10th Mid-Atlantic Dairy Grazing Conference

Supplementing Pasture Systems
Is Corn Silage an Option?

Georgia Bulldogs 34
Missouri Tigers 0

Internet Foto Pubblicita

Supplementing Pasture?

Should We Feed Corn Silage?

- Intuitively we would say "YES" ….BUT
- The Typical University Answer!
- Yes?
- No?
- Maybe?

So Why Corn Silage

How it Balances

- Pasture
  - High Crude Protein
  - High RDP (> 70% ?)
  - Low RUP
  - Low NFC, NSC, Starch
  - Highly Digestible
  - Moderate Energy (0.6-0.7 mcal NEl)
  - Low effective fiber?
- Corn Silage
  - Low Crude Protein
  - Moderate-high NFC
  - Digestible but slower passage rate
  - Moderate-high energy (0.7-0.75 mcal NEl)
  - Effective fiber if harvested correct

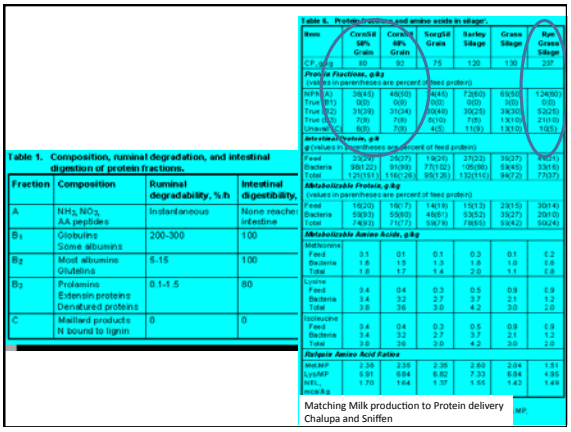


Table 1. Composition, ruminal degradation, and intestinal digestion of protein fractions.

Fraction	Composition	Ruminal degradability, %/h	Intestinal digestibility,
A	NH_3, NO_3, AA peptides	Instantaneous	None reaches intestine
B_1	Globulins Some albumins	200-300	100
B_2	Most albumins Glutelins	6-15	100
B_3	Prolamins Extensin proteins Denatured proteins	0.1-1.5	80
C	Maillard products N bound to lignin	0	0

Matching Milk production to Protein delivery
Chalupa and Sniffen

10th Mid-Atlantic Dairy Grazing Conference

Supplementing Pasture Systems
Is Corn Silage an Option?

Thought on Protein Fractions

- Rumen undegradable protein (RUP) needed?
- Penn State suggests
  - 0.5-1.5 Pounds of RUP
  - Cows milking greater than 70#/day
  - Brewers, Distillers, Corn Gluten, roasted/cooked soybeans are possible sources
- Research Results are Iffy?

Substitution Rate

- Amount of pasture replaced by 1 pound of supplement/forage
- Grains
  - 0.2 to 1.0 pounds of substitution
  - Can be breed/type specific?
  - Depends of stage of lactation
- Forages
  - Usually higher…rate of passage
  - 0.8 to 1.2 pounds of substitution
- Is this bad????

Should We Feed Corn Silage?

- What are your goals and objectives?
  - Increase milk/cow?
  - Extend lactation?
- Risk aversion?
  - Carries your stocking rate through thin times?
- Fully fed cows?
- Enhance reproductive performance?
- Others?

Should We Feed Corn Silage?

- What are your goals and objectives?
  - Increase milk/cow? Depends
  - Extend lactation? Yes
- Risk aversion? Yes
  - Carries your stocking rate through thin times?
- Fully fed cows? Yes
- Enhance reproductive performance? Possibly
- Others?

Who Knows?

- Would think the high NFC from CS and protein in rumen would elicit increase in milk production and milk components
- Bryant and Donnelly, Holden et al found no positive correlation between corn silage and pasture feeding on milk production
- Campbell et al found increased milk production by feeding corn silage but was due to increased DIM rather than nutritionally
- Corn silage may decrease BUN/MUN either through more efficient use of N across ruminal wall or a decreased RDP?
- Substitution rate .47-1.4 kg
- Perez-Prieto et al found positive correlation between milk and production and feeding of corn silage
  - Low pasture availability and poor quality pasture-go figure!
- Post-partum anovulatory interval (8 days shorter)and 6 week pregnancy rate (17% greater) NSC 30 vs 18% of DMI (Burke et al)
  - Suggests nutritional signals associated with NSC independent of energy balance
  - Trial conducted w high NSC grains but would assume similar impact from CS
- Australia reports marginal return to the additional feeding of corn silage is 0.7 to 0.9 lb of milk per lb of corn silage dry matter when feeding up to 10 lb of corn silage DM/cow/day.

