# Alabama Forage & Grassland Coalition

# 2013 Forage Conference Proceedings

## *Forages: Past, Present, Future*

**December 12, 2013**
**Lake Guntersville Lodge**
**Guntersville, AL**

# Alabama State Beef Checkoff Program

It's the only producer directed
beef promotion program in Alabama that promotes beef, tells our industry's story, responses to negative attacks
and supports our youth.

Without the funds from the Alabama State Beef Checkoff Program, these and many other valuable programs that benefit all cattle producers would be discontinued.

- AJCA Roundup Hosted 250 youth in July
- Culinary arts students toured Cullman Stockyard as one of three stops on a Farm Tour
- Sysco Foodservice sales people learned about beef production in a BEEF 101
- Cattlemen and CattleWomen from 41 counties received books about cattle production to read to over school children.
- BEEF U hosted  youth at Auburn University to learn about all aspects of the beef cattle industry
- Dietitians learn about raising cattle from ACA President, Jimmy Holliman at a "Dinner and Discussion" in October.
- Meat market managers learned about beef in 2013 through educational programs provided by the beef checkoff.
- 'Alabama's Best Steak Contest' increased beef sales by generating media attention about steak restaurants around the state.
- The beef checkoff supports the US Meat Export Federation, which promotes beef to other countries resulting in an increase of $278 in carcass value.
- Jr. and Sr. High School Beef Cookoff draw young culinary enthusiasts each year to compete for the "Best in Beef" award.
- ***And it supports programs like the "Alabama Forage Conference"***

## Vote YES on December 18th

### to continue the State Beef Checkoff Program

### 8:30 – 4:00 County Extensions Office

*The assessment amount is equal to one pound selling weight on your calf and is a voluntary program so even if you don't support the investment you can get you money back.*

# Schedule of Events

**Wednesday, December 11, 2013**

| | | |
|---|---|---|
| 1:00 p.m. | Pre-Conference Tour | Sand Mountain Research & Extension Center |

**Thursday, December 12, 2013**

| | | |
|---|---|---|
| 7:30 a.m. | Registration Opens | Lobby, Guntersville State Park Lodge |
| | Trade Show Opens | Camellia Room |
| **Morning Session** | | **Grandview Ballroom** |
| Moderator: Mr. Henry Dorough, Animal Science and Forages Regional Agent, ACES | | |
| 8:45 a.m. | **Welcome and Opening Comments** | |
| | Dr. Paul Mask, Associate Director for Ag, Forestry & Natural Resources, ACES | |
| | Mr. Jimmy Holliman, President, Alabama Cattlemen's Association | |
| 9:15 a.m. | Forages of the Past | Dr. Don Ball |
| 9:45 a.m. | Forages of the Present | Dr. Dennis Hancock |
| 10:15 a.m. | Break | |
| 11:00 a.m. | Forages of the Future | Dr. Jennifer Johnson |
| 11:30 a.m. | Native Warm Season Grasses: | Dr. Pat Keyser |
| | Grasses of the Past Impacting Our Future | |
| 12:00 Noon | Lunch and visit Trade Show | Grandview Ballroom, Goldenrod and Camellia Rooms |
| | Invocation: Mr. Wade Hill, ALFA | |
| **Afternoon Session** | | **Grandview Ballroom** |
| Moderator: Dr. Jennifer Johnson, Alabama Forage Specialist, ACES | | |
| 1:15 p.m. | Animal Products from Forage: The Real Health Food | Dr. Peter Ballerstedt |
| 2:15 p.m. | Soil Health | Dr. Charles Mitchell |
| 2:45 p.m. | Break | |
| **Breakout Session I: Is the Potential for Sustainable Year Round Grazing Obtainable?** | | **Goldenrod Room** |
| Moderator: Mrs. Brenda Glover, Animal Science and Forages Regional Agent, ACES | | |
| 3:30 p.m. | Utilizing Legumes to Maximize Pasture Forage Availability | Dr. Don Ball |
| 4:00 p.m. | How to Manage Drought Potential Before vs. Dealing with Drought Devastation After | Dr. Dennis Hancock |
| 4:30 p.m. | Stockpiling: How to Graze Your Cows from Fall to Spring | Dr. Jennifer Johnson |
| **Breakout Session II: Pasture Weeds and Weed Control Options** | | **Grandview Ballroom** |
| Moderator: Mr. Jonathan Gladney, Animal Science and Forages Regional Agent, ACES | | |
| 3:30 p.m. | Common Pasture Weeds in Alabama | Dr. Stephen Enloe |
| 4:15 p.m. | Weed Control Options | Mr. Matt McGowan |
| 5:00 p.m. | Adjourn | |

# MIX 30

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## Table of Contents

## Speaker Biographies

**Don Ball, Ph.D., Professor Emeritus, Auburn University.** Dr. Don Ball grew up on a farm near Owensboro, Kentucky. He received his B.S. from Western Kentucky University and an M.S and Ph.D. from Auburn University, and was Extension Forage Crop Agronomist at Auburn University from 1976 to 2011. He has authored two books, Southern Forages and Practical Forage Concepts, as well as numerous other articles and publications. He is a former President of the American Forage and Grassland Council and is Technical Advisor to all four Oregon Forage Seed Commissions (Clover, Orchardgrass, Ryegrass, and Tall Fescue). Recognition has included the USDA Superior Service Award, the AFGC Medallion Award, and Fellowship in both the American Society of Agronomy and the Crop Science Society of America. He was inducted into the Western Kentucky University Hall of Distinguished Alumni in 2000. He is now Professor Emeritus at Auburn University.

**Peter Ballerstedt, Ph.D., Forage Product Manager Barenbrug USA**. Dr. Peter Ballerstedt received his Bachelor of Science in Agriculture in 1981 and Master of Science in 1983, both from the University of Georgia. He received his Ph.D. from the University of Kentucky in 1986, specializing in forage management and utilization, minoring in ruminant nutrition. He was the forage extension specialist at Oregon State University from 1986 to 1992. He is currently the Forage Product Manager at Barenbrug USA. His study of human nutrition is fueled by his personal experience. Peter has extensive experience in forage agriculture. His experiences have led him to study human diet and health. What he's learned doesn't agree with low-fat-is-health dietary advice we've been given for more than 30 years. This understanding, combined with his forage background, has given him an interest in truly sustainable forage-based animal production systems. Peter Ballerstedt will introduce evidence that the fat-is-bad hypothesis was wrong, and the impact the growing awareness of this can have on the US in general and Alabama in particular. His knowledge, enthusiasm, and speaking style will provide an entertaining and informative presentation.

**Stephen Enloe, Ph.D., Associate Professor/Extension Weed Specialist, Auburn University**. Dr. Stephen Enloe is an Associate Professor and Extension Weed Specialist in the Department of Crop, Soil and Environmental Science at Auburn University. After receiving his Ph.D in Plant Biology from the University of California Davis, Dr. Enloe began his career as a weed specialist at the University of Wyoming. Since 2008 he has been an integral part of the Alabama Cooperative Extension System providing training for land managers, agents, and commodity groups in weed identification, management, and control. Dr. Enloe has 18 years of research and extension experience on noxious and invasive weeds across the US. He is currently focused on invasive plants in the southeastern US in pasture, forestry, natural areas, and riparian settings.

**Dennis Hancock, Ph.D, Associate Professor/Extension Forage Specialist, University of Georgia**. Dr. Dennis Hancock is an Associate Professor and Extension Forage Specialist in the Crop and Soil Science Department at the University of Georgia. He was raised on a 100-acre cow-calf operation in western Kentucky, where his family also ran a gravel, lime and fertilizer spreading business. Dr. Hancock earned his B.S. in Agriculture from Berea College in 1996 and his M.S. from the University of Kentucky in 1999. After a 2 ½ year stint as a County Extension Agent in northern Kentucky (Grant Co.), he returned to UK and completed a PhD in Crop Science in 2006. During that time, he worked full time as the Research and Extension Coordinator for the Univ. of Kentucky's Precision Agriculture Team. He began at the University of Georgia in 2006 and since then has developed an outstanding forage extension program in the state of Georgia as well as the southeastern region of the U.S. He currently leads the Sustainable Grazing Systems program at UGA where he conducts research to resolve basic issues facing forage/livestock producers in Georgia.

**Jennifer M. Johnson, Ph.D, Assistant Professor/Extension Forage Specialist, Auburn University.** Dr. Jennifer Johnson is an Assistant Professor and Extension Forage Specialist in the Department of Crop, Soil, and Environmental Science at Auburn University. She was raised on a beef cattle operation in South Central Kentucky where she grew up showing cattle and helping to improve the pastures on her family's farm. She began at Auburn on October 1, 2012 after a post-doctoral position in the biomass for bioenergy program at UGA's Tifton Campus. She obtained her Ph.D at the University of Kentucky, where she studied the effect of new novel endophyte tall fescue varieties on the physiology and growth of beef cattle. In addition to her Extension activities, Dr. Johnson will continue to study the influence of cool season forages on stocker production systems in Northern Alabama, as well as conduct studies on the many other aspects of forage management throughout the state of Alabama. The main objective of Dr. Johnson's program is focused on improving forage quality and utilization while extending the grazing season.

**Patrick Keyser, Ph.D, Professor/DirectorCenter for Native Grasslands Management, University of Tennessee.** Dr. Patrick Keyser is Professor and Director, Center for Native Grasslands Management at the University of Tennessee. In this role, he has worked on developing research to better understand how warm-season native forages, such as big bluestem and switchgrass among others, can work in forage production systems in the eastern US. Dr. Keyser earned his PhD at Clemson University, with an MS from Louisiana State University and a BS from Virginia Tech. He and his wife have four (mostly) grown children. He will be presenting information from his ongoing research on the various issues related to using these productive and highly drought tolerant grasses in livestock production.

**Matt McGowin, Range and Pasture Specialist, DuPont Crop Protection.** Matt McGowin focuses on strengthening the presence of DuPont range and pasture products in the marketplace and on the launch of new products. Prior to joining DuPont, McGowin was the mid-South area manager for Progressive Solutions, an herbicide application company. McGowin is currently working toward his master's degree in weed science from Mississippi State University, where he earned his bachelor's degree in agricultural engineering, technology and business in 2007. In 2009, McGowin received the Mississippi Vegetation Management Association's Sam Pittman Award for Excellence in Vegetation Management. McGowin is an active member in various cattle and vegetation management organizations, including the Mississippi Cattlemen's Association and the Mississippi Vegetation Management Association. McGowin's experience with agricultural management began during his childhood on a beef and poultry farm in central Mississippi. McGowin covers the mid-South region, which includes Alabama, Arkansas, Kentucky, Louisiana, Mississippi and Tennessee. This area has a high concentration of smaller acreage farms and operations, where cattle production is seen primarily as a hobby. McGowin educates hobby farmers who rely on mechanical control about the benefits of herbicide applications.

**Charles Mitchell, Ph.D, Professor/ Extension Soil Specialist, Auburn University.** Charles C. Mitchell, Ph.D., is an Extension Agronomist and Professor of Soil Science in the Department of Crop, Soil and Environmental Science at Auburn University where he conducts research and Extension programs related to soil and nutrient management, soil testing, waste management, and sustainable agriculture. He grew up on a farm in Marengo County, Alabama, and graduated from Birmingham Southern College, Auburn University, and the University of Florida. He was director of the Soil Testing Laboratory at Clemson University before coming to Auburn University in 1984. Much of his research and extension efforts are with crop fertilization and the utilization of agricultural and industrial by-products to enhance the productivity of soils and protect water quality. In addition, he serves as research project leader for long term nutrient management research on some of America's oldest, continuous field experiments. Mitchell has been an instructor in the Alabama Master Gardener program since its inception. Mitchell has authored or coauthored over 70 book chapters, journal articles and technical papers and almost 200 extension circulars and articles. He is also an ARCPACS Certified Professional Soil Scientist, a Certified Crop Advisor, and serves on the new Southeastern CCA Board of Directors.

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# FORAGES OF THE PAST

**Dr. Don Ball**
**Professor Emeritus, Auburn University**

Thinking about forage crops and forage crop education and research in the past, present, and future is an interesting exercise that should be of value. We should be able to learn from, and build on, the past; we need to understand and take advantage of developments, programs, and approaches available at present, and we need to embrace and exploit opportunities that loom in the future.

It has been said that, "The only constant is change," and also, "The more things change, the more they stay the same." There is some truth in each of these statements, and they apply about as well to forage-livestock production and forage research and extension work as to anything else. I will add to these a favorite quote of mine by Yogi Berra which is, "You can observe a lot just by watching." Basically, this presentation will be a discussion of some things I observed and learned during 35 years as Alabama Extension Forage Crop Agronomist.

Many changes in forage/livestock production, as well as in the Alabama Cooperative Extension System, and in Auburn University occurred between 1976 and 2011, but it seemed to me that the pace of change accelerated over time. I think there probably were more changes during the last ten years of my career than had occurred in the 25 years previous ones. These included changes in the economics of forage and livestock production, changes in management options for forage crops and for livestock, many new products being made available to producers, and development of different approaches to some aspects of both research and extension.

## Early Forage Production In America

When Europeans began to settle in what is now the United States, they brought horses, cattle and other grazing animals with them. However, at that time most of the eastern portion of the continent was densely forested. Indians in this area had no domestic livestock, as they obtained meat by hunting wild animals, but there are records that indicate some Indians had cattle by the latter part of the 15$^{th}$ century.

Early writings reveal that by the 18$^{th}$ century some settlers were planting forage crops commonly grown in Europe, but most grazing livestock got their nutrition mainly from native vegetation, as did the wild animals hunted by Indians. However, by the early part of the 19$^{th}$ century, hay production had become fairly commonplace on some progressive farms throughout a large portion of (what was then) the United States. In the mid-1800's gypsum, lime, and manure was being used on some farms to substantially increase the yield of hay from planted hay meadows.

Today, most of the grazed land in the eastern portion of our nation consists of grasses and legumes that were introduced from other parts of the world. Learning what introduced forage species are suited to be grown in various areas has been a slow process. Knowledge about, and enthusiasm for, forage production has come a very long way in our country, especially in the past 80 years, but there is still much room for improvement.

**Forage/Livestock Trends Since 1976**

In 1977 I wrote a proceedings paper in connection with the1977 Southern Pasture and Forage Crop Improvement Conference (SPFCIC), which was held in Auburn on about the first anniversary of my employment at Auburn University. In it I made reference to the acreages of various specific forage crops in Alabama at that time. We presently have only about half as many beef cattle on Alabama farms as we had then and consequently much lower pasture acreage than we had then. However, the percentage of the total forage crop acreage that various individual forage crops occupy is quite similar. Alabama forage programs are now, as they were then, based around perennial grasses. Bahiagrass and tall fescue were, and are, the most widely grown grasses followed by bermudagrass and dallisgrass.

The basic structure of the beef cattle industry is also similar to what it was then. The numbers of beef cows on farms within the state have declined by about 50%, much of this occurring in the last ten years. Even in the 1970's the average beef cattle herd in Alabama was less than 30 animals, as is the case today. Most beef cattle producers, then and now, either have off-the-farm sources of income or have diversified farming operations.

