Alfalfa Forage System Management Strategies & Social Concepts for Expanding the Integration of Alfalfa into Southern Forage-Livestock Operations

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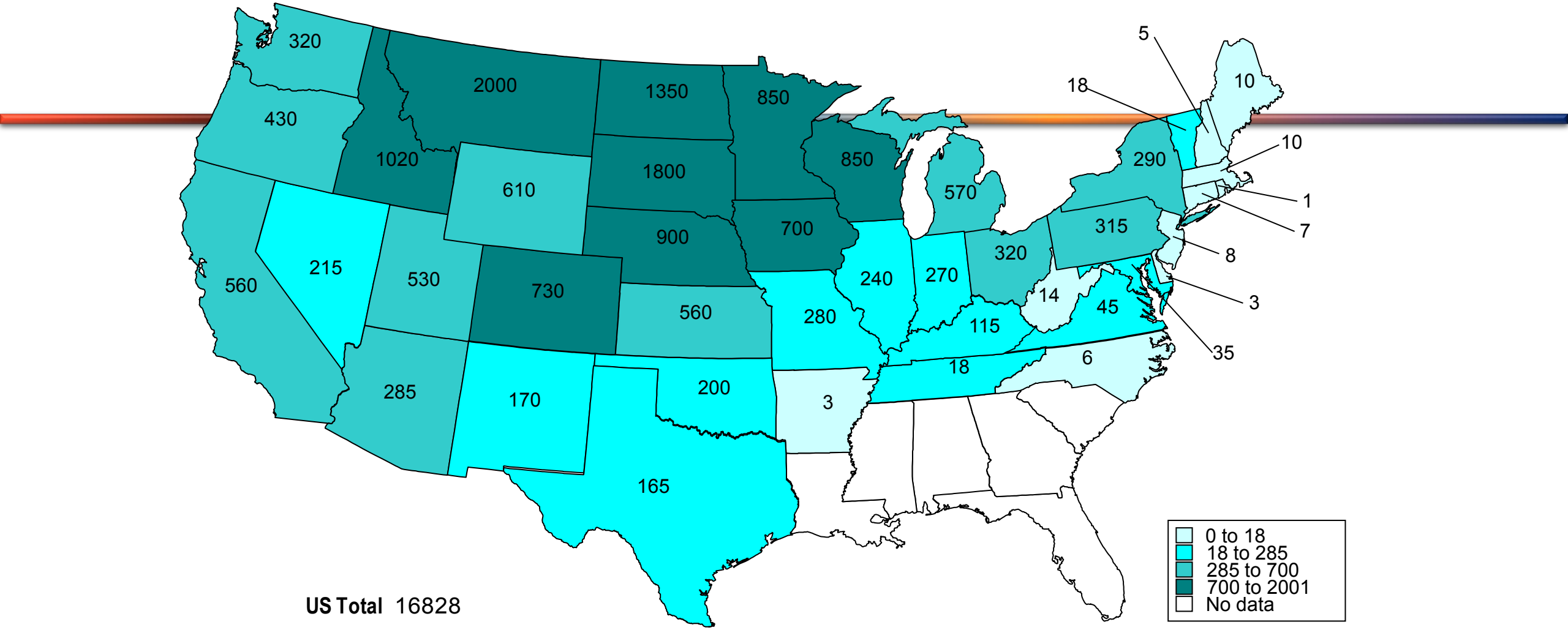
2019 ALFALFA HAY ACRES
(1000 Acres)



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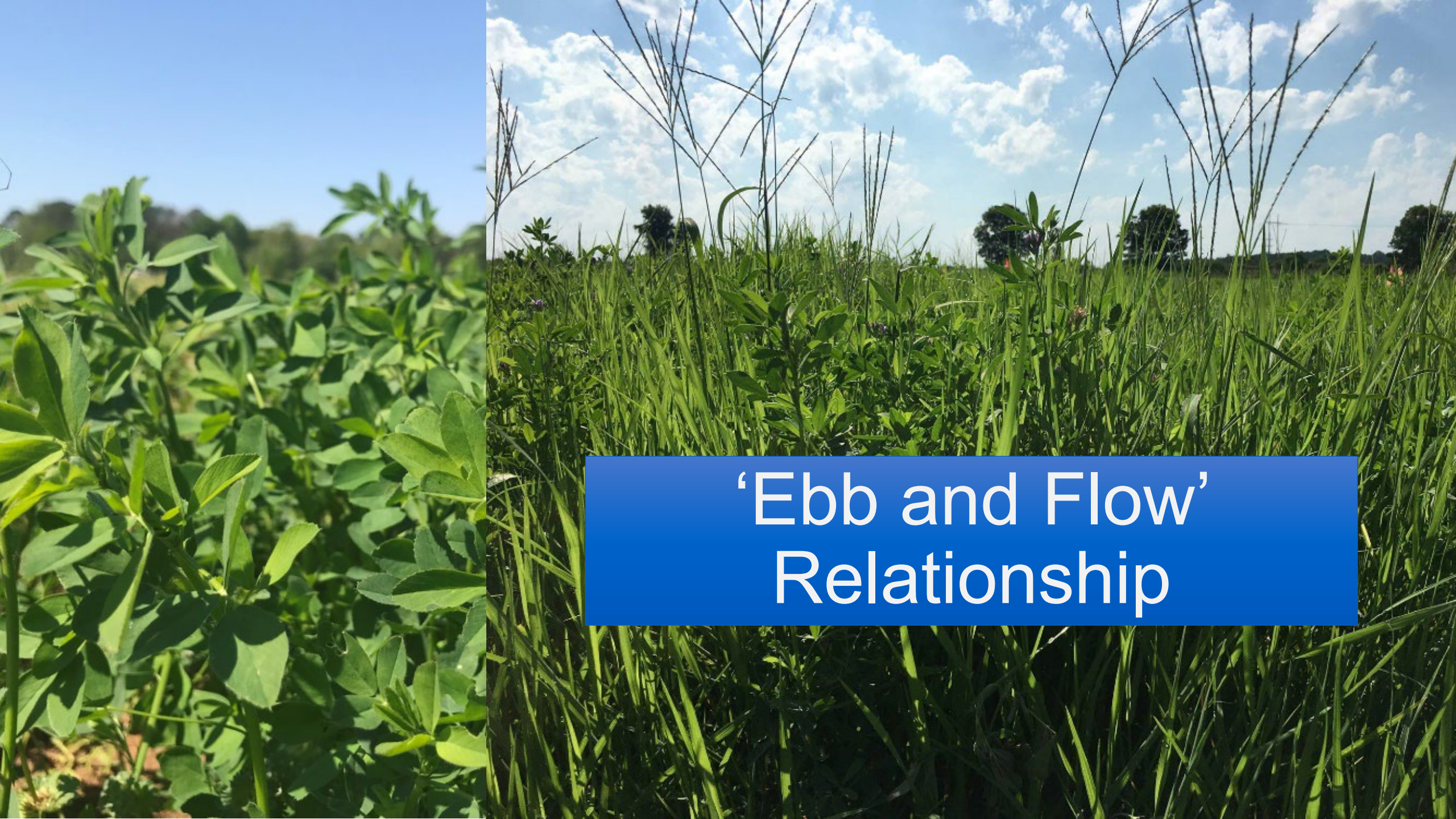

‘Ebb and Flow’ Relationship

Recent Work

- ABG systems work well in baleage production (Hendricks et al. 2020)
- ABG systems can be grazed (Beck 2017a,b,c,d, Burt 2022)
- What are best management practices for ABG system longevity?