Remember the Amount of "Corn" in Corn Silage

Table 1. Bushels of grain contained in a ton of corn silage. Values are derived from experiments conducted in Wisconsin between 1997 and 2005.

Grain yield @ 15.5% moisture	0% moisture		60% moisture		65% moisture		70% moisture	
	Silage yield	Grain equivalent per ton of silage	Silage yield	Grain equivalent per ton of silage	Silage yield	Grain equivalent per ton of silage	Silage yield	Grain equivalent per ton of silage
Bu/A	T/A	Bu/T	T/A	Bu/T	T/A	Bu/T	T/A	Bu/T
25	2.4	24.9	6.0	4.1	6.9	3.6	8.0	3.1
50	3.2	24.1	7.9	6.3	9.1	5.5	10.6	4.7
75	4.0	23.3	10.0	7.5	11.4	6.6	13.3	5.7
100	4.9	22.4	12.2	8.2	13.9	7.2	16.2	6.2
125	5.9	21.5	14.6	8.5	16.7	7.5	19.5	6.4
150	7.0	20.3	17.5	8.6	20.0	7.5	23.3	6.4
175	8.4	19.0	20.9	8.4	23.9	7.3	27.9	6.3
200	10.2	17.1	25.6	7.8	29.3	6.8	34.1	5.9

Joe Lauer, *Corn Agronomist*
http://corn.agronomy.wisc.edu

10th Mid-Atlantic Dairy Grazing Conference

Supplementing Pasture Systems
Is Corn Silage an Option?

Corn Silage as a Supplement for Grazing Dairy Cows

	All Pasture	Corn Silage 6.8 #	Corn Silage 5.75# CSM 1.1#	Corn Silage 18#	Corn Silage 15.1# CSM 2.9#
Pasture DMI	35.6	31.9	30.6	20.5	23.8
Suppl. DMI	0	6.8	6.8	18.0	18.0
TOTAL DMI	35.6	38.7	37.4	38.5	41.8
% CS in Diet	0.00%	17.60%	15.30%	46.60%	36.60%
Milk Yield					
week 3-6	42.9	45.8	45.5	42.5	46.0
week 7-10	38.5	41.1	40.9	38.3	42.5
% BF					
week 3-6	4.8%	4.1%	4.3%	4.4%	4.3%
week 7-10	4.5%	4.1%	4.4%	4.3%	4.3%

Moran et al, Proc. Aust. Soc. Anim. Prod.

Addition of Corn Silage to Pasture Systems
Ruakura Farm #2

	Control	170# N/acre	170# N/acre plus Corn Silage
Cows/acre	1.31	1.31	1.74
Corn Silage (# DM/cow)	0	0	2827
# milk/cow	8086	9412	9464
# milk/acre			
days in milk			

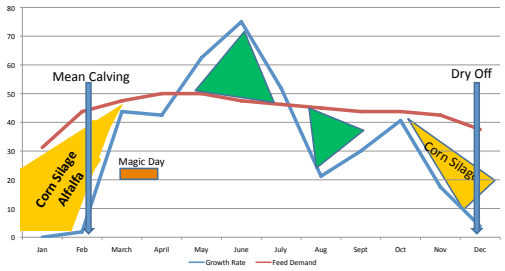
MacDonald, 1999

Addition of Corn Silage to Pasture Systems
Ruakura Farm #2

	Control	170# N/acre	170# N/acre plus Corn Silage
Cows/acre	1.31	1.31	1.74
Corn Silage (# DM/cow)	0	0	2827
# milk/cow	8086	9412	9464
# milk/acre	10629	12372	16462
days in milk	253	266	277

MacDonald, 1999

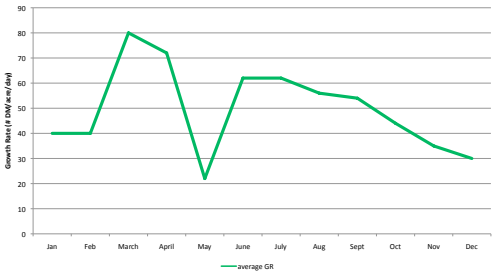
SW Center Dairy Feeding Strategy



Estimated Pasture Supply for Jumping Gully

		Growth Rate (Pounds Dry Matter per Day per Acre)											
Species	**Acres**	**Jan**	**Feb**	**March**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Bermudagrass/Crabgrass	45				10	40	110	110	70	30			
Crabgrass/Millet	90					35	100	100	70				
Annual Ryegrass	225	40	40	80	70					30	40	35	30
Corn Silage-Millet	90					corn	corn	corn	35	45	10		
Average Growth Rate	**1**	**40**	**40**	**80**	**72**	**22**	**62**	**62**	**56**	**54**	**44**	**35**	**30**

