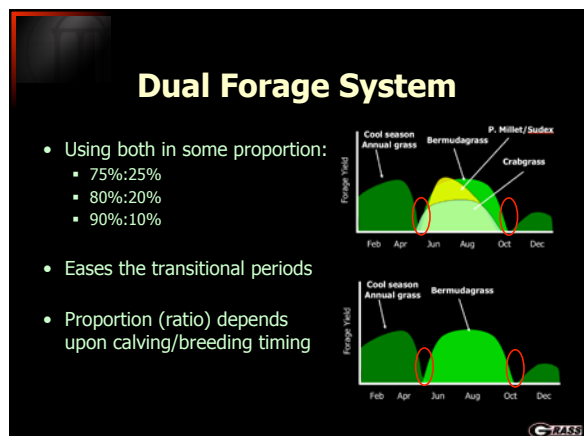
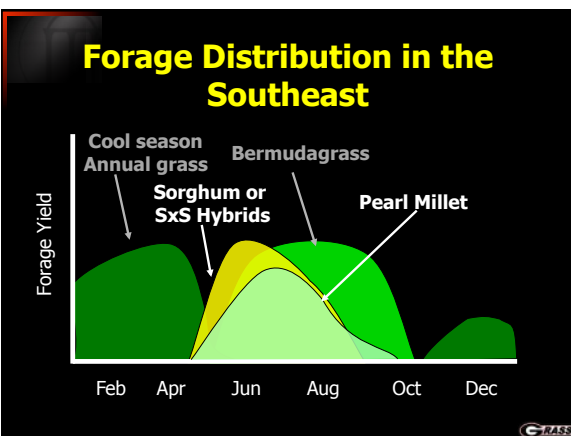
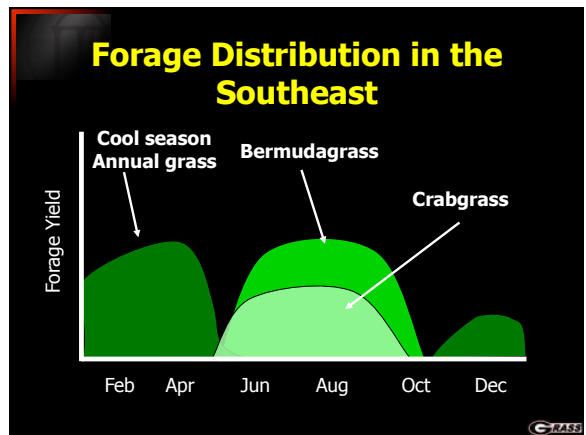
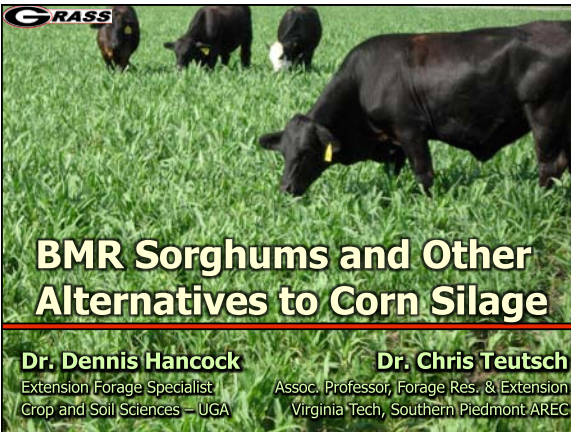


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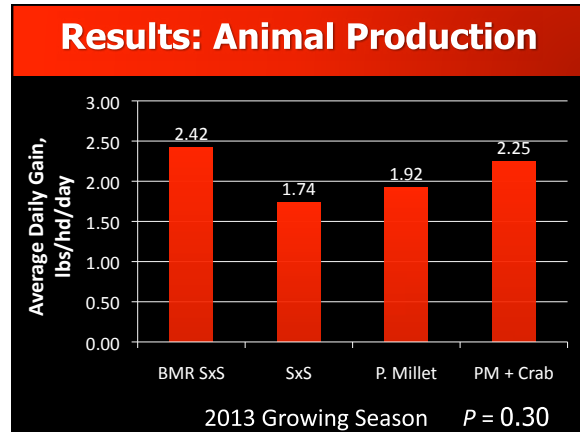
BMR Sorghums and Other Alternatives to Corn Silage



