

Forage Conference at GCA Convention

Utilization of Summer Annual Forages in Georgia for Beef Finishing Systems on Meat Quality and Shelf Life Characteristics



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Alex M. Stelzleni
Georgia Forages Conference
3/30/2016

Steers in paddocks at Eatonton Beef Research Center

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Background

- The Producers
 - Increasing input costs
 - Climate of the Southeastern U.S.
 - Capitalize on growing markets
- Grass-finished market
 - Active consumers
 - Environmental concerns
 - “Health” conscious consumers
 - Community/local attitudes
- Optimize resources at hand (forages)

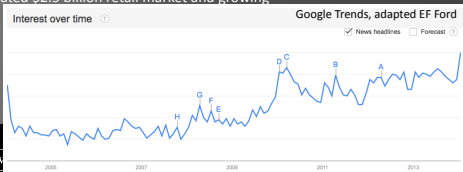


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Grass-Fed Trends (Lacy et al)

- Importance overall
 - 29% somewhat
 - 26% important
 - 10% very important
- Grass seeking consumers
 - Based on different auctions
 - 36% pay 12% Premium with no info
 - 63% pay 22% Premium with info (story)

Estimated \$2.5 billion retail market and growing



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Grass vs. Grain

- ~16% premium for grass over grain to be profitable (Berthiaume 2006)
 - Not everyone will pay this, but approx. 30-45% will pay some premium (Lacy 2007)
- Premium required and BE need to be updated
 - Current beef prices
 - Cx grid basis
 - SE Cx basis
 - Preliminary figures show that grass finished beef is selling 25-32% higher than SE commodity beef

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Problem

- Most warm season perennials are lower in nutrient content than cool season alternatives
 - Maintenance vs Gain during summer months
- Year round beef production supply
 - Cool season, rapid gains
 - Hard to maintain in summer
 - Sell lighter less efficient cattle, or hold until cool season forage available – economics of holding, older animal
- Beef Quality vs Forage Quality

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Objectives

- Evaluate 4 summer annual forages to maximize animal growth potential and Cx traits
 - LW, ADG, US composition, forage analysis, Cx YG/QG
- Determine effects of forage systems on beef color, shelf life, lipid stability, sensory aspects
- Calculate BE pricing and % premium required for BE pricing under these forage systems
 - Based on YG/QG grid index & SE grass fed basis

USDA, AMS Reports

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Experimental Design and Treatments

- 4 treatments; 4 pastures per treatment/yr
 - Pearl Millet
 - Pearl millet + crabgrass
 - Sorghum sudangrass
 - Brown midrib sorghum sudangrass



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Forages

- Pearl millet
 - Drought and heat tolerant
- Crabgrass
 - High palatability
 - Tolerant of defoliation
- Brown midrib (BMR) sorghum sudangrass
 - Drought tolerant
 - Lower lignin content → increase in digestibility
- Sorghum sudangrass
 - Drought tolerant






Photo: AM Stelzleni



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Experimental Design and Treatments

- Eatonton Beef Research Center 2014-2016
 - Eatonton, Georgia
- 16- 0.73 ha pastures
 - 75-85 days
 - June-September
- 2 steers per pasture as experimental animals (n=32)
- *Put and take steers utilized to manage available forage

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Summer Annual Grazing Trials at Eatonton

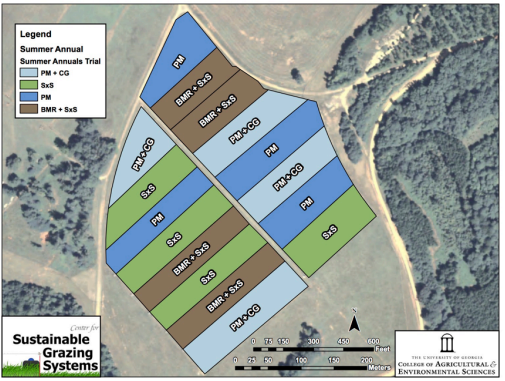



Photo: D. Hancock



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Field Data Collection

- Animal
 - Weigh, ADG
 - Ultrasound for body composition
 - Beginning, Middle, End
- Forage
 - Mass
 - Nutrient analysis
 - Every 2 weeks or
 - as steers are rotated