Estimated Pasture Supply for Jumping Gully

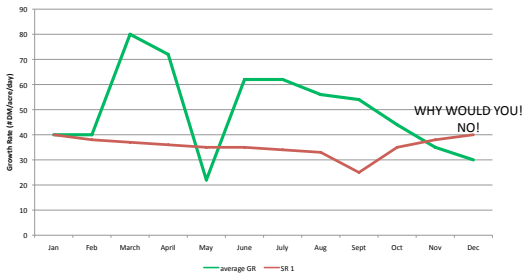


Stacey A. Hamilton
Dairy Specialist, University of Missouri

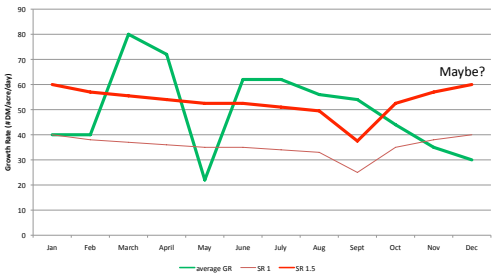
10th Mid-Atlantic Dairy Grazing Conference

Supplementing Pasture Systems
Is Corn Silage an Option?

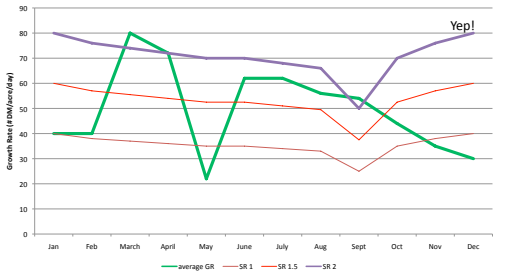
Estimated Pasture Supply for Jumping Gully
Feed Demand for Stocking Rate 1 Cow per Acre



Estimated Pasture Supply for Jumping Gully
Feed Demand for Stocking Rate 2.0 Cows per Acre

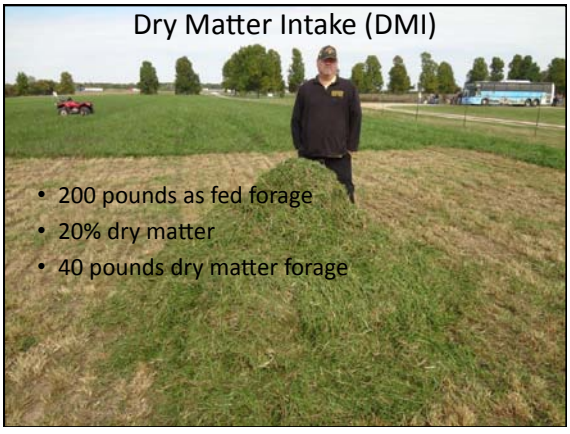


Estimated Pasture Supply for Jumping Gully
Feed Demand for Stocking Rate 2.0 Cows per Acre



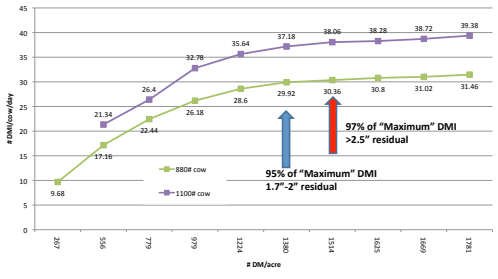
Can we achieve this kind of pasture intake?

Dry Matter Intake (DMI)



- 200 pounds as fed forage
- 20% dry matter
- 40 pounds dry matter forage

Grazing Residual and Herbage Intake



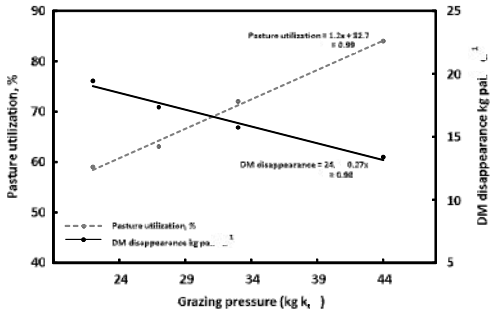
Chris Glassey, MS Thesis, Massey University

Stacey A. Hamilton
Dairy Specialist, University of Missouri

10th Mid-Atlantic Dairy Grazing Conference

Supplementing Pasture Systems
Is Corn Silage an Option?