How long will alfalfa last in an ABG baleage system?

	2016	2017	2018	2019	2020	2021
Number of Harvests	6	8	7	6	6	?
Tons per acre	7	10	9	5.3	6.5	?

Year	CP	NDF	ADF	TDN	IVDMD
2016	13.9	52.0	31.5	65.6	78.6
2017	22.1	39.9	26.8	70.6	82.2
2018	20.7	41.0	29.2	68.0	79.7
2019	18.8	47.4	32.0	63.6	76.2
2020	17.8	52.3	32.2	62.5	76.0
5 yr AVG	**18.6**	**46.5**	**30.3**	**66.1**	**78.5**

United States Department of Agriculture
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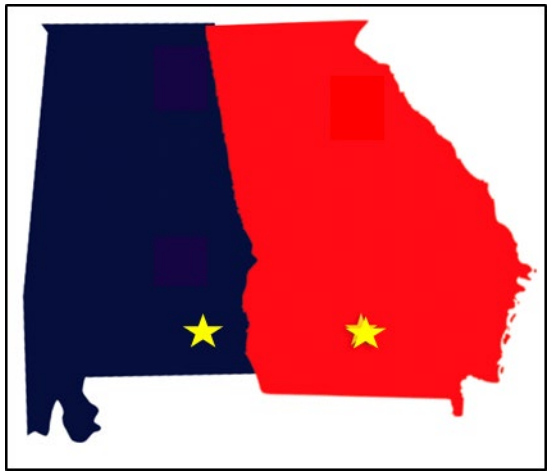
ASAFS # 2019-70005-30360 and 2020

Alfalfa forage system management strategies and social concepts for expanding the integration of alfalfa into Southern forage-livestock operations



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Hypothesis

- Defining management strategies for a cut-and-graze alfalfa-bermudagrass system will improve forage yield, quality, animal performance, and economics of southern forage systems for forage-livestock producers
- Capitalizing on alfalfa's long growing season in the South may provide a fall forage option for forage-livestock producers through stockpiling of mixtures
- Assessment of current perceptions of alfalfa among southern forage-livestock producers and targeting early adopters will improve the regional presence and educational strategies for alfalfa integration in the South




Objectives:

1. To evaluate varied harvest management strategies of alfalfa forage systems in the South to improve management practices and expand alfalfa utilization in the region.

Simultaneous evaluation of management systems

Research:

Experiment 1: Evaluating management strategies of alfalfa forage systems in the South: Dual-purpose usage for conserved forage and grazing

Experiment 2: Expanding the use of alfalfa for livestock producers by evaluating its use in fall stockpiling systems: Small plot evaluation

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To be presented by Justin Burt on Thursday!

Objectives

2. To develop an economic analysis of dual-purpose alfalfa-bermudagrass systems.

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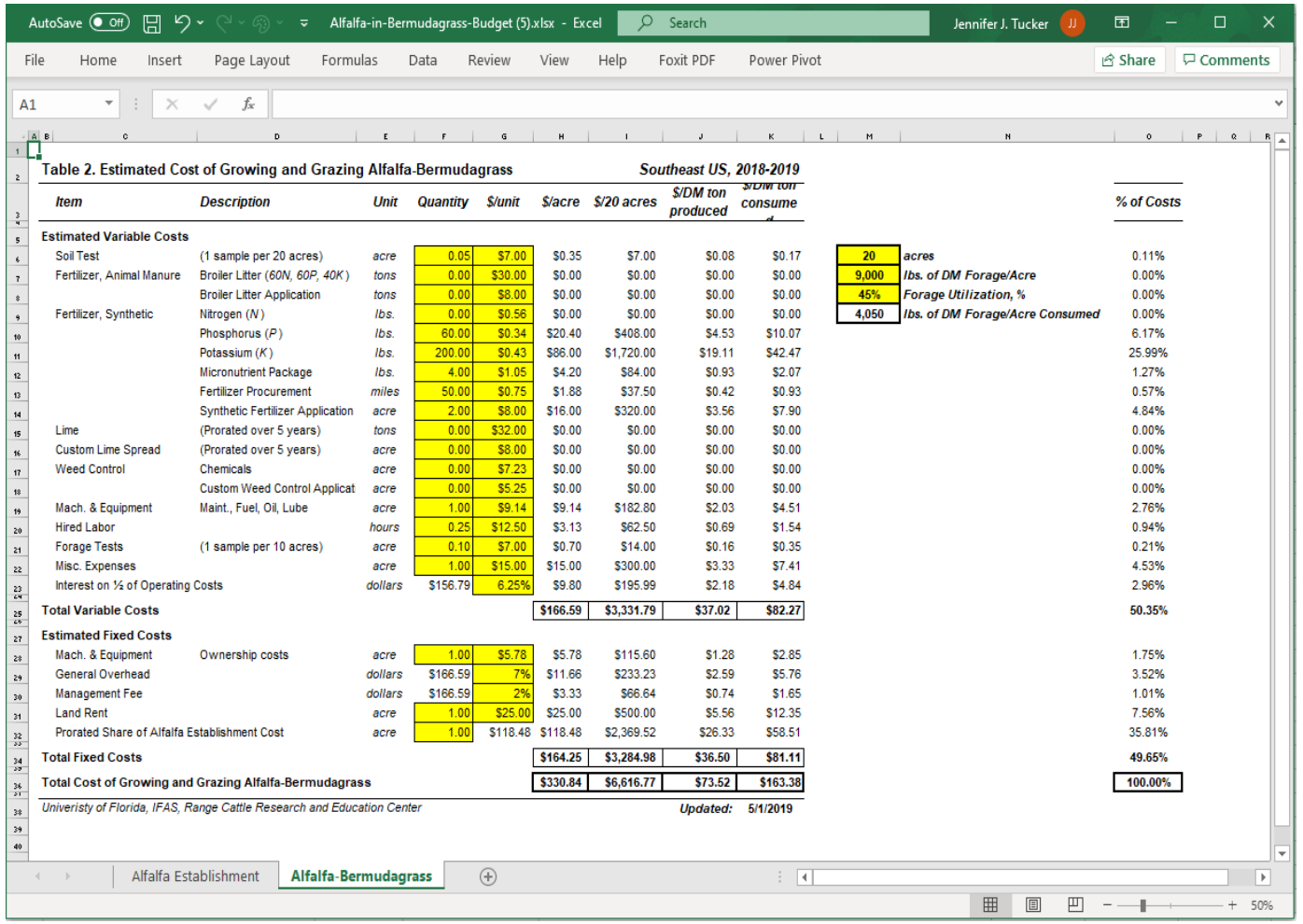

Table 2. Estimated Cost of Growing and Grazing Alfalfa-Bermudagrass — Southeast US, 2018-2019

