

Forage Conference at GCA Convention

Winter Annual Forage Systems: Current Research

WINTER GRAZING FORAGE SYSTEMS: CURRENT RESEARCH

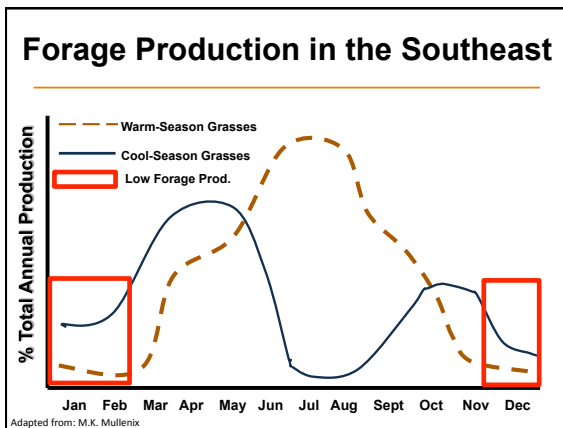
Jennifer J. Tucker, Ph.D.
Assistant Professor
Department of Animal and Dairy Science
Tifton, GA

UGA extension

Winter Grazing Options

- Cool season forages
 - Small Grains
 - Winter Annual Mixtures
 - Stockpiled Tall Fescue
 - Clovers
- Stockpiled Perennial Warm Season Grasses
 - Bermudagrass

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COOL SEASON FORAGES

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Stocker Cattle Performance on Cereal Rye and Rye-Based Cool Season Mixtures

2009-2012
Central Georgia Research and Education Center
Eatonton, GA

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Objective

- Measure the potential of cereal rye with or without annual ryegrass, wheat, or arrowleaf clover for stocker steer production in the Southeast
- Evaluate the potential through measuring:
 - Stocking Rate
 - Length of Grazing Season
 - ADG
 - Mean Gain

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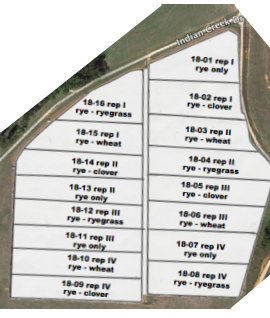
Dr. Jennifer Tucker
Asst. Professor
Animal And Dairy Sci. Dept.

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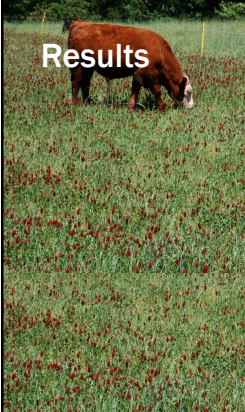
Experimental Design

- 16 -2 ac paddocks
- 4 treatments/4 reps
 - Rye
 - Rye + Wheat
 - Rye + Annual Ryegrass
 - Rye + Arrowleaf Clover + Crimson Clover
- Planted October 15 - each year
- Continuously stocked at a variable rate using "Put-N - Take" management
 - 2 Testers and additional Grazers
 - Maintain ~1000-2500 lbs DM/acre
- Yearly crossbreed steers ~500 lbs



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Results

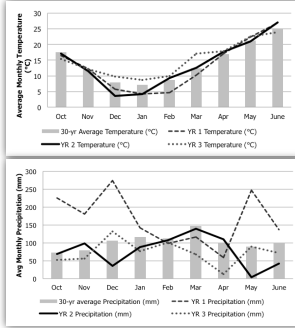


- Average Daily Gain (ADG)
- Mean Gain
- Stocking Rate
- Total Days of Grazing (Animal Unit Days)

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Historical Weather Data

- YR 1**
 - Colder Dec-Feb
 - Higher than avg. precipitation
- YR 2**
 - Colder Dec-Jan
 - Dry in May and June
- YR 3**
 - Warmer than avg. temperatures
 - Lower than avg. precipitation
 - Dry April
 - Very early start grazing (1 mo. early)