Beef cow/calf production is still overwhelmingly the most common type of livestock enterprise. Thirty-five years ago we thought stocker cattle production was likely to sharply increase. In fact, the number of stocker cattle operations in Alabama has decreased, although the average stocker operator now runs more animals. Recently there has been increased interest in grassfed beef and organic livestock products, but this remains a very small part of the picture in terms of overall farm income. Interestingly, one of the articles in the Proceedings of the 1977 SPFCIC was on the topic of finishing beef cattle on forage, and was written by Dr. Ralph Harris, who was a faculty member in the Animal Science Department at Auburn University at that time.

Milk production per dairy cow has increased by about 65%, but today we have only about 15% as many dairy operations in Alabama and less than one-tenth as many dairy cows. The number of horses in the state is estimated to be about 150,000, down from an estimated 200,000 in the late 1970's. As was the case then, we still have almost no sheep, but meat goat numbers have increased in the past 15 years and it seems likely there will be additional future increases.

During the past 35 years there has been substantial scientific and technological progress, including the development, release and commercial availability of numerous improved forage varieties. In the 1970's there were relatively few no-tillage drills on farms, but

many producers now own or have access to such equipment, and no-till planting of forage crops is common. Numerous new herbicides have been developed that facilitate control of various weeds in pastures and hayfields. Near infrared reflectance spectroscopy (NIRS) has made it easier and cheaper to assess forage nutritional value in samples associated with research studies as well as producer-submitted samples.

Probably the single most important scientific development pertaining to forage/livestock production during my career has been the knowledge, insights, and production strategies that have resulted from tall fescue endophyte work. While contributions to this area of study have been made by workers in many disciplines, in many states, and in numerous countries, a substantial portion of this important work was done by scientists at Auburn University.

**Method of Operation of Extension Workers**

In the 1970's, most Extension Specialists at Auburn University and elsewhere had 100% extension appointments. However, most Specialists hired in recent years have split research/extension appointments. Thus, more applied research is being done by Extension Specialists than used to be the case (County and Regional Extension Agents are also often involved in applied research today). Along with this trend has come increased pressure to seek funding for research.

Technology has impacted greatly on day-to-day extension work. This includes use of cell phones, voice mail, and fax machines. But the most dramatic and important development is widespread use of computer technology. Most extension workers take laptops, tablets, and/or smartphones with them virtually everywhere they go. Most extension workers use these tools to both receive and disseminate a great deal of information via the internet, and spend many hours each week reading and responding to e-mail and text messages. Power Point presentations and LCD projectors have made slides and slide projectors obsolete.

The number of people doing forage research and extension work in the United States has declined dramatically during the past three decades. This has made it essential that there be more dissemination of forage information via non-face-to-face methods. Distance learning equipment is used widely, and much forage information is provided via web sites. The number of students taking forage courses has declined, but there is a definite trend in extension to offer more intensive training sessions to producers. The membership of, and the numbers of people participating in, forage-oriented organizations has declined.

There are fewer county-level extension meetings, but more multi-county extension meetings held today, and it seems that many extension workers now attend more Experiment Station field days, statewide commodity meetings, and industry events of various types. Overall travel requirements may have declined slightly for most extension forage workers(though it has increased for some), but position-related travel funding by universities and extension organizations is generally much less than it used to be, or is even non-existent.

**Extension Programming**

During my career several states, including Alabama, began offering grazing schools and other programs such as Master Cattleman training that have provided in-depth training on specific topics. One reason that grazing schools have become popular is that many producers are more concerned about the cost of stored feed, and thus are interested in extending grazing, which is recognized as being a key to profitability in livestock production. One important strategy for lowering hay requirements is to minimize hay storage and feeding losses, another area that has been a focus of extension programs in Alabama and in other states.

In the 1970's, most producers recognized the value of forage legumes, but many were not willing to expend much effort to grow them. Mainly as a result of skyrocketing fertilizer costs, today there is much more interest in forage legumes. Producers are also seeking other means of lowering their fertilizer costs where possible.

Forage quality and forage testing have been a focus of extension workers in Alabama and many other states during the past 35 years, but progress in this area has been slow. However, efforts such as the Southeastern Hay Contest and hay shows (local, area, and statewide) are beneficial.

A few forage-related topics that were rarely mentioned in the mid-1970's now get a significant amount of attention by extension forage workers. Some Southern Region extension workers at the state, area, or county level spend a substantial amount of time advising wildlife enthusiasts on planting forage crops in wildlife food plots. Concern about the environment has increased greatly, and the role of forages in issues such as disposal of organic wastes or erosion control is discussed more frequently.

During my career I had the opportunity to be involved with many different educational programs, to work with numerous people in other disciplines, and to work with virtually all of the sixty or so forage species that can be grown in Alabama. Not long ago someone asked me what I consider to have been the five main areas of educational focus in my extension activities. After a bit of thought I listed the following: (1) use of forage legumes; (2) reducing losses to toxic endophyte in tall fescue; (3) extending the grazing season; (4) minimizing losses in hay storage and feeding; and (5) grazing management.

The demographics of extension clientele have changed and continue to change, which has also impacted on extension programming. Given the large number of people who have moved from urban areas to live on small acreages, some educational programs have been aimed at addressing their unique educational needs. Also, some extension programs are now oriented toward Spanish-speaking people, and some educational materials on forage crops have been translated into Spanish.

**Lessons Learned**

I have saved until last this portion of this paper, which may be the most important part. It is also the most subjective part and thus is most subject to criticism and/or to being misunderstood. Many of the following statements are simply common sense, and some are not unique to extension work or to forage-livestock production. Nonetheless, I decided to include this section simply because I think it has the potential of being helpful to some people, even to some persons not associated with agriculture. I probably would have agreed with most or all of them on the first day I was on the job. However, through the years I have had experiences (or observed experiences of others) that have made me realize just how true and important they really are. Therefore, I feel strongly that they are worthy of mention.

*Throughout my career I have heard the statement, "People don't care how much you know until they know how much you care." I have observed that people really can sense very quickly (even over the phone) the level of concern you have regarding helping them. The lesson here is that one's tone, demeanor, and approach have a huge effect on how well a message is received. In particular, anyone who "talks down" to people or tries to impress them with how smart they are will largely nullify the value of information they present.

*Within reason, a person should strive to treat all clients with equal respect. Regardless of the size or economic impact of an operation, the concerns a forage-livestock producer has are important to him or her. I think it is also worthwhile to mention that I have learned that profit is not the only (and surprisingly often not even the primary) motivating factor for many livestock producers, especially beef producers.

*It is helpful to critically assess your personal strong and weak points. Don't kid yourself on this. When possible, one should choose to do the sorts of things he or she does best.

*You can get more done working with other people than you can get done working alone. People stimulate others to come up with creative ideas, and they are more likely to stay motivated when others are depending on them. Also, working together increases the likelihood that various people will have the opportunity to focus on tasks they can do well.

*To the extent possible, one should strive to work and associate as frequently as possible with the best and most productive people at one's location or within one's organization and profession.

*Professional success requires lots of work, but there is a limit to how much a person can do. Learning to prioritize effectively is one of the most valuable skills an extension worker can develop. Learning to tactfully say "no" is another. There is a fine line between outstanding and laudable professional commitment and being an insane "workaholic." If a good honest effort has been made, one should not feel badly about what didn't get done.

*Enthusiasm and excitement associated with a project go a long way toward it being successfully achieved. If you are able to view a task as fun, it is more likely to turn out well.

*Staying organized is a never-ending struggle, but is worth the effort.

*If you don't know the answer to a question, say so. People realize that you can't know everything. Being able to find an answer quickly approaches the value of knowing the answer.

*Professional visibility is important. There is a strong correlation between visibility and perceived credibility.

*Getting a job done is more important than how many hours were invested. If a person can find a more effective way to get a job done in some unorthodox way, he or she should do it.

*Credit from a successful project can be divided an infinite number of times without diminishing the value. If someone deserves credit, they should be given credit. Failure to give credit where it is due decreases the likelihood of future cooperation.

*With regard to interaction with other people, one tends to get back what he or she gives out. This is an argument for being positive, polite, and cooperative.

*Technicians, secretaries, and other support personnel are generally the people who actually make it possible for things to get done. Treating them badly is wrong and isn't smart.

*Strong expression of dislike of an idea or approach (although sometimes necessary) tends to make the person who proposed it angry and is not conducive to progress or cooperation. However, stating (or at least implying) that you appreciate two or more ideas or approaches but especially like one is rarely a problem.

*One should consider whether criticism is valid and, if not, one should not take it too seriously. Some people who feel their poor performance is becoming too obvious in comparison to others try to remedy this by criticizing those who outperform them.

**Conclusion**

Based on observations I made during my career, I think it is likely that during the next 35 to 40 years some things will change a great deal and others will change very little (the difficult part is predicting specifically *which* things will change!). There will be many scientific advances that will benefit forage-livestock producers, and there will likely be technological advances that will affect the way producers get educational information. However, the statements included in the "Lessons Learned" section of this paper were true in 1976-2011, they are true today, and I expect they will continue to be true in the future.

**SELECTED REFERENCES**

Ball, D.M., 1977. Forages in Alabama. Proc. Of the 34th Southern Pasture and Forage Crop Improvement Conference, April 12-14, Auburn, AL.

Ball, D.M., C.S. Hoveland, and G.D. Lacefield, 2007. History of Southern Forage Crops, pp. 1-7 *In* Southern Forages (4th Ed.). International Plant Nutrition Institute, Norcross, GA.

Kerr, Homer L., 1964. Introduction of Forage Plants into Ante-Bellum United States. *Agric. Hist*. 38:87-95, Agricultural History Society, Arlington, TX.

## Forages Present:
### The Day of Opportunities

**Dr. Dennis Hancock,**
Assoc. Professor, State Forage Extension Specialist,
& Sustainable Grazing Systems Program Director
Crop and Soil Sciences – UGA

GRASS
Center for Sustainable Grazing Systems

## Over the next few minutes…

- Successes with Forage Breeding
  - High yields and persistent.
- Successes with Forage Management
  - Fertilization
  - Grazing Management
  - Baleage
- The State of the Industry
  - A little international perspective

## Tall Fescue

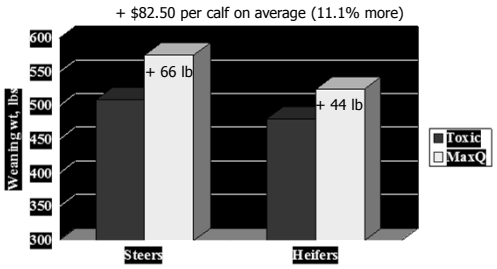
- Most widely used forage grass in the U.S.
  - High yields and persistent.
- Endophytic fungus produces toxic alkaloids
  - Alkaloids aid drought tolerance and persistence
  - Fescue toxicosis

## NE Tall Fescue

- Novel Endophyte
  - Endophyte from different TF population
- UGA and AgResearch (NZ) researchers developed and tested Jesup MaxQ.
- NE TF gives persistence benefit w/o toxicosis problems.

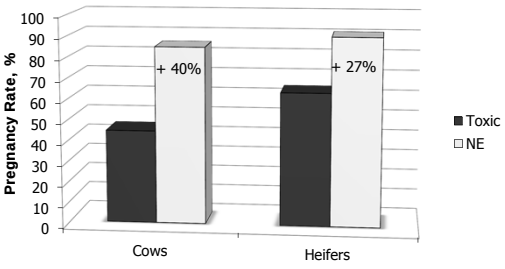
## Novel Endophyte vs Toxic Fescue

**Calf Weaning Weight**




Bouton, 2003
3 yrs, Calhoun GA
Both different P<0.05

## Novel Endophyte vs Toxic Fescue

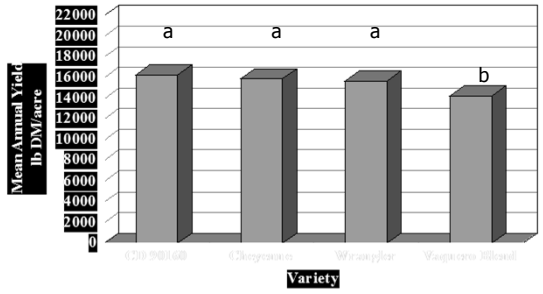



Coffey et al., 2007, 2008
2 yrs, Arkansas Exp. Stations

## Bermudagrass

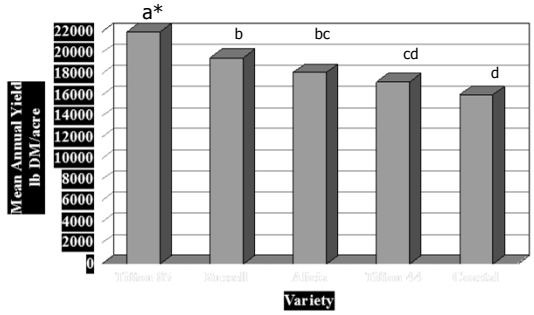
- Common (seeded)
- Hybrids (sprigged)
  - Tifton (USDA-ARS & UGA)
- Typically very drought tolerant
- Aggressive and persistent
- Requires high fertility

## Seeded Bermudagrass Yields at Calhoun 2003-2005




Varieties labeled with the same letter were not significantly different (α=0.05).

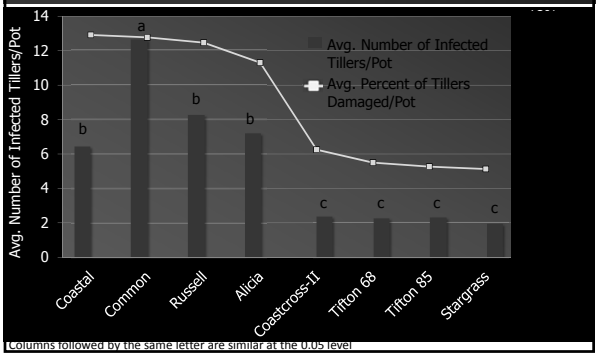
## Hybrid Bermudagrass Yields at Calhoun 2003-2005




Varieties labeled with the same letter were not significantly different (α=0.05).