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Carcass Data

- Slaughter
 - Shrunk BW, Dress %
 - 24 hr PM YG and QG
 - Pricing USDA-AMS
 - Se basis Breakeven





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Meats Data

- BNLS short loin (Strip) removed 24 hr PM
 - VP and aged for 21 d
 - Cut 1" steaks
 - Proximate analysis (CP, F, water)*
 - Fatty acid lipid profile*
 - Shear force and Sensory
 - 7 d shelf life
 - Color, Lipid Oxidation



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Animal Performance



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Animal Performance

Trait	Treatment				YR
	BMR	PM	PMCG	SS	
Weight					14 = 15
D0	971 ^x	967 ^x	965 ^x	964 ^x	
D34	1047 ^y	1031 ^y	1033 ^y	1019 ^y	
D70	1102 ^{az}	1071 ^{abz}	1074 ^{abz}	1061 ^{bz}	
ADG					14 > 15
0-34d	2.24 ^{ax}	1.86 ^{bx}	2.00 ^{abx}	1.61 ^{bx}	
34-70d	1.66 ^y	1.17 ^y	1.24 ^y	1.22 ^y	
Total ²	1.97 ^a	1.54 ^b	1.63 ^b	1.45 ^b	

^{ab}Means in a row or ^{xyz}Means in a column are different P < 0.05.
²2015 ADG was less than 2014 due to hot, dry condition in second half of summer of 2015

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Carcass Yield and Quality



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Carcass Yield

Trait	Treatment				YR
	BMR	PM	PMCG	SS	
Kill wt, lb	1045	1018	1016	1012	14 = 15
Shrink, %	5.08	4.86	5.28	4.58	14 > 15
HCW, lb	610	595	592	588	14 < 15
DP, %	58.35	58.43	58.32	58.10	14 = 15
REA, in ²	11.06	11.04	10.76	10.81	14 > 15
Fat, in	0.19	0.22	0.20	0.19	14 = 15
KPH, %	1.44	1.31	1.22	1.47	14 = 15
Y. Grade	2.07	2.05	2.08	2.08	14 < 15

Shrink – 7.26% vs 2.64%; HCW – 589 vs 603; REA – 11.35 vs 10.49
 YG – 1.94 vs 2.20 – due to heavier Cx and smaller REA in 2015

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Carcass Quality

Trait	Treatment				YR
	BMR	PM	PMCG	SS	
Maturity	A50	A52	A48	A44	14 > 15
Marb	Se 67	Se 79	Se 63	Se 62	14 > 15
Lean Color	4.8	5.0	4.5	4.4	14 < 15
Fat Color	4.3	4.5	4.1	3.9	14 < 15
Firmness	1.9	1.7	1.7	1.7	14 = 15
Texture	1.4	1.6	1.6	1.3	14 = 15

Maturity – 154 vs 143; Marbling - Se 86 vs Se 49; Lean color – 1-7 lower number is lighter brighter red – 4.2 vs 5.2; Fat color – 1-7 lower number is whiter creamer fat – 3.3 vs 5.2; Firmness – 1 = Extremely firm, 5 = Extremely soft; Texture – 1 = Extremely fine, 5 = Extremely course.