Item	Description	Unit	Quantity	$/unit	$/acre	$/20 acres	$/DM ton produced	$/DM ton consumed	% of Costs
Estimated Variable Costs									
Soil Test	(1 sample per 20 acres)	acre	0.05	$7.00	$0.35	$7.00	$0.08	$0.17	0.11%
Fertilizer, Animal Manure	Broiler Litter (60N, 60P, 40K)	tons	0.00	$30.00	$0.00	$0.00	$0.00	$0.00	0.00%
	Broiler Litter Application	tons	0.00	$8.00	$0.00	$0.00	$0.00	$0.00	0.00%
Fertilizer, Synthetic	Nitrogen (N)	lbs.	0.00	$0.56	$0.00	$0.00	$0.00	$0.00	0.00%
	Phosphorus (P)	lbs.	60.00	$0.34	$20.40	$408.00	$4.53	$10.07	6.17%
	Potassium (K)	lbs.	200.00	$0.43	$86.00	$1,720.00	$19.11	$42.47	25.99%
	Micronutrient Package	lbs.	4.00	$1.05	$4.20	$84.00	$0.93	$2.07	1.27%
	Fertilizer Procurement	miles	50.00	$0.75	$1.88	$37.50	$0.42	$0.93	0.57%
	Synthetic Fertilizer Application	acre	2.00	$8.00	$16.00	$320.00	$3.56	$7.90	4.84%
Lime	(Prorated over 5 years)	tons	0.00	$32.00	$0.00	$0.00	$0.00	$0.00	0.00%
Custom Lime Spread	(Prorated over 5 years)	acre	0.00	$8.00	$0.00	$0.00	$0.00	$0.00	0.00%
Weed Control	Chemicals	acre	0.00	$7.23	$0.00	$0.00	$0.00	$0.00	0.00%
	Custom Weed Control Applicat	acre	0.00	$5.25	$0.00	$0.00	$0.00	$0.00	0.00%
Mach. & Equipment	Maint., Fuel, Oil, Lube	acre	1.00	$9.14	$9.14	$182.80	$2.03	$4.51	2.76%
Hired Labor		hours	0.25	$12.50	$3.13	$62.50	$0.69	$1.54	0.94%
Forage Tests	(1 sample per 10 acres)	acre	0.10	$7.00	$0.70	$14.00	$0.16	$0.35	0.21%
Misc. Expenses		acre	1.00	$15.00	$15.00	$300.00	$3.33	$7.41	4.53%
Interest on ½ of Operating Costs		dollars	$156.79	6.25%	$9.80	$195.99	$2.18	$4.84	2.96%
Total Variable Costs					**$166.59**	**$3,331.79**	**$37.02**	**$82.27**	**50.35%**
Estimated Fixed Costs									
Mach. & Equipment	Ownership costs	acre	1.00	$5.78	$5.78	$115.60	$1.28	$2.85	1.75%
General Overhead		dollars	$166.59	7%	$11.66	$233.23	$2.59	$5.76	3.52%
Management Fee		dollars	$166.59	2%	$3.33	$66.64	$0.74	$1.65	1.01%
Land Rent		acre	1.00	$25.00	$25.00	$500.00	$5.56	$12.35	7.56%
Prorated Share of Alfalfa Establishment Cost		acre	1.00	$118.48	$118.48	$2,369.52	$26.33	$58.51	35.81%
Total Fixed Costs					**$164.25**	**$3,284.98**	**$36.50**	**$81.11**	**49.65%**
Total Cost of Growing and Grazing Alfalfa-Bermudagrass					**$330.84**	**$6,616.77**	**$73.52**	**$163.38**	**100.00%**

20	acres	
9,000	lbs. of DM Forage/Acre	
45%	Forage Utilization, %	
4,050	lbs. of DM Forage/Acre Consumed	

Univeristy of Florida, IFAS, Range Cattle Research and Education Center — **Updated:** 5/1/2019

Figure 7. Alfalfa-Bermudagrass Grazing budget developed by team and published on secattleadvisor.com (2019)

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Objectives

3. To identify barriers to the adoption of alfalfa among stakeholders, and create awareness on management for alfalfa integration among forage-livestock technical educators and producers.

Barriers and Perceptions of Alfalfa in the South

- Refine Extension approach based on survey data

On-Farm Dual-Use Management System Demonstrations

- Immediate farmer engagement

Establishment of Web-Resources and Video Development

- Build resource library for information release

Forage-Livestock Educator Training

- Current research and Extension knowledge on alfalfa in the South

Commodity Group Engagement

- Create awareness among early adopters in the forage-livestock area

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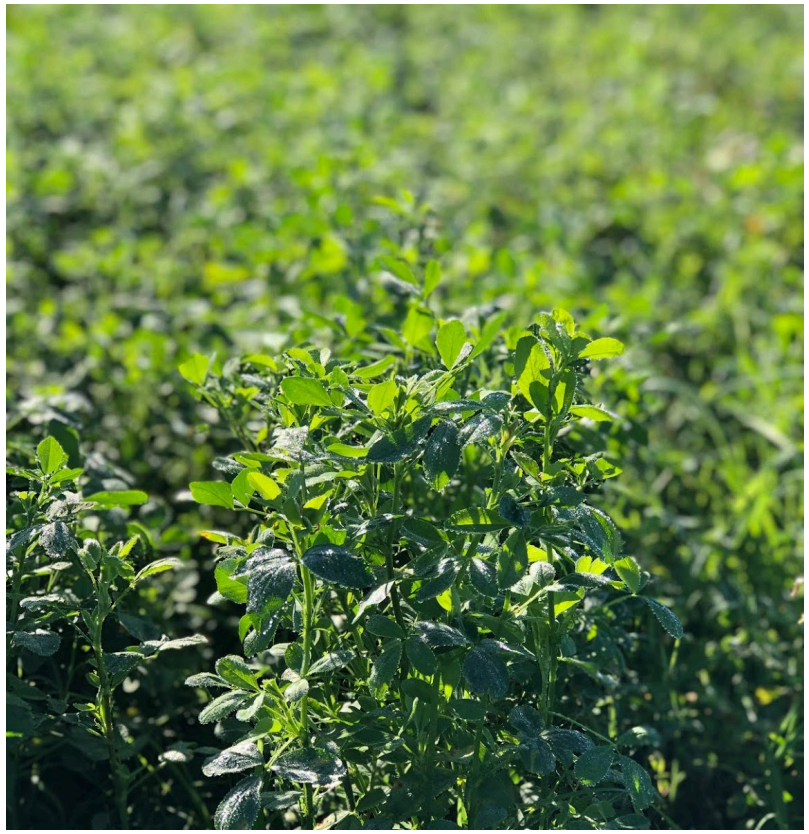
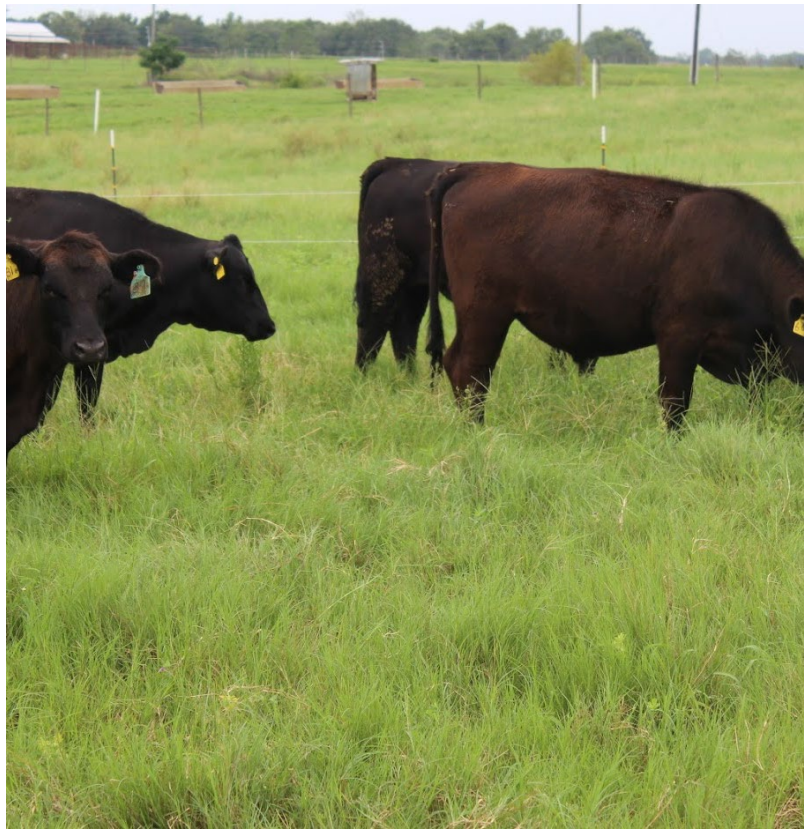
Alfalfa in the South program

- Recurrent program with goal of increasing awareness, knowledge and production acreage through in-depth Extension education.
- Collaboration between Universities and Industry
- Traditional format: one day - half-day in the classroom and the other half on field

Tucker, J., T. Hendricks, K. Mason, K. Mullenix, D. Hancock, and C. Prevatt. 2019. Alfalfa in the South Workshop Series: Increasing Acreage through Education. Journal of National Association of County Agricultural Agents. 12(2) ISSN 2158-9429

It’s Good – but how do we make it better?

