Feeding Grass to Dairy Cattle

(Could a little grass in your ration be a good thing?)

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Dr. David Combs
Dept. of Dairy Science
University of Wisconsin-Madison

Grass feeding: Perceptions

- **Confinement dairies:**
  - **Grass perceived to be too high in fiber/too low in quality for high producing dairy cows**
  - **Corn silage a higher yielding alternative to perennial or annual grasses**
  - **Pure alfalfa stands easier to manage**
- **Pasture based dairies:**
  - **Have challenged perceptions about grass**
  - **Have created research opportunities**

Why incorporate some grass into dairy rations?

Agronomic

- **Shorter alfalfa rotations, need for higher yields in establishment year**
- **Faster drying**
- **Less risk of winterkill**

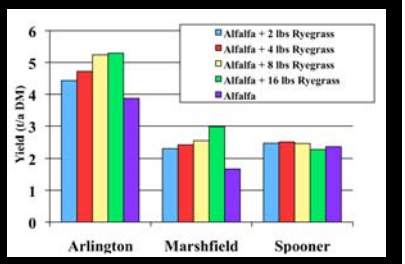
Nutrition

- **Higher total fiber with grass/legume mixtures than alfalfa**
- **Higher proportion of digestible fiber than alfalfa or CS**
- **Possible good fit with high NFC, low fiber diets (ie high corn silage diets)?**

Two to Four lb/acre of ryegrass improved yield w/o reducing alfalfa stands

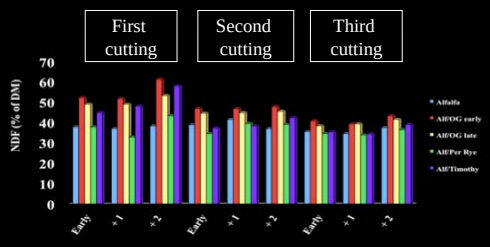
Ryegrass seeded at 2, 4, 8, and 16 lbs.

Note that rates above 4 lbs/a reduced alfalfa stand



Undersander, 2006

Use Late Maturity Grasses and Cut Early!



Undersander, 2006

Alfalfa/grass mixtures for silage

- **Improve yields relative to alfalfa alone**
- **Mixtures must be managed carefully to avoid significant reduction in forage quality: especially first cut**
- **Late maturity grass varieties best fit with alfalfa**

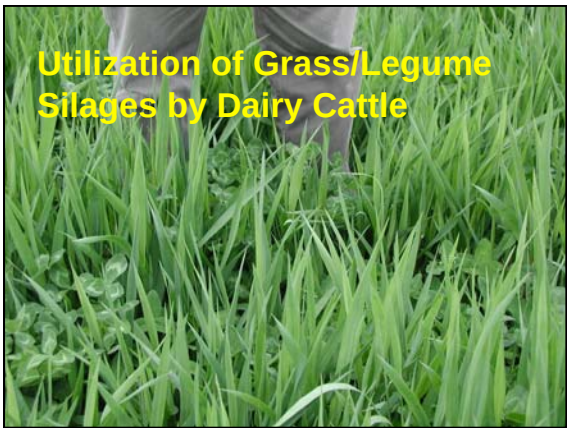
Winter Kill

Agronomic Reasons for Considering Grass in Dairy Rations.

- *Improve forage yields in first year alfalfa stands*
- *Reduce risk of winterkill*
- *Manure management options*

BUT: Must harvest grasses early (especially 1st cut) to avoid forage quality issues!

Utilization of Grass/Legume Silages by Dairy Cattle



How to evaluate grasses in dairy rations

- **'Traditional' replace alfalfa with equal amount of grass**
  - ***Grasses almost always look inferior***
- **Cornell Researchers (Cherney et al) Adjust F:C ratio when grasses are added to keep ration NDF similar**
  - ***All alfalfa is replaced, but NDF intake kept similar***

Production response to perennial ryegrass silage

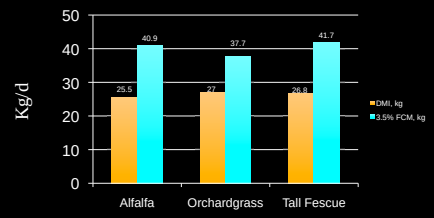
Hoffman et al. JDS, 1998

Item	Ryegrass TMR	Alfalfa TMR
DM intake,lb/d	45[b]	50[a]
FCM yield, lb/d	64	66

Ryegrass silage: 18% CP, 47% NDF
Alfalfa silage: 20 % CP, 44% NDF

Performance of Cows fed Alfalfa, Orchardgrass or Tall Fescue Silage

Cherney et al, 2004 JDS 87:2268-2276



Forage, % DM	62	54	59
HMC, % DM	34	38	33
Protein/mineral	4	8	8
TMR NDF, % DM	27	28	29
TMR CP, % NDF	20	21.5	21.8

Another Opportunity for Grass in Dairy Rations

Good fit with high corn silage (high NFC/low NDF) diets

Evaluate grass as a *source of digestible fiber with low NFC*

Partial substitution of corn silage and alfalfa with grass

Reduce laminitis?