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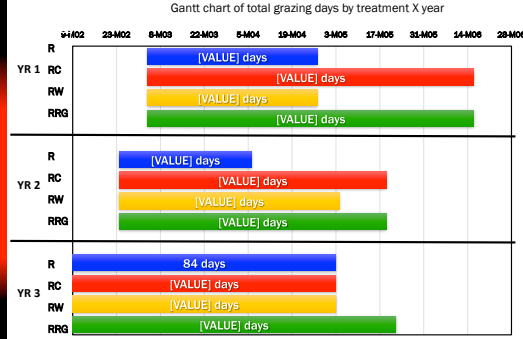
Cumulative Average Daily Gain over the grazing season by forage treatment, separated by year (LSMean)

	Treatment			
	R	RC	RRG	RW
	----- lbs/ hd/ d -----			
YR 1	2.47	2.34	2.07	2.38
YR 2	2.73 ^a	2.32 ^b	2.80 ^a	2.27 ^b
YR 3	2.29	2.34	1.92	2.25

^{a,b}Least squares means within a row with different superscripts are different (P < 0.05).

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Gantt chart of total grazing days by treatment X year



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Animal Unit Days

The amount of dry forage consumed by one animal unit per 24-h period.

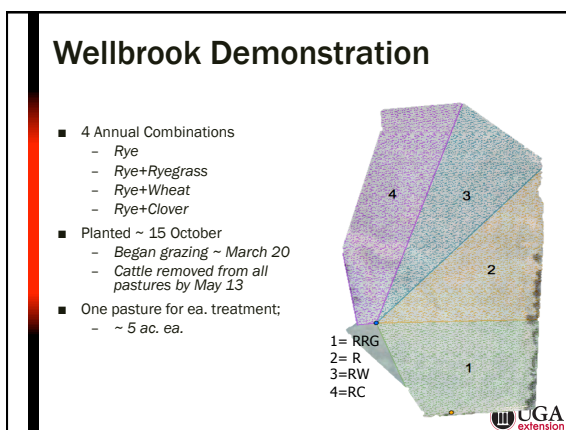
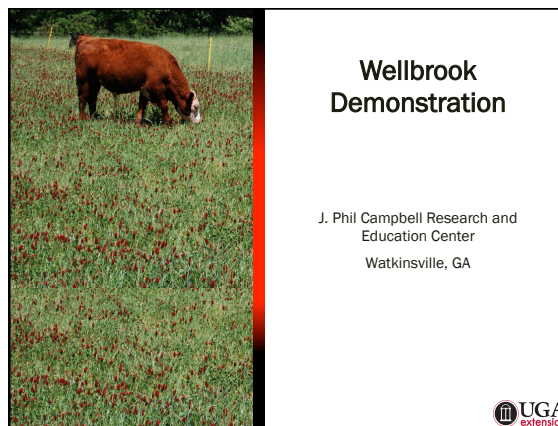
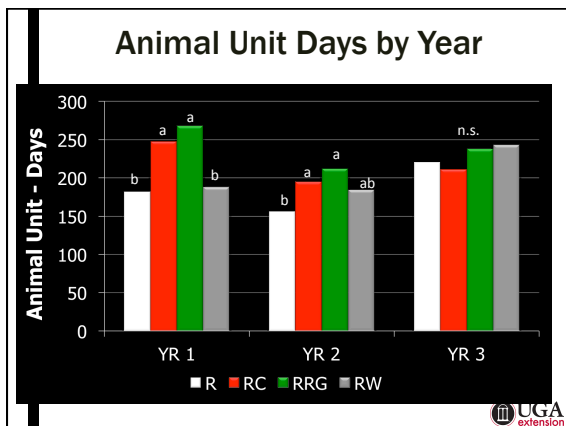
- 1000 lbs = 1 Animal Unit
- 1 yearling ~ .75 AU
- 4 yearlings * .75 AU = 3 Animal Units
- Total # of Days per Grazing period on an acre of land
 - 28 days * 3 AU = 84 AUD
 - 84 AUD/2 acres = 42 Animal Unit Days