**Results:**

## Effect of Cultivar on Number of Infected Tillers with Flies Present

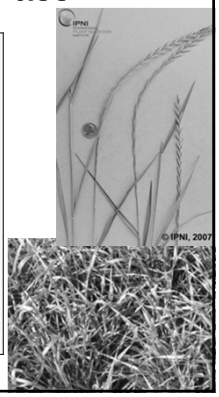



Columns followed by the same letter are similar at the 0.05 level

## Annual Ryegrass

| Varieties | **Early Varieties:** Attain, Big Boss (CP), Bulldog (aka Grazer), Diamond T, Ed, Flying A, Marshall**, Oregro DH-3, Prine, Rio, TAMTBO, and Verdure (CP)<br><br>**Late Varieties:** Attain, Big Boss, Jumbo, Marshall**, ME94, Oregro DH-3 (P, M), Prine, Rio (CP, P), and Verdure (CP)<br><br>**Season-Long:** Attain, Big Boss, Ed, Diamond T, Jumbo (CP), Marshall**, Oregro DH-3 (CP), Passerel Plus (M), Prine, Rio (CP, P), and Verdure (CP) |
|---|---|

** Highly susceptible to crown rust.




## Introduction

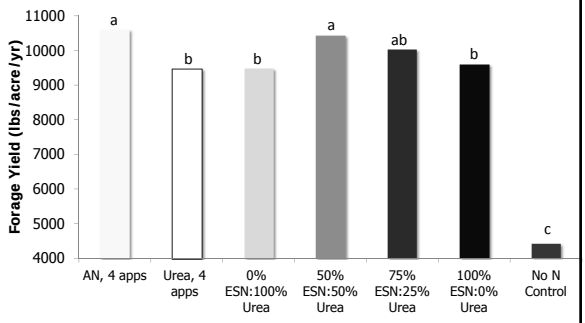
- Without AN, users of N face risky alternatives.
  - $NH_3$ volatilization loss
- Enhanced Efficiency (EE) N products may reduce volatilization loss
  - Urease inhibition
  - Encapsulate & release

AGROTAIN Improved Nitrogen Efficiency — **NBPT**

ESN SmartNitrogen — **Polymer Coating**

NutriSphere-N — **maleic-itaconic co-polymer**

## N Treatment Effects on Total Forage Production Per Year




Columns followed by same letters are similar at $P = 0.05$

## Basic Cost Analysis

| Trt. | lb N | lb as urea | $ as urea | lb as ESN | $ as ESN | trips | $ trips | Total | Yield (lb/A/yr) | Forage Cost | Forage Value | net revenue |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **100 Urea x 4** | 300 | 300 | $210 | 0 | $- | 4 | $20 | $530 | 9461 | 0.0560 | $1,324.50 | **$794.50** |
| **100 Urea x 2** | 300 | 300 | $210 | 0 | $- | 2 | $10 | $520 | 9483 | 0.0548 | $1,327.63 | **$807.63** |
| **50 Urea: 50 ESN** | 300 | 150 | $105 | 150 | $115.50 | 2 | $10 | $530.50 | 10426 | 0.0509 | $1,459.63 | **$929.13** |
| **25 Urea:75 ESN** | 300 | 225 | $157 | 75 | $57.75 | 2 | $10 | $525.25 | 10035 | 0.0523 | $1,404.88 | **$879.63** |
| **100 ESN** | 300 | 0 | $- | 300 | $231 | 2 | $10 | $541 | 10035 | 0.0539 | $1,404.88 | **$803.88** |

**Values Determined Assuming**

Urea Price: $0.70/ lb N

ESN Price: $0.77/ lb N

1 trip across the field: $5

Total Cost: $300 + fert $ + trip $

Forage Cost: 50 lb DM @ $7/bale: $0.14/ lb DM

Forage Value: Yield x $0.14/lb DM

Net Revenue: Forage Value – Total Cost

## Problem with "Heavy Metal"?

Let there be no doubt,

The most profitable forage-based livestock systems store very little forage.

- "The most cost-effective forage harvester has four legs."
- Just like other harvesters, the four legged harvesters have to be driven.

Effects of rotational stocking on performance of beef cattle grazing bermudagrass and endophyte-free tall fescue in central Georgia.

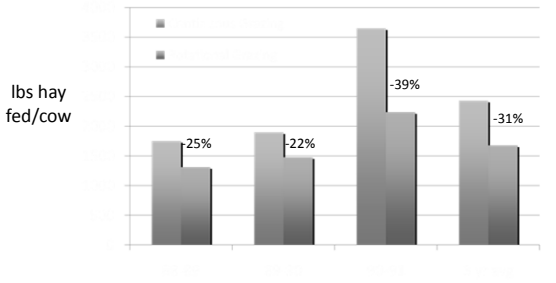
| Item | Continuous | Rotational | Difference* |
|---|---|---|---|
| Cow weight at calving, lbs | 1037 | 1017 | NS |
| Cow weight at weaning, lbs | 1090 | 1071 | NS |
| Stocking rate, cows/acre | 0.50 | 0.69 | +38% |
| Pregnancy rate, % | 93 | 95 | NS |
| Weaning weight, lb | 490 | 486 | NS |
| Calf production, lb/ac | 243 | 334 | +37% |

* NS = not statistically significant

Increase in gain per acre in rotational compared to continuous grazing in studies from various southern states.

| State | % Increase |
|---|---|
| Arkansas | 44 |
| Georgia | 37 |
| Oklahoma | 35 |
| Virginia | 61 |

## Effect of Grazing System on Hay Needs




$37.54/cow savings using $100/ton hay

## Efficiencies of Grazing and Mechanized Harvest

| System | Efficiency |
|---|---|
| Grazing | |
| Continuous Stocking | 30-40% |
| Slow Rotation (3-4 paddocks) | 50-60% |
| Moderate Rotation (6-8 paddocks) | 60-70% |
| Strip Grazing | 70-80% |
| Mechanical | |
| Hay | 30-70% |
| Silage | 60-85% |
| Green Chop | 70-95% |

## Baled Silage as an Alternative

**Advantages:**

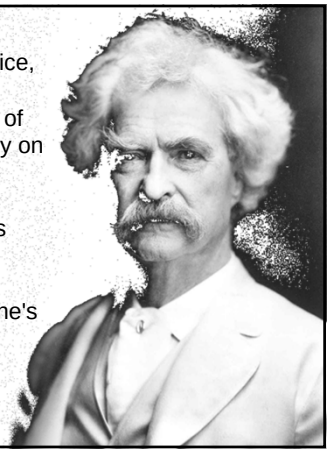
- Minimize harvest loss
- Decrease influence of weather
- Capture high-quality
- Flexible system

**Disadvantages:**

- Potential for 'operator error'
- Cost of materials
- Added labor
- Keeping vermin out

"Travel is fatal to prejudice, bigotry, and narrow-mindedness, and many of our people need it sorely on these accounts. Broad, wholesome, charitable views of men and things cannot be acquired by vegetating in one little corner of the earth all one's lifetime."

— Mark Twain, The Innocents Abroad/Roughing It

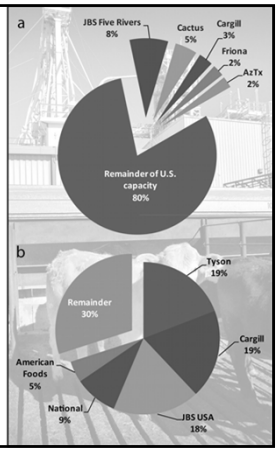


**Beef Cattle Finishing:**

Feed Lot Ownership in the U.S.

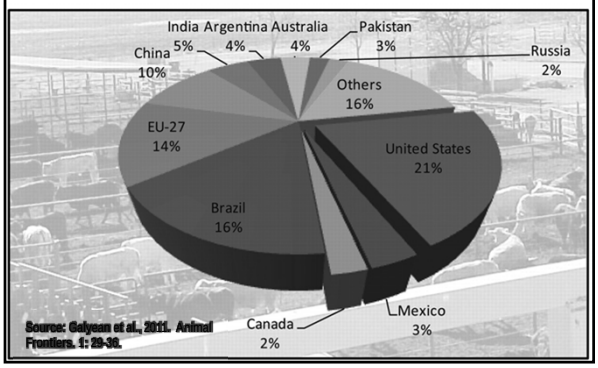
**Beef Packing:**

Packing Plant Ownership in the U.S.




Source: Galyean et al., 2011. Animal Frontiers. 1: 29-36.

## Global Beef Production




Source: Galyean et al., 2011. Animal Frontiers. 1: 29-36.

## Livestock Product Consumption Statistics and Projections

| | | annual *per capita* consumption | | total consumption | |
|---|---|---|---|---|---|
| | | meat (kg) | milk (kg) | meat (Mt) | milk (Mt) |
| developing | 1980 | 14 | 34 | 47 | 114 |
| | 1990 | 18 | 38 | 73 | 152 |
| | 2002 | 28 | 44 | 137 | 222 |
| | *2015* | *32* | *55* | *184* | *323* |
| | *2030* | *38* | *67* | *252* | *452* |
| | *2050* | *44* | *78* | *326* | *585* |
| developed | 1980 | 73 | 195 | 86 | 228 |
| | 1990 | 80 | 200 | 100 | 251 |
| | 2002 | 78 | 202 | 102 | 265 |
| | *2015* | *83* | *203* | *112* | *273* |
| | *2030* | *89* | *209* | *121* | *284* |
| | *2050* | *94* | *216* | *126* | *295* |

Source: Thornton, 2010. Phil. Trans. R. Soc. B (2010) 365, 2853-2867

## Science and Technology as a Driver/Mitigator of Change

Breeding and Genetics
- Conventional breeding
- Enhancing with genetic screening
- Transgenic (?)

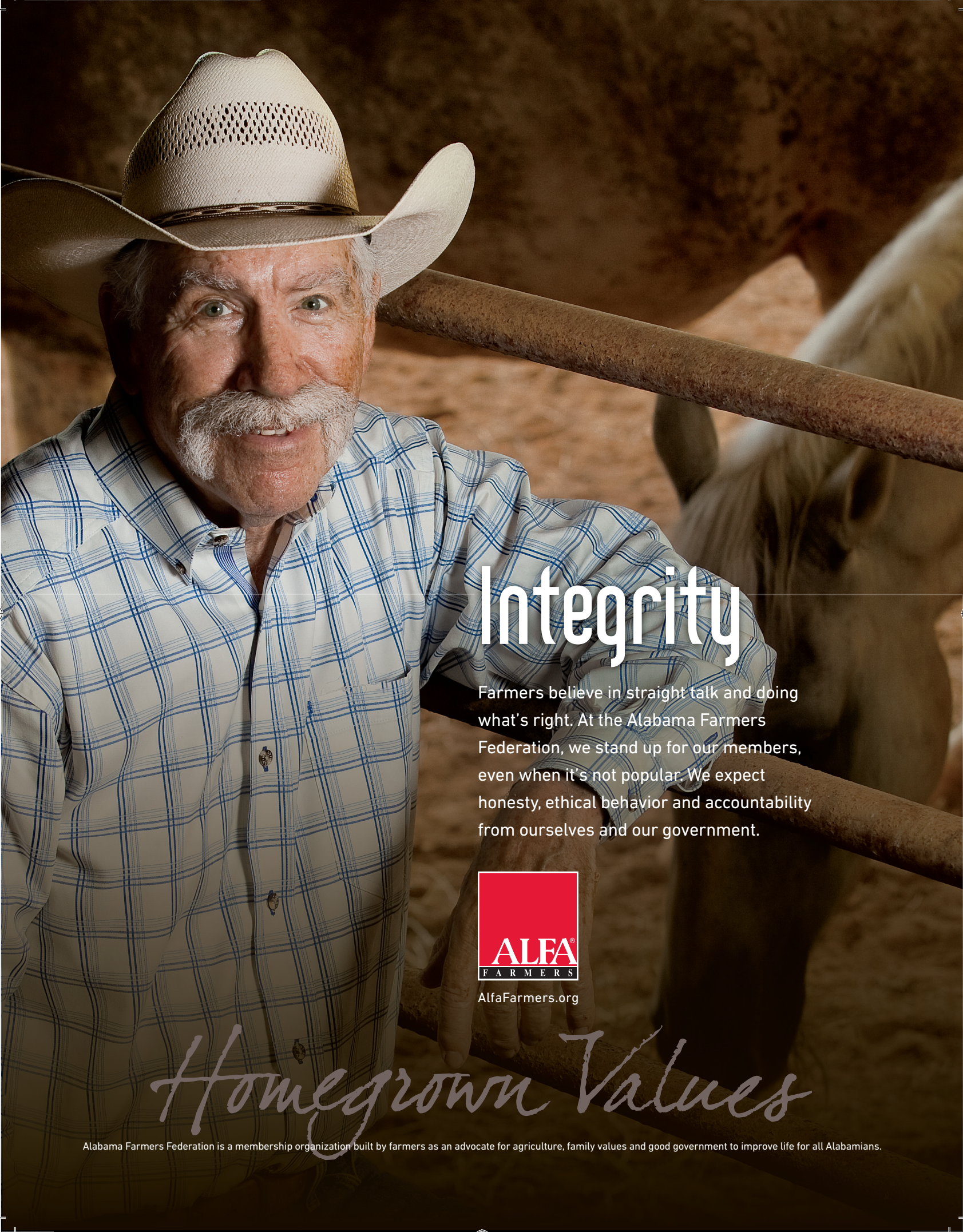
Nutrition & Grazing Management
- Greatest limit to fulfilling genetic potential
- Grazing management to improve quality, gains, and efficiency

Disease Prevention/Mitigation
- Animal health

Info. & Mgmt. Technologies

## Summary

- Forage Breeding has Kept Pace and is a Success
  - Non-toxic
  - High yields and persistent
  - Greatly improved animal performance
- Forage Management has Kept Pace and is a Success
  - Efficient/Economical Fert. Techniques
  - Efficient/Economical Grazing Mgmnt.
  - Efficient/Economical Baleage
- Demand/Industry is strong
  - But, the U.S. has become complacent and is in danger of falling behind.


Integrity
Farmers believe in straight talk and doing what's right. At the Alabama Farmers Federation, we stand up for our members, even when it's not popular. We expect honesty, ethical behavior and accountability from ourselves and our government.
ALFA
FARMERS
AlfaFarmers.org
Homegrown Values
Alabama Farmers Federation is a membership organization built by farmers as an advocate for agriculture, family values and good government to improve life for all Alabamians.

# Going Back to the Future with Forages

Jennifer M. Johnson, Ph.D
Assistant Professor/Extension Specialist
Crop, Soil and Environmental Science
Auburn University

## Change

- Change in Producer
- Change in Extension
- Change in Research
- Change in Management
- Change in Technology

## What we are facing:

- Less than 1% of the U.S. population claim farming as an occupation
- About 2% of the U.S. population live on farms
- Average American Farmer is 58 years old
- Global decline in the number of people interested in pursuing farmers as a professional career

## Changing Face of the Farmer

## Change in Extension

- The way we reach producers
- The way we communicate with producers
- The way we educate producers
- More regional approach

**Education is the most powerful weapon you can use to change the world**

**– Nelson Mandela**

**There are those who look at things the way they are, and ask why?**

**I dream of things that never were, and ask why not?**

**– Robert Kennedy**

## A Generation of Thinkers

- A different generation of producers that learn differently
- Extension programming will become more focused on providing the tools needed to effectively make management decisions and not just the information.
- Critical Thinking

## Change in Research

- In the 1980's and 1990's there was a push towards priority research on plant/animal management, physiology, grazing and breeding
- Still a big push from the producer sector in plant/animal research

Rouquette et al. 2008

## Change in Research

- From 1984-2004 there was a nearly 50% reduction in FTE in research
- Since 2004 (2008 report) there has been continual decline in forage utilization research and number of scientists
- Scientist are aware of stakeholders needs
- Dwindling resources and fewer forage related scientists make them hard to meet

Rouquette et al. 2008

## Change in Research

- 2008 study indicated biggest obstacles:
  - Securing grants
  - Lack of prioritization by administration
  - Inadequate commodity group support
- From extension standpoint
  - Projected even greater decrease in federal support
  - More time writing grant proposals, less time maintaining viable extension programming efforts

Rouquette et al. 2008

## Change in Research

We know a lot now –

but most of all what we know is,
there is so much more to learn!

We've just tipped the iceberg!

