Welcome to the 2012 Florida Beef Cattle Short Course:

The 2012 Florida Beef Cattle Short Course Program Committee and the Department of Animal Sciences would like to welcome you to this year’s Short Course. We look forward to this week every year in anticipation of delivering the premier educational event for serious beef cattle producers in the Southeast. We hope that you enjoy the program and take away some new knowledge about the beef cattle industry’s future direction, additional management decision making skills, and new information about specific production and management practices that impact your beef cattle enterprise.

Planning for the Florida Beef Cattle Short Course is a year-round event. Shortly after every Short Course we review the survey comments from those participants that return them to us. The surveys are one of our key mechanisms to get your feedback about the quality and content of the Florida Beef Cattle Short Course. We appreciate the feedback that we get and would welcome all of our participants to return the surveys and voice their opinion. Late in the summer we begin evaluating subject areas and specific topics for the next year’s Florida Beef Cattle Short Course. Our program committee works hard to identify important, timely topics that impact our beef cattle producers. We then work through the fall to identify the best speaker for that topic area and invite them to speak at the Florida Beef Cattle Short Course. We are privileged to get nationally recognized individuals to speak at the Florida Beef Cattle Short Course and appreciate the limited time they have in their schedules. Our excellent speakers come from both out of the state and within UF/IFAS. Our UF/IFAS speakers are a valuable resource, with Florida specific experience and an investment in the Florida beef industry. Likewise partnering with our valuable Allied Industry partners we work to bring you a viable and diverse tradeshow to share industry and product specific information.

Gainesville has been the home of the Florida Beef Cattle Short Course for the past 60 years. Survey responses consistently indicate that our participants prefer the Florida Beef Cattle Short Course to stay in Gainesville. Remaining in Gainesville offers certain advantages for us to deliver the excellent program that you have come to expect. This year we are excited to utilize a brand new venue, the Alto and Patricia Straughn Extension Professional Development Center. We hope that this new location provides a comfortable and professional location, allowing us to provide a cost-effective, valuable learning experience for you.

The Program Committee has worked hard over the years to deliver a premier program at a reasonable cost to our participants. The Florida Beef Cattle Short Course is a self-sustaining program and receives no direct financial support from the UF/IFAS Department of Animal Sciences or UF/IFAS Extension. In as much, the Florida Beef Cattle Short Course has to meet costs associated with speakers’ expense, meeting space, refreshment breaks, and material costs. Unfortunately, we have to pass those increased costs on to our participants. Just like the beef cattle industry, our costs of operation continue to increase in all facets.

Thank you for choosing to attend the 2012 Florida Beef Cattle Short Course. We hope that the program meets your expectations and provides you with valuable information to impact your beef cattle enterprise.

Best Regards,

Matt Hersom
Chair, 2012 Florida Beef Cattle Short Course
61st Annual Florida Beef Cattle Short Course

May 2 – 4, 2012

Presented by
Department of Animal Sciences
Cooperative Extension Service
Institute of Food and Agricultural Sciences
University of Florida, Gainesville, Florida

2012 Florida Beef Short Course Committee

Matt Hersom, Chair

John Arthington
Chad Carr
Nicolas DiLorenzo
Randall Gormto
Max Irsik
Dwain Johnson

Cliff Lamb
Joel McQuagge
Todd Thrift
Mark Warren
Jerry Wasdin
Wes Williamson

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Allied Industry Trade Show
Straughn Extension Professional Development Center &
UF/IFAS Horse Teaching Unit
May 2-4, 2012
Exhibitors and Sponsors

Accelerated Genetics
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Farm Credit
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**Allied Industry Trade Show**
Straughn Extension Professional Development Center
&
UF/IFAS Horse Teaching Unit
May 2-4, 2012

*Exhibitors and Sponsors*

**Florida Mineral, Salt & Agricultural Products**
*Greg Clark*
4014 North 40th Street
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**Gallagher**
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**Gold Standard Labs**
*Sandy Grant*
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**Merck Animal Health**
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**Pfizer Animal Health**
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Allied Industry Trade Show
Straughn Extension Professional Development Center
&
UF/IFAS Horse Teaching Unit
May 2-4, 2012
Exhibitors and Sponsors

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Southern States Cooperatives, Inc.
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Sunbelt Agricultural Exposition
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Sweet Pro Feeds
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USDA-NRCS/Florida Grazing Lands Coalition
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2012 Annual Florida Beef Cattle Short Course Agenda

Wednesday, May 2, 2012
PM Straughn Extension Professional Development Center

Beef Enterprise Issues

1:00 Welcome – Dr. Geoff Dahl, Professor and Chair, Dept. of Animal Sciences, UF/IFAS, Gainesville, FL
1:15 Cattlemen’s Comments – Mr. Don Quincey, President, Florida Cattlemen's Assoc., Chiefland, FL
1:30 Market Outlook – Dr. Curt Lacy, University of Georgia, Tifton, GA
2:15 Expansion of Cattle Harvest Capacity in the Southeast – Dr. Chad Carr, Dept. of Animal Sciences, UF/IFAS, Gainesville, FL
3:00 Break
3:30 Putting U.S. Meats on the World’s Table: A Global Perspective – Ms. Elizabeth Wunderlich, Wunderlich Associates/U. S. Meat Export Federation
4:15 What’s Wrong with This Picture? – Dr. Matt Hersom and Dr. Todd Thrift, Dept. of Animal Sciences, UF/IFAS, Gainesville, FL
5:00 Reception (Straughn Extension Professional Development Center)

Thursday, May 3, 2012
AM Session Straughn Extension Professional Development Center

Stocker Cattle Opportunities in Florida

8:30 Food Technology in the News – Dr. Chad Carr, Dept. of Animal Sciences, UF/IFAS, Gainesville, FL
Use of E. coli Vaccinations for Beef Safety – Dr. Dwain Johnson, Dept. of Animal Sciences, UF/IFAS, Gainesville, FL
9:15 Stocker Options in Adverse Conditions – Dr. Ted McCollum, Texas A&M University, Amarillo, TX
10:00 Break
10:30 Can We Produce an 850 lb Stocker Calf in Florida? – Dr. Jason Banta, Texas A&M University, Overton, TX
11:15 Risk Management for Stocker Production – Dr. Curt Lacy University of Georgia, Tifton, GA
12:00 Leave for Lunch at UF/IFAS Horse Teaching Unit
2012 Annual Florida Beef Cattle Short Course Agenda

PM Session UF/IFAS Dept. of Animal Sciences Horse Teaching Unit

Cattle Management Decisions and Applications
12:00 Trade Show Opens - Lunch
1:30 The Best and Worst Decisions I’ve Made in the Beef Business – Producer Panel
2:30 BQA Injection Site Training
   Cattle Evaluation Skills
3:30 Refreshment Break and Trade Show
4:00 Application and Use of Animal Health Products
   Cattle Feed Facts
5:00 Adjourn
6:00 Cattlemen’s Steak-Out (Horse Teaching Unit)