Relationship between Grazing Pressure-Pasture Utilization and Pasture Disappearance



University of Missouri-Curtis

Why Corn Silage?

- Low protein but high energy NFC
  - Balances well with pasture
- Amino acid profile lacking
  - Easily remedied if a concern
- Substitution Rate
  - 0.8 – 1.2 pounds pasture replaced with 1 pound corn silage
  - May be beneficial on post-grazing residual
- Do we have the infrastructure or capabilities to:
  - Plant/harvest/store and at what cost?
  - Feeding strategies and wastage?
- Is it a "Guaranteed" crop?
- Stored Correctly?
  - Molds and spoilage?

Harvested Timely?

Stored and Packed Correctly?

Feeding off Face Properly?

Is this How We Should Feed Corn Silage?

10th Mid-Atlantic Dairy Grazing Conference

Supplementing Pasture Systems
Is Corn Silage an Option?

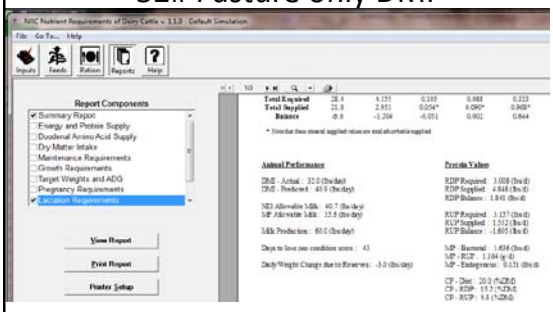
Feeding Capabilities?
Wastage?

So Where does Corn Silage Fit in Pasture Systems?

Comparing Rations

- NRC Nutrient Requirements of Dairy Cattle Analyzer
  - 1000 pound Holstein Cow
  - 60 pounds 4% BF milk
  - 90 Days in Milk
- Comparison of pasture only to various levels of grains and corn silage

32# Pasture only DMI



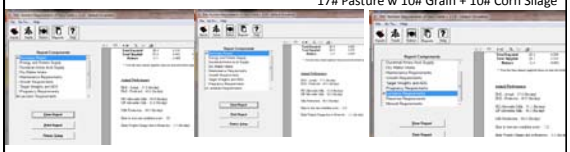
10th Mid-Atlantic Dairy Grazing Conference

Supplementing Pasture Systems
Is Corn Silage an Option?

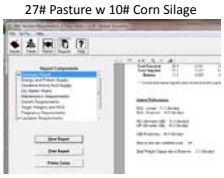
37# Pasture only DMI

27# Pasture w/ 10# Grain

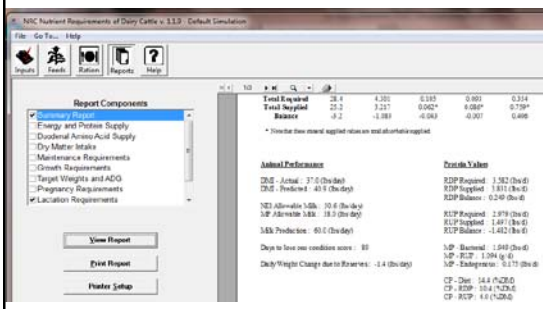
17# Pasture w 10# Grain + 10# Corn Silage



27# Pasture w 10# Corn Silage



18.5# Pasture-18.5# Corn Silage



Potential Profitability of Supplementing w/ Corn Silage

	32# Pasture	37# Pasture	27# Pasture 7# Corn 3# Soy Hulls	17# Pasture 7# Corn 3# Soy Hulls 10# Corn Silage	18.5# Pasture 18.5# Corn Silage	27# pasture 10# Corn Silage	30# Pasture 7# Corn 3# Soy Hulls
NRC Predictions							
NEI Allowable Milk	40.7	49.9	52.9	53.1	50.6	50.3	57.9
MP Allowable Milk	35.6	42.4	42.9	40.5	38	40.9	46.9
Days to lose 1 BCS	43	83	118	121	89	86	305
Estimated CP Diet	20.0%	20.0%	17.6%	14.5%	14.4%	17.0%	17.80%
Pasture Consumed							
Feed Cost/Cow/Day							
Milk Income/Cow/Day							
IOFC/Cow							
Projected Stocking Rate							
IOFC/Acre							