Development of Online Alfalfa Management Extension Education Resources Amid the COVID-19 Pandemic

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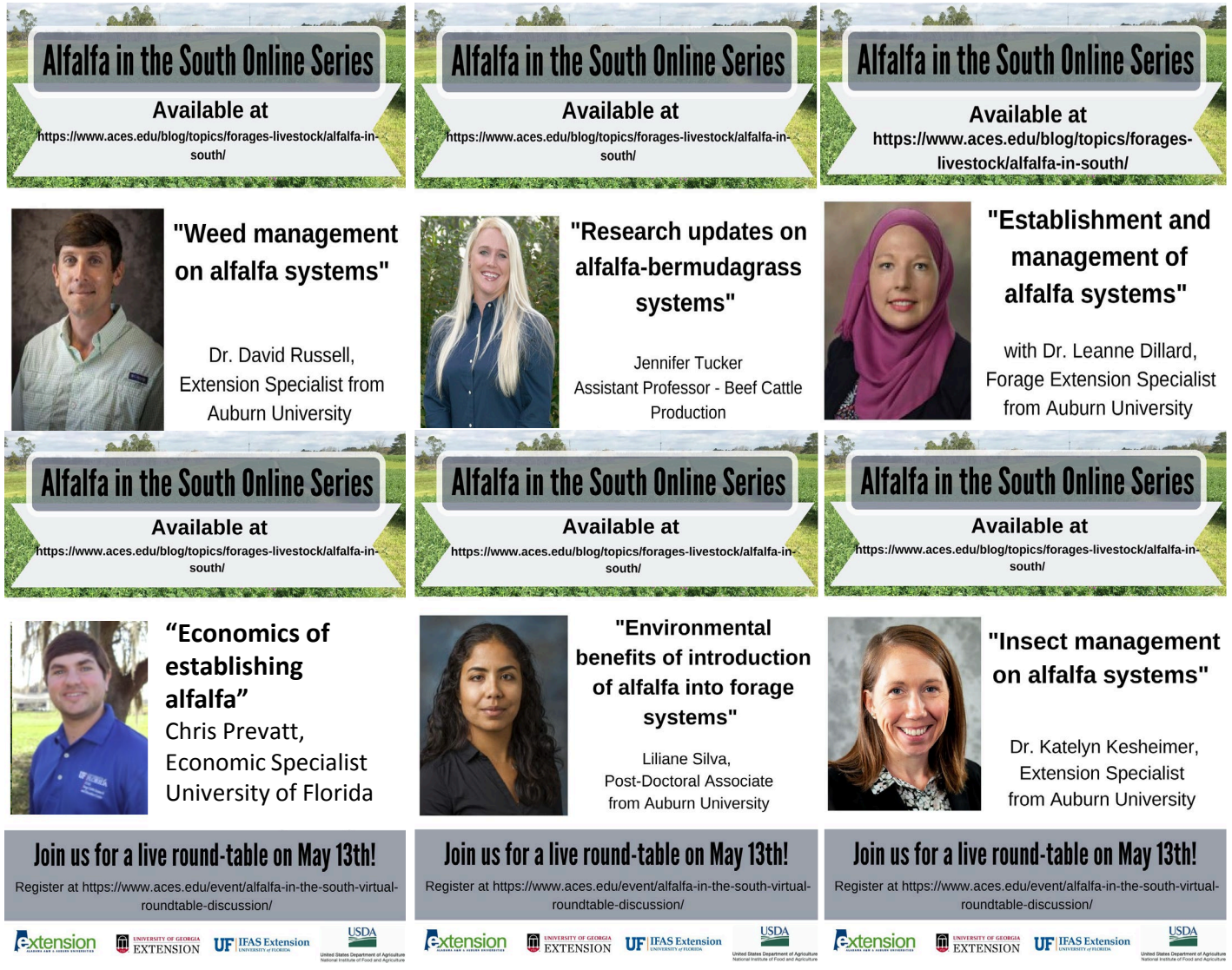
Liliane Silva



Six pre-recorded webinars archived on the ACES page and posted on additional social media resources (engagement over 3 K).

First online edition

- One-hour live Zoom roundtable was held with Extension faculty and agents, and producers.
  - Outline of topics and live questions from audience
  - Archived on social media
  - Educational resource available for reference and use for Extension personnel
  - Over 1.3 K views on Alabama Cooperative Extension System (ACES) webpage