Friday, May 4, 2012

AM Session Straughn Extension Professional Development Center

Current Topics for the Cow Herd
8:30 Strategies for Beef Cattle Winter Feeding in the Southeast – Dr. Nicolas DiLorenzo, North Florida Research & Education Center, UF/IFAS, Marianna, FL
9:15 Maternal Nutrition and Fetal Programing – Dr. Kim Vonnahme, North Dakota State University, Fargo, ND
10:00 Break
10:30 The Brahman Project – Dr. Mauricio Elzo, Dept. of Animal Sciences, UF/IFAS, Gainesville, FL
11:15 Comparison of Jiggs to Other Bermudagrass Alternatives – Dr. Joao Vendramini, Range Cattle Research & Education Center, UF/IFAS, Ona, FL
12:00 Adjourn

Thank you for your participation and we look forward to seeing you next year!
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Speakers Biographies
61st Annual Florida Beef Cattle Short Course

Jason Banta  
**TX AgriLife Research & Extension Center, Overton, Tx**

Dr. Jason Banta is an Assistant Professor and Extension Beef Cattle Specialist stationed at the Texas A&M Research and Extension Center in Overton. He is also a member of the beef cattle section in the Department of Animal Science at Texas A&M University. Jason earned his bachelor’s degree in Animal Science from Texas A&M University in 1999, his master's in Animal Science from West Texas A&M University in 2002, and his doctorate in Animal Nutrition with an emphasis on beef cattle nutrition from Oklahoma State University in 2005.

As an Extension Beef Cattle specialist Banta works with county Extension agents and allied industry personal to develop educational programming for cow-calf and stocker producers in East and Northeast Texas. Banta also works with other AgriLife and A&M faculty to conduct beef cattle research in the areas of ruminant nutrition, cow-calf and stocker management, and animal health. Additionally, he co-coordinates and teaches a Special Topics in Applied Beef Cattle Nutrition course in the College of Veterinary Medicine.

Professional memberships include the American Society of Animal Science, the Plains Nutrition Council, and the American Registry of Professional Animal Scientists.

Chad Carr  
**UF/ IFAS, Depart. of Animal Sciences, Gainesville, FL**

Dr. Chad Carr serves as Extension Meat Specialist at the University of Florida within the Department of Animal Sciences. His responsibilities include serving as coordinator for HACCP training to food processors within the in the state, providing educational programs in meat and livestock evaluation to youth, facilitating the needs of Florida’s niche meat marketers, and providing meat safety and quality training to Florida’s extensive food service industry.

Geoff Dahl  
**Professor & Chair, UF/IFAS, Depart. of Animal Sciences, Gainesville, FL**

Dr. Geoff Dahl received a B.S. degree from the University of Massachusetts and a Ph.D. from Michigan State University in East Lansing, Michigan, both in Animal Science. He joined the University of Florida as Professor and Department Chair, 2006. Dr. Dahl conducts applied and basic research with direct impact on animal production and health. Specifically, his program focuses on understanding the physiological impact of management interventions at various stages of the lactation cycle, in an attempt to harness that knowledge to optimize cow health and performance. The fundamental aspects of Dr. Dahl’s research have led to applications in other agriculturally important species including sheep, goats and pigs.

Nicolas DiLorenzo  
**UF/North Florida Research and Education Center, Marianna, FL**

Dr. Nicolas DiLorenzo received his degree in Agricultural Engineering from the Universidad Nacional de La Plata, Argentina, in 2002. He moved to the U.S. in 2002 to pursue graduate studies at the University of Minnesota, where he obtained his Master degree in 2004 and his PhD in 2008, both in Animal Science with emphasis in beef nutrition. From July of 2008 to July of
2010 DiLorenzo worked as a postdoctoral Research Associate at Texas Tech University in Lubbock, TX, conducting research in the area of feedlot nutrition and management under the supervision of Dr. Mike Galyean. In August of 2010 he joined the University of Florida as an Assistant Professor in Animal Sciences at the North Florida Research and Education Center in Marianna. His primary research interests are in the area of beef cattle nutrition, with the objective of improving the efficiency of use of forage resources minimizing the environmental impact. His research projects involve ruminal metabolism and fermentation, emissions of greenhouse gases, and nutrient excretion in cattle systems.

**Mauricio Elzo**  
*UF/ IFAS, Depart. of Animal Sciences, Gainesville, FL*

Dr. Mauricio A. Elzo is a Professor of Animal Breeding and Genetics in the Department of Animal Sciences of the University of Florida. Dr. Elzo has a DVM from the Austral University of Chile (1974), a Ph.D. in Genetics from the University of California, Davis (1983), and postdoctoral training in Animal Breeding and Genetics from Cornell University (1983-1986). Dr. Elzo has worked on theoretical, computational, and applied aspects of genetic evaluation of animals in multibreed populations both nationally and internationally. Dr. Elzo’s research at UF has emphasized genetic and genomic evaluation of beef cattle for growth, feed efficiency, ultrasound, carcass, and meat palatability traits in beef cattle ranging in breed composition from 100% Angus to 100% Brahman. Dr. Elzo is currently working on the development and implementation of a genetic improvement program for Brahman cattle in cooperation with cattle producers and researchers from several states in the southern region.

**Matt Hersom**  
*UF/ IFAS, Depart. of Animal Sciences, Gainesville, FL*

Dr. Matt Hersom is an Associate Professor and Extension Beef Cattle Specialist at the University of Florida. His specific area of emphasis includes development of strategic nutritional and supplementation programs to optimize beef cattle performance utilizing forage and roughage based diets and evaluation of calf production and growing practices to improve animal performance in integrated beef production systems. Extension areas address expanding education experiences in beef cattle nutrition, implementation of optimal supplementation strategies for Florida cow-calf production, and development of increased pasture and forage utilization and management.

**Dwain Johnson**  
*UF/ IFAS, Depart. of Animal Sciences, Gainesville, FL*

Dr. Dwain Johnson is a native of Abilene, Texas where his family is involved in a cattle, wheat and hay farming operation. He obtained a B.S. at Texas A&M University in Animal Science and a M. S. degree from Oklahoma State University in Food Science. He returned to Texas A&M University for a Ph.D. in Meat Science and Muscle Biology. In 1984, he joined the faculty of the Department of Animal Science at the University of Florida as an Assistant Professor. Currently he is a Professor of Meat Science and is involved in teaching and research. The research program he and his students are involved in focuses on antemortem and postmortem factors influencing animal composition and meat palatability. Dr. Johnson is also currently serving on the Board of Directors of the Florida Beef Council.
**Curt Lacy**  
*Agriculture & Applied Economics Depart. The UGA, Tifton, GA*

Dr. Curt Lacy is a Livestock Economist and Associate Professor in the Agricultural and Applied Economics Department at the University of Georgia-Tifton. Since coming to UGA in 2001, Dr. Lacy has had extension and applied research responsibilities in the areas of livestock/forage economics and marketing. He also co-teaches an undergraduate class, “Issues in Animal Agriculture” and will be the undergraduate advisor for the UGA Tifton Agribusiness major that will begin in fall 2011.