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Wellbrook Data

	R	RC	RRG	RW
Beginning BW (lb)	523	598	538	540
End BW (lb)	611	686	646	646
ADG (lb/hd/d)	2.31	2.16	2.49	2.87
Cumulative Gain	1325	1347	1601	1579
Gain/ac	280	280	333	356
Total grazing days (AU Days)	582	624	636	564

Conclusions

- Though variable from year-to-year, RRG and RC maintain a higher stocking rate for a longer period of time.
 - Dry springs can shorten the grazing season or even negate the advantage of RRG or RC
- In the winter and early spring, each of these forage systems provide similar ADGs. But, ca. 1 mo. into spring, the systems begin to separate:
 - RRG sustained high ADGs in 2 of 3 years
- RRG provided highest gain/animal in most years
 - RC provided equally high gain/animal when moisture was closer to average.

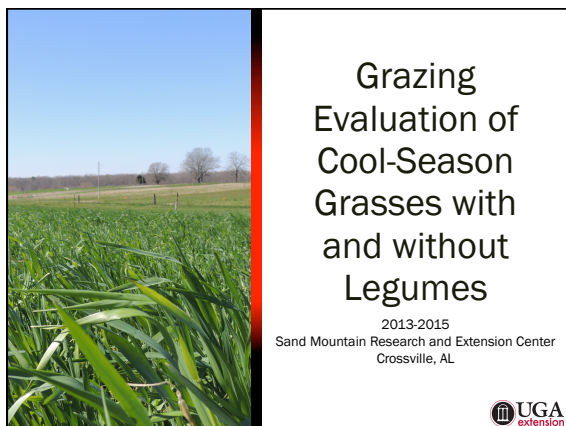
Key Points

- Rye + Ryegrass** provided the most reliable animal performance of these forage systems
- Rye+Clover** can perform equally well under typical/average weather and may be more cost-effective
- Rye alone** may be appropriate for animal performance if grazing in winter through early April, only.
- Rye+Wheat** offers no advantage over rye alone and is not likely to be economical

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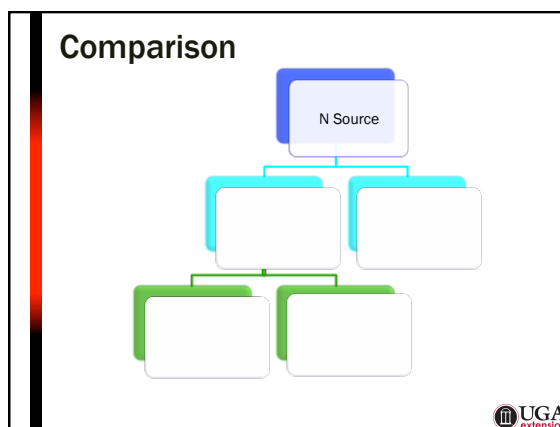
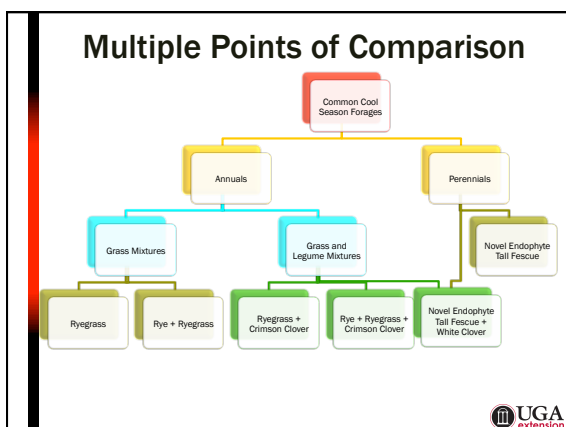
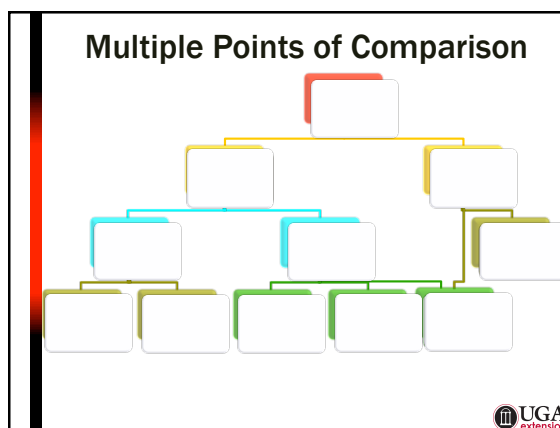