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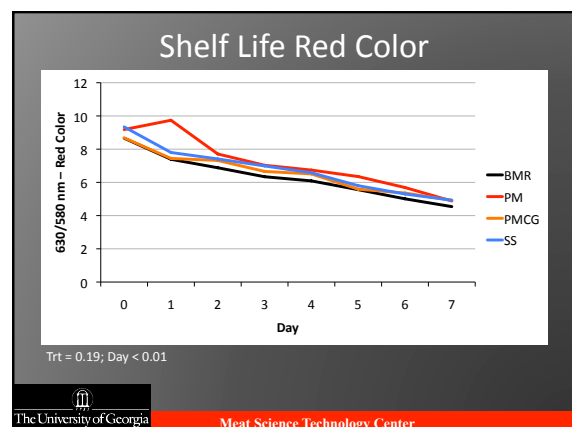
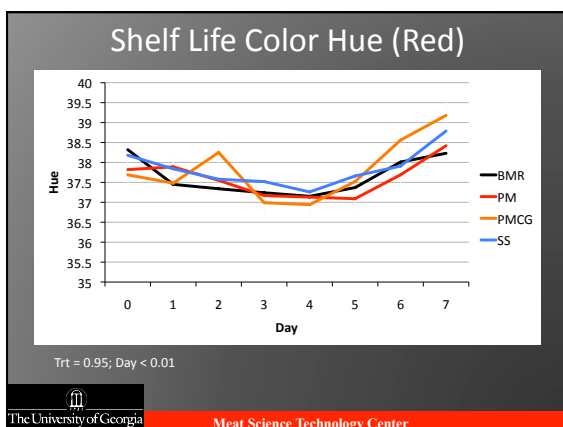
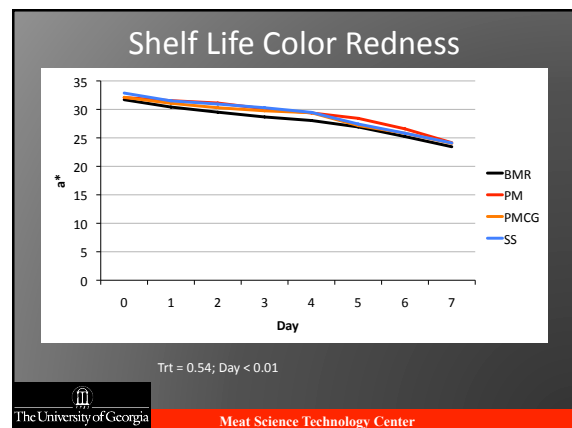
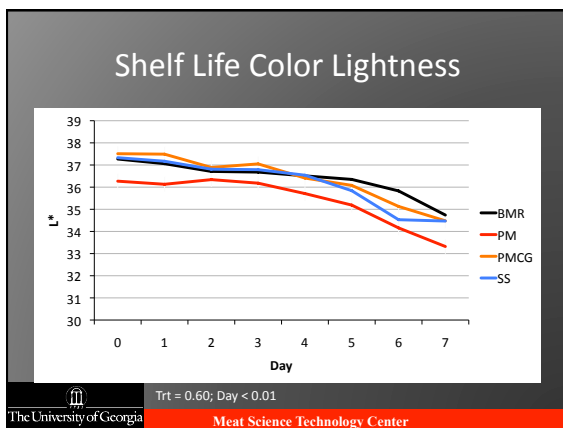
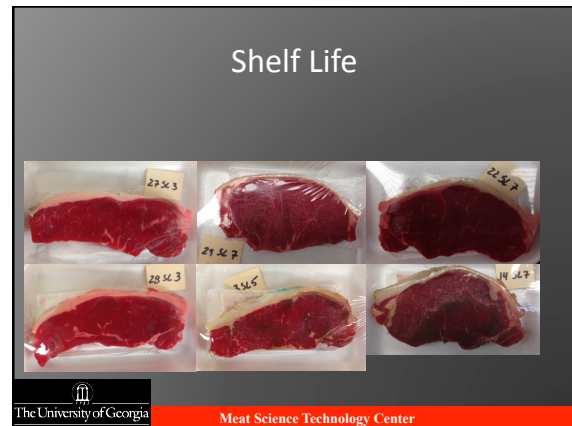
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Eating Characteristics

