

Nutritional Reasons to Feed Grass with Corn Silage and Alfalfa

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Why incorporate some grass into dairy rations?

Agronomic

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

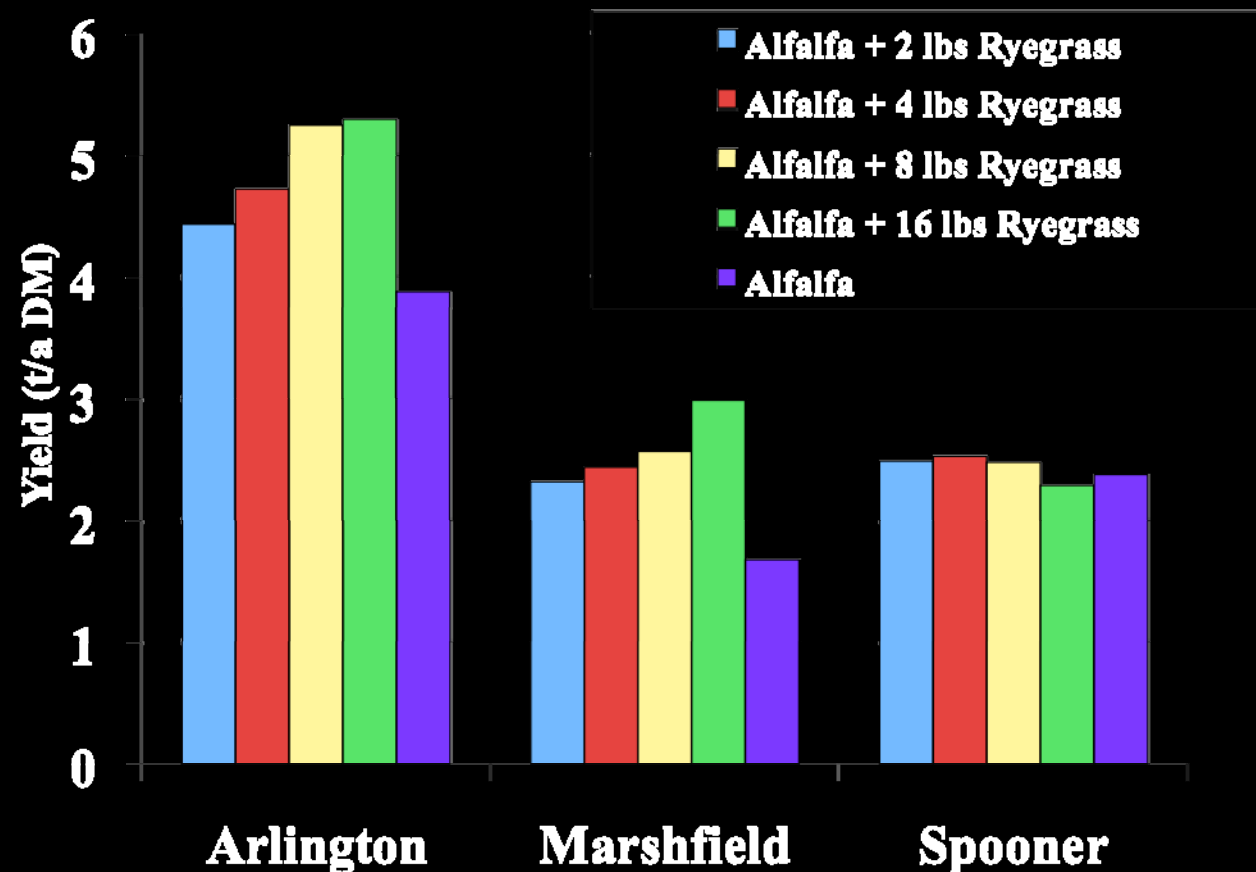
Nutrition

- 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)?