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BMR Sorghums and Other Alternatives to Corn Silage



Water Use in Forage Crops

Crop	Water Used			Reference
	lb H ₂ O/ lb DM	Acre-inches H ₂ O/ton DM	% of Alfalfa	
Alfalfa (C3)	844	7.5	100	Bennett and Doss, 1963
Sudangrass (C4)	380	3.4	45	Martin et al., 1973
Corn (C4)	372	3.3	44	Martin et al., 1976
Sorghum (C4)	271	2.4	32	Martin et al., 1976
Coastal Bermuda (C4)	265	2.3	31	Doss et al., 1962

Forage Yield of Selected Forage Grasses in Georgia

Forage Crop	Typical Yield (lbs DM/acre)
Corn silage	20,000-32,000
Tropical corn silage	5,000-22,000
Ann. Ryegrass	8,000-14,000
Oats	6,000-11,000
Triticale	3,000-7,000
Bermudagrass, Coastal	12,000-15,000
Bermudagrass, Tifton 85	14,000-22,000
Forage Sorghum	10,000-16,000
Sorghum x Sudangrass (SxS)	9,000-24,000
Pearl Millet	8,000-13,000

Differences in Forage Quality

Forage	CP	NDF (%)		
		NDF	NDFD	NFC
Corn silage	8	42	58	42.5
Forage Sorghum	8	48	58	37.0
BMR Forage Sorghum	8	48	65	37.0
Sorghum-Sudan (SxS)	10	67	58	12.0
BMR SxS	10	67	65	14.0
Alfalfa	20	40	48	27.5
Annual ryegrass	20	52	65	12.5
Rye	20	57	60	12.5
Bermudagrass, Tifton 85	12	69	60	<10

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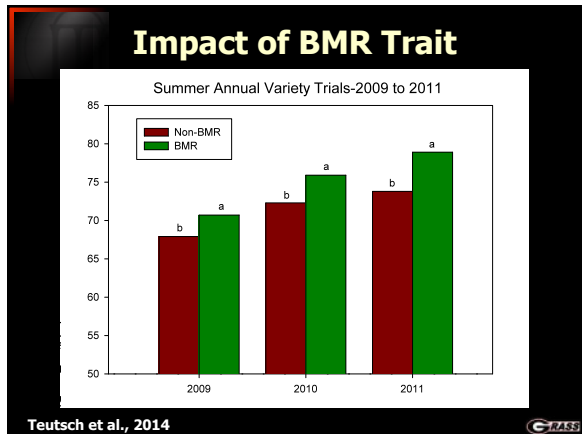
BMR Sorghums and Other Alternatives to Corn Silage



Comparing Whole Plant Grain Sorghum (WPGS) and Forage Sorghum (FS) as a Substitute for Corn Silage (CS)¹

Item	CS ²	WPGS	FS ³

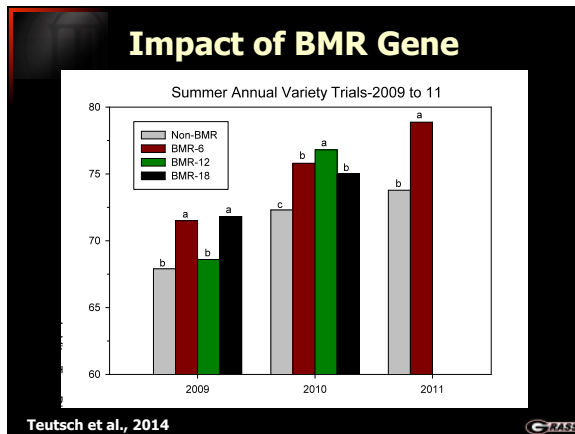
¹ Colombini et al., 2012. J. Dairy Sci. 95:4457-4467
² The WPGS and FS diets contained 33% and 63% more ground corn, respectively than the CS diet.
³ The researchers noted the FS was not chopped short and this may have influenced results. DMI of FS tended to be lower than the others (P=0.07).