Although he has many varied interests, his primary areas of emphasis are the economics and marketing of beef and dairy in alternative production systems, forage economics and breeding herd economics in beef, pork and dairy systems. He routinely provides beef cattle market updates and other economic information to producers, county agents and agribusiness people across the state and within the region. He is also the risk management coordinator for the Georgia Beef Challenge, one of the oldest beef cattle feed-out and carcass evaluation programs in the country.

**Ted McCollum**  
*TX AgriLife Research & Extension Center, Amarillo, TX*

Dr. Ted McCollum is the Extension Beef Cattle Specialist at the Texas AgriLife Research and Extension Center in Amarillo. From this location, McCollum serves the North Region (Panhandle, South Plains, Rolling Plains districts). In the north region, Dr. McCollum assists Texas AgriLife Extension Service county staff with educational programming, directs beef cattle programs for producers, provides assistance to cattle producers and industry groups, and conducts field research. At the state level, he assists with statewide programs and serves as a resource person for beef cattle nutrition and stocker cattle programs. Interests include production management of all phases of commercial cattle and beef production from rangeland and forage-based production systems to cattle feeding systems.

McCollum is a member of the animal nutrition section in the Department of Animal Science and the graduate faculty of Texas A&M University, as well as adjunct faculty at West Texas A&M University. He received his bachelor’s degree in Biology from Baylor University, his master’s degree in Animal Science from New Mexico State University and his doctorate in Ruminant Nutrition from New Mexico State University. He is a Professional Animal Scientist and Diplomat of the American College of Animal Nutrition in the American Registry of Professional Animal Scientists.

**Don Quincey**  
*President, FL Cattlemen’s Association, Chiefland, FL*

Don Quincey is a 5th generation Floridian and has lived in Levy County his entire life. He attended Santa Fe Community College. Don has spent his whole career in the agriculture and farm supply business; though for the past 20 years he has been a full-time Florida rancher. In 2011, Don received the Award of Distinction from the College of Agriculture and Life Sciences at the University of Florida for contributions to Florida’s agriculture and natural resource industries.

Don, in addition to running his ranch, Quincey Cattle Company, is currently the Florida Cattlemen’s Association president and Chairman of the Board of the Suwannee River Water Management District.
Todd Thrift  
UF/ IFAS, Depart. of Animal Sciences, Gainesville, FL
Dr. Todd Thrift received his B.S at the University of Kentucky in Animal Science, an M.S. at Oklahoma State University in Ruminant Nutrition, and a Ph.D. at Texas A&M University in Physiology of Reproduction. Dr. Thrift has been with the University of Florida’s Department of Animal Science for thirteen years in a 70% teaching, 30% extension position in Beef Cattle Management. His teaching appointment has him teaching Cow/Calf Management, Beef Cattle Nutrition, and Stocker/Feedlot Management. His extension appointment has him focusing as a Beef Quality Assurance Coordinator and with the National Animal I.D. Prior to coming to the University of Florida; Dr. Thrift worked for Texas A&M University, as a beef cattle specialist for five years.

Joao Vendramini  
UF/IFAS, Range Cattle Research & Education Center, Ona, FL
Dr. Joao (Joe) Vendramini, Forage Specialist at the Range Cattle Research and Education Center, Ona, FL, received his M.S. in Animal Science from the University of Sao Paulo, Brazil and a Ph.D. in Agronomy from the University of Florida. He has been closely involved with animal production and worked as a Farm Manager in a large-scale beef cattle operation in Southern Brazil, which collectively maintained more than 10,000 beef cattle; 2,400 acres of sugarcane; and 1,200 acres of soybean and corn. After he earned his Ph.D., Dr. Vendramini worked as Assistant Professor - Forage Specialist at Texas A&M University. His research program at the UF/ IFAS Range Cattle Research and Education Center in Ona, focuses on management of warm-season grasses, different aspects of the plant-animal interface in grazing systems, and effects of supplementation on forage utilization and animal performance. He is a member of the America Society of Agronomy, Crop Science Society of America, America Society of Animal Science, and Professional Animal Science.

Kim Vonnahme  
Depart. of Animal & Range Sciences, ND SU, Fargo, ND
Dr. Kim Vonnahme received her B.S. degree from Iowa State University majoring in Animal Science. After graduation in 1996, Kim pursued her M.S. degree at Oklahoma State University working on embryo-uterine interaction during early pregnancy in the pig with a thesis entitled “Detection of Glandular Kallikrein and Low Molecular Weight Kininogen in the Porcine Uterus during the Estrous Cycle and Early Pregnancy.” She returned to Iowa State University in 1998 to begin her Ph.D. program and moved with Ford to the University of Wyoming in 2000, where she completed her Ph.D. degree in 2003. While her dissertation title was “The Impacts of Placental Size and Vascularity on Litter Size in the Pig”, Kim also helped with the early studies in the Center for the Study of Fetal Programming developing a nutritional model using pregnant sheep. In the fall of 2003, Kim moved to North Dakota State University with interests in learning measurements of vascularity in sheep and cow placenta from Dr. Larry Reynolds. In April, 2004, Kim accepted an assistant professor position in the Department of Animal and Range Sciences to teach and conduct research. She was promoted to Associate Professor in 2010. Kim served as the Co-Director of the Center for Nutrition and Pregnancy from 2009 until April 2012.

Kim is lead instructor and continues to improve the Physiology of Reproduction course, which is a dual listed undergraduate and graduate student course. She also has established a Research in Reproduction course where undergraduate students undertake an independent research project.
Dr. Vonnahme’s research programs focuses on the impacts of maternal nutrition on fetal and placental development in sheep and cattle. More specifically, Kim is interested in how the maternal nutrition impacts uteroplacental blood flow, development of the placenta, and nutrient transfer. She has generated over $1.8 million in research grants, has 70 peer review publications, > 160 abstracts, 1 book chapter, and 1 patent.

**Elizabeth Wunderlich**  
*Wunderlich Associates/U.S. Meat Export Federation, TX*

Ms. Elizabeth Wunderlich, in 1993, after a 10 year stint of working in the field of marketing red meat for (in order) Southwest Meat Association, Texas Beef Council, and Keystone Foods, the opportunity came for Elizabeth Wunderlich to form her own marketing company, Wunderlich Associates (WA). At that time (November, 1993), the U.S. Meat Export Federation was shifting the marketing efforts in the Caribbean from a policy-based program to marketing/promotion type activities and hired Wunderlich Associates to move them into that direction and manage the area on their behalf. Also at that time, the National Livestock and Meat Board’s retail marketing division was looking for account representatives in the northeast and contracted with WA to represent them on the beef and veal accounts.