Potential Profitability of Supplementing w/ Corn Silage

	32# Pasture	37# Pasture	27# Pasture 7# Corn 3# Soy Hulls	17# Pasture 7# Corn 3# Soy Hulls 10# Corn Silage	18.5# Pasture 18.5# Corn Silage	27# pasture 10# Corn Silage	30# Pasture 7# Corn 3# Soy Hulls
NRC Predictions							
NEI Allowable Milk	40.7	49.9	52.9	53.1	50.6	50.3	57.9
MP Allowable Milk	35.6	42.4	42.9	40.5	38	40.9	46.9
Days to lose 1 BCS	43	83	118	121	89	86	305
Estimated CP Diet	20.0%	20.0%	17.6%	14.5%	14.4%	17.0%	17.80%
Pasture Consumed	32	37	27	17	18.5	27	30
Feed Cost/Cow/Day	$1.28	$1.48	$2.19	$2.60	$2.23	$1.88	$2.31
Milk Income/Cow/Day	$8.95	$10.98	$11.64	$11.68	$11.13	$11.07	$12.74
IOFC/Cow	$7.67	$9.50	$9.45	$9.09	$8.91	$9.18	$10.43
Projected Stocking Rate							
IOFC/Acre							

Potential Profitability of Supplementing w/ Corn Silage

	32# Pasture	37# Pasture	27# Pasture 7# Corn 3# Soy Hulls	17# Pasture 7# Corn 3# Soy Hulls 10# Corn Silage	18.5# Pasture 18.5# Corn Silage	27# pasture 10# Corn Silage	30# Pasture 7# Corn 3# Soy Hulls
NRC Predictions							
NEI Allowable Milk	40.7	49.9	52.9	53.1	50.6	50.3	57.9
MP Allowable Milk	35.6	42.4	42.9	40.5	38	40.9	46.9
Days to lose 1 BCS	43	83	118	121	89	86	305
Estimated CP Diet	20.0%	20.0%	17.6%	14.5%	14.4%	17.0%	17.80%
Pasture Consumed	32	37	27	17	18.5	27	30
Feed Cost/Cow/Day	$1.28	$1.48	$2.19	$2.60	$2.23	$1.88	$2.31
Milk Income/Cow/Day	$8.95	$10.98	$11.64	$11.68	$11.13	$11.07	$12.74
IOFC/Cow	$7.67	$9.50	$9.45	$9.09	$8.91	$9.18	$10.43
Projected Stocking Rate	1.24	1.07	1.47	2.34	2.15	1.47	1.32
IOFC/Acre	$9.52	$10.16	$13.88	$21.26	$19.15	$13.50	$13.76

This is Why We Feed Corn Silage

- One of the highest yielding digestible energy/acre forage crops
- Relatively inexpensive
  - Depends on wastage
- Balances well with high protein forages
- Highly palatable
- Relative ease of handling
- Cows will perform with profitable milk
- Substitution Rate can be beneficial
  - Low pasture covers w/ corn silage may result in higher post-grazing residuals and increases subsequent pasture growth rates
- May optimize use of pasture and increase IOFC/ acre

Stacey A. Hamilton
Dairy Specialist, University of Missouri

10th Mid-Atlantic Dairy Grazing Conference

Supplementing Pasture Systems
Is Corn Silage an Option?

Bottom Line for Corn Silage

My Opinion for SE United States

- If using corn silage for increased milk per cow
  - Probably not if feeding additional grain supplement
  - Yes, if no grain feeding and/or poor grazing management
- Assumes growth rates discussed previously
- Low stocked systems (1 cow/acre or less)
  - No!
- Moderate Stocked (1-2 cows/acre?)
  - Pencil it out
  - May fit shoulders and gaps especially at the higher end
  - Strategically feed cows
- High Stocked systems (greater than 2 cows/acre)
  - Definitely see a fit
  - Allows additional milk/acre
  - Does your system allow for the use of CS easily?
  - If so---use it!

Southeastern

NCAA FBS standings

< Mid-American | Mountain West | Pac-12 | Southeastern | Sun Belt >

East	Conference	Overall	STRK	vs Top 25
Missouri	4-1	7-2	W3	1-1
Georgia	5-2	7-2	W1	2-1
Florida	4-3	5-3	W2	1-1
Kentucky	2-5	5-5	L4	0-1
South Carolina	2-5	4-5	L2	1-2