0.5% to 1.1%.
- However, amino acid analysis determined that the S in the grass plant wasn't effective—though it was there, it wasn't used by the cow to decrease DCAD.

Chloride research

- Palaton reed canarygrass established in 1994.
- Treatments applied April 23, 1998:
 - 100# N as ammonium nitrate
 - 100# N + 50 lbs Cl as urea-calcium chloride
 - Control—no fertilizer
- First harvest May 26, second harvest July 22.

Chloride trial results

	Harvest	-N - Cl	-N + Cl	+ N - Cl	+N + Cl	N effect	Cl effect
Yield	1	0.92	0.88	1.86	1.48	*	
	2	0.74	0.75	1.88	1.70	**	
CP %	1	11.6	12.1	19.6	18.1	***	
	2	13.6	12.8	16.7	17.6	*	
K %	1	2.47	2.57	2.41	2.52		
	2	2.37	2.49	2.11	2.27		
Cl%	1	0.59	1.46	0.45	1.27		***
	2	0.72	1.42	0.35	1.04		*
DCAD	1	402	<u>198</u>	440	<u>244</u>		***
	2	<u>326</u>	<u>186</u>	409	<u>264</u>		

*, **, *** = P < 0.05, 0.01, 0.005

N uptake, lbs/acre

	-N -Cl	-N + Cl	+ N - Cl	+N + Cl
1 st cut	37	34	117	86
2 nd cut	32	31	100	96
Total	69	65	217	182

Applied N efficiency was over 100%!

Efficiency of chloride uptake

From a single application of 50 lbs Cl/acre

N	Cl	Cl uptake Harvest 1 lbs/acre	Cl uptake Harvest 2 lbs/acre	Total	Efficiency %
-	-	11	11	22	
-	+	17	13	30	17
+	-	26	21	47	
+	+	38	35	73	52

Chloride, theory vs. practice

- Calcium chloride is very hygroscopic—attracts water. Granular product turns to mush in humid weather.
- When dissolved in water and sprayed under normal field sprayer pressure, solution gets hot enough to melt plastic sprayer lines. (Don't ask how I know this.)
- Cost: Comparable to using anionic salts, but high Cl forage is much more palatable than the salts. Miner Institute research confirmed this, plus effectiveness in decreasing urine pH.



Forage sampling

Doing it right

- Taking “grab samples” from the face of a bunker silo isn’t recommended—hard to get a representative sample. Silo face dries out, hard to sample near the top, etc.
- Best place is coming out of a TMR mixer after mixing. Or, for fresh forage samples, coming out of a self-unloading wagon.
- Or, with a pile or feed cart full of silage, put your closed fist into the pile, open it and grab a handful. Do this 5-6 times in various parts of the pile.

Silage bags

- DO NOT bore holes through the side of a silage bag, and DO NOT let your feed consultant do it.
- Almost impossible to adequately seal the hole and prevent oxygen from being injected into the silage during sampling.
- Take samples going into the silo, or at the face during feedout. Neither is perfect, but...

Checking your sampling technique

- Caution: This may be humbling (but useful) information.
- Take a sample the way you usually do. Then take a second one the same way.
- Send both to the forage lab. The results should be very close.

Wet chemistry vs. NIR

- Don't use NIR for mineral analysis. Impossible for NIR to accurately analyze them—even though they report mineral numbers.
- NIR is fine for DM, protein, NDF. Might be even more reliable for protein and fiber than wet chemistry, especially if the forage is a common one.



Questions?