For over 18 years, WA has worked under the vision laid out by USMEF to develop not only a strong presence and network of relationships on virtually every island in the non-USA Caribbean, but to supervise the market’s United Export programs. WA is an expert in both the marketing side (29+ years of experience in public relations, merchandising, promotional execution and evaluation) and also specializes in red meat science (with a B.S. degree in Animal Science from University of Florida, high individual awards in meats and livestock intercollegiate judging, and Master’s degree work from Texas A&M University in Agricultural Economics).

With a strong family history in agriculture (cattle, sheep, goats), WA goes beyond other marketing agencies because of a passion of the product and respect for the industry. Building demand for, and sharing the U.S. industry with the international market, is part of the commitment, belief, and personal “drive” WA brings to the Caribbean market.
Introduction
Other than no rain, cattle producers have had little to complain about in the past 12 months. In a little less than a year cow-calf producers have added around $40 per hundredweight (Figure 1) or $200 per head in revenue to their calf-crops.

It should come as no surprise that these high prices are a result of extremely tight feeder cattle supplies, favorable weather conditions in the primary stocker growing regions and speculation on the direction of the fed cattle market.

Will these prices hold or are we in the midst of a “cattle bubble?” The fundamentals say prices should remain firm, but there has also probably been some “irrational exuberance” on the part of some buyers.

The reminder of the paper considers the key factors affecting supply, demand, and ultimately cattle prices for the foreseeable future.

Supply Situation
Overall beef supply is expected to be down in 2012. Even though exports are expected to increase this year, the overall decline in beef and total meat production (Table 1) will be the primary driver for supplies.

The decline in beef production is directly tied to the declining U.S. beef cow herd. In the past five years, the herd has declined by 2.5 million cows or almost eight percent to less than 30 million beef cows. To be sure, the price signals were present last year to stimulate herd expansion, but the crippling drought in the primary cow-calf states of Texas and Oklahoma led to another drop in cow numbers (Figure 2).

Demand Outlook
Overall demand is expected to remain steady for the foreseeable future. Many people confuse higher prices with an increase in demand. In reality, higher prices can be function of short supplies or increased demand. Currently, the high prices that cattlemen are experiencing are a result of short-supplies and stable demand domestically, and short supplies and increased demand internationally.

Demand is a function of income, population, prices of competing goods, and consumer’s tastes and preferences. Domestically, demand is influenced mostly by consumer’s disposable income. In other words, it’s all about the economy.

The Congressional Budget Office (CBO), a non-partisan economic part of the government, projects U.S. economic growth to be sluggish for the next several years (Figure 3). According to their projections, it will take about five years for the U.S. economy to get back to where it should be. As a result, it will be difficult to pass along much higher prices to consumers, especially if gas remains close to $4 per gallon.

Internationally, exports are expected to be down ever so slightly as other nations’ economies continue to struggle. However, as long as the U.S. Dollar remains weak exports should hold up reasonably well.

Prices and Profitability
Overall, prices are expected to remain favorable for the next several years as supplies remain tight. Cattlemen should expect prices to stay about where they are to improving slightly for the next several years.

Profits are expected to be buoyed by high cattle prices. Even though input prices have increased...
in recent years, they are expected to stay in-line with current prices.

For the near-term, the major concern on the cost side is not so much prices but how much feed and hay will need to be fed.

Current projections are for significant drought to continue in the Southeastern US (Figure 4). As a result, costs of gain will likely remain elevated due to decreased performance of animals.
Table 1. Projected Meat Production for 2012.

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<tbody>
<tr>
<td>Beef</td>
<td>26.41</td>
<td>26.19</td>
<td>25.04</td>
<td>-0.84%</td>
<td>-4.59%</td>
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<tr>
<td>Pork</td>
<td>22.46</td>
<td>22.76</td>
<td>23.27</td>
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<td>Total Red Meat(^1)</td>
<td><strong>49.18</strong></td>
<td><strong>49.24</strong></td>
<td><strong>48.58</strong></td>
<td><strong>0.12%</strong></td>
<td><strong>-1.37%</strong></td>
</tr>
<tr>
<td>Broilers</td>
<td>36.52</td>
<td>37.20</td>
<td>36.55</td>
<td>1.83%</td>
<td>-1.78%</td>
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<tr>
<td>Total Poultry(^2)</td>
<td><strong>42.59</strong></td>
<td><strong>43.51</strong></td>
<td><strong>43.04</strong></td>
<td><strong>2.11%</strong></td>
<td><strong>-1.09%</strong></td>
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<tr>
<td>Total Red Meat &amp; Poultry</td>
<td><strong>91.77</strong></td>
<td><strong>92.75</strong></td>
<td><strong>91.62</strong></td>
<td><strong>1.06%</strong></td>
<td><strong>-1.24%</strong></td>
</tr>
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Source: April 2012 WASDE Outlook, USDA-ERS
\(^1\)Also includes veal and lamb production
\(^2\)Includes turkey production

Figure 1. Average weekly prices for Georgia 400-500 pound steers and bulls. Source: USDA-AMS, graph compiled by Livestock Marketing Information Center (LMIC).
Figure 2. Change in beef cow numbers from 2011 to 2012. Source: data compiled by USDA-NASS, chart developed by LMIC

Figure 3. Projections for economic growth in the US until 2011
Figure 4. Projected precipitation through June 30, 2012. Source: NOAA
Expansion of Cattle Slaughter Capacity in the Southeast

Chad Carr, Ph.D.¹

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Introduction
Existing slaughter operations in the Southeast are making modifications to their business plans due to the changing dynamics of the beef industry. Also, several businesses have built or are building new beef processing facilities in the area.

Existing or renovated slaughter facilities
The short supply of cattle has required southeastern market cow and bull slaughter facilities to acquire cattle from a greater distance to maintain their existing slaughter capacity. Therefore, the area’s two largest market cow and bull slaughter facilities, Central Beef Industries LLC and FPL Food LLC have either established or plan to establish a fed beef processing program. Additionally, Florida Beef, Inc. has purchased and is remodeling an older facility to target beef producers who are looking to market locally produced beef products or products from animals with specific production claims.

Central Beef Industries LLC, Center Hill, FL
Central Beef Industries LLC has expanded its facilities and plans to operate six days a week, slaughtering 250-300 fed cattle daily, with the remainder of their 650-800 daily slaughter being market cows and bulls. According to Mr. Marshall Chernin, owner of Central Beef LLC, the company plans to develop a branded fed beef product. Additionally, he feels that two commercial five-10,000 head commercial feedlots will be needed in north Florida to generate the cattle supply needed for this regional fed beef market. Mr. Chernin stated that the new coolers are operating and that some fed beef processing could start soon if animals could be sourced. Central Beef LLC can be contacted at (352) 793-3671.