Effect of Italian Ryegrass Seeding Rate on Forage Yield

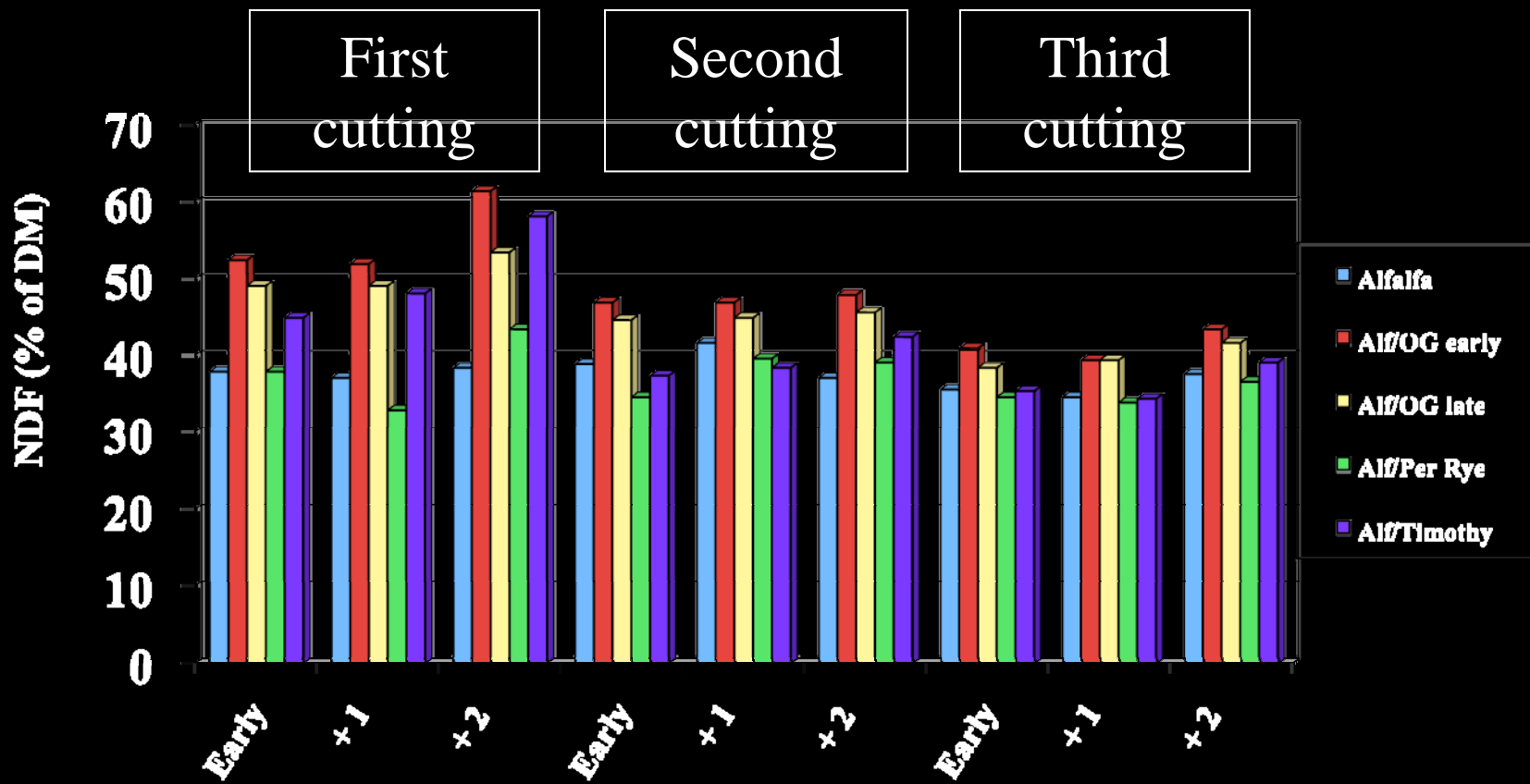
Ryegrass seeded at 2, 4, 8, and 16 lbs.

Note that rates above 4 lbs/a reduced alfalfa stand



Undersander, 2006

Quality changes in Alfalfa-Grass mixtures with Maturity - Marshfield NDF



Undersander, 2006



Agronomic Reasons for Considering Grass in Dairy Rations.

Improve forage yields in first year alfalfa stands

Reduce risk of winterkill

Manure management

A photograph of a person standing in a lush green field of grass and legumes. The person is wearing a grey long-sleeved shirt and dark pants, and is leaning forward, possibly examining the plants. The field is filled with tall, green grasses and smaller, clover-like legumes. The text "Utilization of Grass/Legume Silages by Dairy Cattle" is overlaid in yellow on the upper left portion of the image.