Lameness in Dairy Cattle

Midwest United States: *(Cook, Oetzel and Nordlund,2003)*

Overall 20-25% of cows are mildly to seriously lame.

Causes: 58 % due to disease or trauma, 42% due to nutrition (excessive grain/inadequate fiber)

Severity: influenced by diet, stall design and bedding, stocking density, time in parlor holding area, etc.

Lameness triggered by too much NFC, and not enough effective Fiber

- **Fiber** — Less than 28% NDF
- **NFC** — More than 40% NFC
- **Particle Size** — Finely processed TMR, use of feed co-products.
- **Sorting** — Coarse forage, low TMR moisture
- **'Slug' feeding** — Top dressing, overcrowding

High fiber/low NFC feeds

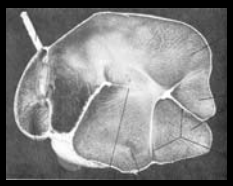
	NDF	NDFD	NFC
	--------- % of DM---------		
Wheat straw	73	32	12
Corn gluten feed	35	82	30.5
Beet pulp	46	84	36
Soyhulls	60	90	18
High quality grass silage	40 to 50	60 to 70	18 to 25

Composition of high quality silages

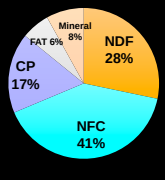
	% CP	% NDF	NDFD	% NFC
Tall Fescue	22	47	62	20
Orchardgrass	18	50	65	21
Reed Canarygrass	20	52	68	17
Perennial Rye	18	48	68	23
Italian Rye	20	46	68	23
Alfalfa	20	40	48	28
Corn Silage	9	41	68	41