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BMR Sorghums and Other Alternatives to Corn Silage



Using BMR Sorghum x Sudan (bmrSxS) as a Substitute for Corn Silage (CS) in a Diet for Holstein Milk Cows (120 DIM)¹

Item	bmrSS ²		CS	
	35%	45%	35%	45%

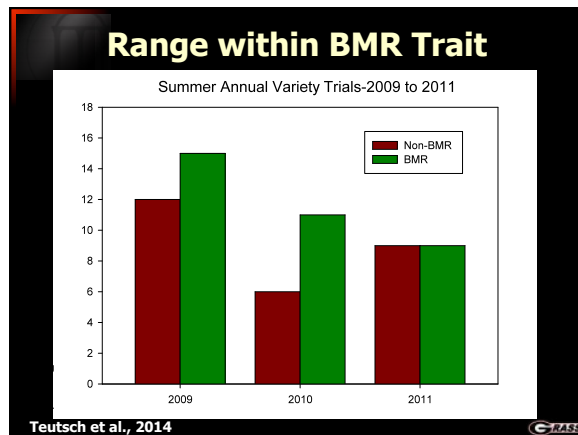
¹ Dann et al., 2008. J. Dairy Sci. 91:663-672
² The 35% and 45% bmrSS diets contained 64% and 143% more ground corn than the corresponding CS diets, respectively.

Teutsch et al., 2014

TAKE HOME NOTES

- **bmrSxS (especially the bmr-6 variants) can sustain milk yields and improve components (and weight gains) compared to CS, as long as energy and protein are balanced to need.**
- **Blending, rather than complete replacement may be best in TMR.**

Teutsch et al., 2014

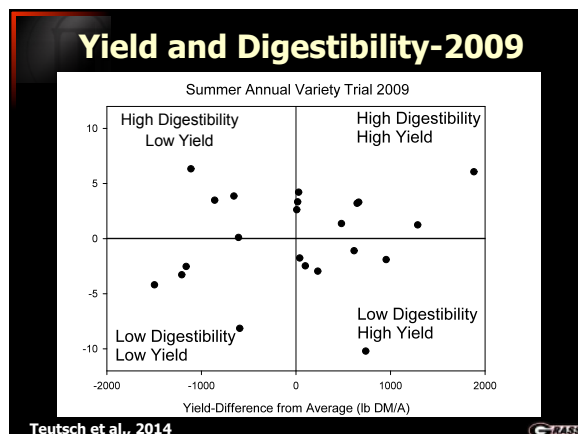


Range in IVTD within BMR Trait

BMR Trait	2009	2010	2011
	%	%	%
Non-BMR	59 to 71	66 to 72	72 to 81
BMR	61 to 76	69 to 78	73 to 82

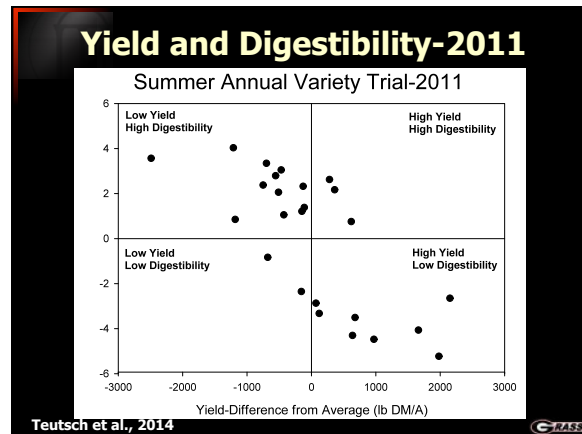
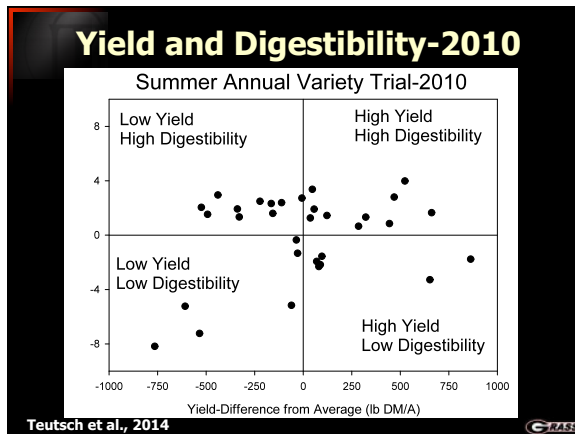
- Range quite large within a BMR trait
- Simply selecting a "BMR" variety does not necessarily mean that it has increased digestibility
- Need to consider digestibility when selecting varieties

Teutsch et al., 2014



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BMR Sorghums and Other Alternatives to Corn Silage