Utilization of Grass/Legume Silages by Dairy Cattle

Typical composition of high quality grass forages

Forage	% CP	% NDF	NDFD	% NFC
Reed Canarygrass	20	55	68	12.5
Perennial Rye	18	47	65	22.5
Tall Fescue	17	56	60	14.5
Annual Rye	20	55	60	12.5
Orchardgrass	16	60	55	11.5
Alfalfa	20	40	48	27.5
Corn Silage	9	41	68	37.5

Production response to perennial ryegrass silage

Hoffman et al. JDS, 1998

Item	60% Ryegrass TMR	70% 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

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)

A “New” Opportunity for Incorporating Grass

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

*Excellent source of digestible fiber
Reduce laminitis?*

Fiber and NFC for Dairy Cows

Typical analysis of high group TMR for high producing herds
WI High herds *NRC(2001)

NDF, %	27-30	>25
NDF from forage	19-22	>19
NDFD (% of NDF),	53-67	
NFC, %	38-43	<44

*Kaiser and Shaver, 2004 Wisconsin high herd summary, UW extension

Alfalfa vs Corn Silage: with herd expansion, more CS

Improving yield and quality of CS hybrids

- ✓ **20-25% more DM/acre with corn silage than alfalfa**
- ✓ **Recent advances in development of corn silage hybrids**

Less harvest risk

- ✓ **Winterkill**
- ✓ **Weather: rain damage and 'window of harvest'**

Manure management

- ✓ **4 ton alfalfa => 60 lb P_2O_5 , 220 lb K_2O**
- ✓ **7 ton corn silage => 60 lb P_2O_5 , 120 lb K_2O , + Nitrogen**

Alfalfa vs Corn Silage: nutritional considerations

Alfalfa upper limit : ? 75% of Forage

- ✓ **High CP, RDP, Ca**
- ✓ **Low RUP, NFC**
- ✓ **Need for high starch/NFC supplements?**

Corn silage upper limit: 65 - 75 % of Forage

- ✓ **High Starch, Moisture, Acid**
- ✓ **Low CP, Ca, peNDF**
- ✓ **Supplements with high CP, lower NFC fit well**

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.

Potential Losses Due to Lameness

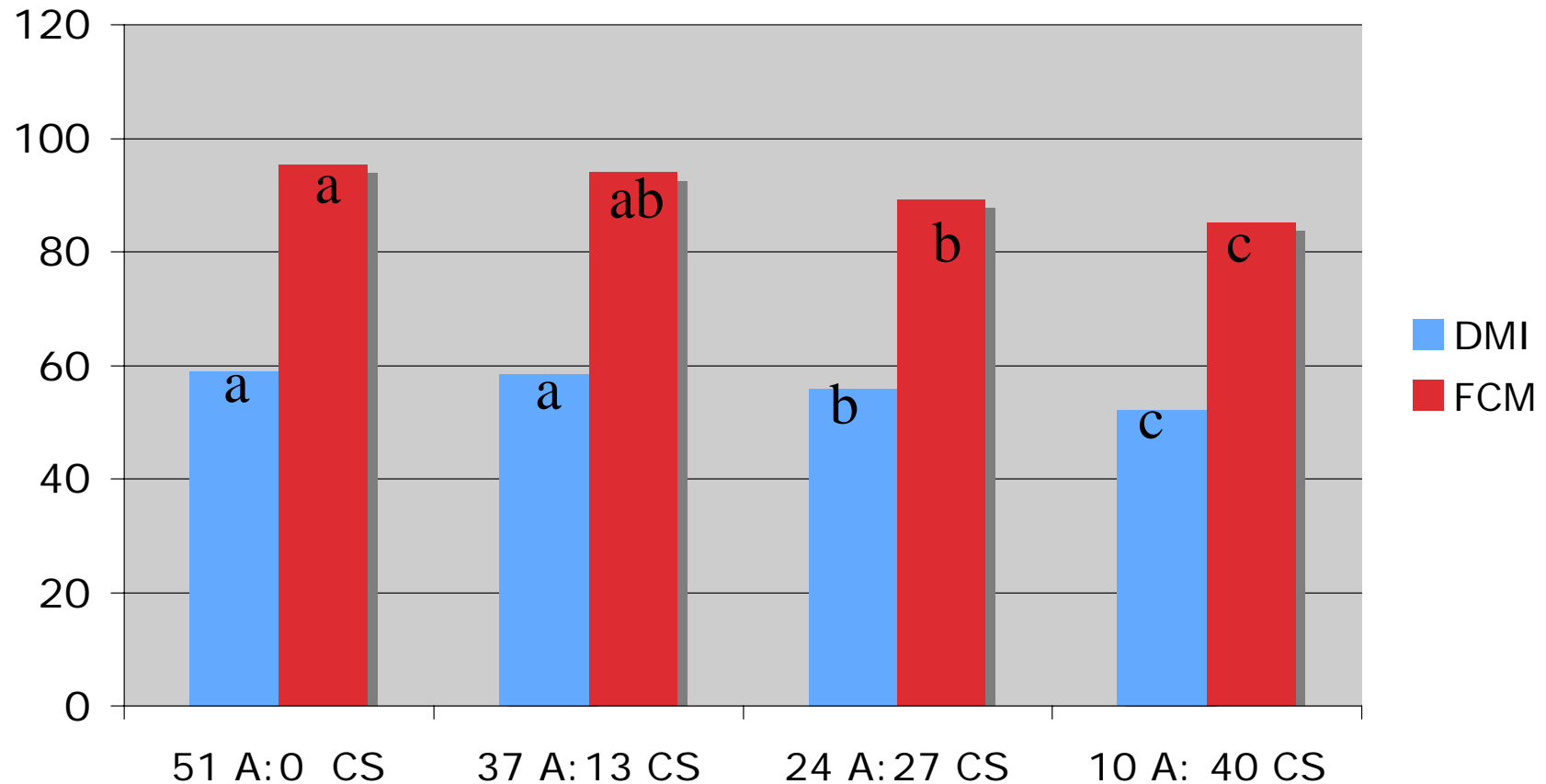
Locomotion Score	2 (Mild)	3 (Moderate)	4 (Severe)	5 (Severe)
DM intake reduction, lb	1	3	7	15
Milk Yield Loss, lb	0	5	15	30