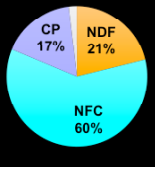
Partial Substitution Approach

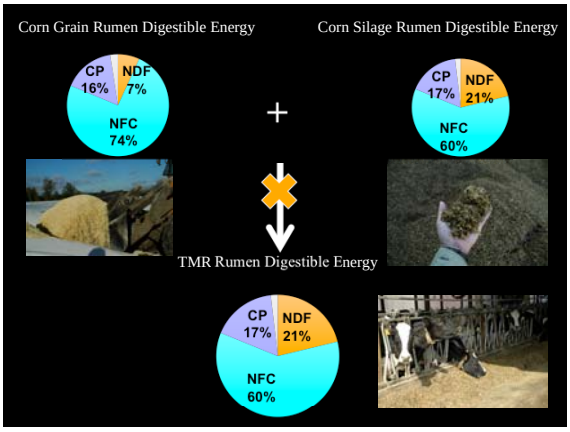
TMR, % of DM

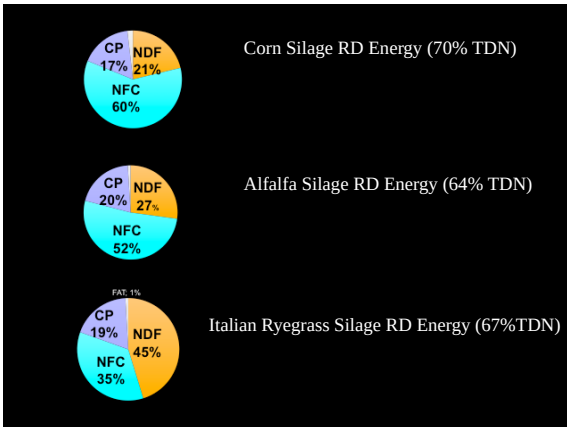


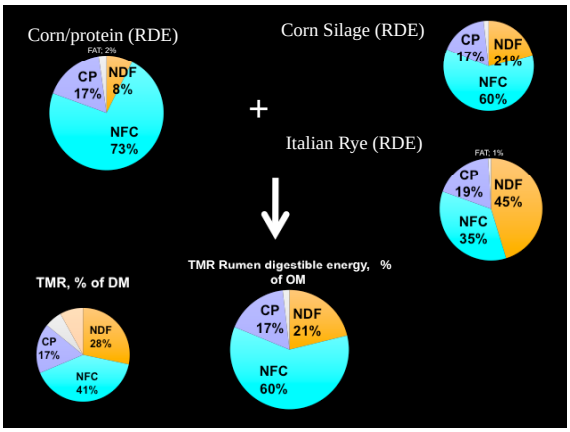
Rumen digestible energy, % of OM





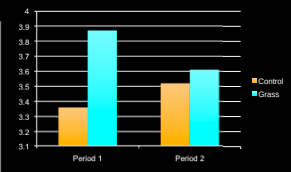


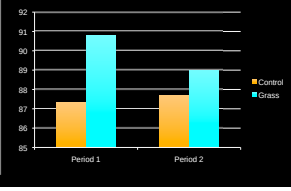




DKC 371, 2009

	CON	TRT
	(DM % of Diet)	
NDF	24.8	26.9
NFC	48.5	46.5
Corn Silage	24.65	16.58
Alf. Silage	25.49	16.03
Rye Silage	0	17.53
HMSC	29.5	29.5
Conc.	20.36	20.36





Partial Substitution of CS and Alfalfa with Italian Ryegrass Silage:

- ✓ Significantly increased Fat Test (P<0.05)
- ✓ Tended to increase milk yield in mid-lactation cows
- ✓ We were not able to detect differences in lameness

Incorporating Grass with Corn Silage Diets

Grasses:

- ✓ Contain higher NDF levels than alfalfa or corn silage
- ✓ Have higher NDFD than alfalfa
- ✓ Need for evaluating potential of grass/legume mixtures for high NFC, low fiber diets (ie high corn silage rations)

What grass should I use?

www.uwex.edu/ces/forage/resdata/grass_table.htm

Selection Criteria (Most important first)

- **Yield**
- **Persistence**
- **Late maturity**
- **Establishment**

Grasses for silage

	Yield	Persistence	Late maturity	Establishment	Other
Tall Fescue	***	***	***	***	Select rust resistant varieties
Orchardgrass	**	***	**	***	Select late maturity varieties
Reed Canarygrass	***	***	***	*	Select low alkaloid varieties
Meadow Fescue	**	**	***	*	
Brome	**	*	**	***	
Timothy	*	***	**	***	Poor drought tolerance and seasonal distribution
Bluegrass	**	***	**	***	Poor drought tolerance and seasonal distribution
Perennial Rye	***	*	***	***	Poor drought tolerance
Italian Rye	***	0	***	***	Poor drought tolerance

Recommended Alfalfa/Grass mixtures

Alfalfa/Tall Fescue

Alfalfa/Orchard grass

Summary: Utilizing Grass

Grasses:

- ✓ Contain higher NDF levels than alfalfa or corn silage
- ✓ Have higher NDFD than alfalfa

Research:

- ✓ Most trials have compared grasses to alfalfa, results difficult to interpret because of confounding effects of fiber level or F:C levels of treatment diets
- ✓ Need for evaluating potential of grass/legume mixtures for high NFC, low fiber diets (ie high corn silage rations)

Profit Potential for Grass in Dairy Rations

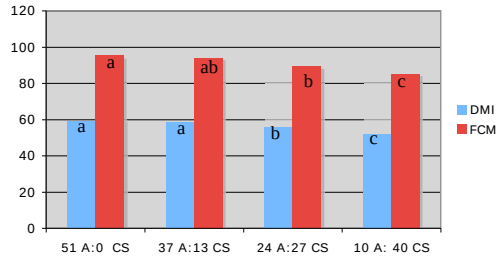
Agronomic

- ***Improve forage yields in first year alfalfa stands***
- ***Manure management***
- ***Reduce risk of winterkill***

Nutritional

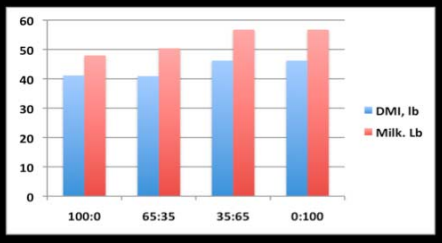
- ***Good fit with high corn silage (high NFC/low NDF) diets***
  - ***Excellent source of digestible fiber***
  - ***Reduce laminitis?***

Effects of varying ratios of alfalfa silage to corn silage on milk production and intake (Brito and Broderick JDS 2006)



Alfalfa Silage: 38% NDF, Corn Silage: 41% NDF
TMR's: 23-25% NDF, 48-49% NFC: Cows 93 DIM at start of experiment

Substituting Annual Rye for Corn Silage Increased Intake and Milk Yield



NFC, % TMR DM	**47**	**43**	**39**	**36**
NDF, % TMR DM	**28**	**31**	**39**	**35**

Corn Silage:Annual Rye Ratio

Bernard et al. 2002, JDS