

Supplementing Lactating Cows Requires Different Thinking

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Why Graze?

- Low cost feed source for seasonal dairy
- Least cost way to begin dairying
- Protein source for conventional dairy

Grazing when grazing wasn't cool!! WHY?

- Blaser Resources available
- Turn off the mix wagon and graze 8-12 weeks
- Plant the corn, get the forage crops in
- Fun to do – did not over shadow major research
- Seasonal grazing not on radar screen

Good Pasture – WVU Circular 379 – Early '50s

- Young and growing – more concentrated nutrients
- Dense and abundant (150 lb/d)
- Proper height – 6 in. ideal
- Palatable and digestible – species important
- Even growth all season

What factors affect supplementation

- Composition of cool-season swards
- Limits on intake of pasture
- Pasture protein: asset or liability

Composition of grass pasture

Nutrient	Spring	Summer
Crude protein %	23.0	20.0
RUP, % of CP	22.0	28.0
Sol P, % of CP	32.0	28.0
ADF %	26.0	31.0
NDF %	42.0	52.0
NE, Mcal lb ⁻¹	0.75	0.72
Non-fiber CHO (NFC)	18.0	14.0

Modified Muller and Fales (1998)

- Recommended NE_L for heavily lactating cow is 0.78
- NE_L of corn silage is 0.72

Limits on Intake

(Kolver and Muller, 1998)

	Grazed ryegrass	TMR
Milk Yield	65	97
DM Intake	41.8 (3.4% BW) ~20 lb grain	51.5 (3.9% BW)

- High producing cows drop a lot in milk when moved from TMR to pasture
- Voisin – eat (work) no more than 8 h/d
- Intake depends on biting rate and sward density and height
 - Intake decreases in lower density stands as height decreases (Mayne, 1997)
- On pasture only, milk yield limited to 50-55 lb/d

Pasture protein: asset or liability

PLUS

- Crude protein intake good if captured in rumen
- Fermentable carbohydrates drive microbial growth and N capture
- Corn increases microbial yield 1.4 fold in continuous culture fermenters

Pasture protein: asset or liability

MINUS

- Excess NH_3 in blood costs energy, 3 to 6 lb milk (Kolver, 1997)
- Excess NH_3 may adversely affect reproduction (MUN above 15-16 mg/d)

How much grain?

- Responses in milk yield are small with increments above 10 lb grain (Fat test↓).
- In 1995, Holsteins produced more milk (67.8 vs. 61.4) when fed 20 vs 12 lb of corn, brewers grains and whole cottonseed (Table 2). Jersey response was 1.4 lb milk.

How much grain?

- Milk yield (55.2 lb) was not different due to CP (12 vs 16%) or amount of supplement (14 or 21 lb). (Jones-Endsley et al., 1997).
- When corn-based (12% CP) grain was supplemented at 0, 11, and 22 lb, milk yield was 48, 59, and 67 lb. DMI increases with supplementation. (Reis and Combs, 2000)

How much grain?

- Penn State (Muller, 1998) developed a table of feeding guidelines for grass-based dairying. Table 3 in Proceedings.
- Penn State has not shown grain amounts are effective for milk yield response. However, increments in grain increases intake in high-yielding cows and improves body condition with possible improved conception.
- Grain feeding follows the law of diminishing returns.

Synchrony

- Synchronizing N and fermentable energy in rumen may be useful (Kolver, 1997).
- Grain several x daily, grain after a period of grazing, or grains with different rates of fermentability have not shown promise
- Feeding a partial TMR before rather than after grazing captured more ruminal N, but no effect on milk yield or components

Substitution

- For each unit of grain fed, pasture DMI decreases 0.5-0.8 lb (Muller and Fales, 1998).
- With more grain, total DMI will likely increase (Reis and Combs, 2000).
- Feeding more grain extends supply of grass (has advantages).
- With silage or TMR, substitution rate is 1:1.

Supplementing with mixed diets (TMR)

- Provides intake adjustments with variation in pasture
- Stable base diet with less animal adjustment
- Extra job to mix. Silage may spoil.
- Our data – no advantage over corn supplementation
- Makes sense if it supplies 60% or more of DMI (no data).

Protein supplementation

- Protein in grain (14-16%) may enhance intake
- Positive response (2.5 lb) in milk yield by replacing corn with soybean meal (18% CP) and additional milk yield (4 lb) by replacing SBM with dried brewers and corn gluten meal (Table 4, Proceedings)

Protein supplementation

- In other studies with bypass sources, including fishmeal, we have gotten no response.
- My opinion – take care to capture rumen N with carbohydrates and not be concerned about bypass sources.
- Energy is still first-limiting.

Conclusions

- Intake can be increased by grain supplementation.
- Microbial protein synthesis will be increased.
- Reproductive disturbances and costs from excess N may be reduced.

Conclusions

- Amounts of grain would usually be from 10 to 20 lb. 1:4 ratio usually makes sense (>40lb milk)
- 12% CP (with minerals) adequate; should be readily fermentable.
- Expect fat test to drop as starch increases in diet