Adapted from P. Robinson. UC-Davis Cooperative Extension

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 of feed co-products.**
- **Sorting** **Coarse forage, low TMR
moisture**
- **'Slug' feeding** **Top dressing, overcrowding**

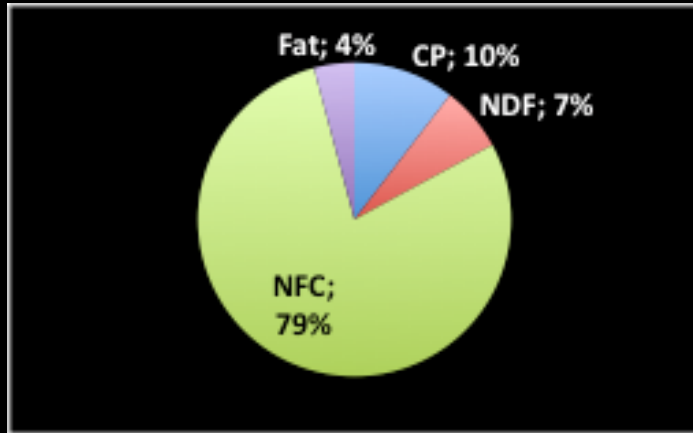
Effects of varying ratios of alfalfa silage to corn silage on milk production and intake (Brito and Broderick JDS 2006)



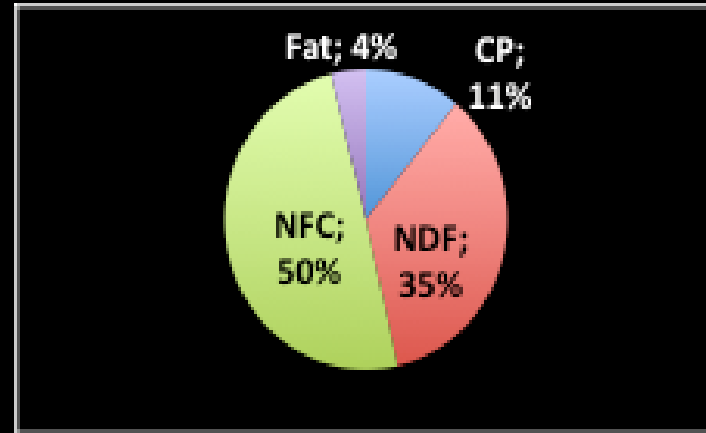
Alfalfa Silage: 38% NDF, Corn Silage: 41% NDF