Alfalfa in the South: Frequently Asked Questions Edition
Week Sept 7th to 11th

September edition

Dr. Esteban Rios
University of Florida

Dr. Lynn Sollenberger
University of Florida

Dr. Joe Bouton
Bouton Consulting Group, LLC

Dr. Jennifer Tucker
University of Georgia

Dr. Leanne Dillard
Auburn University

Dr. Jose Dubeux
University of Florida

Dr. Marcelo Wallau
University of Florida

Dr. Lisa Baxter
University of Georgia

Dr. Liliane Silva
Auburn University

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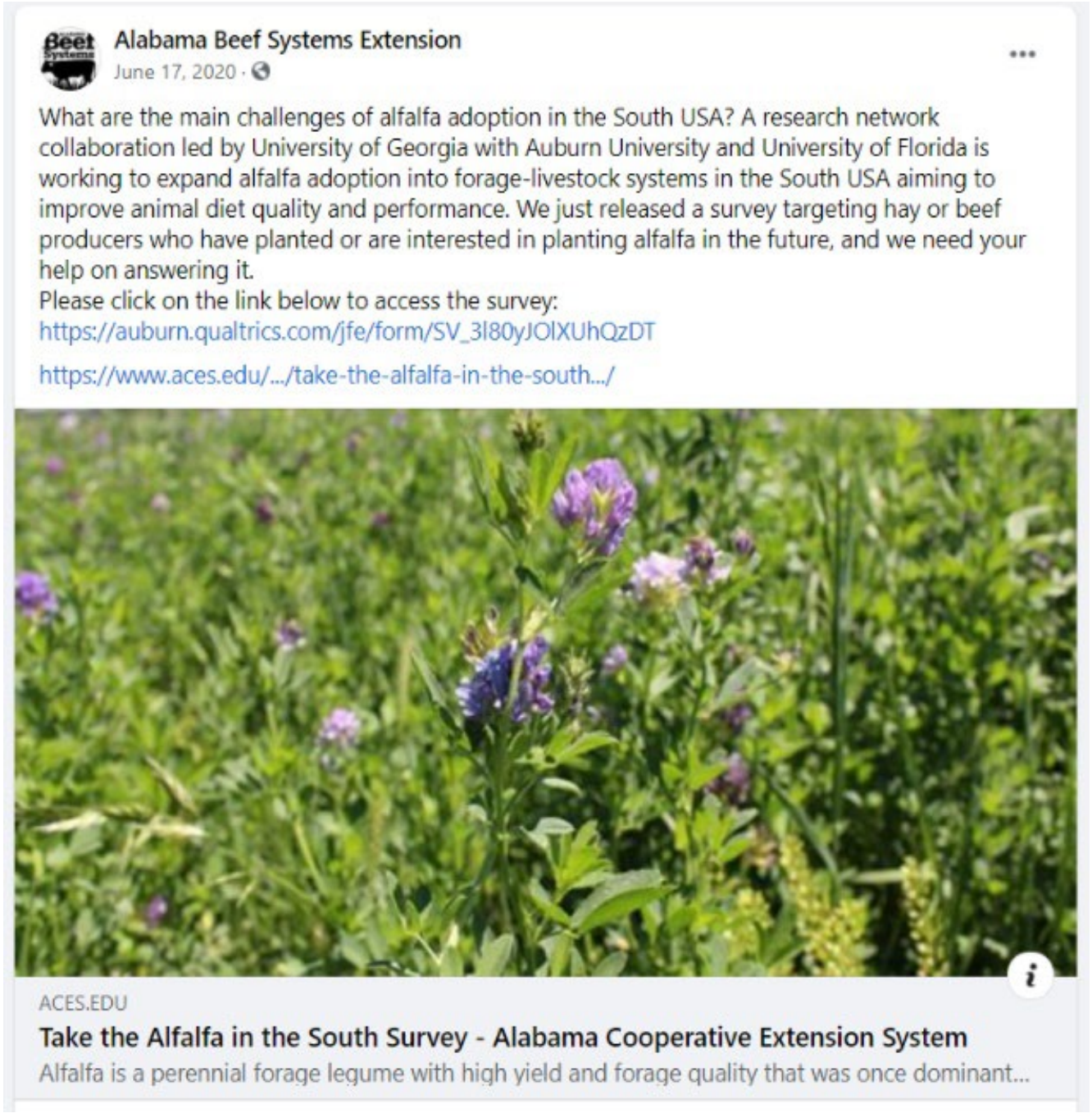
Alfalfa in the South Survey

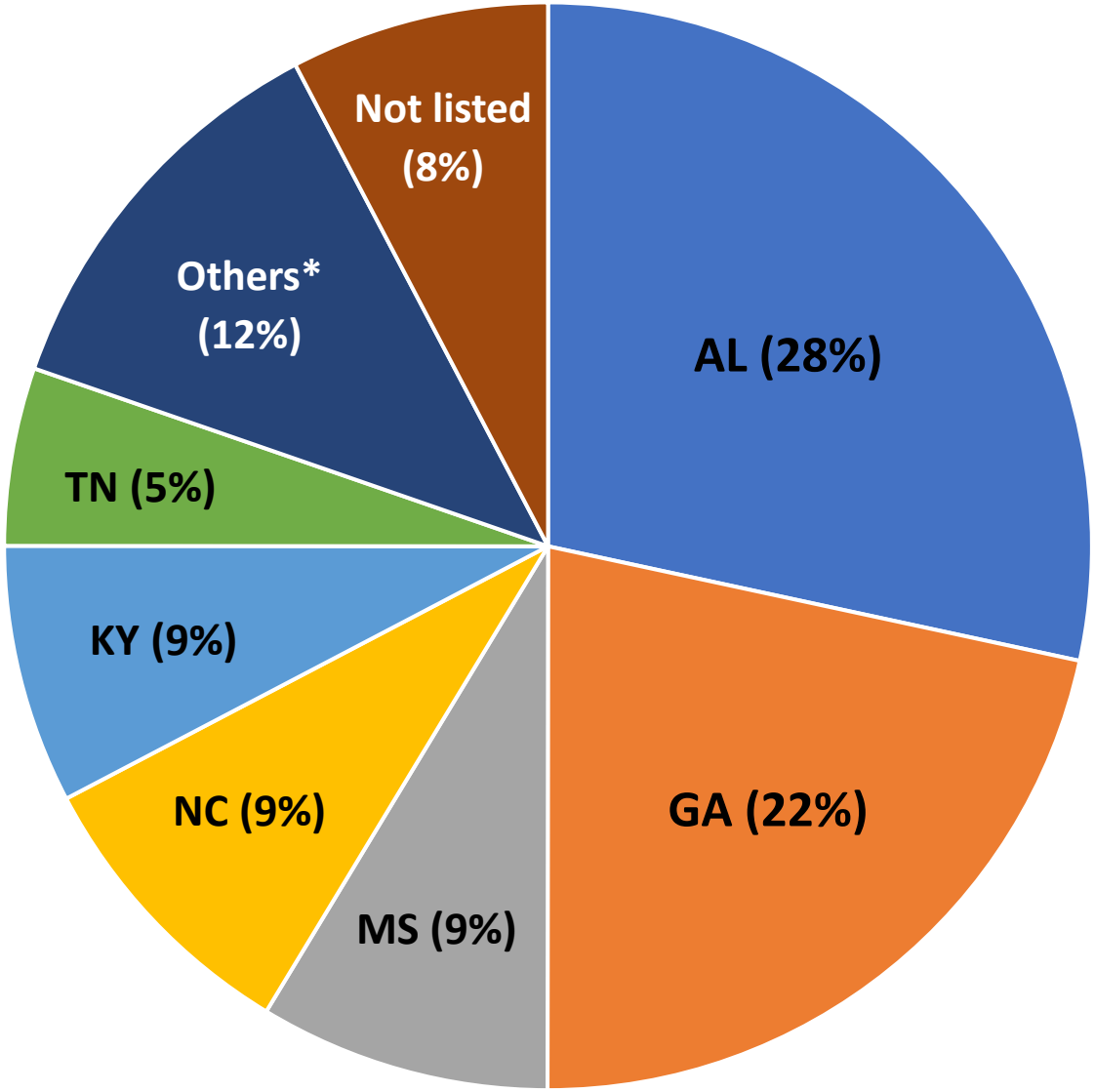
- Format: 24 questions
- Distribution from May through Dec 2020
- Online via social media, through email listservs, and regional Extension networks



Alfalfa survey

- 12 states: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia and Texas.
- **Goal**: **understand main challenges and limitations of alfalfa adoption by beef and forage producers in the Southeast US**
- This study was deemed exempt under federal regulation 45 CFR 46.101(b).