Objective

- Conduct a simultaneous **"real-world"** comparison of commonly used **annual** and **perennial** forage species and mixtures utilized to extend grazing in the winter/early spring time period
- First evaluation of this type

Parameters

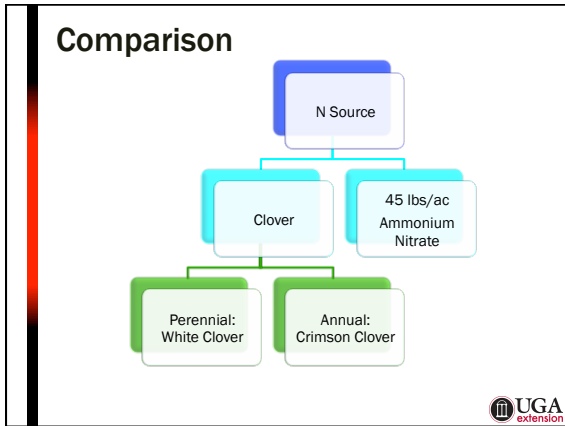
- Forage species chosen for this study reflect those commonly used cool-season forages in the Northern Regions of Alabama, Georgia, & Mississippi
- Determine timing and length of grazing period offered by each treatment
- Evaluate the effect of legume in comparison to N fertilizer on Forage Mass and Animal Performance
- Evaluate Animal Performance during the grazing period
- Evaluate forage quality through nutritive analysis



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Experimental Design

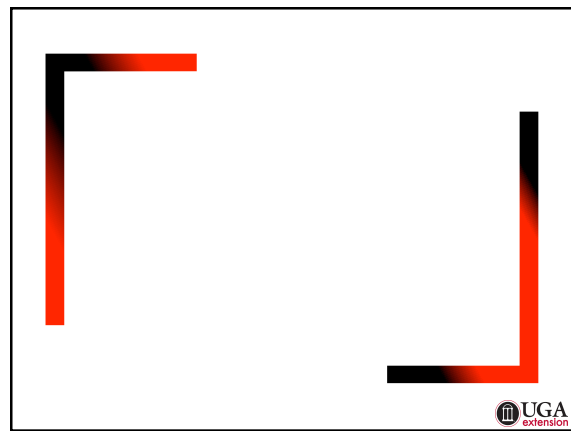
- 6 treatments/2 reps
- 2 ac paddocks
- Annual paddocks drilled into prepared seedbed early October/Late September
- All Paddocks received 45-60 N lbs/acre (species dependent) in Fall
- Paddocks without clover received second N application before grazing initiation in late Winter/early Spring
- Continuously stocked at a fixed rate of 2 steers/ac (4 per paddock)
- Yearly crossbreed steers ~530 lbs

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Results

- Total Days of Grazing
- Available Forage DM
- ADG
- Total BW gain/acre

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Impacts of Weather

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Available Forage Dry Matter by Treatment, Sample Date, and Year

Sample Date*	Ryegrass	Ryegrass + Crimson Clover	Ryegrass + Rye	Ryegrass + Rye + Crimson Clover	NE Tall Fescue	NE Tall Fescue + White Clover
2014						
1	2,536	2,320	3,127	1,772	2,590	2,041
2	3,746	3,500	3,246	3,563	2,961	2,883
3	2,983	2,679	3,459	4,539	2,998	2,777
4	2,280	2,007	2,575	4,205	2,094	1,250

* Available forage dry matter estimated at Initiation, Termination, and every 28 days of the grazing period
 ** Sample date occurred 28 days post removal from paddocks for Ryegrass and Ryegrass + CC treatments

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Estimate of Percent clover in legume inclusion treatments X year