FPL Food LLC, Augusta GA
FPL Food LLC is the largest market cow and bull processor in the southeastern U.S., with a daily slaughter capacity of near 1,000 cattle five days a week. Since March 2011, 100-200 fed cattle sourced from the southeastern U.S. have been slaughtered one day each week. According to Dr. Randall Garrett, Chief Operating Officer of FPL Food LLC, the company would like to schedule and purchase cattle from any producer/feeder in the region which can produce at least two loads of fed cattle quarterly. Dr. Garrett emphasized the need for interested producers to have continuity and predictability when scheduling cattle with FPL Food. FPL Food LLC can be contacted at (706) 722-2694.

Florida Beef Inc. Alma, GA and Zolfo Springs, FL
Florida Beef Inc. has a daily slaughter capacity of approximately 250 market cows and bulls between their two facilities in Alma, GA and Zolfo Springs, FL. According to Mr. Clay Lee, owner of Florida Beef, Inc., the existing facilities will continue as-is and the business has recently purchased and is renovating a processing facility in Okeechobee, FL. The goal of this revamped facility will be to become an USDA-FSIS inspected facility to provide custom processing for producers or customers of locally produced beef or those who require special needs such as segregation related to USDA Organic. The Okeechobee facility should be operating within eighteen months. Florida Beef Inc. can be contacted at (863) 735-2233.

New or under construction facilities
Nettles Beef Processing, Lake City, FL
This operation has been providing USDA custom exempt processing since February 2011 and has slaughtered under USDA-FSIS inspection since August 2011. According to Mr. Billy Nettles, owner of Nettles Beef Processing, the company’s primary function has been the custom processing, fabrication, and packaging of products from show steers from Florida county fairs. The operation has a daily beef slaughter capacity of
approximately 20 animals, but has cooler space for over 100 carcasses. Mr. Nettles would like to increase his slaughter numbers from niche marketers or those selling freezer beef, especially from May through December, when few Florida county fairs occur. Nettles Beef Processing can be contacted at (386) 752-2228.

**Adena Springs Beef, Ocala, FL**
This 61,000 square-feet facility is currently under construction in Marion County. Adena Springs is owned by Canadian businessman, Mr. Frank Stronach, who plans to develop an integrated all-grass-based beef production system. According to Mr. Rick Moyer, cattle manager at Adena Springs, the facility will be constructed to slaughter 150 grass-fed young steers and heifers two days a week and process carcasses into cuts the remaining three days. Adena Springs Beef can be contacted at (352) 867-0196.

This increase in cattle slaughter capacity will increase marketing options for Florida beef producers
Putting U.S. Meats on the World Table: A Global Perspective

Elizabeth Wunderlich

1Wunderlich Associates/U.S. Meats Export Federation

Notes
There are the four questions that every beef cattle producer should consider when they read, view, or talk with anyone about cattle management, production practices, or new products.

1. Compared to What?
2. At What Cost?
3. What Hard Evidence Do You Have?
4. What is Your Motivation?

This level of evaluation applies to any of the aspects associated with beef cattle production or any other application of management and dollar expenditures. This level of evaluation (or skepticism if you will) also needs application to the messenger regardless of the source (i.e. university, industry, consultants, veterinarians, or fellow cattlemen). Logic and common sense should apply in all aspects of decision making regarding the beef cattle enterprise. Unfortunately, shiny paper, catchy slogans, and presumed authority mislead and beguile cattlemen at times.

**Compared to What?**
Valid comparisons are the key to true evaluations; lack of a comparable product or claim or faulty comparisons obscure any true difference, or lack thereof. Comparing “apples to apples and not apples to oranges” is critical during the evaluative process. Most any product or claim can appear better or have an advantage if allowed an uncompetitive comparison. Likewise, narrow definitions of application or evaluation limit the validity of comparisons. The context that the comparison is just as important; utilization of a product or differential applications invalidate comparisons.

For us in Florida and the Southeast that means comparisons in our environment with our resources. Our environment will challenge comparisons of time, particularly relative or production cycles and seasons, sustained high temperature and humidity, sporadic rainfall, and unique growing conditions. Likewise, our production environment of different soil and forage conditions, feed resources, and makeup of the cow herd mean that for comparisons to be valid and valuable to us some aspect of the production challenges must be addressed. Conduct a thorough evaluation of any methodology and practices that have been solely developed or adopted in one region. Things work in a region for a reason and transfer to another region requires careful evaluation. Consider all of the factors that make your current situation successful or not; will these same characteristics be applicable with the adopted methodology?

**At What Cost?**
This question should be obvious. No change in product use, application of technology, or management comes without a cost. The value of application or adoption comes in that the output out-weighs the input. However, all too often incorporation of products, technologies, and management philosophy occurs without adequate consideration. Not acknowledging, knowing, or understanding what the input costs of a production practice puts the beef cattle producers at a financial disadvantage. Likewise, calculation of breakeven costs or return on investment can’t occur if the true or even apparent cost of a something is not considered.

Input cost advantages may be region specific for production/management practices. Accessory costs for the adoption of new technologies or products often are not fully revealed. The accessory costs are not identified because they are inherent within a different system. So many products, technologies, and methods are available that span the spectrum from feedstuffs and grazing systems to castration equipment and working facilities. Put pencil to paper and do the math that determines whether adoption in feasible and sensible. Just because “it” is good does not make it right for every producer.
What Hard Evidence Do You Have?
This is where the rubber meets the road. What proof is there to back up the claim that is made? If proof is available, what is it; where and how was it generated (see question one); how repeatable are the results are they validated by multiple trials? These questions do not make the people representing good products uncomfortable, but they do expose less validates or worthy products. As a producer, you should be able to look at the data that is provided and see a direct relationship and application to your operation. If you have to use your imagination then reconsider adoption of the product, technology, or system.

Many products, technologies, and systems have been validated, but outside the state of Florida. So then consider, how robust the information that you are provided with is. What will the results be under Florida conditions, with Florida cows, within your management skill set? Research and demonstrations are conducted for a reason to validate and explore the limits of a product or system. This evaluation is valuable to both the purveyor and you the adopter. Robust evaluation provides a measure of confidence that should be evident. Look for the limitations of the application. Also understand that only so many variables can be controlled in a research or demonstration setting, but they better have been the right variables.

What is Your Motivation?
Obviously everyone in business is in business to make a profit, without profit it is a hobby. However, the other motivating factors should be easily definable. Many individuals and companies what to and work to cultivate a relationship with a customer to develop a long-term beneficial relationship. This relationship is the foundationally developed by addressing the prior three questions. The agriculture community is fortunate to have many entities that do truly want to improve producer enterprises and producer bottom lines. Healthy, happy beef cattle enterprises make for successful commercial entities. Work to identify these entities that want your enterprise to succeed.