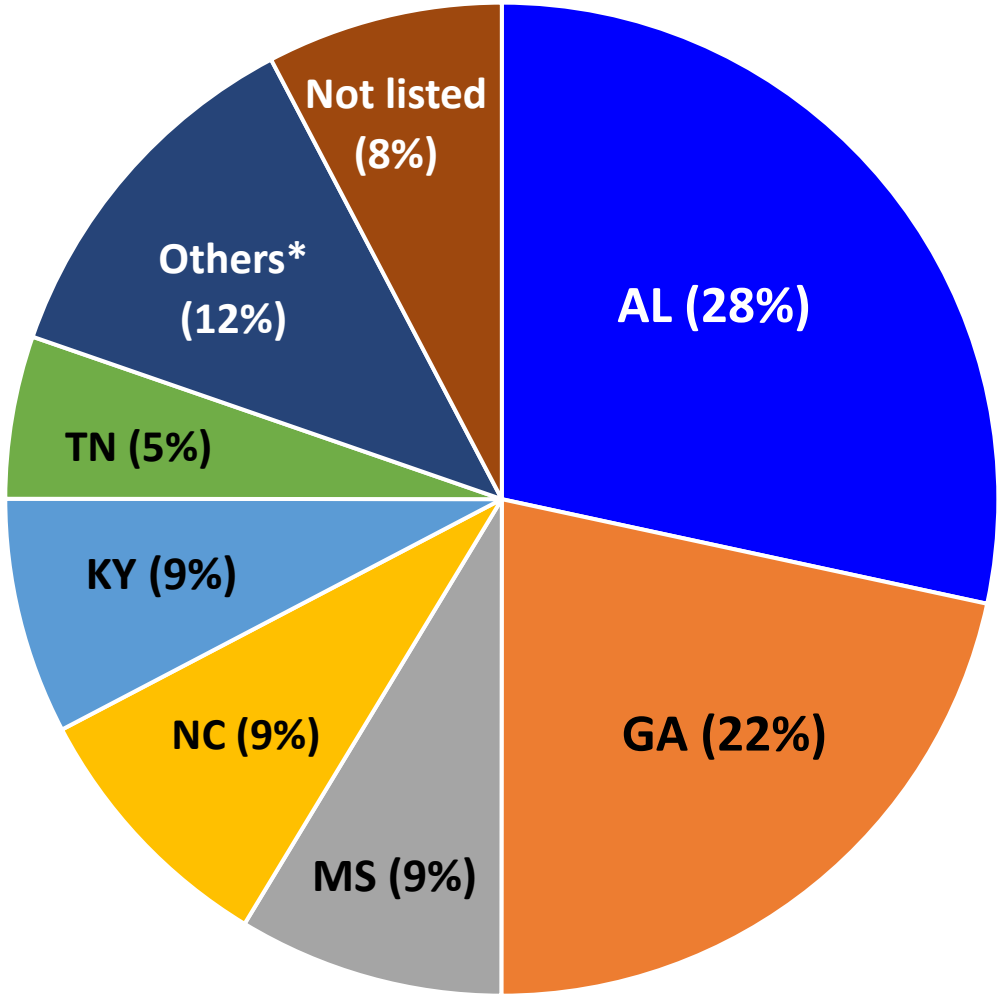
➢ Total: 209 participants



*AR, FL, LA, SC, VA, TX (<10 participants/state)

Demographics highlights

Total: 209 participants



*AR, FL, LA, SC, VA, TX (<10 participants/state)

- Majority male participants (90%)
- Over 56-yr-old (~50%) with >20-yr of experience
- Full-time (39%) or part-time (49%) farmers
- Cattle herd up to 50 (52%) or up to 150 animals (34%) in their property

Type of activity†	0 to 10 acres	11 to 50 acres	51 to 100 acres	> 100 acres
Hay production	11%	30%	26%	33%
Pasture	11%	26%	27%	36%

Survey results

- ~50% knows someone growing alfalfa in their state
- High interest in learning about management (86%) and currently have use in their operation (68%)
- 65% of participants have accessed online resources
- Alfalfa can be ***profitable*** in the Southeast: **74%**
- **Current growing** (n= 40; 5 to 40 acres, pure stand)
  - •Increased forage yield and quality, profit and pests/weeds
- **Prior to 2019** (n= 66; 10 to 50 acres, pure stand)
  - •Challenges related to weather, and diseases pressure

If you are interested in growing alfalfa, indicate why:

- Greater profits: 15%
- Greater hay quality: **48%**
- Reduce N fertilizer input: 10%
- Greater yields: 9%
- Other: **18%**
  - All the above
  - Diversify forage base
  - Extend grazing season
  - Target horse market (hay)

If you are hesitant about growing alfalfa, indicate why:

- Cost of establishment: **21%**
- Stand longevity: **21%**
- Weed/pest issues: 16%
- Management intensity: 14%
- Soil fertility: 5%
- Other: **21%**
  - All the above
  - Drying time *vs* weather conditions
  - Economics of growing alfalfa

Take Away

- There is interest in learning more about growing alfalfa
- Most farmers are seeking alfalfa as an option to increase forage quality and extend production season
- Major concerns are related to costs of establishment, stand longevity and potential weather issues
- There is a need to incorporate environmental benefits into educational efforts related to alfalfa production.
- More alfalfa educational resources and trainings are needed to help farmers on making educated decisions to include alfalfa into their operations in the SE US

Perceptions of adoption of alfalfa plantings by forage–livestock producers in the southern United States

Liliane S.Silva, Mary K. Mullenix, Chris Prevatt, and Jennifer J.Tucker

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Applied Animal Science 37:665–669

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Applied Animal Science 37:665–669
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ARPAS

EXTENSION AND TEACHING: *Original Research*

Perceptions of adoption of alfalfa plantings by forage–livestock producers in the southern United States

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[1]Department of Animal Sciences, Auburn University, Auburn, AL 36849; [2]Range Cattle Research and Education Center, Institute of Food and Agricultural Sciences, University of Florida, Ona 33865; and [3]Department of Animal and Dairy Science, University of Georgia, Tifton 31793

ABSTRACT

Objective: The development of newer alfalfa cultivars with improved adaptation to local growing conditions and dual-purpose applications (hay and grazing) has increased alfalfa incorporation into forage systems in the southern United States. The objective of this survey was to identify main challenges associated with alfalfa adoption by forage–livestock producers in the southern region.

Materials and Methods: The web-based survey consisted of 24 questions and was distributed from May through December 2020 across 12 states (Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and Texas).

Results and Discussion: There was a total of 211 respondents. Most participants had already considered planting alfalfa and sought out information through extension publications (84 and 66%, respectively). Thus, most participants were seeking alfalfa as an option to increase forage quality (48%) and profits (15%). The major considerations associated with low adoption of alfalfa plantings were cost of stand establishment (21%), longevity of stand life usefulness (22%), and "others" (22%). In the latter category, most participants mentioned weather-related conditions that represent a challenge to produce high-quality hay, along with proper management practices. Although environmental benefits of alfalfa incorporation are diverse, including decreasing reliance on nitrogen (N) chemical fertilizer input, only 10% of participants were interested in including alfalfa to reduce N input.

Implications and Applications: Educational re-

Key words: alfalfa production, forage production, nitrogen fertilization, nutrient recycling

INTRODUCTION

Alfalfa (*Medicago sativa* L.) is a perennial forage legume with high forage yield and nutritive value (Jones and Olsen, 1987; Hakl et al., 2016). The "Queen of Forages" is one of the most widely grown forage crops in the United States, with most production concentrated in the northern and western regions of the country (USDA, 2019). Alfalfa can be grown in pure stand or in a mixture with perennial grasses. In the southern United States, bermudagrass (*Cynodon dactylon* Pers.) has similar soil fertility and drainage requirements to alfalfa, and alfalfa incorporation into swards reduces the need to input chemical N fertilizer (Ball et al., 2015). Several research trials demonstrated the viability of alfalfa–bermudagrass systems for conserved forage production or grazing in livestock systems (Beck et al., 2017; Hendricks et al., 2020).

Traditionally, there has been a high reliance on chemical N fertilizer to maintain forage production and nutritive value to sustain animal performance in warm-season perennial grass-based systems (Silveira et al., 2014). This reliance on N fertilizer affects costs of production due to fluctuations of fertilizer prices and increases the carbon footprint of livestock systems (Lal, 2004). The increasing focus on sustainable practices in livestock production systems has expanded the incorporation of legumes into forage systems. Legumes are able to fix biological N, improving soil fertility and working as an alternative to N fertilizer (Muir et al., 2011).