	2014	2015
	%	
Ryegrass + Crimson Clover	39	14
Ryegrass + Rye + Crimson Clover	26	11
NE Tall Fescue + White Clover	0	7


- Clover threshold 30% stand or greater to eliminate need for N
- 2015 stand % negligible, therefore treatments should be viewed at N vs no- N



Comparison of the sum of **available Forage DM** estimates
Clover v. Spring N application,
for the entire grazing season - separated by year

	2014		2015	
	Clover	N	Clover	N
	----- lbs DM/acre -----			
Ryegrass	10,505	11,545	7,142	11,300
Ryegrass + Rye	14,079	12,407	5,378	5,097
NE Tall Fescue	8,952	10,643	9,047	11,358

	2014	2015
	%	
Ryegrass + Crimson Clover	39	14
Ryegrass + Rye + Crimson Clover	26	11
NE Tall Fescue + White Clover	0	7




Average Daily Gain and Total BW Gain/Acre

	ADG (lbs/d)		Total BW Gain (lbs/acre)	
	2014	2015	2014	2015
Ryegrass	2.49 ^x	2.46	342 ^x	426 ^x
Ryegrass + Rye	1.76 ^y	2.46	244 ^y	284 ^y
Tall Fescue	1.87 ^y	2.11 ^x	307 ^{xy}	359 ^x

*There were no differences between Legume and N+ Treatments, therefore all treatments combined by grass forage base

^{x,y} Within a column, means differ $P < 0.05$




Weather – an uncontrollable factor

2014

- Varying temperatures and rainfall delayed access to all paddocks until mid-March
- Quick growth and maturity of Rye, and decreased grazing pressure allowed for increased competition and decreased availability of quality forage in all paddocks containing Rye
 - While forage mass was great in these paddocks, the amount of grazeable quality forage was limited

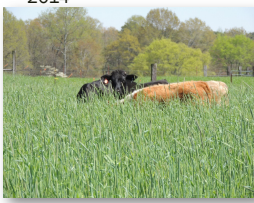
2015

- Lots of forage mass early in the season allowed for early access to all paddocks containing Rye
- Late frost in Feb. led to severe decrease in forage availability in Ryegrass paddocks
- Rye paddocks were able to sustain grazing for a month following frost while Ryegrass paddocks required rest
- Rest allowed Ryegrass and Ryegrass + Crimson Clover Paddocks to Recover





Weather – an uncontrollable factor

2014



2015






Perennial Performance

Novel Endophyte Tall Fescue paddocks were not available to graze until:

2014	2015
▪ ~1 month later than all paddocks containing Rye	▪ ~1.5 month(s) later than all paddocks containing Rye and Ryegrass <ul style="list-style-type: none"> - Late March (2015)
▪ ~two weeks later than paddocks containing Ryegrass without Rye <ul style="list-style-type: none"> - Mid April (2014) 	▪ Tall fescue paddocks were not being used and were not severely damaged due to Feb. frost
▪ At study conclusion - Available forage dry matter for NE Tall Fescue + N paddocks was still well above the 1,500 lbs DM/acre threshold <ul style="list-style-type: none"> - 2,094 lbs DM/acre 	▪ At study conclusion - Available forage dry matter for all NE Tall Fescue treatments was still well above the 1,500 lbs DM/acre threshold to continue grazing <ul style="list-style-type: none"> - ~3,100+ lbs DM/acre




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Perennial Performance Continued


- Once available, Novel Endophyte Tall Fescue paddocks were able to provide abundant available forage throughout the study until conclusion in late June in both years
- Potential to graze NE Tall Fescue into mid-July without negative effects on the livestock while waiting on Warm Season Perennial Forage Base



Key Points



- This was a "real-world" comparison, therefore stocking rate and management decisions were made to reflect as such
- Crimson clover is a viable option to mitigate N fertilizer needs in annual pastures
- All treatments provided extended grazing while maintaining an ~2 lb/day ADG - decreasing the need for stored forages and supplemental feed during this time
- Our data serves to aid producers in developing farm specific forage management systems for stocker production