## Change in Research

- More Regional rather than state specific work
  - Incorporation of Technology
  - More Sustainable Projects
- Higher reliance on industry and commodity group support for applied forage related research
- As funding for applied Forage based research is continually decreasing

## Change in Management

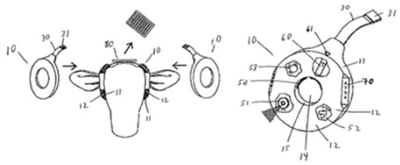
- Modifications in Grazing Methods
- Utilization of Diverse Forages
- Introduction and Adoption of improved forage lines

## Change in Technology

- Precision Farming in Grazing Management
- Soil Mapping - Fertility maps
- Managing grazed grasslands
  - Measuring intake and grazing location
  - Herbage management
- Controlled grazing
- “Pastures from space”
- Remote or timed released gates
- Know where, when, what and how much grazing and where to go next
- GPS Technology

## Virtual Fencing

Connecting the Cow and The Computer



Drawings from Dean Anderson's patent #7753007 for an "Ear-a-round" equipment platform for animals

## Virtual Fencing

- Aid in Managing grazed grasslands
- Controlled Grazing
- Herbage Management

## Sustainable efficiency through technology – Can it be done?

## Challenges

- Switching the focus from Forage Quantity to Forage Quality
- Emphasizing and Embracing underutilized tools to assist in management decisions – Soil and Forage Testing
- Decrease the reliance on stored feed by improving grazing efficiency
- Improve storage methods

## "The More Things Change, The More they Stay the Same"

**- Bon Jovi**

## Continuity of Concepts

The methods to achieve a goal may change, but the key concepts of forage production will stay the same.

## Are these really new ideas?

- Year-round Grazing
- Improved forage utilization
- Grazing Management
- Diversify

## Continuity of Concepts

The problems we face as forage producers, and the information we provide as forage specialists today are very similar to those of the past, and will remain the same in the future!

The definition of insanity is doing the same thing over and over again and expecting different results – Albert Einstein

## Let's Face it…

Things aren't getting any cheaper – and won't be any cheaper in the future - we have to become more efficient at doing more with less!

With new forage lines, new technology, and continued efforts of forage experts past, present, and future –

The future of forages is looking bright, and the best years may be just around the corner.

Facebook:
www.facebook.com/ForageFocus
www.facebook.com/AUForage

Twitter:
@AUForage

Website:
www.alabamaforages.com

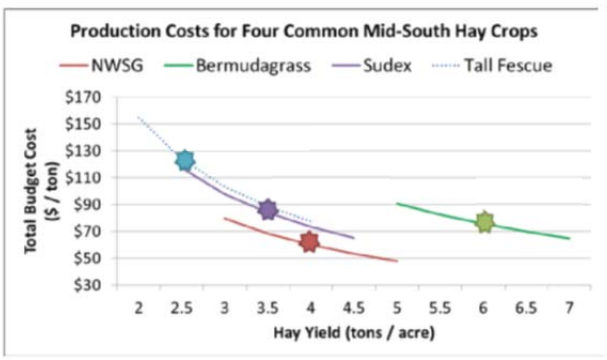
## Native Warm-season Grasses – Grasses from the Past Impacting Our Future

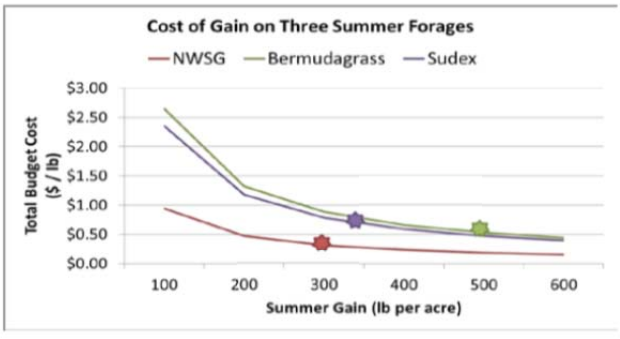
Dr. Pat Keyser, Center for Native Grasslands Management, University of Tennessee

Native warm-season grasses such as switchgrass, big bluestem, indiangrass, and eastern gamagrass, once were common throughout the South and were the basis of free-range grazing in the region into the 20th Century. Because of unrestricted, year-round grazing and other changes in agriculture, they have become much less common. Renewed interest in these grasses in recent years has made it clear that they can have an important impact on the future of the region's forage systems.

There are several reasons that cattlemen should take a fresh look at this old neighbor. In recent decades, we have been plagued by what appears to be more severe and more frequent summer droughts. This places a premium on drought tolerant forage species and at the same time increases risks (establishment, timing of availability, and nitrates) associated with summer annuals. Native grasses, because of their C-4 metabolism and their exceptionally deep (>10 feet) root systems, are the most drought-tolerant forages we can grow in the South. Increases in input costs (diesel, fertilizers) have also placed a premium on low-input forages. Bermudagrass has been a mainstay of Southern forages, but to achieve its production potential requires considerable inputs of both N and K. Fertilizer prices peaked in 2008, but remain well-above historical levels and there is little prospect for falling prices in the future. Given the linkage between fertilizer and petroleum prices, global economic recovery, and the development of major economies such as India and China suggest the opposite trend in these prices for years to come.

Exceptional weight gains (>2.0 lbs/day during summer) and high carrying capacity (1,200 – 1,800 lb/ac or more) underscore the value of native grasses as forage. When the long life of a native grass stand (low pro-rated establishment costs) is combined with low inputs and high production, the result is another important form of sustainability – economic. Substantial yields of hay (4 – 5 T/ac) can be produced with fewer cuts (1 – 2) and at a lower cost and under grazing, gains are less expensive (see figures, below). In addition to providing cheap gain (based on one UT analysis, $0.31 vs. $0.54 per lb for bluestem vs. bermudagrass), natives also offer an excellent opportunity for producers to address a key economic opportunity – backgrounding. Spring weaned steers can be put on native grass pastures and achieve gains in excess of 150 lb over 60 days during May and June. Given input costs, this is a very profitable strategy for our producers. With high grain prices, heavier calves are more desirable for feedlot operators as reflected by price trends.



Although the future of biofuels remains uncertain, native grasses, notably switchgrass, can work effectively in a dual-use forage-biomass system giving producers some market flexibility and the potential to weather changing beef and energy markets. Another potential market niche is grass fed/finished/local beef. Because of the high rates of gain, native grasses may prove to be a valuable tool for producers wanting to take advantage of that market.

Native grasses can be challenging to establish and require more management to avoid overgrazing. Producers who are willing to meet these challenges have the opportunity to benefit from the many advantages that native grasses can offer. It may be time to welcome one of the oldest residents of Alabama back home!

# TOP FORAGE OPTIONS FOR *Alabama*

## FLYING A
ANNUAL RYEGRASS

#1 Newton, MS 07/08
#1 Fairhope, AL 05/07 3 yr. avg.
#1 Louisiana 08/09 Statewide
#1 Fairhope, AL 07/09 3 yr. avg.
3 location

## TAMTBO
TETRAPLOID
ANNUAL RYEGRASS

#1 Mississippi 08/09 Statewide
#1 Newton, MS 08/09
#1 Poplarville, MS 08/09
#1 Louisiana 07/09 3 yr. avg.

## KENTUCKY 32
TALL FESCUE
THE NEW CHOICE
OREGON GROWN GRASS SEED

- ENDOPHYTE FREE
- PERSISTENT
- HIGH FORAGE YIELDS
- FAST ESTABLISHMENT

3 location
## COMPANION
ladino
WHITE CLOVER

- EXCELLENT WINTER HARDINESS
- TOLERATES INTENSIVE GRAZING
- FIXES NITROGEN
- EXCELLENT PALATABILITY
- IMPROVES PASTURE QUALITY

Available from **AGRI-AFC,LLC** - Decatur, AL
Grady Congo: 256-308-1732 Bill Reedy: 256-308-1706

For more information on these products and other quality forage seed, go to www.oregroseeds.com or call Jeff Ray, Oregro Southern Sales Representative at 256-303-0874

# Animal Products from Forage: The Real Health Food

Peter Ballerstedt, Ph.D. Forage Product Manager Barenbrug USA

The 2010 Dietary Guidelines for Americans recommends restricting our intake of saturated fat to less than 7 percent of calories, and our cholesterol intake to less than 300 mg per day (less than two eggs). They promote the use of low-fat milk and lean meat, and the use of "meat substitutes" in school lunches. These recommendations are consistent with the official dietary policy that began in 1977 with the release of the first Dietary Goals for the United States by the United States Senate Select Committee on Nutrition and Human Needs. These guidelines were not justified by the then-available science. They were adopted despite the concerns of researchers and physicians. Subsequent research has disproven the hypothesis upon which they were based. They have failed to produce the promised benefits. Since animal products are a significant source of saturated fat and cholesterol, the official advice has been to limit the consumption of animal products in general and red meat in particular. At best animal products have been wrongly accused and unfairly impacted by public policy; at worst vast physical and fiscal harm has been done to the American public.

Introduction: A thorough discussion of diet, health and human nutrition is beyond the scope of this paper. The comprehensive review by Taubes (2008) is highly recommended. Rather, this will be a brief examination of the dietary cholesterol and saturated fat recommendations.

In 1977 the United States Senate Select Committee on Nutrition and Human Needs chose one side of an on-going scientific debate. They endorsed the unproven diet-heart hypothesis, which proposed that the excessive consumption of fat in our diets – particularly saturated fats – raises serum cholesterol levels and so causes atherosclerosis, heart disease, and untimely death (Taubes, 2008). That decision was antithetical to the then-mainstream paradigm of the fattening carbohydrate, since low fat diets are higher in carbohydrates by definition. Ultimately, the goal of all dietary policy became reducing heart disease, and what was good for the heart must be good for every other diet-related matter. Thus an unproven hypothesis became the unquestioningly accepted basis for dietary recommendations for over a generation. The 2010 Guidelines, the "federal government's evidence-based nutritional guidance to promote health, reduce the risk of chronic diseases, and reduce the prevalence of overweight and obesity," (USDA, 2011) continues to maintain this position. The USDA's admission that despite their dietary advice, "more than one-third of children and more than two-thirds of adults in the United States are overweight or obese." (USDA, 2011) suggests the need for a thorough re-evaluation of the diet-heart hypothesis. A brief examination of the effect of dietary cholesterol upon serum cholesterol levels, and the relationship between saturated fat and coronary heart disease will demonstrate that this hypothesis was not true and that advice to limit the consumption of animal products is groundless.

Discussion: At the time of the Committee's decision there was a vigorous scientific debate about the diet-heart hypothesis. "Two strikingly polar attitudes persist on this subject, with much talk from each and little listening between." (Blackburn, 1975). Three years later, the year after Dietary Goals was released, Thomas Dawber wrote: "It must still be admitted that the

diet-heart relation is an unproved hypothesis that needs much more investigation." (Dawber, 1978). Indeed, the Committee didn't even know if their recommendations would work. The first entry on their list of "Important questions, which are currently being investigated" was "Does lowering the plasma cholesterol level through dietary modification prevent or delay heart disease in man?" (Senate Committee, 1977) Available research suggested it would not.

Two Columbia University biochemists had demonstrated in 1937 that dietary cholesterol has little or no influence on serum cholesterol (Rittenberg, Schoenheimer, 1937). This finding has never been refuted. For most individuals, the effect of following the recommendation would be "clinically meaningless." (Howel et al., 1997). Nevertheless, we are still advised to eat less cholesterol because "telling people they should worry about cholesterol in their blood but not in their diet has been deemed too confusing" (Taubes, 2008). Lowering serum cholesterol by replacing saturated fat with polyunsaturated fats had produce mixed results. Such cholesterol lowering interventions occasionally reduced heart disease mortality, but they increased cancer mortality (Dayton et al., 1969), so there was no decrease in total mortality. More deaths were recorded in the intervention group of one study, but the results went unreported for 16 years (Franz et al., 1989), because "we didn't like the way it turned out." (Taubes, 2008). This relationship between low cholesterol and increased cancer mortality has been repeatedly observed (Feinleib, 1983).

Ironically Ancel Keys, the father of the diet-heart hypothesis, reported seven years after the Guidelines were released that neither high cholesterol nor saturated fat consumption predicts total mortality (Keys et al, 1984). Keys later recanted the idea that dietary cholesterol raises blood levels: "Cholesterol in food has no effect on cholesterol in blood and we've known that all along." "I've come think that cholesterol is not as important as we used to think it was," he said, "Let's reduce cholesterol by reasonable means, but let's not get too excited about it." (Boffey, 1987).

Just when the Committee was forming the guidelines that would shape the eating habits of every American, the first reports on Low Density Lipoprotein (LDL) cholesterol and High Density Lipoprotein (HDL) cholesterol were emerging from the Framingham, San Francisco, Puerto Rico, Albany and Honolulu cohort studies. They demonstrated that: Total cholesterol does not predict future heart disease; LDL cholesterol is a "marginal risk factor;" HDL cholesterol is a 4-fold better predictor of risk than LDL cholesterol and the only reliable predictor of risk for men or women over 50. It was demonstrated that saturated fat raises HDL cholesterol while carbohydrates lower it (Castelli et al, 1977, Gordon et al, 1977). It was reported in 1981 that saturated fat and total fat were positively associated with longevity (Gordon et al, 1981, Feinleib, 1981).This information would not deter policy makers from labeling saturated fat "artery-clogging" and that carbohydrates were "heart-healthy diet food." The 2010 Guidelines, still state that "Healthy diets are high in carbohydrates." (USDA, 2010)

The basis for recommending low-fat and low-saturated fat diets has been further disproven by recent research. Meta-Analyses on "Reduced or modified dietary fat for preventing cardiovascular disease" found no effect on longevity, and no "significant effect on

cardiovascular events." (Hooper et al, 2001). An analysis of "Multiple risk factor interventions for primary prevention for coronary heart disease" demonstrated that "The pooled effects suggest multiple risk factor intervention has no effect on mortality." (Ebrahim et al. 2006) The Women's Health Initiative failed to prove several frequently-stated dietary myths, although policy hasn't been affected. "The intervention did not reduce risk of CHD or stroke." (Howard et al. 2006) "A low-fat dietary pattern did not result in a statistically significant reduction in the risk of invasive breast cancer..." (Prentice et al. 2006). "There is no evidence that a low-fat dietary pattern intervention reduces colorectal cancer risk..." (Beresford et al. 2006). "A low-fat dietary pattern among generally healthy postmenopausal women showed no evidence of reducing diabetes risk..." (Tinker et al. 2008). Prior to the release of the 2010 Guidelines, the FAO stated that "The available evidence from cohort and randomized controlled trials is unsatisfactory and unreliable to make judgment about and substantiate the effects of dietary fat on risk of CHD." (FAO, 2010, Skeaff, Miller, 2009). And in 2010 "A meta-analysis of prospective epidemiologic studies showed that there is no significant evidence for concluding that dietary saturated fat is associated with an increased risk of CHD or CVD." (Siri-Tarino et al 2010) Yet the recommendations to restrict total fat and saturated fat consumption continue.

Substantial evidence has accumulated that these recommendations are in fact harmful. "The low-fat, high-carbohydrate diet, promulgated vigorously ... by the USDA food pyramid, may well have played an unintended role in the current epidemics of obesity, lipid abnormalities, type II diabetes, and metabolic syndromes." (Weinberg, 2004).

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# Soil Health

Charles C. Mitchell
Extension Agronomist-Soils & Professor
Auburn University

In January, 2013, I read a gardening blog written by Mr. Bill Finch who was garden editor of the Mobile Press Register and is now director of the Mobile Botanical Gardens. He was talking about soil testing so it got my attention. In the article he said, "Soil tests won't help you create good soil. At best, they help you scrape by with really poor soil." At first, I was greatly offended by this statement but the more I thought about it, I realized that he is absolutely correct. It was 60 years ago this year that Alabama began a public soil testing program through the Alabama Polytechnic Institute at Auburn. For the first time, Alabama producers had a tool to help them make decisions about fertilizer use and nutrient management. We've come to expect this tool to solve all our production problems. Just soil test and follow the recommendations and all is well.