Trait	Treatment			
	BMR	PM	PMCG	SS
Cook				
Thaw loss %	2.86	3.09	3.27	3.31
Cook loss %	16.63	13.59	15.34	15.66
Shear Force, lb	8.16	8.05	7.63	8.10
Sensory				
In Tender ¹	4.50	5.08	4.74	5.06
Sus Tender ¹	4.61	5.22	4.85	5.11
Beef flavor ¹	4.25	4.49	4.23	4.22
Juiciness ¹	3.68 ^a	4.54 ^b	4.46 ^b	4.20 ^b
Off flavor ¹	1.22	1.30	1.32	1.23

¹ 1 = Extremely tough, Bland, Dry; 8 = Extremely tender, Intense, Juicy
^a 1 = None Detected; 6 = Extreme off flavor

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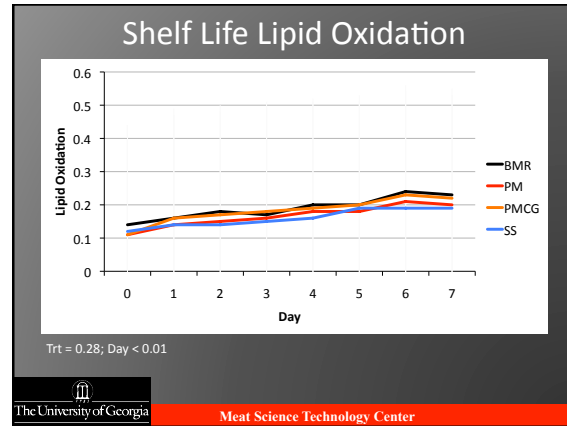
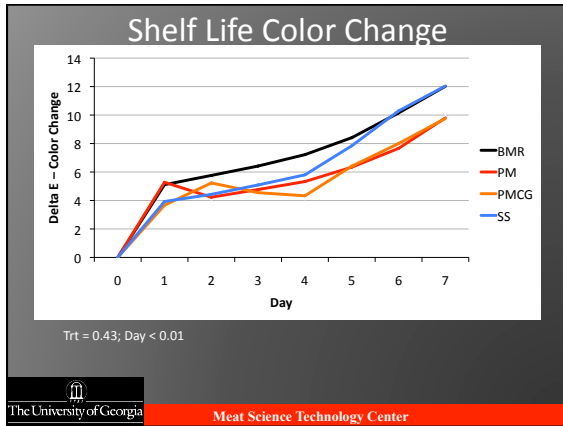


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Se Carcass Value Basis

Trait	Treatment				YR
	BMR	PM	PMCG	SS	
In Value, \$	1662.35	1653.32	1663.68	1684.92	14 < 15
Cx Value, \$	1323.43	1292.16	1284.42	1276.28	14 > 15
Cx Loss, \$	(338.93) ^a	(361.16) ^{ab}	(379.25) ^{bc}	(408.63) ^c	14 > 15
\$/Cwt Prem	55.44 ^a	61.01 ^{ab}	64.08 ^{bc}	69.34 ^c	14 < 15
Prem Req, %	25.72 ^a	28.37 ^{ab}	29.68 ^{bc}	31.11 ^c	14 < 15
Cx BE, \$/Cwt	272.55 ^a	278.12 ^{ab}	281.19 ^{bc}	286.44 ^c	14 < 15

USDA Report – Forage finished beef Cx basis: 2014 = \$275-295/Cwt; 2015 = \$290-350/Cwt. BE 2014 = \$272.22, 2015 = \$286.93
 Year differences are due to the increased value of cattle in 2015 and carcass values being in a contra-year cycle.
 Purchase \$177.00 vs \$197.00 Cwt; Cx Se basis \$223.14 vs \$211.07 Cwt

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- ### Closing
- Still have 1 year to go
 - Exercise caution until enough numbers are in
 - Currently little to no Cx, shelf life, eating differences
 - As of now BMR and PM have value advantage over PMCG and SS
 - Final value has been below USDA Grass Finished pricing
 - Room for profit if know production costs
 - Simulated same cattle on feed from previous data for each year, approx loss of \$150/hd
 - Next steps – PM and BMR PM with and without fiber supplementation (2016-2018)
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