PERENNIAL WARM SEASON GRASSES – STOCKPILED



Stockpiled T85 for a Fall-calving Cow Herd

2012-2013
Wiregrass Research and Extension Center
Headland, AL





Background

- Previous studies had largely focused on dry, pregnant cows
- Few studies with lactating cows

Can we reduce hay and supplementation needs by using improved bermudagrass hybrids such as T85?
(Known quality and production characteristics)

Courtesy of M.K. Mullenix




Objectives

To Determine:

- Forage production and nutritional value of stockpiled T85 at 3 nitrogen fertilization levels
- Compare this with feeding hay and supplement for cow-calf pairs
 - Reproductive performance
 - Calf and dam performance
- Evaluate costs among systems

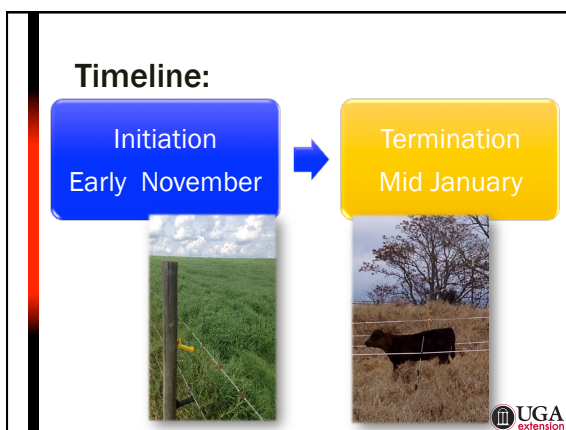
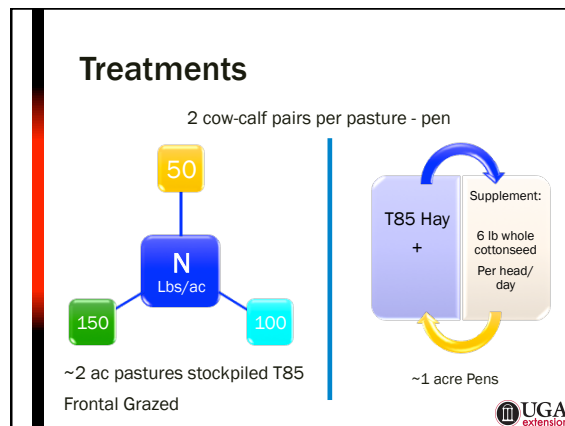
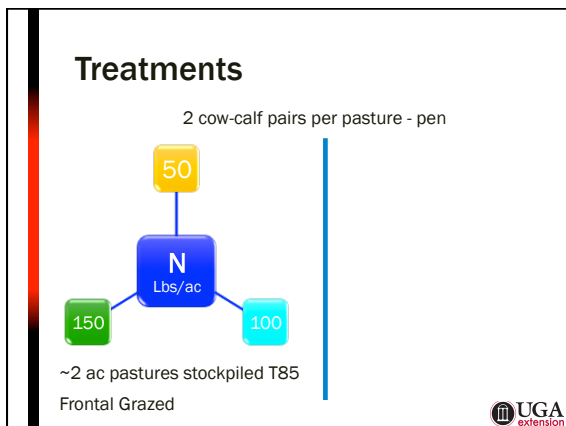
Courtesy of M.K. Mullenix



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Results

- Forage Mass
 - 4,700 lb DM/ac
 - 50 lb N/ac sufficient
- Nutritive Value
- Animal Performance
 - Maintained BCS of 5 until Jan.

Sampling Date	CP, %	TDN, %
Early-Nov	17	73
Late-Nov	12	64
Dec	11	58
Early-Jan	11	53
Late-Jan	10	53
Average	12	60

Table 1. Nutritive value of stockpiled Tifton 85 bermudagrass receiving different rates of N fertilization.