Below is a list that we developed just looking through several issues of multiple popular press magazines and emailing. This list is not exhaustive, but is not meant to ostracize any particular industry. Rather it identify places were careful, evaluative thought needs to be applied.

- Breeding and Genetic Selection
- Crossbreeding and Hybrids
- Genetic Testing and Genetic Markers
  - Marbling
  - Tenderness
  - Stayability
- Measures of Efficiency
- Pest Control
  - Deworming
  - fly control
- Nutrition
  - Feeds
  - Forages
  - Minerals
- Grazing management
  - Systems
  - Forage species
  - Fertilization
- Health products
- Sustainability
- Process Verification / Natural / Organic
- Management
  - Castration
  - Other Technologies

As you view popular press magazines, direct email sources, and industry literature keep in mind the four questions for critical evaluation. Apply each one of those questions to the next magazine ad you read. Read the next article with those four questions at hand and consider what the message is.

*There is no lie that is too big, that told boldly enough and repeated loudly and often enough, that will not be believed by a significant number of people.*
Questions and Answers About Lean Finely Textured Beef

Lean finely textured beef (LFTB) is a category of beef products that uses high-technology food processing equipment to separate lean meat from fat because doing it by hand would be impossible. LFTB products prevent the waste of valuable, lean, nutritious, safe, beef by using technology to do what hands cannot.

Unfortunately, recent media reports and so-called “reality” shows have raised concerns about the product without the benefit of facts from those that produce or use it. These questions and answers aim to provide the facts.

Are these products regulated and inspected?

Yes. Lean finely textured beef is beef, quite simply, and all beef products are strictly regulated and inspected by the U.S. Department of Agriculture (USDA). Inspectors are present in plants where these products are made every day to ensure that this product is produced in a safe and wholesome manner. During the two decades these products have been produced, they have had an excellent food safety record.

What are the different types of lean finely textured beef?

There are two common types. One is called boneless lean beef trimmings and the other is called finely textured beef. The products are similar in many ways, but they use different antimicrobial treatments to enhance the safety of the finished product.

What are boneless lean beef trimmings (BLBT) finely textured?

When beef carcasses are processed into meat cuts consumers and restaurants use, trimmings result. Trimmings are smaller pieces of fat that contain small portions of beef that are wholesome and nutritious. To make BLBT, the trimmings are warmed to about 100F degrees in equipment that looks like a large, high speed mixing bowl that spins these trimmings to separate meat from the fat that has been liquefied. The resulting product is very low fat (95+% lean), which many consumers desire. This process is very similar to the one used to separate cream from milk.

Is it true that these trimmings previously were only used for pet food and oil and were unfit for human consumption, as one media outlet claimed?

That statement is patently false. Beef trimmings are edible. No process can make an inedible product edible. What the process does is separate the lean meat from the fat, which was previously near impossible to accomplish through knife trimming by hand.
Is ammonia used to produce BLBT?
Food grade ammonium hydroxide (basically ammonia + water), which has been declared safe by the Food and Drug Administration since 1974, is used to produce a number of products such as puddings and baked goods and can be used in the processing of boneless lean beef trimmings to control any harmful bacteria that may be present in the beef.

Why is ammonium hydroxide used in processing a beef product?
A puff of ammonium hydroxide gas slightly raises the pH of a product and can destroy bacteria that could make someone ill if a raw product is not cooked thoroughly. The USDA, after consultation with FDA, has determined that this use of ammonium hydroxide is safe and it has been in use for this purpose since 2001.

Is ammonium hydroxide used in all lean, finely textured beef products?
No. Another variation known as finely textured beef is made in a similar way, but uses citric acid, like the acid in a citrus fruit, to destroy bacteria. That particular type is referred to as finely textured beef or FTB.

When any form of lean finely textured beef is blended into ground beef, will it be labeled?
Because it is 100% beef, LFTB is not singled out as a separate ingredient on ground beef packages.

What do the experts say about its safety?
Experts such as Dr. Gary Acuff at Texas A&M University and Dr. John Floros at Pennsylvania State University have examined these products and say that all forms of lean finely textured beef are safe when produced in compliance with USDA regulations.

What do the food safety data show?
USDA data show that the incidence of *E. coli* in fresh ground beef has been declining significantly over the past decade. The number of USDA ground beef samples testing positive for *E. coli* O157:H7 dropped 55 percent between 2000 and 2010. Lean finely textured beef products have been a part of that success story.

Is it really necessary to try to get every small bit of beef from a carcass?
Necessary? Perhaps not. But it absolutely is the right thing to do.

All types of lean finely textured beef are sustainable products because they recover lean meat that would otherwise be wasted. The beef industry is proud to produce beef products that maximize as much lean meat as possible from the cattle we raise. It’s the right thing to do and it ensures that our products remain as affordable as we can make them while helping to feed America and the world. If this beef is not used in fresh ground beef products, approximately 1.5 million additional head of cattle would need to be harvested annually to make up the difference, which is not a good use of natural resources, or modern technology, in a world where red meat consumption is rising and available supply is declining.

For more information, visit [www.MeatMythCrushers.com](http://www.MeatMythCrushers.com)
Use of E. coli Vaccinations for Food Safety

Dwain Johnson, Ph.D.¹

¹Department of Animal Sciences, UF/IFAS Gainesville, FL

Notes
Stocker Options Under Adverse Conditions

F.T. McColllum III, PAS-ACAN

Texas AgriLife Extension Service, Texas A&M University, Amarillo, TX

Stocker cattle enterprises rely upon weight gain to increase dollar value (per head) of calves to generate marginal profits. Stating the obvious, the cost of the gain must be lower than the added value in order to realize a profit. The purchase and conditioning of calves for a grazing program results in upfront costs (morbidity, mortality, animal health products, feed) that must be recovered. In the classical sense these are not "fixed costs" but in a stocker enterprise these costs that are fixed or "sunk" within about a month of purchasing the calves. From that point on, the contribution of these sunk costs to cost of gain is diluted by accumulated weight. In addition to these sunk costs, there are continuing costs (interest, labor/equipment, grazing) that must be covered through the ownership period. Rate of gain and total weight gain by stocker calves are drivers influencing the recovery these costs.

More total gain dilutes the cost of production inputs over more pounds of weight. Total gain is a function of time as well as rate of gain. More time (days) allows calves to continue to add weight. More rapid gains (lb/day) dilute the upfront production costs on a daily basis and allow the cost to be recouped in a shorter period of time. More rapid gains help ensure that continuing daily cost of ownership are covered by increased weight and value.

In order to gain weight and dilute dollar costs, daily nutrient consumption must exceed the metabolic costs associated with maintenance. As nutrient consumption increases, the cost of maintenance is diluted and more rapid gains are achieved.