Mr. Finch was right. All soil testing could do was help us "scape by with really poor soil." Lime and fertilizer can do only so much. Today's emphasis is on "soil health". Just like human health involves a lot more than just eating well. Taking care of your soil involves a lot more than just adding lime and fertilizer.

What is soil health You might also call it "soil quality" or "soil productivity." USDA defines it as ". . . how well soil does what we want it to do. Healthy soil gives us clean air and water, bountiful crops and forests, productive grazing lands, diverse wildlife, and beautiful landscapes." (http://soils.usda.gov/sqi/)

In 2001, we did a survey of Central Alabama Cotton fields. In this survey we found

- 63% had traffic pans within 12 inches of surface in spite of in-row subsoiling
- 55% had less than 0.4% soil organic matter in soil surface
- 85% WERE NOT using a cover crop
- 80-95% were doing a great job of fertilizing and liming according to soil test; soil pH and plant nutrients were in ideal range.

We knew something was wrong and we figured it was related to soil organic matter. Data from Alabama's "Old Rotation" experiment (circa 1896), the world's oldest cotton study, showed us that yield potential increases as soil organic matter increases (Fig. 1). Soil organic matter or soil organic carbon (SOC) as it is measured in the lab, is related to so many soil chemical and biological functions. We guessed that the Central Alabama cotton fields had traffic pans

because the SOC was so very low and the growers were not using a cover crop. Soil organic carbon is related to water holding capacity, infiltration, aggregate stability, erosion potential, mineralizable soil nitrogen, soil respiration, and many other improvements in soil productivity. Now we call this “soil quality” and “soil health”.

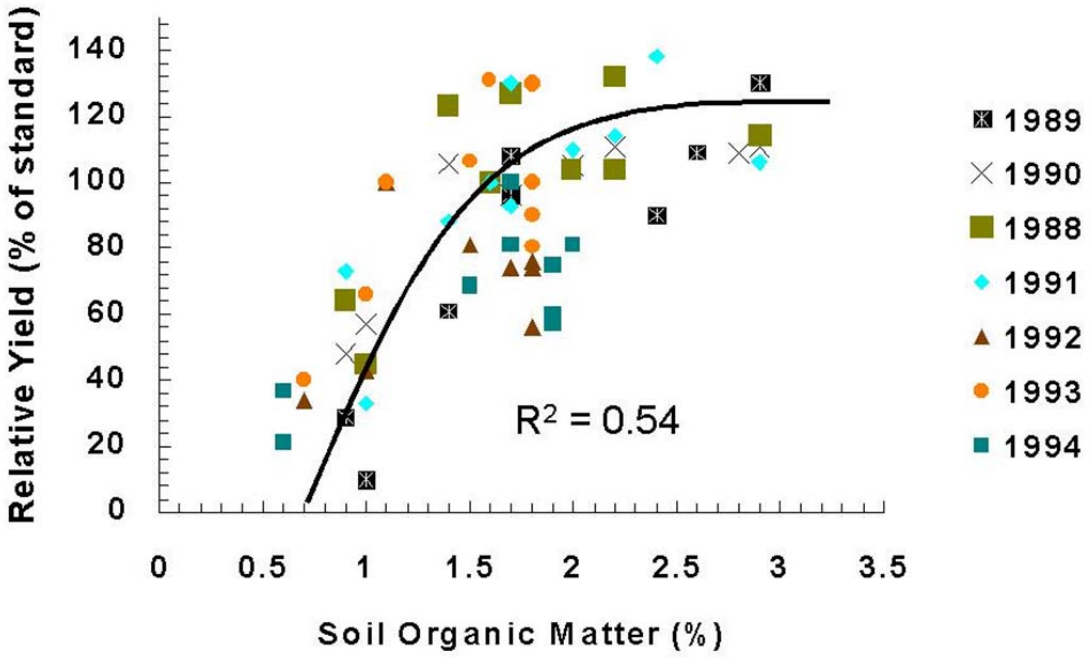



Fig. 1. As soil organic matter increases on the Old Rotation experiment (circa 1896) on the Auburn University campus, relative cotton yield also increases. Soil organic matter is just one measurable indication of soil quality.

Looking back on Alabama agricultural history, we know we have abused our soils in the past (Fig.2). This abuse has led us to the very poor quality or health of many of our soils today.

- A history of severe erosion
- Low soil organic matter
- Excessive runoff
- Traffic pans or surface crusting/soil compaction
- Steep slopes
- Shallow rooting of crops
- Lack of cover crops
- Soil borne diseases e.g. nematodes

- Low water holding capacity
- Low productivity

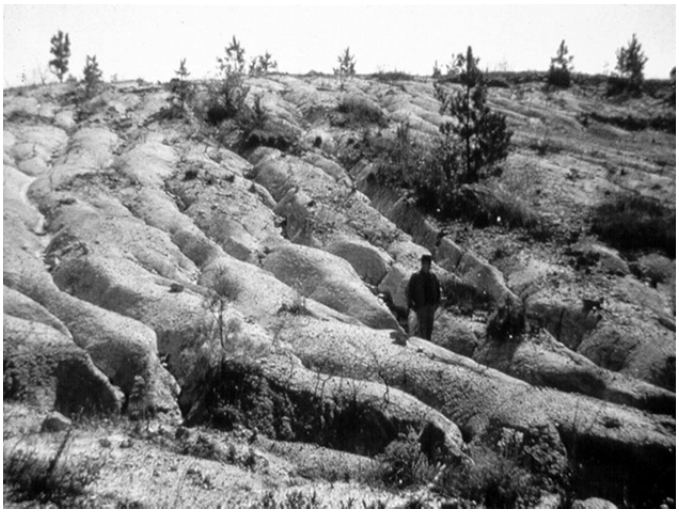


Fig. 2. Many Alabama soils looked like this 100 years ago. While the scars of erosion have been hidden by pine trees and pastures and subdivisions, todays soil quality is a result of continuing abuse.

We also know that Conservation tillage practices can improve soil quality in cropland by

- Preventing erosion
- Increasing soil organic matter
- Reducing or eliminating traffic pans
- Increasing water infiltration and soil moisture holding capacity
- Increasing yields

The same factors that increase soil quality in cropland can increase soil quality in pastures and hayfields.

- Keep vegetation growing year round
- Practice some type of rotational grazing
- Keep a deep, healthy root system
- Never overgraze a pasture for a long period of time
- Recycle nutrient
- Avoid soil compaction
- Increase soil organic matter
- Increase water infiltration and soil moisture holding capacity
- Increase productivity/stocking rates

Auburn University is undertaking a project that may change we way we look at soil testing in the future. Not only will we continue to test for nutrients and make fertilizer recommendations but in the near future we may offer a soil quality/soil health test that could include values such as:

- Soil organic carbon
- Cation Exchange Capacity (CEC)
- Base Saturation
- Soil respiration
- Mineralizable soil nitrogen (N)
- Micronutrients
- Potentially toxic metals
- Aggregate stability
- Electrical conductivity/salts

In the future, the goal of soil testing may be to improve soil quality and not just save a little on our fertilizer bill. Improve soil quality promises to leave us with higher yields, a more sustainable production system and a cleaner environment.

# Production Tips

These alfalfa production tips will help you establish a great stand of high yielding, high quality alfalfa.

### Soil Selection

- Choose a field with good drainage
- Test the soil for pH and fertility
- Soil should have a pH of 6.5 or above
- If your soil pH is below 6.5, use lime to raise soil pH
- If soil pH is very low, it may require 1 year to raise pH, so select another field with a minimum 6.5 pH

### Soil Test

- Soil test for P, K and other elements like Sulfur
- Your local soil testing firm can make best recommendations for fertility based on your soils
- P & K can be applied anytime prior to seeding and some at seeding
- Your soil tests can also guide you for topdressing ratios

### Seeding

- With proper management, alfalfa can be seeded conventionally, in reduced tillage or no-till
- Seed a minimum of 15 lbs. per acre
- Spring seedings can begin as soon as frost is out of the ground, seeding early will help improve first year yields
- Fall seedings should occur at least 6 weeks before the historic freeze date for your area and reduce the chance of weed intrusion and improve stand performance the following year

### Seeding Depth

- Start with a firm seed bed
- Seed to soil contact and proper seeding makes the difference in stand performance
- 1/4 to 1/2 inches deep in heavier soils
- 3/4 inches deep in sandy soils
- When seeding grasses with alfalfa, use divided planter boxes

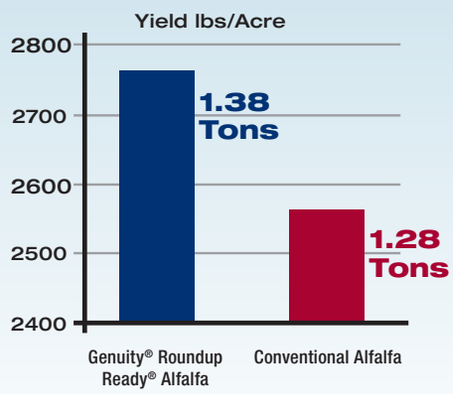
### Harvest

- Cut first year spring seeded stands at early to mid-bloom (about 70–80 days after seeding)
- Subsequent harvests can be made 25 to 28 days later
- Established stands (second year or older) can be harvested more frequently without severe stand damage
- Most growers like to start first harvest on established stand with a bud cut and following harvests at early bloom (about 26–30 days in most areas)
- Traffic Tested® varieties have been University proven to withstand more frequent harvests

## The Value of Genuity® Roundup Ready® Alfalfa

- Increased yields versus conventional varieties
- More high quality alfalfa forage with fewer weeds
- Less herbicide cost for weed control and crop safety


### 1st Year – 1st cutting results




Based on data from 68 head-to-head comparisons at 41 locations - Roundup agricultural herbicide treatments are generally a single treatment of Roundup agricultural herbicides at 0.75, but the data also includes Roundup agricultural herbicides at 1.25, 1.5 and dual sequential applications of Roundup agricultural herbicide at 0.75. - Conventional Treatments include Raptor, Pursuit, Select, Buctril, Poast. - Source: Based on University and Monsanto field trials, 2004-2006. - Roundup agricultural herbicide treatments were compared to other alfalfa herbicides and applied according to labeled rates and timings.

| Variety Characteristics | Number of Cuttings | Fall Dormancy | Traffic Tested | Salt Tolerance | Phytophthora Root Rot | Anthracnose | Verticillium Wilt | Fusarium Wilt | Bacterial Wilt | Aphanomyces Root Rot Race 1 | Aphanomyces Root Rot Race 2 | Stem Nematode | Root Knot Nematode | Pea Aphid | Spotted Alfalfa Aphid |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AmeriStand 433T RR | 3-4 | 3.3 | EX | – | HR | HR | R | R | HR | HR | – | – | – | R | – |
| AmeriStand 403T Plus | 3-4 | 4 | EX | – | HR | HR | HR | HR | HR | HR | R | MR | – | R | – |
| New AmeriStand 427TQ | 4-5 | 4.3 | EX | – | HR | HR | HR | HR | HR | HR | HR | HR | – | R | – |
| New AmeriStand 455TQ RR | 4-5 | 4.4 | EX | – | HR | HR | HR | HR | HR | HR | – | R | – | R | – |
| AmeriStand 407TQ | 4-5 | 4.4 | EX | – | HR | HR | HR | HR | HR | HR | R | R | – | R | – |
| Archer III | 4-5 | 5 | – | – | HR | HR | HR | HR | HR | HR | – | HR | HR | HR | – |
| Alfagraze 600 RR | 5+ | 6 | EX | – | R | R | R | HR | – | – | – | MR | HR | – | R |
| New AmeriStand 715NT RR | 6+ | 7.4 | EX | Ger | HR | HR | R | HR | R | – | – | HR | R | HR | HR |
| AmeriStand 855T RR | 6+ | 8 | EX | Ger/For | HR | R | – | R | R | – | – | R | R | – | HR |
| AmeriStand 803T | 6+ | 8.3 | EX | – | HR | MR | – | HR | MR | – | – | HR | HR | HR | R |
| AmeriStand 901TS | 6+ | 9 | EX | Ger/For | HR | R | MR | HR | R | – | – | R | HR | HR | – |
| New AmeriStand 915TS RR | 8+ | 9.1 | EX | Ger | HR | R | MR | R | R | – | – | R | HR | HR | HR |

T = Traffic Tested®
N = Nematode Resistance
Q = High Quality Potential
RR = Genuity® Roundup Ready®
S=Salt Tolerant

Ger=Germinating seeds. For=Forage production. In tests established by the NAAIC Review Board the variety has demonstrated forage production under salt stress and/or salt tolerance of germinating seeds comparable to the salt tolerant checks. References available upon request.

EX = Excellent • VG = Very Good • G = Good • S = Susceptible/Satisfactory

HR = >51% Resistance • R = 31-50% Resistance • MR = 15-30% Resistance • LR = 6-14% Resistance

# USING LEGUMES TO MAXIMIZE PASTURE FORAGE AVAILABILITY

**Dr. Don Ball**
**Professor Emeritus, Auburn University**

Forage legumes have long been known to be valuable in livestock production, not just in the United States, but also in many other countries. In fact, there has actually been much more widespread use of legumes in pastures in certain other parts of the world. However, interest in forage legumes has increased here in recent years.

Higher cost of nitrogen fertilizer has probably enhanced interest in forage legumes in the United States more than any of the other attributes they offer. The amounts of nitrogen fixed per acre per year vary due to numerous factors, but often is within the range of 50 to 150 for annual legumes, 75 to 200 for red clover or white clover, and 150 to 200 for alfalfa.

Some forage legumes have substantial yield potential, plus the nitrogen fixed by legumes also stimulates grass growth. Consequently, in some cases planting a legume with a grass can increase dry matter yields as compared to grasses alone, especially in a situation in which grass would receive little or no nitrogen fertilizer.

It is of great importance that the forage quality of legumes is, on average, higher than that of forage grasses. As compared to grasses, legumes tend to be higher in crude protein, digestibility, minerals, and vitamins. As a result, animal performance is usually higher when legumes are present in a pasture stand.

When grown with toxic endophyte tall fescue, forage legumes can reduce fescue toxicity symptoms and substantially improve animal performance (in fact, this is currently the most widely-practiced approach to minimizing the impact of endophyte toxins). Legumes also contain more magnesium than grasses, and thus may help reduce the likelihood of grass tetany, the underlying cause of which is magnesium deficiency.

Legumes also offer environmental acceptability. They provide slow-release nitrogen, which is more environmentally friendly than commercial nitrogen. They furnish pollen and nectar for bees, tend to increase populations of beneficial predatory insects, and are a preferred food of many wild animals, which is why they are widely planted in wildlife food plots.

All of the benefits of legumes mentioned in the preceding paragraphs are valuable, and easily justify using them in many situations. However, today we are going to focus on yet another benefit offered by legumes; namely, extension of the grazing season.

## WHY EXTEND THE GRAZING SEASON?

For most livestock producers, extending the grazing season for their animals, or otherwise filling gaps in pasture forage availability to reduce stored feed needs, should be a high priority objective. There are several reasons why this is beneficial:

***Better for the environment.** Feeding hay or other stored materials in a barn or other enclosed area concentrates animals and also concentrates manure. Feeding livestock in pastures often results in hoof damage to the land.