Courtesy of M.K. Mullerix

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Results: Animal Performance

- Body Condition Score (Cows)
 - Marginal decrease
 - BCS: 5.8 to 5.2
 - Expected for lactating animals
- Reproductive performance
 - 88% rebreeding rate
- Calf performance
 - Similar among treatments - weaning weights of 550 to 620 lb

Courtesy of M.K. Mullerix

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Key Points

- 50 lb N/acre was sufficient in achieving acceptable amount of forage mass (for this study)
- Reproductive and calf performance were not affected by diet
- No differences were detected between grazing and Hay + Supplement treatments
- Stockpiled T85 is a viable option for reduced costs during these respective months
 - Cost per cow:
 - Hay + Supplement > Stockpiled T85

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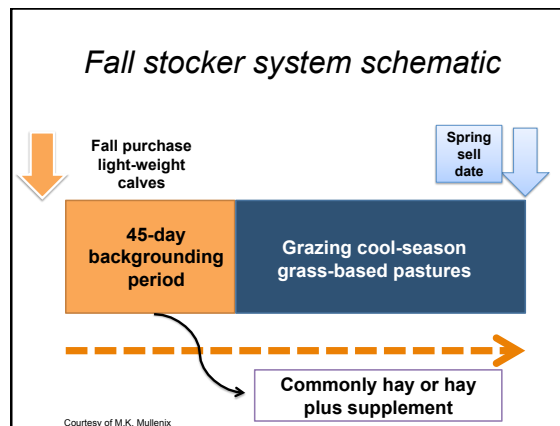

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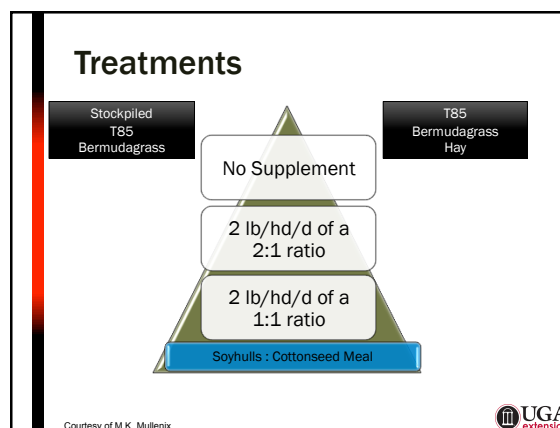
**STOCKPILED T85
FOLLOWED BY WINTER
ANNUALS FOR
STOCKER CALVES**

2013-2015
Wiregrass Research and Extension Center
Headland, AL


(Part 1)
Stockpiled
T85 for
Stocker
Calves

2014-2016
Wiregrass Research and Extension Center
Headland, AL





Initiation:

- Five (600 lb) steers on each ~2 acre paddock
- Frontal grazed
- Initiated Late October – Terminated Early January
- Steers moved to Winter Annuals at end of Jan.



Courtesy of M.K. Mullenix




Results: Animal Performance

Table 1. Average daily gain, initial, and final body weight of steers grazing stockpiled Tifton 85 bermudagrass with or without supplementation.

Treatment (0.9 kg/head/day)	11/11/14 – Initial Weight (lbs BW)	1/6/15 – Final Weight (lbs BW)	ADG* (lbs/day)
T85	628	569 ^b	-1.08 ^b
T85 + 50/50	615	612 ^a	-0.04 ^a
T85 + 75/25	621	608 ^a	-0.26 ^a

^{a,b} Within a column, means differ $P < 0.10$.
*56 total grazing days

Courtesy of M.K. Mullenix



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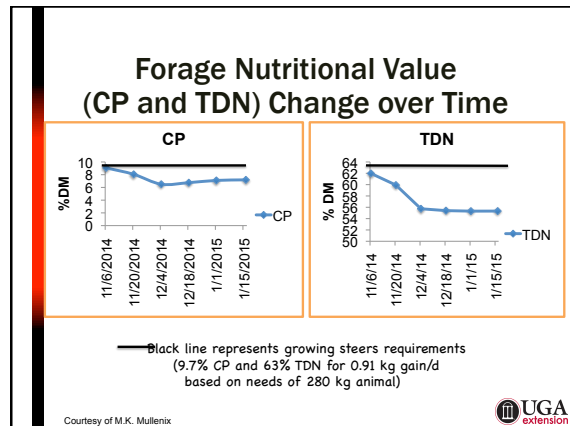
Results: Forage Parameters

Table 2. Date effects for pre- and post-grazing forage mass, forage allowance, and percent utilization of stockpiled Tifton 85 bermudagrass.