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

Corn Energy



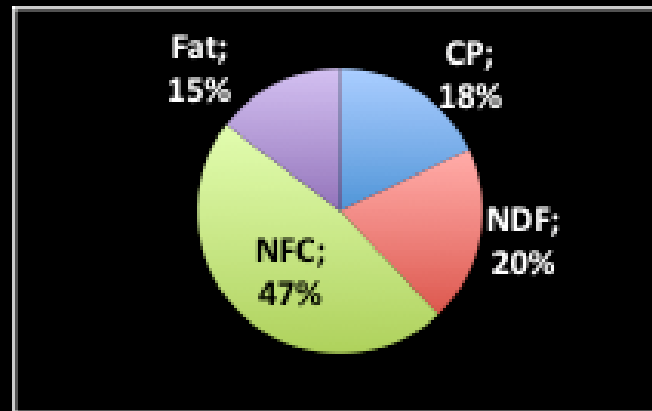
Corn Silage Energy

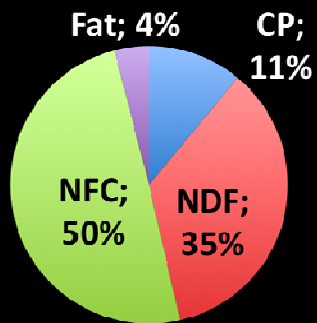


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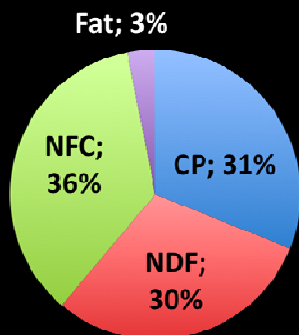


TMR Energy

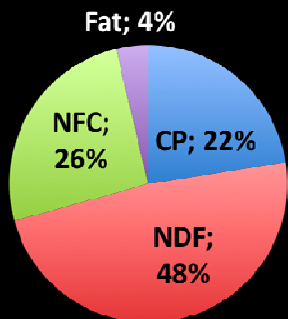




Corn Silage Energy (70% TDN)

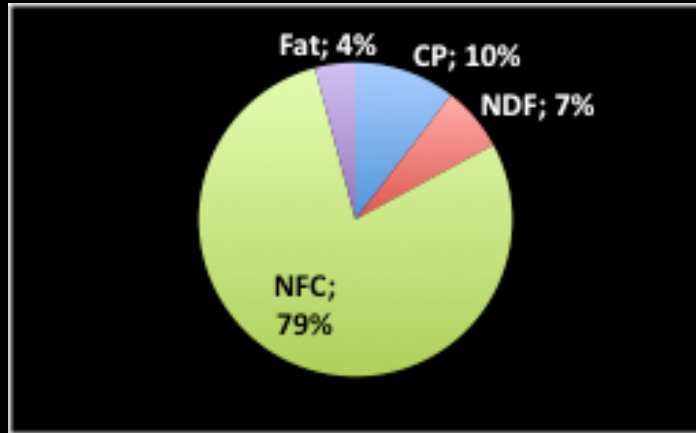


Alfalfa Silage Energy (64% TDN)



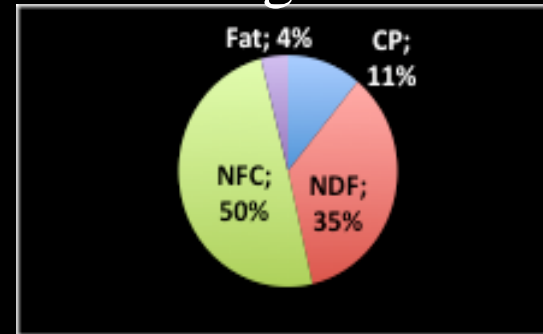
Italian Ryegrass Silage Energy (67% TDN)

Corn Grain

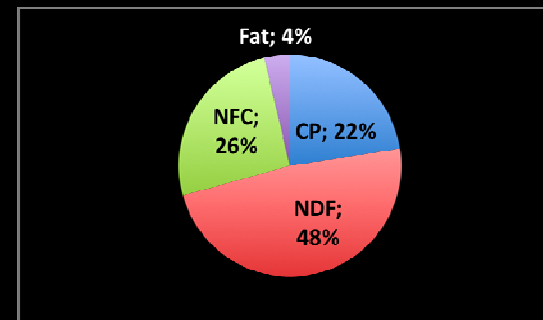


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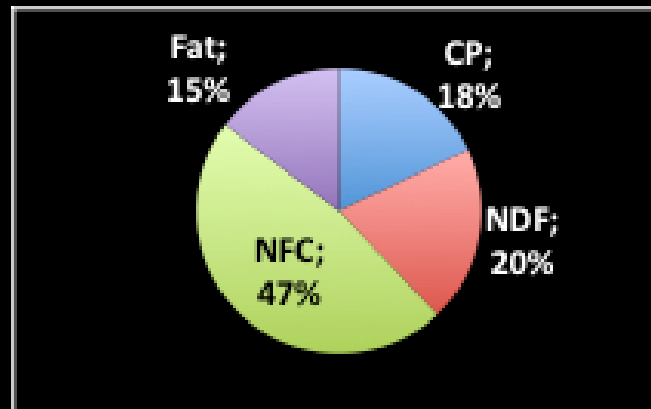
Corn Silage