Adverse conditions that limit nutrient consumption and/or utilization by calves reduce potential gains and profits. These conditions may be "preexisting" - harsher production environments, forage resources with relatively low nutritional value and/or productivity - or, these conditions may develop during the time calves are being managed - changes in forage quality or availability as a result of prevailing climate. Management options can possibly aid in offsetting these limiting factors.

Value of weight gain and cost of weight gain

Value of weight gain ($/lb gain) is calculated as the [([Final $ value/head - initial $ value/head)/weight gained]). The value of weight gain does not necessarily equate to the sale price ($/lb). Value of gain can be calculated for the entire ownership period. A calf was purchased for $700 and after gaining 300 lbs was sold for $1000. Value of gain was $300/300 lbs or $1.00/lb.

Value of gain can also be used to evaluate the efficacy of management practices. For instance assume that a supplemental feeding program will increase sale weight by 30 lbs. The value of the 30 lbs is estimated as [($ value/head of the supplemented calf - $ value/head of an unsupplemented calf)/weight increase attributed to supplement].

Cost of gain for the entire ownership period is simply [total cost $/head / total weight gain]. To evaluate an optional practice to improve gain, cost of gain for the practice is [total cost $/head for the practice / weight increase attributed to the practice]. These two concepts must be kept in mind when evaluating alternative practices.

Extend grazing

Total weight gain can be increased by lengthening time of ownership. Extending the grazing season also changes the marketing window; moving the marketing date can influence (up or down) the value of weight gain. Longer grazing programs may be a means of increasing gain and returns in production environments where potential weight gains are inherently low.
Grazing can be extended by using different forage resources in sequence or perhaps adding forage species with different growth curves into a pasture (i.e. interseeding). The former requires some planning and development of different forage types that have different growing seasons and provide some continuity of forage supply. The grazing of cool season annual pastures in the late winter and spring then moving calves onto warm season perennials in late spring and removal before summer slump sets in is an example. In this case, the risk associated with establishing winter annuals, perhaps having limited grazing and gain on the winter annuals can be somewhat offset by following onto the summer perennial. Likewise, the warm season perennial can be grazed at a more optimum time and the cattle removed before the gains drop off in the summer.

Diversifying a pasture by interceding may also extend grazing. Such an approach might utilize a mixture of cool and warm-season perennial grasses; a mixture or warm-season perennials with different late spring and summer growth patterns might also be a consideration. However, management of pastures containing a mix of species with different growth curves/characteristics is more difficult and sustainable production by the different components may be a risk.

Another alternative for extending grazing or the ownership period is the addition of supplementation to enhance nutrient intake and carry cattle through less desirable forage conditions. The type and level of supplementation will depend on forage quality, forage availability, feed costs, and the amount of gain added by supplementation as opposed to no supplement.

Alter the grazing season
Changing the period when forages are utilized may offer the opportunity to capitalize on periods of better forage conditions and avoid periods that are less desirable. For instance, in the tallgrass prairie regions of Kansas and Oklahoma, stocker cattle gains decline during the latter half of the summer season as a result of forage quality and heat. One approach to increasing production but avoiding the summer slump in that region is to increase stocking density (hd/ac) and end the grazing season in mid-July rather than September. Daily gains are not affected, total gain per hd is lower, but gain per acre increases with this system. Developing a forage system that avoids grazing cattle during times of low forage value or climatic stressors on the calves may be a useful strategy.

Enhance quality of available forage
In general, warm-season perennial grasses are the class of forages that have the lower nutritional value. Diversifying the forage species in a grazing system can enhance quality of forage available for calves. Introduction of legumes (clovers, peas, peanuts) into a warm-season pasture system should enhance overall forage quality and potentially support better gains than a forage system based on warm-season grass alone. The legumes will also provide some N fixation. As mentioned previously, maintaining mixtures of species is more challenging than managing monocultures.

Match cattle to forages
Heavier (more mature) cattle tend to gain more rapidly than lighter cattle on similar forages. If forage quality and resulting weight gains are of concern, the weight of calves purchased/selected may be a consideration.

Ackerman et al (1999) reported that, averaged across two years, lighter weight calves gained less (ave. 0.30 lb/day lower) than calves that were 150 to 170 lbs heavier at turnout onto old world bluestem. Despite the lower gains by the lighter calves, gain per acre was greater because more head of the lighter calves could be grazed compared to the heavier calves.

The difference in daily gain can be partly explained by the relationship of potential forage intake and maintenance requirements of calves. As calf size increases, maintenance energy requirements relative to body weight (mcal NEm/100 lb BW) decline. Forage intake capacity is related to body weight. So as calves consume forage to their intake capacity, more of the daily consumption is used for maintenance in the lighter calf while less is used for...
maintenance and more is available for gain in the larger calf.

For instance, the maintenance energy requirement for a 400 lb calf is about 3.81 mcal NE\textsubscript{m}/day or 0.95 mcal/100 lb BW while the requirements for a 500 lb calf are 4.50 mcal NE\textsubscript{m}/day or 0.90 mcal/100 lb BW. If a forage contains 58% TDN, the lighter calf must consume 1.94% BW to meet maintenance while the heavier calf has to consume 1.83% BW. In this example, the difference of 0.1% BW forage intake is equivalent to about 0.14 lb gain/day.

**Manage forage availability**

Forage production is the combined result of growing conditions (rainfall and temperature), soil fertility, and forage type/species and varies from month to month and year to year. Forage availability (lb forage/hd/time) is the combined result of forage production and stocking rate (hd/ac/time). Forage availability can be further evaluated as the amount of forage in the total forage mass that is more or less desirable by the grazing calves. Cattle graze selectively and discriminate among species of plants, plants within a species, parts of plants, and age of plant parts. As stocking rate increases, the availability of the desirable components in a grazing unit becomes more limited, nutrient intake is more difficult to sustain and calf performance declines.

Most would associate adverse conditions with rainfall and growing conditions that limit forage production. However, in some instances excess rainfall and abundant forage production can also adversely affect calf performance. In the face of adverse growing conditions it becomes necessary to either adjust forage availability, supplement calves to sustain nutrient intake, or accept lower performance by the calves.

Adjusting stocking rates is a primary means of managing forage availability and sustaining better calf performance. However, adjusting stocking can be one of the more challenging adjustments to commit to and carry through. Decisions on the type and number of calves to purchase/retain are usually made and "sunk" costs are accrued before the grazing season. The prospects of losses or limited income cloud the decisions to reduce numbers or take on additional costs of supplementation.

In some cases, what one might consider excellent growing conditions may actually adversely affect calf performance as a result of more rapid forage growth and accumulation and a decline in forage nutritional value. In this situation, the availability of more desirable forage is reduced even though total forage mass is elevated. Adjusting stocking rates upward to attempt to regulate and use the forage might be beneficial but requires foresight and access to (and investment in) additional calves. Or, supplementation may be required to support higher gains by the calves.