***Weather is less of a concern.** Weather is a major concern with hay production, but animals can graze almost without regard to weather.

***Higher-quality forage leads to better animal performance.** The forage quality of young, vegetative pasture growth is usually considerably higher than that of hay, which is produced by cutting older, more fibrous forage (this is true for both grasses and legumes). Consequently, performance is typically better when animals graze properly managed pasture.

***Requires less labor.** Less labor is required to have animals graze as opposed to providing them with stored feed. In particular, in contrast to feeding stored feed in an enclosed facility, when animals graze pasture forage, the labor associated with manure removal is avoided.

***Lowers expenses.** Stored feed is almost always at least two to three times more expensive per animal or per day than pasture. In livestock budgets, stored feed typically accounts for 25% or more of the cost of production, and producer records often reveal it to be higher. The quantity of stored feed required is one of the best indicators of profitability for a livestock operation. In general, the less hay needed, the more cost-efficient the operation.

## HOW CAN LEGUMES EXTEND GRAZING?

First, a few statements need to be made to help avoid possible misunderstandings regarding legumes. Use of a forage legume with, or instead of a grass, does not always result in extension of the grazing season. After all, there are many different legume species (some more productive than others or that have a distribution of growth that differs from others) and there are many different situations in which legumes may be grown. It is also important to realize that legumes are more site specific than grasses. They are generally more sensitive to soil type, soil pH, and drainage than most grasses. Thus it is important to make certain a given legume species is suited to an area that is to be planted.

Legumes and legume-grass mixtures generally require a higher level of management than forage grasses. Legume seed must be inoculated, the seed of some legumes needs to be planted with more precision than seed of most grasses, and with grass-legume mixtures proper

grazing management needs to be exercised to avoid shading of legumes. Bloat is occasionally a problem with some legumes, but as long as 50% or more of the ground cover is grass, it is unlikely to be a problem. Also, various management practices can be used to practically eliminate the likelihood of bloat.

Additionally, not every legume species, or every situation in which a legume might be used to extend the grazing system, can be included in this paper. The objective is to give examples of ways that selected legumes can be used to extend the grazing season, and thus facilitate good animal performance on pasture for a longer period of time than would otherwise be the case.

**WARM SEASON VERSUS COOL SEASON GROWTH PERIOD**

Warm season forage crops make most of their growth during the warmer months of the year, and cool season forage crops make most of their growth during the cooler months of the year. In north Alabama cool season grasses dominate pastures most farms, while warm season grasses dominate the majority of pastures in south Alabama. Thus, in north Alabama many producers could benefit from having more acreage of warm season forages (actually, grasses and/or legumes), and vice versa in south Alabama. Depending on soil types and location, either situation can exist in central Alabama.

In south Alabama the cool season legumes that are widely adapted and dramatically complement the growth period of warm season perennial grasses are mostly annuals. Arrowleaf clover, crimson clover, ball clover, berseem clover, common vetch, and hairy vetch are examples of such cool season annual legumes. These are usually planted in combination with annual ryegrass and/or small grain. They are most commonly overseeded on the dormant sods of warm season perennial grasses, but can also be planted on a prepared seedbed.

In north Alabama lespedezas are warm season legumes that make growth during summer when cool season grasses (with tall fescue being by far the most prevalent such grass) make little growth. Annual lespedeza is not a high yielding forage crop, but it is easy to establish, widely adapted, and the timing of its growth complements tall fescue quite well. Sericea lespedeza is a drought-tolerant perennial legume having a higher yield potential and longer growing season than annual lespedeza. Both annual lespedeza and sericea lespedeza produce forage of relatively good forage quality.

**LONG GROWING SEASON/PERENNIAL GROWTH HABIT**

Three perennial legumes could have been included in the previous alternative growth period discussion, but they differ from annual legumes enough that separate discussion seems justifiable. White clover is a true perennial, and red clover is a biennial (having potential for two

years of growth). Each of these clovers has a longer growing season than cool season annuals, and this is especially true for red clover.

However, in most of south Alabama these clovers act as annuals, and when they do so they are often less productive than annual legumes in this area. In recent years breeding programs have resulted in release of clover varieties (especially of white clover) that will act as perennials in a few areas in south Alabama, which is an important development. Both red clover and white clover are suited to be grown in many areas in north Alabama.

Alfalfa is also a cool season perennial forage legume, and it has high yield potential, produces excellent quality forage, and a long growing season. It can be grown on certain sites in every county in Alabama, but it is more exacting than other forage crops, and it becomes increasingly more challenging to grow it the farther south in Alabama one goes. Alfalfa is most commonly harvested as hay or silage, but with good grazing management it can be a productive pasture crop.

When white clover or red clover are planted in a grass sod in south Alabama it almost always will be a warm season grass sod, usually bermudagrass or bahiagrass, because there are few cool season grass sods in this area. Either of these clovers can be grown with dallisgrass in the Black Belt area of central Alabama. Alfalfa is most commonly grown in pure stands.

**SERVE AS A COMPANION SPECIES TO GRASSES WITH THE SAME GENERAL GROWING SEASON**

It is easy to see how legumes having an alternative growing season to grasses (warm season legume versus cool season grass or vice versa) can easily add calendar grazing days. However, many legumes can be grown with a grass or grasses having the same general growing season and still effectively extend the grazing season. In fact, this represents the approach most frequently employed to extend the grazing season of Alabama pastures with legumes. White clover is present in many fescue pastures and helps to extend the grazing season, but because red clover has such a long growing season, it is particularly impressive in this regard. Red clover is quite tolerant of heat, and if adequate fertility and moisture are present, it can make a surprising amount of growth even in summer.

Legumes often add calendar days of grazing simply by thickening a pasture stand. For example, if a hot, dry summer thins a pasture stand in north Alabama, white clover or red clover that volunteer or are planted in autumn will likely increase forage production during the following calendar year. Nitrogen produced by the clover can also increase grass production.

Alfalfa also has potential for use as a companion pasture species to tall fescue where the soil is suitable and appropriate management is exercised. With a growing season that runs from

roughly April through September (although most growth occurs during the early part of the growing season), it has much potential for extending calendar days of grazing.

In south Alabama annual legumes can extend the grazing season when grown with annual grasses (small grain and/or ryegrass). In overseeding of a warm season perennial grass sod (mentioned earlier) crimson clover makes more early growth than other productive winter annual pasture legumes and thus is particularly useful in providing early legume growth. Arrowleaf clover makes most of its growth between early April and mid-June, and thus can help extend the grazing season and maintain forage quality of a winter annual pasture into late Spring.

**DIFFERENCES AMONG VARIETIES**

The distribution of forage growth of varieties *within* forage species (legumes or grasses) can be surprisingly large. This is one of several reasons for reviewing data from forage variety trials. In some cases, a variety that tends to make more forage growth at a time when there is normally a gap in pasture forage availability, will be more valuable than another variety that produces more total forage occurring at a time when forage is less likely to be in short supply.

**IMPACT OVER TIME**

The presence of legumes in a pasture tends to improve forage quality and often extends the number of calendar days of grazing *during* a given growing season. Though obvious, it is also worthwhile to specifically state that persistence (the number of years a significant population of a legume remains in a pasture) is an important consideration. Some perennial legume species live longer than others, and some varieties within a given species live longer than others. Thus, the legume benefits continue longer. The same concept applies for annual legumes that dependably reseed.

**CONCLUSION**

Extending the grazing season makes sense for a number of reasons, and should be a goal of virtually every producer who grows pasture for grazing animals. There are several ways that various forage legumes can increase the number of calendar days of grazing. Given that legumes also offer several other valuable benefits, extending the grazing season might be viewed “as icing on the cake.”

# Forage Management Practices for Surviving a Drought


**Dr. Dennis Hancock**
Extension Forage Specialist
Crop and Soil Sciences – UGA

## Looking for Options

- Alternative forage systems
- Recognize that a “band-aid” is only for minor wounds
- Minimize the damage
  - Short and long term consequences

## Option: Continue Feeding Hay

**Recommendations**

- **Take a forage inventory**
  - **Hay**
  - **Pastures**

## Calculate Forage/Feed Needs

- Each cow consumes about 2 lbs of feed for every 100 lbs of body weight.

  1200 lbs x 2% = 24 lbs/hd/d

- Account for losses and inefficient grazing

  $$\frac{24 \text{ lbs/hd/d}}{50\% \text{ inefficiency}} = 48 \text{ lbs/hd/d}$$

- Account for low forage quality or supply

## Option: Continue Feeding Hay

**Recommendations**

- **Limit hay losses by using a hay ring, limit feeding (esp. if nitrates are an issue), etc.**

## Option: Continue Feeding Hay

**Recommendations**

- **Feed in areas that need soil building**

## Option: Continue Feeding Hay

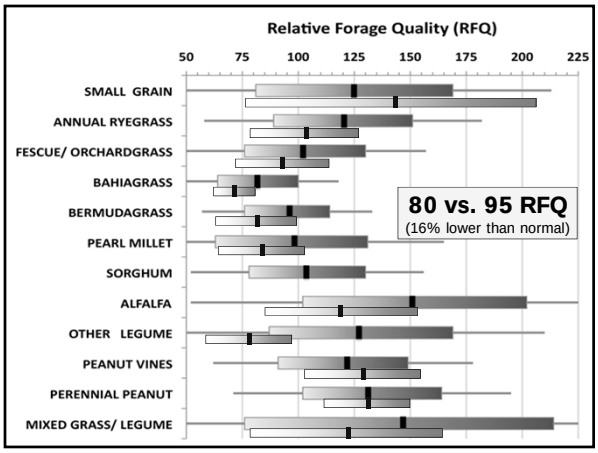
### Recommendations

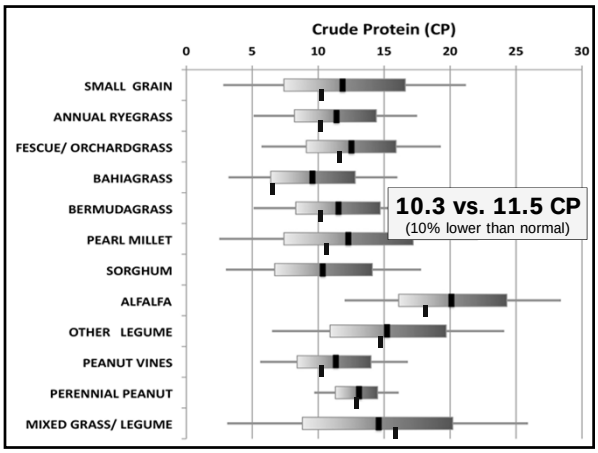
- Use a supplemental feed strategy that stretches the hay.

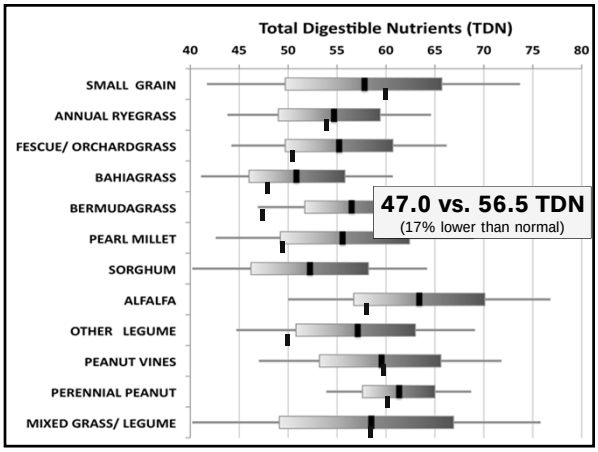
## Option: Continue Feeding Hay

### Recommendations

- Recognize that feeding hay is increasingly expensive






## Option: Drought Stressed Corn

### Harvest Methods

- Green chop
- Hay
- Grazing
- Silage/Baleage

## Option: Drought Stressed Corn

### Beware of Nitrates

- Increase cutting height to decrease nitrate concentration
- Sample to establish the high end of the range
- Sample again before feeding

## Nitrate in forage fed to beef cattle.

| Forage Nitrate (ppm dry forage) | Guidance |
|---|---|
| < 4500 | Safe to feed with adequate feed and water |
| 4,500 to < 6,500 | Safe under most conditions, but if feeding pregnant animals limit to half (1/2) ration |
| 6,500 to < 9,000 | Limit to half (1/2) ration |
| 9,000 to < 15,000 | Limit to third (1/3) ration |
| 15,000 to < 18,000 | Limit to quarter (1/4) ration |
| > 18,000 | Potentially lethal, very risky |

## Peanut Hay Quality

| Variable | n | Mean | Units | Range |
|---|---|---|---|---|
| RFQ | 26 | 129.5 | | 69.8 - 222.1 |
| TDN | 26 | 58.1 | % | 46.3 - 72.0 |
| CP | 26 | 10.1 | % | 5.5 - 15.0 |
| NDF | 26 | 41.0 | % | 28.0 - 55.0 |
| ADF | 26 | 34.7 | % | 22.6 - 45.5 |
| Lignin | 26 | 10.9 | % | 8.0 - 13.4 |
| $NO_3$ | 23 | 1939 | ppm | 0 - 4787 |

## Peanut Hay Mineral Content

| Nutrient | n | Mean | Range | Std. Dev. | C.V. |
|---|---|---|---|---|---|
| | | ---------- % ---------- | | | |
| N | 27 | 1.64 | 0.88 - 2.40 | 0.390 | 24% |
| P | 7 | 0.12 | 0.08 - 0.21 | 0.050 | 41% |
| K | 7 | 2.14 | 1.46 - 2.74 | 0.410 | 19% |
| Ca | 7 | 0.91 | 0.63 - 1.22 | 0.196 | 21% |
| Mg | 7 | 0.31 | 0.21 - 0.42 | 0.072 | 24% |

## Option: Other Crop Residues

**Grazing is Best**
- Soybeans
- Cotton
- Snap bean
- Other vegetables

**Hay/Baleage**
- Soybeans
- Snap bean
- Sweet corn
- Other vegetables

Assess biomass. 2000 lbs of residue will be enough biomass to support 1 cow for ~30 days. Frontal grazing will make it last longer.