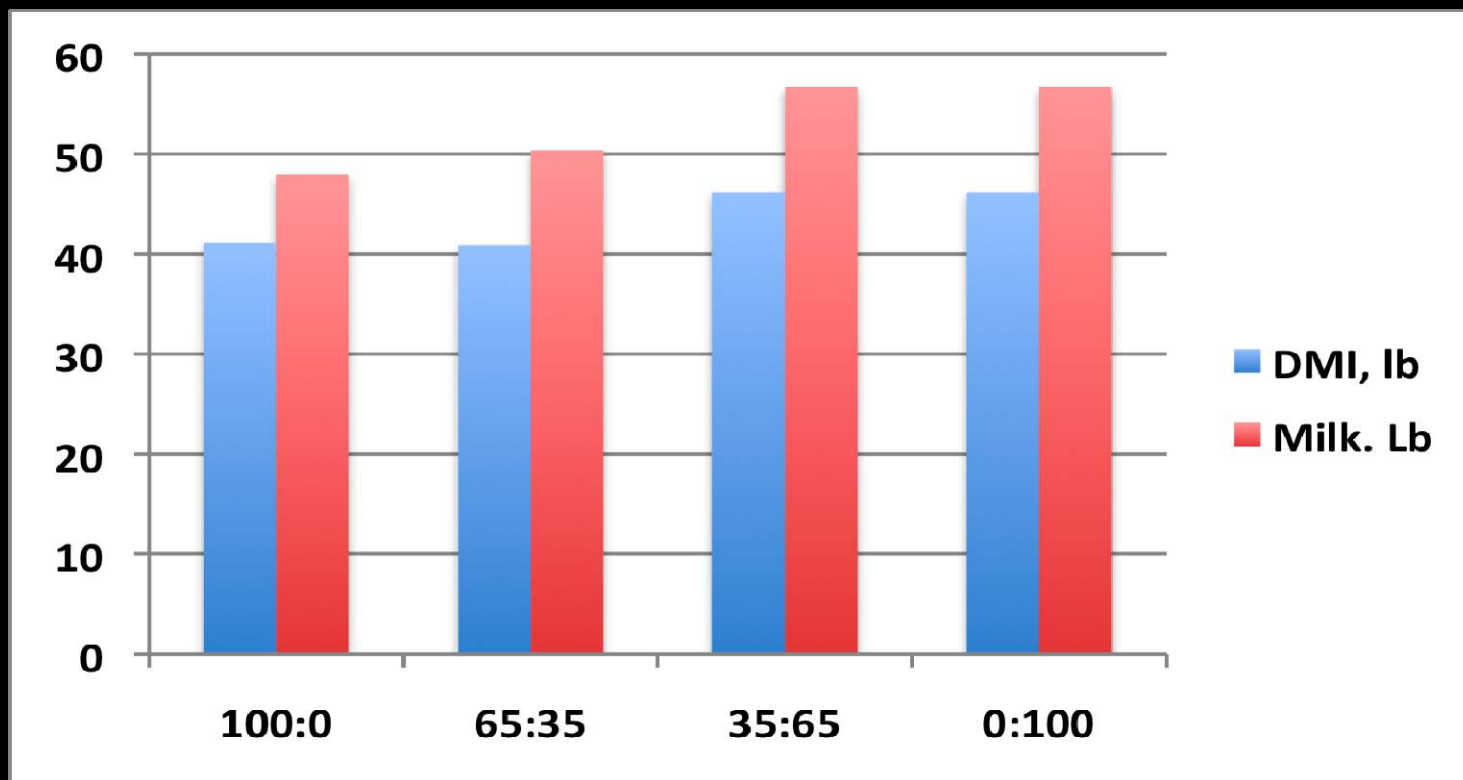
Italian Rye



TMR Energy



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				

Incorporating Grass with Corn Silage Diets

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Potential for Grass in Dairy Rations

Agronomic Reasons

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Nutritional Reasons

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Web Resources

UW Extension Forage Resources

www.uwex.edu/ces/crops/uwforage/uwforage.htm

UW Extension Corn Agronomy

<http://corn.agronomy.wisc.edu/Extension.htm>

UW Department of Dairy Science

<http://www.wisc.edu/dysci/>