Date	Pre-Grazing Forage Mass (lbs DM/ac)	Post-Grazing Forage Mass (lbs DM/ac)	Herbage Harvested (lbs DM/ac)	Forage Allowance (lbs DM/ lbs BW)	% Forage Utilization
11/6/2014 (A)	4,899 ^a	1,984 ^a	3,315	4.9	67 ^c
11/20/14 (B)	6,612 ^a	1,328 ^b	5,276 ^a	4.4	80 ^b
12/4/14 (C)	5,929 ^{abc}	680 ^c	5,249 ^a	4.4	89 ^a
12/18/14 (D)	4,901 ^b	388 ^d	4,514 ^{ab}	3.5	92 ^a
1/1/15 (E)	4,644 ^b	290 ^d	4,353 ^b	3.3	94 ^a

^{abc} Within a column, means differ $P < 0.10$


Courtesy of M.K. Mullenix


Key Points




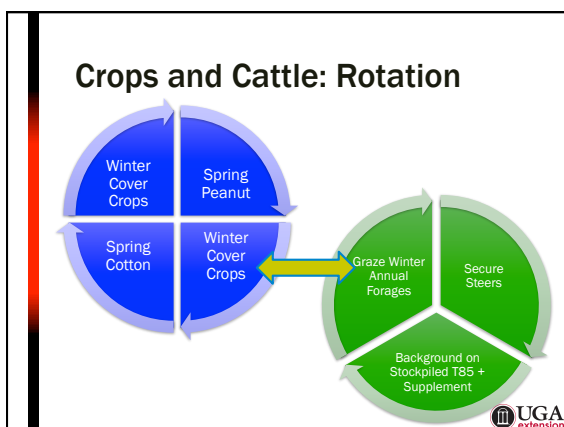
- This is first year data only: 2014 and 2015 have been very different years
- The goal of this evaluation is to "background" or maintain stockers
- Some level of supplementation will be required to meet nutritional requirements of stocker animals



(Part 2) Winter Annual Cover Crops for Stocker Calves




2014-2016
Wiregrass Research and Extension Center
Headland, AL

Preparation

- Winter Annuals planted as Cover Crops to be grazed following T85
- Paddocks were planted in mid-November into prepared seedbed following Peanuts harvested in October
- Part 1 (T85) of the study Terminated in Early January
- Steers were re-randomized and assigned to Winter Annual Treatments
- Steers began grazing winter annuals in late Jan.



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Treatments

Florida
401 Rye
+
Earlyploid
Ryegrass

Florida
401 Rye +
Marshall
Ryegrass

Florida
401 Rye +
RAM
Oats


- Stocking Rate 1.6 head/acre
 - Based on previous studies in the area that determined a SR of 1.5 to 1.8 on cool-season annuals to target 2.0 lb adg
- 5 (600 lb) steers to each 3 acre paddock
- Continuously grazed
- Late January to Mid April




Results (year 1)

	Average Forage Mass (lbs/acre)	Average Daily Gain (lbs/day)
Florida 401 Rye + Earlyploid Ryegrass	1,986	2.17 ^a
Florida 401 Rye + Marshall Ryegrass	2,053	1.78 ^{ab}
Florida 401 Rye + RAM Oats	2,206	1.65 ^b


^{a,b} Within a column, means differ $P < 0.10$.



Key Points



- This is first year data only: 2014 and 2015 have been very different years
- Grazing of Winter Annuals serves as an alternative use in Crop Rotation System
- Priority still remains on the Row Crop
- Full utilization of later maturing Winter Annuals is hindered by land preparation for crop planting beginning in April
- Earlier winter annual varieties are a better option for grazing and forage utilization in row crop focused rotations



Questions?



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Dr. Jennifer Tucker
Asst. Professor
Animal And Dairy Sci. Dept.