Variety Performance

- Above average yield and digestibility for both 2009 and 2010
 - Xtragraze, SxS, BMR-6, Evergreen Seed
 - AS9301 or SS140, Sudangrass, BMR-6, Alta Seed
 - AS6501, SxS, BMR-6, Alta Seed
 - 22050, SxS, BMR-6, Alta Seed

Teutsch et al., 2014

Variety Performance

- Above average yield and digestibility for both 2009, 2010, and 2011
 - AS9301 or SS140, Sudangrass, BMR-6, Alta Seed
 - AS6501, SxS, BMR-6, Alta Seed

Teutsch et al., 2014

Dairy Cow Performance

Study	Normal	BMR-6	BMR-12	BMR-18	Corn
lbs fat corrected milk/day					
Browning and Lusk, 1966	35.7a				35.5a
Lusk et al., 1984					
Experiment I			49.2a		47.8b
Experiment II			54.5a		52.2a
Grant et al., 1995	39.5b	57.8a			58.6a
Oliver et al., 2004	64.2b	74.3a		68.8ab	73.4a
Aydin et al., 1999					
Experiment I	45.6c	52.2b			63.9a
Experiment II	69.2b	74.5a			71.4ab

Contreras-Govea, F.E., M.A. Marsalis, M.A., L.M. Lauriault, and B.W. Bean. 2010. Forage sorghum nutritive value: A review. Online. Forage and Grazinglands doi: 10.1094/FG-2010-0125-01-RV.

Economics


Teutsch et al., 2014

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BMR Sorghums and Other Alternatives to Corn Silage

Input Costs	FS-15 ton/A	Corn-15 ton/A
	\$/acre	\$/acre
Variable Costs		
Seed	20	65
Fertilizer & lime	239	259
Herbicide	35	35
Fuel, oil, repair	76	76
Labor	43	43
Interest & crop ins.	33	33
Interest	12	12
Total-Variable	458	523
Fixed Costs		
Machinery	68	68
Gen. Overhead	40	40
Total-Fixed	108	108
Total Cost/acre	566	631
Total Cost/ton	38	42



Input Costs	CN-FS-15 ton/A	Corn-8 ton/A
	\$/acre	\$/acre
Variable Costs		
Seed	85	65
Fertilizer & lime	259	259
Herbicide	35	35
Fuel, oil, repair	76	76
Labor	43	43
Interest & crop ins.	33	33
Interest	12	12
Total-Variable	543	523
Fixed Costs		
Machinery	68	68
Gen. Overhead	40	40
Total-Fixed	108	108
Total Cost/acre	651	631
Total Cost/ton	43	79



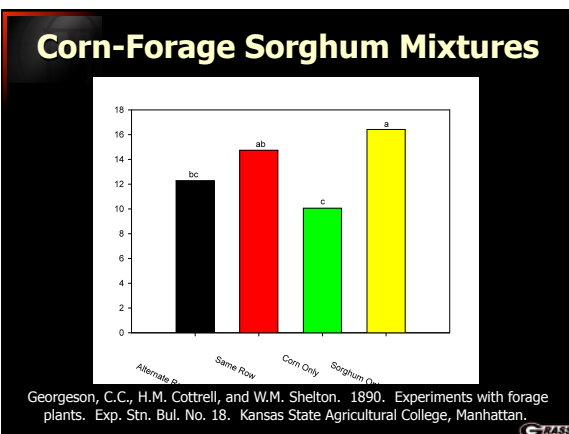
White Sugarcane Aphid Damage on Sorghums

Section 18 label for Transform WG (*sulfoxalor*, Dow AgroSciences). Rate of 1.0 – 1.5 oz per acre is about 90% effective



Where does forage sorghum fit into silage production systems?

- NOT going to totally replace corn silage!!!
 - Better option when corn is cheap.
- Best fit on droughty, rainfed fields that are marginal for corn silage production
- Arid regions or regions that are prone to short-term drought
- Delayed or late silage plantings
- Sugarcane aphid too damaging (???)




Summary and Recommendations

- BMR trait increases digestibility
 - BMR-6 gene generally best (agronomically and in terms of nutritive value)
- Range in digestibility is great within both BMR trait and BMR gene
- Need to consider both yield and digestibility when selecting or recommending varieties
- BMR forage sorghum is a reasonable and economical alternative to corn silage

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