## Summer Annuals are Water Use Efficient

- **If rainfall becomes more frequent, summer annuals can help one rapidly develop a forage inventory.**
- **If only a small area can be irrigated, this can produce the most forage with limited water.**

# Pearl Millet

- **More productive in drought conditions**
- **Can develop toxic nitrate levels**
- **No prussic acid toxicity concerns**
- **Less palatable**
- **Easier to manage under grazing**
  - **Irrigated pasture**

## Effect of Planting Date on Rainfed Pearl Millet Yields

| | Planting Date | | | | |
|---|---|---|---|---|---|
| Year | Late Apr | Late May | Late Jun | Late Jul | Late Aug |
| | ---------- *(lbs of DM/acre)* ---------- | | | | |
| 2007 | 5137 a[†] | 3601 b | 1612 c | 847 cd | 0 d |
| 2008 | 5352 a | 4648 b | 2265 c | 1990 c | 768 d |
| 2009 | 10812 a | 8440 b | 6007 c | 3666 d | 1084 e |

## Other Summer Annuals

- Brown Top Millet
  - 4000-7000 lbs/acre
- Foxtail Millet
  - 4000-6000 lbs/acre
- Proso Millet
  - 3000-5000 lbs/acre

## Overgrazing During Drought

- Plants slow way down and go dormant
- Drought rarely kills most pasture species.
  - But can if combined with poor fertility, overgrazing, or pests…
  - Competition w/ warm-season species
- Overgrazing reduces reserves (carbohydrates) and root growth

## Limit the Damage!

**Confine your animals to a sacrifice pasture or paddock.**

## The Drought Will Eventually End

**Cattle come and go,**

**but you're stuck with whatever you do to your pastures.**

## Drought Recovery

- Allow the pasture to recover
  - Leave sufficient grazed stubble
    - Bermudagrass: ~2 in.
    - Bahiagrass: ~ 1 ½ in.
    - Tall Fescue: 2 - 3 in.
- Not too soon!
  - Target height to start grazing
    - Bermudagrass: 4 - 8 in.
    - Bahiagrass: 4 - 6 in.
    - Tall Fescue: 4 - 8 in.
- Reintroduce pastures slowly

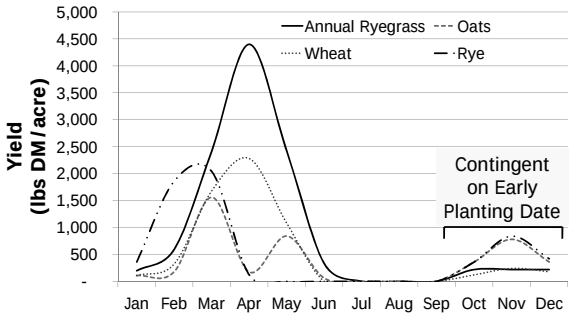
Pastures that are grazed short will decrease rainfall infiltration.

Nitrates can spike, even if no N has been applied.

- **Rains will cause rapid N-release and uptake**
  - **High nitrate levels for first 3 – 7 days.**

Monitor Weed Competition

## Yield Distribution of the Major Winter Annual Grasses




## Winter Annual Forage Quality

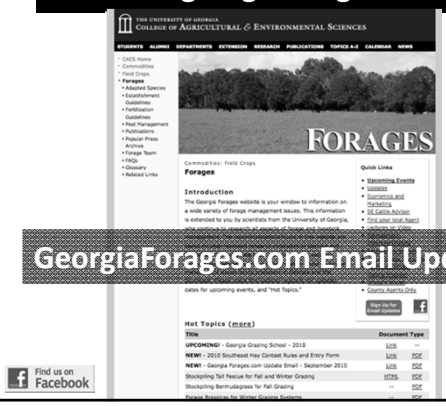
| Species | Crude Protein | $NE_L$ | Annual Yield* |
|---|---|---|---|
| | % | Mcal/lb | lbs DM/acre |
| Ryegrass | 10-20 | 0.52-0.70 | 10,630 |
| Oats | 8-18 | 0.50-0.67 | 7,100 |
| Wheat | 8-18 | 0.50-0.68 | 7,110 |
| Rye | 8-18 | 0.48-0.68 | 4,850 |
| Arrowleaf | 12-20 | 0.60-0.70 | 3,470 |
| Crimson | 12-20 | 0.60-0.70 | 3,570 |

Quality ranges approximate the typical values and are highly dependant upon forage maturity at grazing/harvest. Yields are 3-yr averages from GA and AL.

## Take Home Points….

- Confine your damage
- Don't exacerbate the problem.
- Stretch out your forage inventory
  - Early weaning strategy
  - Supplement to stretch forage
- Cull following a priority list
- Don't exhaust your hay stocks
- Focus on alternative forages

**www.georgiaforages.com**



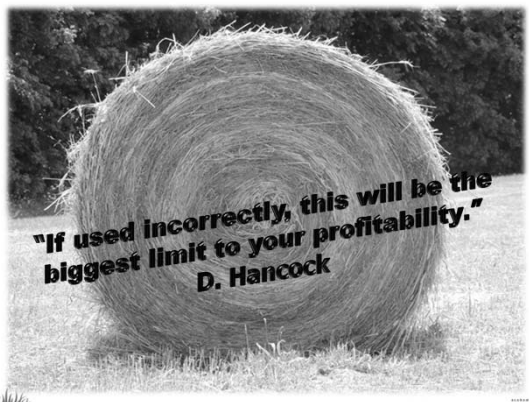

**GeorgiaForages.com Email Updates**

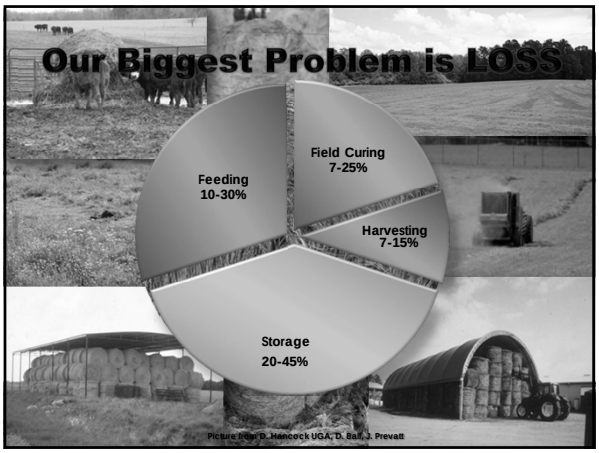
# Stockpiling: How to graze from fall to spring

**Jennifer M Johnson, Ph.D**
**Assistant Professor/Extension Specialist**
**Department of Crop, Soil and Environmental Science – Auburn University**

## Why?

- **Assume it costs $1 to $1.50 to feed 1 cow a day**
- **Stored feed can account for 25-30% of overall production costs**
- **Maintaining Pasture can cost ½ to 1/3 the costs of hay production**






## Efficiencies of Grazing and Mechanized Harvest

| System | Efficiency |
|---|---|
| Grazing | |
| Continuous Stocking | 30-40% |
| Slow Rotation (3-4 paddocks) | 50-60% |
| Moderate Rotation (6-8 paddocks) | 60-70% |
| Strip Grazing | 70-80% |
| Mechanical | |
| Hay | 30-70% |
| Silage | 60-85% |
| Green Chop | 70-95% |

## EXTENDING THE GRAZING SEASON WITH STOCKPILED FORAGE

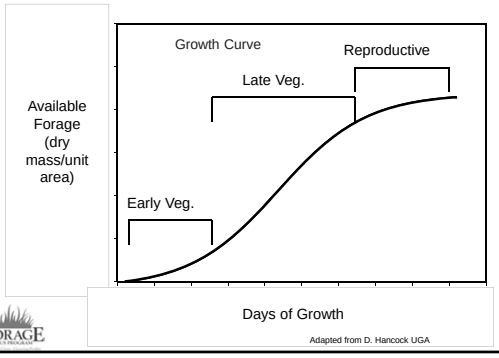
## Stockpiled Forage

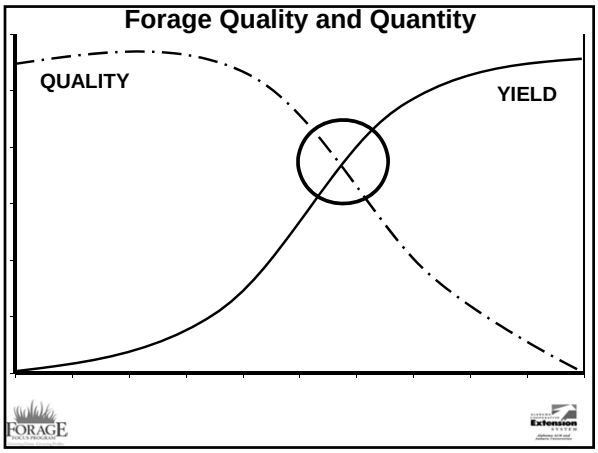
- Forage allowed to accumulate for grazing at a later time
- Forage is often stockpiled for later grazing in a period when growth is reduced or nil but stockpiling may occur at any time during the years as a part of a management plan.

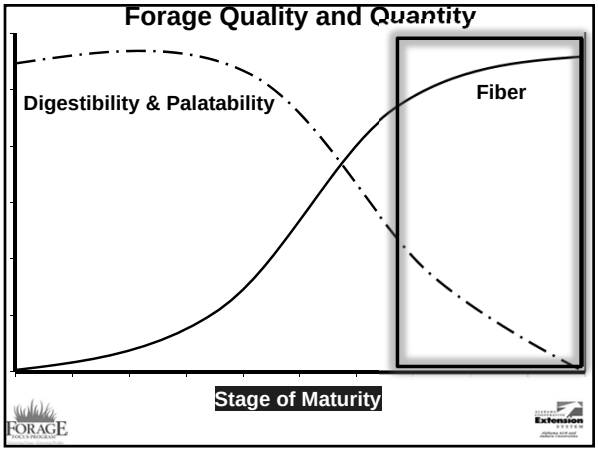
## Stockpiling vs Accumulated Forage

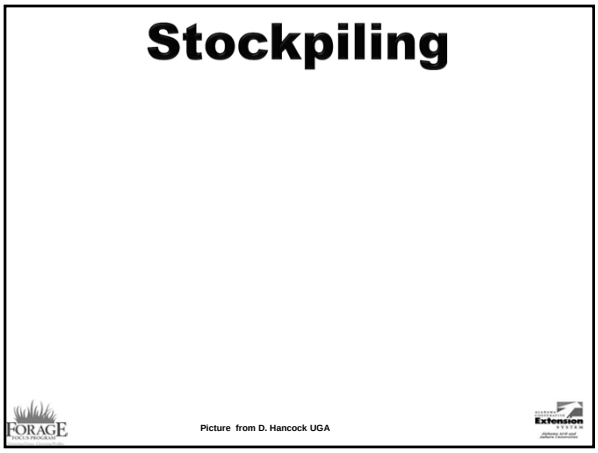
- Just closing the gate is not the same at stockpiling
- Planned Management Technique
- Forage Quality!

## How Does your Forage Grow?




Forage Quality and Quantity
QUALITY
YIELD


Forage Quality and Quantity
Digestibility & Palatability
Fiber
Stage of Maturity


Stockpiling
Picture from D. Hancock UGA

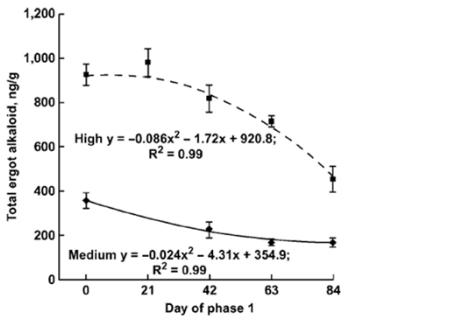
## What Forages can I stockpile?

- **Most Common:**
  - **Tall Fescue**
  - **Bermudagrass**
- **Some success:**
  - **Bahiagrass**
  - **Dallisgrass**
- **AVOID: Forages that have quick degradation, are unpalatable late in the season, deteriorate after frost.**

## What about "Toxicosis"

- **Caused by endophyte (*Neotyphodium Acremonium*) that produces ergot-alkaloids**
- **Research from Missouri and Arkansas indicates that ergovaline concentrations decrease later in the season, typically from Mid-December to March**
- **Delaying use of toxic fescue until mid or late winter could minimize associated problems and reduce concerns of toxins**

Kallenbach et al. 2003, Burns et. al 2006




**Total Ergot Alkaloid Concentrations of Stockpiled tall fescue from pastures with medium and high endophyte infection**
**Curtis et al. 2007**

| | Low (20%) | Medium (51%) | High (89%) |
|---|---|---|---|
| Phase 1 (84 days of grazing stockpiled TF) | Average Daily Gain, lbs | | |
| Cow | -1.04 | -1.41 | -1.63 |
| Calf | 1.68 | 1.57 | 1.54 |
| Phase 2 (Gain from Feb – weaning in April on sp tf at medium %) | | | |
| Cow | -1.72 | -1.26 | -0.95 |
| Calf | 0.86 | 1.06 | 0.97 |
| *Data are pooled over two years | | | |

Low (20%) Medium (51%) High (89%)

**Results Indicated:**

- **Weight loss and body condition of lactating beef cows was influenced by endophyte infection, although BCS was still above 5 for all entries**
- **Nursing calves did not show changes in ADG based on endophyte infection level**

**Curtis et al. 2007**

# When should I start "Stockpiling?"

**Location Dependent – Species Dependent**

**Cool season perennials –**
**Early to Mid September**

**Warm Season Perennials –**
**6-8 weeks before first anticipated frost**

## Stockpiled Forage "users"

**Forage quality is adequate for:**

- **Non-lactating cows**
- **Lactating cows during fall and early winter**
  - **Some supplementation may be required later in season.**
- **Non-breeding horses on Fescue**

"Create a balance between forage nutrition and allowance"

Match animal nutritional needs to available forage

## Factors that Affect Accumulation

- **Variety**
- **Moisture**
- **Climate**
- **Timing**
- **N rate**

- **Application of Nitrogen typically provides linear increases in stockpiled bermudagrass yield**

**Biomass production and forage quality of warm season perennial grasses from November to February in Arkansas**
**Evers et. al 2004**

| | Yield (lb/ac) | CP % | ADF % |
|---|---|---|---|
| Bahiagrass: | | | |
| Tifton 9 | 588.5 | 13.6 | 35.8 |
| Pensacola | 458.1 | 13.9 | 35.0 |
| | | | |
| Bermudagrass: | | | |
| Coastal | 666.2 | 11.6 | 33.0 |
| Common | 725.1 | | 34.1 |
| Cheyenne | 761.7 | 14.0 | 32.4 |
| Giant | 714.4 | | 38.2 |
| Tifton 85 | 1068.9 | 12.5 | 37.4 |
| Wrangler | 513.5 | | 30.7 |

**Biomass production and forage quality of warm season perennial grasses from November to February in Arkansas**
**Evers et. Al 2004**

| | Yield (lb/ac) | CP % | ADF % |
|---|---|---|---|
| Bahiagrass: | | | |
| Tifton 9 | 588.5 | 13.6 | 35.8 |
| Wrangler | 513.5 | | 30.7 |

Results indicated after a three year study:
- Bermudagrass (Esp Tifton 85) provided greater autumn standing forage mass.
- CP concentrations declined slowly from Oct-Feb but were always above minimum requirements for non-lactating pregnant cows.
- ADF increased with time and Bahiagrass always had higher ADF than the Bermudagrass cultivars.

**"Forage quality can make the difference between high and low production and between profit and loss!"**
**D.Ball**

## What is required?

- Moisture
- N Fertilizer (60-80 lbs)
- Grazing Management
- Water
- Grazing stick/Yard Stick
- Temporary Fencing
  - Fence Charger
  - Wire/Tape
  - Temporary posts

## What should I expect?

- Average Expectations:
  - 1500-3500+ standing dry matter/acre
  - 30-60 days of grazing (depending on grazing management)
  - CP levels starting in 8-16% , ending lower
  - TDN levels ranging 55-60%

## How do I stockpile?

- Take last cutting of hay/graze to 2-3 inch stubble height
- Remove livestock or treat as last hay cutting and Fertilize with 60-80 lbs N/acre
- Defer grazing to allow forage accumulation until needed

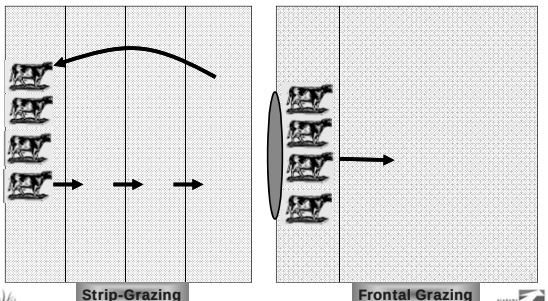
## How do I stockpile?