Technical publications pieces published.

Alfalfa (*Medicago sativa* L.) is a perennial forage legume suited for hay, silage, or grazing management systems. The "Queen of Forages" is high yielding and produces excellent quality forage with high energy and protein. Alfalfa was once a dominant species utilized in the Southeast US. However, the harsh environment and elevated insect pressure soon eliminated many productive stands, resulting in a decline in alfalfa acreage. In recent years, breeding efforts have resulted in development of new varieties with improved adaptation to growing conditions in the Southeast, making alfalfa once again a desirable legume for this region. The purpose of this information sheet is to highlight frequent questions associated with establishment and management of alfalfa when planted into warm-season perennial grass stands.

Can alfalfa be grown in Southeast US?
Yes! This is a common question and misconception that alfalfa does not grow in the Southeast. Historically, alfalfa was grown throughout the region, and recently, development of improved varieties has resulted in greater potential for an alfalfa market. Alfalfa may be established in a pure stand, or interseeded into warm-season perennial grasses, such as bermudagrass. Interseeding into these systems provides complementary growth by alfalfa in the spring and fall months, extending the growing season length compared to warm-season perennials alone.

What are important soil considerations when planting alfalfa?
The site must be well-drained with high soil fertility to allow deep rooting and adequate establishment. Prior to planting, soil pH should range from 6.5 to 7 for topsoil and be greater than 6 for subsoil. Annual soil tests are essential, and lime should be applied to maintain a pH range between 6.5 and 7.0. This

Why might I consider planting alfalfa into bermudagrass?
Integrating alfalfa can add nitrogen to the system, increase yield by extending the growing season, and improving forage quality relative to warm-season perennial grasses alone. Alfalfa is an excellent companion crop for bermudagrass. Both alfalfa and bermudagrass prefer well-drained soils for success and have similar seasonal fertility requirements with the exception of nitrogen, which is not necessary when alfalfa is in the mix. Alfalfa may last 3 to 5 years in mixed stands with bermudagrass, with many stands persisting for longer periods of time. Growing alfalfa with warm-season perennials has some built-in risk management: when alfalfa plays out, the warm-season perennial will reclaim its dominance. A summary of expected yield and quality characteristics of alfalfa-bermudagrass mixtures is provided in **Table 1**.

Can I interseed alfalfa into bahiagrass sods? Alfalfa can be grown in a mixture with

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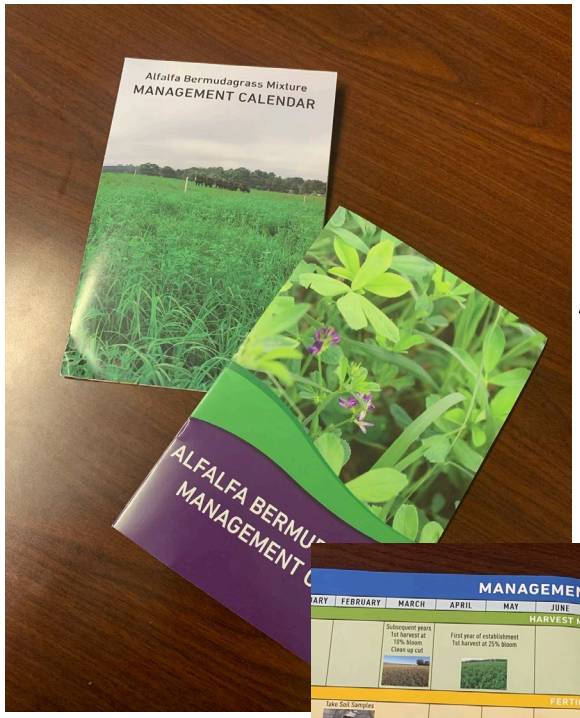
Alfalfa Establishment and Management

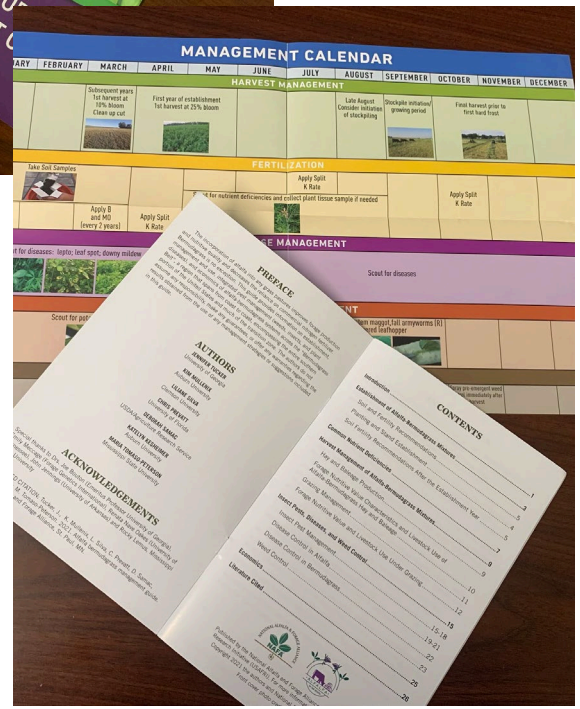
► Alfalfa (*Medicago sativa* L.) is popularly known as the Queen of Forages because of its high forage nutritive value characteristics. Alfalfa is a high-yielding, perennial legume that is well-suited for hay, silage, baleage, and grazing management systems.

Alfalfa is one of the most widely grown forage crops in the United States with most production concentrated in the northern and western regions of the country. In the southeastern United States, there has been a decrease in alfalfa acreage during the last century because of constraints related to challenging weather conditions, pests, and disease pressure. Recently, forage breeding efforts and research associated with improved management strategies have increased the stand persistence ability of alfalfa. As a result, the crop is slowly returning to the Southeast.

Introduction

Alfalfa has compound leaves with three leaflets, purple flowers, a long taproot system, and grows to a height of 24 to 36 inches. Alfalfa requires well-drained, high-fertility soils for growth and has limited tolerance to pests, disease pressure, and prolonged drought conditions. In the Southeast, it is crucial to choose a well-adapted variety that tolerates higher temperatures, pests, and diseases. The choice of variety must also align with the proposed use of alfalfa in the system, such as for hay production, grazing, or dual-purpose use. Several varieties are available that vary in forage yield potential and dormancy rating. Alfalfa varieties are ranked on a fall dormancy scale (table 1) based on when growth stops for each one in the fall.