- Measure forage to determine daily allocation
- Collect Forage Samples to determine supplement need

## How do I stockpile?

- When grazing is initiated: Frontal graze for highest utilization of available forage
- Only let them have small strips (no more than 2-3 days worth) at a time.
  - Each 1200 lb cow will need ~35-40 lbs of stockpile/day
  - Allow access to mineral, ionophore, and supplement as needed. (Varies)

## Stockpiling



# Bermudagrass

- Annually – most yield in late spring and summer
- Little growth in early spring or fall
- Research shows that bermudagrass can produce significant yield in late summer than can be grazed during late fall.

# Bermudagrass

- Likes "hot" weather – 85 – 95oF
- Growth declines when night temperatures drop below 60oF
- Must allow enough time to accumulate before growth is slowed
- Typically grazed: October-November

- 6-8 weeks before first anticipated frost
- Typically Mid-August in AL
- Warm-season grasses not as tolerant as cool season to frost
- Best used during Mid-Late Fall if in a location where excessive cool rain/ice cause leaf defoliation and quality drops

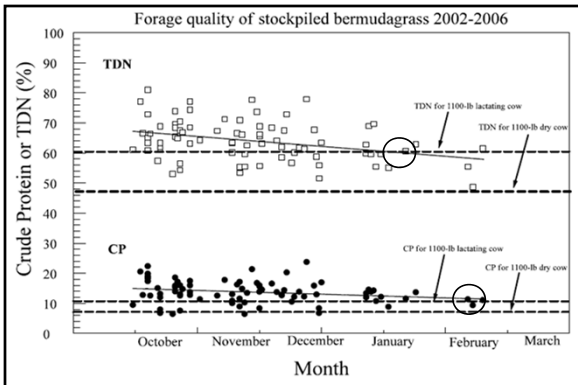
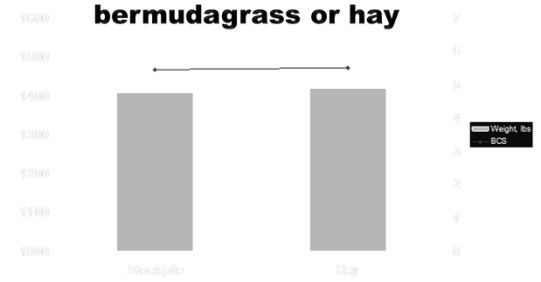



Figure 1. Crude protein and TDN content of stockpiled bermudagrass from October to February in Arkansas on-farm demonstrations from 2002 to 2006.

Jennings et al. FSA3133. Arkansas

## Cow performance on stockpiled bermudagrass or hay



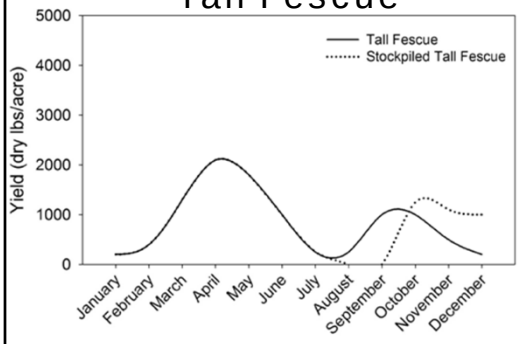

Animal performance did not differ between hay and stockpiled forage.

On average, 1786 lbs of hay fed per cow over the 70 d trial.

2,115 lbs/hd of forage needed for grazing.

D. Hancock UGA

## Tall Fescue




Forage distribution of tall fescue and the typical amount and timing of stockpiled tall fescue.

Hancock et al. Bulletin 1392. UGA

## Tall Fescue

- **Two growing seasons, Spring and Fall**
- **Dormant "Summer Slump"**
- **Likes "cool" weather – 68 – 77°F**
- **Growth declines when night temperatures drop below 40°F**
- **Must allow enough time to accumulate before growth is slowed**

# Tall Fescue

- Stockpiling typically begins in September
- Tall Fescue is Very tolerant of cool weather
- Typically grazed: November to February
- Provides palatable forage through the winter and stays green in color for much of the winter

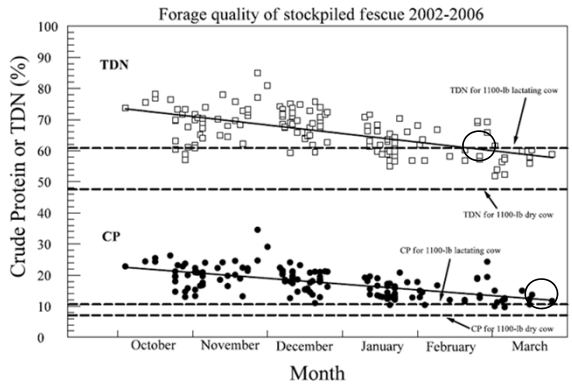



Figure 2. Crude protein and TDN content of stockpiled fescue from October to March in Arkansas on-farm demonstrations from 2002 to 2006.

Jennings et al. FSA3133. Arkansas

# Forage Quality

- No decline in herbage mass
- After Killing Frost
  - Rain leaches nutrients from forage gradually
- Minor declines in Nutritive value
  - Slowly from mid-December through early March
- Low levels of ergovaline in Tall Fescue by mid-late winter

Kallenbach et al. 2003

**Feed as LITTLE as possible,**
**Graze as MUCH as possible!**

**Grass is the cheapest feed available**
**Graze it!**

## Questions?

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## Pasture weeds: past, present, and future

Dr. Stephen Enloe
Associate Professor/Extension Weed Specialist
Auburn University

Weeds have been a problem in agriculture for thousands of years but the species that are troublesome have not always stayed the same. Over time, many changes in production systems have resulted in incredible weed community shifts. Many weeds your Great Grandfather faced seem to have come and gone and have been replaced by other more aggressive weeds. However, there are also many weeds that have stood the test of time and have persisted as problems across the years. Today, our pastures are filled with a mix of problems, both past and present, and there are new species waiting in the wings. Many of these fringe species are now beginning to creep out of the ditches and into the pastures. This talk will attempt to put it all together in an interactive format that will involve strong audience participation. Please come prepared to discuss your weed experiences both past and present and we will work to discover what the future may hold!

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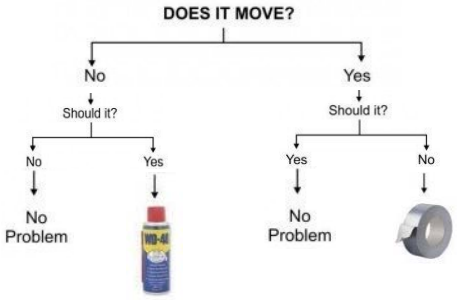
**FLOWOOD, MS 39232**
**RANGEANDPASTURE.DUPONT.COM**


## How an Ag. Engineer's Mind Works





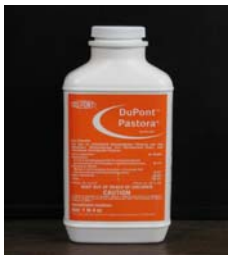
## Pasture Weed Control

***If you control your weeds, then you are only paying for fertilizer for your grass … not for the weeds***

## Pasture Weed Control

Before selecting a weed control option, understand what are your desirable grasses and what are your target weeds.

## DuPont™ Pastora® herbicide for bermudagrass pastures




## Grasses Controlled with Pastora®

Johnsongrass

## Grasses Controlled with Pastora®

**Broadleaf signalgrass**

## Grasses Controlled with Pastora®

**Barnyardgrass**

## Grasses Controlled with Pastora®

**Yellow foxtail**


## Grasses Controlled with Pastora®

Annual ryegrass

## Grasses Controlled with Pastora®

Little barley

## Grasses Controlled with Pastora®

Wild garlic

## Grasses Controlled with Pastora®

Annual bluegrass (Poa annua)

## Broadleaf Weeds Controlled with Pastora®

Buttercup

## Broadleaf Weeds Controlled with Pastora®

Henbit

## Broadleaf Weeds Controlled with Pastora®

Woolly croton

## Broadleaf Weeds Controlled with Pastora®

Thistle species

## Broadleaf Weeds Controlled with Pastora®

Curly dock

## Broadleaf Weeds Controlled with Pastora®

Dogfennel

## Broadleaf Weeds Controlled with Pastora®

Annual marshelder

## DuPont™ Pastora® herbicide

### Application Information

- Use Rate - 1.0 to 1.5 ounces/acre
  - Can apply up to 2.5 ounces/year
- Apply by ground or air
  - Ground - 10 GPA / Air - 2 GPA (minimums)
- Requires an Adjuvant
  - NIS or COC

Fertilizer

- Low rate for improved weed control
- As carrier - liquid N

**Application Timing**

Time applications to the target weed

- Must be postemerge to grass weeds

Consider time of year and when weeds are emerged

- Dormant bermudagrass for winter annual weed control
- Bermudagrass green-up for early annual weeds
- Summer timings for later annual and perennial weeds



DuPont™ Cimarron® MAX herbicide

DuPont™ Cimarron® Plus herbicide

## Saw Palmetto

## Cimarron Max rate 3 for saw palmetto control

## Smutgrass

## Smutgrass

## Velpar® L for Smutgrass Control

Rate 3-4 pints per acre

Use a minimum of 25 gallons of water per acre

Apply when there is adequate soil moisture

Need to time Velpar® L applications with rainfall (just like nitrogen applications)

Velpar® L now has ***no grazing restrictions***

**Velpar® L for Smutgrass Control**

**Velpar® L @ 4pts/acre 45 DAT on Alicia bermudagrass**


## Velpar L Spot Treatment 2cc's per inch of basal stem within 3 ft of root collar


The miracles of science

## Eastern Redcedar 51 DAT


**Wax Myrtle**
**1 year after treatment**

## VELPAR® - BRUSH CONTROL

- **Stay way from desirable trees!!**
- **Root uptake can occur!!**

The miracles of science

## ARMYWORMS


## Recommendations for DuPont™ Prevathon® – Alfalfa, Pasture and Grasses

*Count on DuPont to help optimize alfalfa yield and pasture quality through reliable and consistent insect control*

**DuPont™ Prevathon™ Use Rates — Alfalfa**

| Crop | Target Pests | Rate of Application: Pound active ingredient per acre | Rate of Application: Fluid ounces per acre | Last application (Days to Harvest) | REI (Hours) |
|---|---|---|---|---|---|
| **Pasture — Crop Group 18** (non-grass animal feeds — forage, fodder, straw and hay) | Alfalfa looper, beet armyworm | 0.047 – 0.067 | 14.0 – 20.0 | 0 | 4 |
| Make no more than 4 applications per acre per crop. Make one application per cutting. Do not apply more than 59.7 fl oz Prevathon™ or 0.2 lbs a.i. of chlorantraniliprole-containing products per acre per crop. | | | | | |
| **Pasture — Crop Group 17** (grass forage, fodder and hay) | Beet armyworm, corn earworm, fall armyworm, southern armyworm | 0.047 – 0.067 | 14.0 – 20.0 | 0 | 4 |
| Make no more than 4 applications per acre per crop. Minimum interval between treatments is 7 days. Do not apply more than 59.7 fl oz Prevathon™ or 0.2 lbs a.i. of chlorantraniliprole-containing products per acre per crop. | | | | | |

# Become an Alabama Success Story.

"We have been using Marshall ryegrass for over twenty-five years in our winter grazing program. Before using Marshall our calves would be around 450 lbs. at weaning but now **with Marshall our calves wean at 675 lbs.** This is **over a two hundred pound gain.**

**We have tried other, newer ryegrasses but they didn't work as well as Marshall.** Marshall ryegrass works for Fairview cattle and **there is no way I'm going to stop using Marshall.**

**I make a better profit with Marshall."**

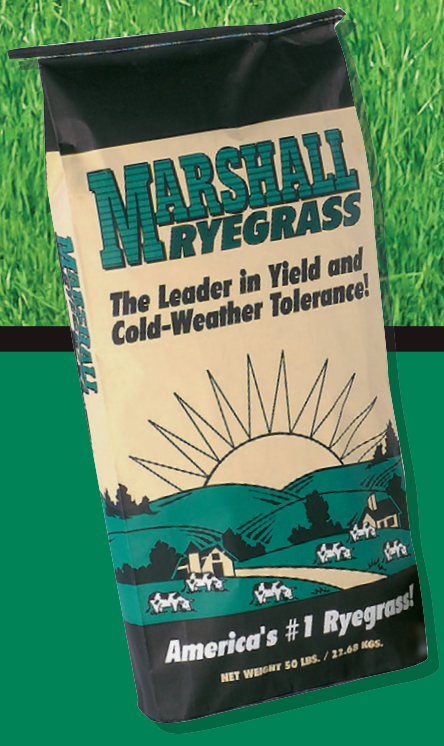
**Craig Sizemore**
Fairview Farms
Beaverton, Alabama

**"We have been using Marshall and Jackson ryegrasses for twenty plus years. This combo has been very profitable in our operation.** We over-seed Jackson in our Bahia grass. It is rust tolerant and will stay two weeks longer than the others. We use it for grazing and hay. Jackson has been our staple for years.

We plant Marshall on a prepared seedbed with early plantings, which gives us early production. We always get a good stand. This along with Jackson's late spring helps us **graze ten months out of the year.**

**Marshall and Jackson are pushed hard on our farm, but they respond bycoming back quick each time. No other improved ryegrasses in this area can compare to them."**

**Anthony Faggard**
Faggard Farms
Grand Bay, Alabama




## Marshall ... America's #1 Ryegrass!*

Wax® Since 1898 The Wax Company 888 CALL WAX

*For grazing. According to university grazing studies - AL AR LA MS ©2013 The Wax Company, LLC

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## The Alabama Forage and Grassland Coalition

**2013 Forage Conference Evaluation Form**

1. What county, State are you from?

2. What is your primary business?

3. How long have you been in this business?

4. How likely are you to recommend this program (and/or other programs like this) to a friend or neighbor?

   Very Unlikely  Unlikely  Maybe  Likely  Most definitely

5. Did you already use some of the practices mentioned today before attending this conference?

   Yes  No  Abstain

6. Will you incorporate more practices after attending this program?

   Yes  No  Abstain

7. How likely are you to adopt some of the practices presented here today?

   Very Unlikely  Unlikely  Maybe  Likely  Most definitely

8. Which practices are you likely to adopt?

9. Approximately how many acres of pasture and hayland do you think will be impacted by the practices you plan to adopt?

   <10 10-50 50-100 100-500 500+

10. What economic value would you assign to the information you received and the knowledge gained by attending this program?

    $100 or less $1,000 $5,000 $10,000 More than $10,000

11. How satisfied were you with the following aspects of the conference? (Circle 1 – least satisfied: 5 – most satisfied)

    Location:
    1 2 3 4 5

    Food:
    1 2 3 4 5

    Exhibitor area:
    1 2 3 4 5

    Time allotted to interact with exhibitors:
    1 2 3 4 5

    The hands on educational opportunities provided (i.e. forage ID contest):
    1 2 3 4 5

    The line up of speakers as a whole:
    1 2 3 4 5

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