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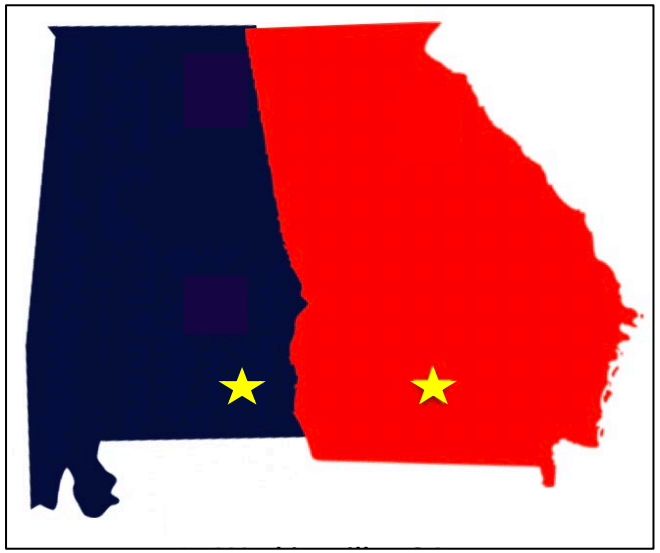
Alfalfa Nutrient Preservation, Utilization and Cycling in Sustainable Southeastern Livestock Systems



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Jennifer J. Tucker, M. Kimberly Mullenix, Chris Prevatt, Liliane S. da Silva, Sandra L. Dillard, Todd Callaway, and Lisa L. Baxter

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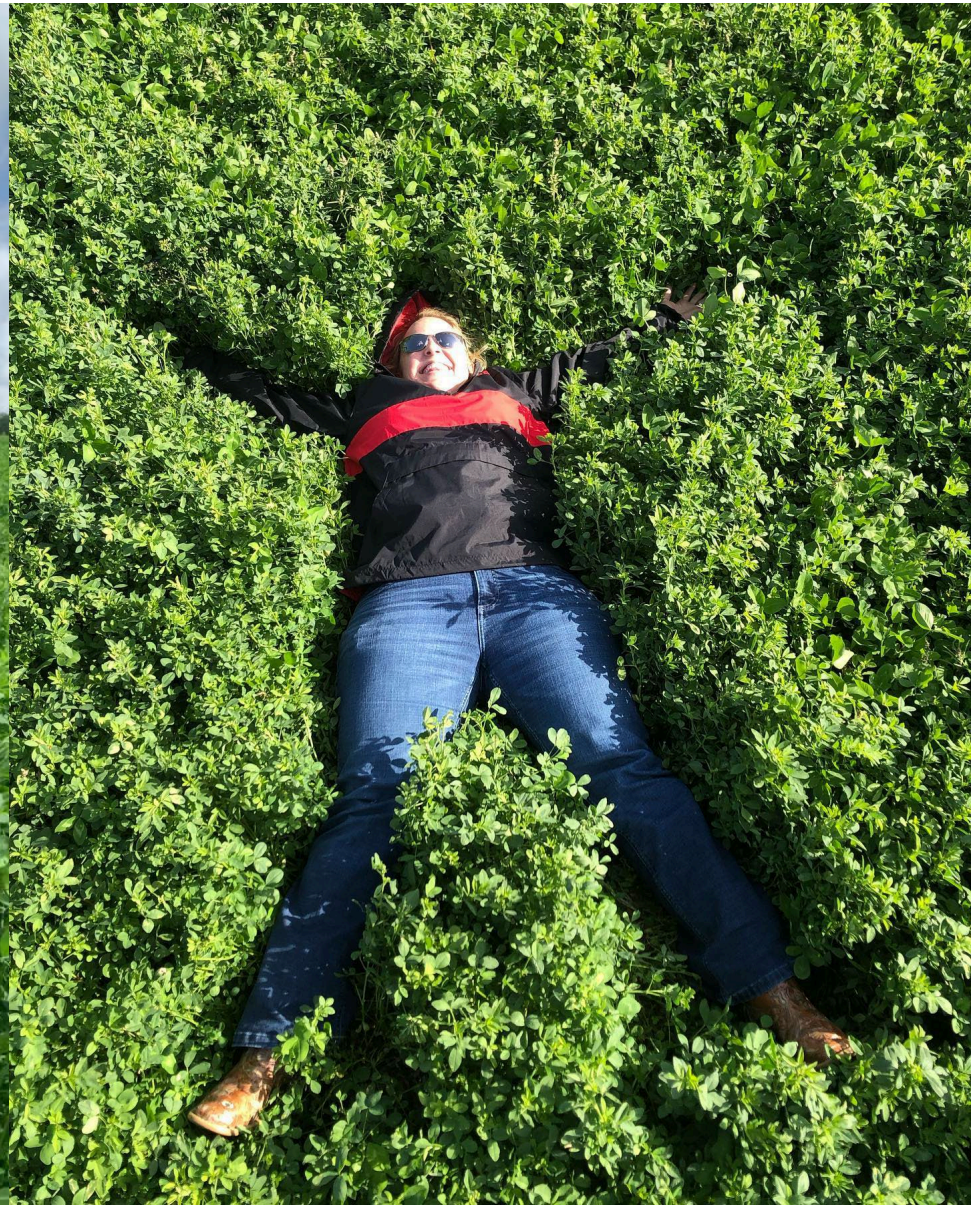
Alfalfa following long-term annual crop production and the associated impact on Carbon

Seed provided by FGI



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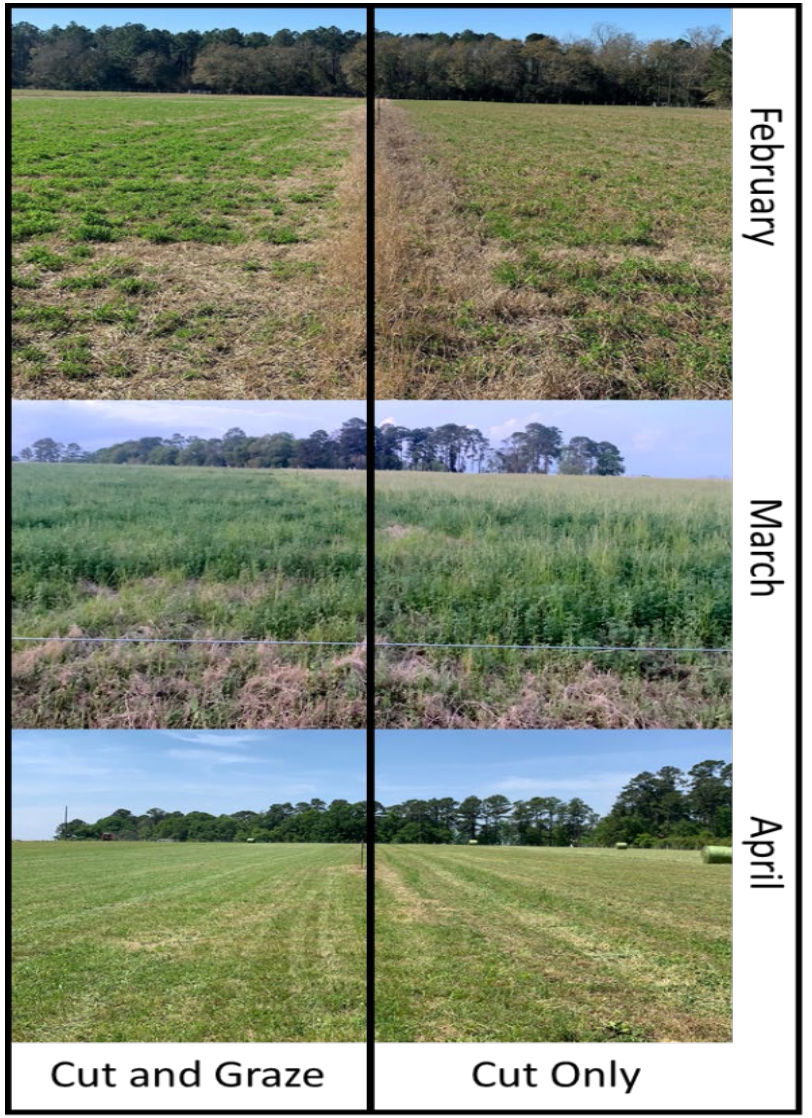

Figure 1. Visual observation of Cut-and-Graze and Cut only defoliation strategies on alfalfa-bermudagrass mixtures post first year utilization in Tifton, GA. (2021)