Figure 1 illustrates relationships derived from research with stockers grazing bermudagrass (Guerrero et al, 1984). The researchers classified forage as low, medium or high quality. As expected, projected gains were greater as forage quality increased (except at very low forage availabilities). Regardless of forage quality, projected gain increased with increasing forage availability. But, note that the forage availability that promoted the highest projected weight gains varied with forage quality. As forage quality declined, higher forage availability was required to support higher weight gains. As a generality, weight gain is relatively less sensitive to forage availability when forage quality is high and vice versa.

Adjusting forage availability by adjusting stocking rates is the immediate means of managing adverse growing conditions. Conditions that limit forage production require lower stocking rates to ensure forage intake. When conditions lead to excessive accumulation of lower quality forage, reducing the stocking rate may support higher gains by allowing calves to graze more selectively.

**Supplemental feeding**

Supplemental feeding is a means of managing production risk when forage nutritive value is low or forage production is limited. Approaches vary depending on the issue at hand and range from supplying small amounts of a supplemental
feed to correct a key nutrient deficiency to feeding relatively large amounts to push performance beyond what the forage supply may allow. The former could involve minerals, protein and energy while the latter is focused on increasing energy consumption by calves. In either, evaluating cost and benefit (cost of added gain versus value of added gain) is an important part of the decision process.

**Low rates (lb/hd/day) of supplement** are used to supply specific nutrients such as protein or minerals that are deficient and may be retarding growth or forage intake and utilization.

With warm season grasses the protein concentration in the forage or the balance of protein and energy in the forage can be too low to support optimal microbial activity in the rumen. When this occurs, forage digestibility and forage intake will be lower than potential. This results in less energy being derived from the forage, less total energy being consumed daily, and less total energy and protein available for the calf. Feeding protein supplements can enhance digestibility and intake and increase performance.

With cool-season forages (small grains as an example) the opposite may be the case. Forage protein levels can be high relative to the energy density in the forage. In this case, supplying small amounts of energy-based supplement can enhance nutrient utilization from the forage.

In both of these cases, the increase in performance achieved with a low supplement intake (less than 0.4% body weight) is usually very efficient with supplement conversion rates (lbs of supplement/lb additional gain) ranging from 1:1 to 3:1. During periods when forage quality is seasonally low or on forages that have inherently low protein concentrations, this approach is usually a very economical means of enhancing weight gain.

**Moderate rates of supplement** are used to supply protein and energy to calves with the goal of maintaining forage intake and enhancing performance of the calf. In some cases, simply correcting a ruminal protein deficiency may not provide the performance boost that is desired. The approach is then to increase the intake of supplement while allowing the calves to continue fully utilizing the forage resources. Supplying adequate protein with increased energy intake is a key consideration to maintaining ruminal activity and forage intake. Focus is usually on supplements with moderate protein concentrations (20-30%). This approach to supplementation will usually result in supplement conversion rates in the 4:1 to 6:1 range. Because of the efficiency, attention to cost versus value of gain becomes more important than with the low-level programs.

**High rates of supplementation** are used in an attempt to push calf gains or maintain weight gains with limited forage supplies. The program focuses on supplying energy. Protein must be supplied but the levels in the supplements will be lower (9-18%). The daily feeding rates are relatively high (in excess of 0.75% of body weight). The conversion of the supplement to added gain per calf will be lower than in the aforementioned situations and can range from about 8:1 to infinity (no added gain per lb of supplement offered).

These programs reduce daily forage consumption or, put another way, reduce the need for a full daily allowance of forage. Oftentimes this is the reason these approaches are implemented. Forage accumulation and forage availability (lb/hd/day) are limited. In lieu of reducing stocking rates, supplements are fed to replace the forage that cannot be consumed by the calves. Or, the supplements are fed to intentionally reduce forage consumption and spread the limited forage supply into the future over more calves and more days.

Because of the relatively poor supplement conversion rates, attention to cost and return is even more imperative. On a per head basis, the conversion rates are often unattractive. However, in essence these approaches are used to support higher stocking rates than allowed by the forage supply. So rather than view efficiency on a per head basis it may be more appropriate to evaluate efficiency as a function of added gain per acre.
Summary
Adverse conditions can result in reduced forage nutritional value and/or reduced forage availability. Both of these limit weight gain by calves and hence affect profit potential. Developing forage systems and nutritional management programs to maintain higher nutrient intake and gains can help offset the adverse production environment.
“Can we produce an 850 lb stocker calf in Florida”? The easy answer to this question is yes. However, several additional questions need to considered:

- How do we do it?
- What are the best options?
- Is it cost effective?
- Are there better uses for the available forage resources?

Although numerous strategies can be utilized to put weight on stocker cattle, forage based programs generally provide the most cost effective source of gain. Consequently, this paper will focus on forage programs that require no or limited amounts of energy and protein supplementation.

Ownership Scenarios and Weight Gain

When thinking about producing stockers there are 3 basic ownership scenarios that might be considered:

- retained ownership of normal weaned calves (i.e. weaned at 6 to 8 months of age),
- retained ownership of early weaned calves (i.e. weaned at 2 to 3 months of age), and
- purchased stockers ranging in weight from 250 to 700 lbs.

Depending on which of these scenarios apply, the amount of weight gain needed to reach the goal of 850 lbs and the length of the stocker phase can be determined. Table 1 illustrates the amount of time it would take for the calf to gain 350 lbs given a range of average daily gains (ADG) from 1 to 3 lbs. When rate of gain is below 1.5 lbs/d it can take over seven months to add 350 lbs of gain. It is generally not practical to manage stockers for extended time with low rates of gain when interest, opportunity costs, and total cost of gain are considered.

When evaluating stocker programs nutrient requirements to achieve the desired ADG must be considered. Estimated requirements of total digestible nutrients (TDN), crude protein (CP), and calcium (Ca) for 500 to 800 lb Brangus-type steers are reported in Table 2. Nutrient requirements increase as ADG increases. Additionally, requirements are higher for a 500 lb calf gaining 2 lbs/d (65% TDN, 12.7% CP) as compared with an 800 yearling gaining 2 lbs/d (61% TDN, 9.5% CP). These differences must be considered when evaluating forage programs for stocker cattle.

The concept of the first limiting nutrient must also be considered when evaluating ADG potential of stockers. Simply stated this means that ADG will be limited to the level supported by the first limiting nutrient. In other words if the diet contains enough protein to support an ADG of 3 lbs/d, but only enough energy to support 2.5 lbs/d then the calf will only gain 2.5 lbs/d. Calcium is often the first limiting nutrient of stocker cattle grazing cool-season annual grasses. Florida researchers measured the mineral concentration of cool-season annual grasses in North Florida and reported that Ca concentration averaged 0.31% over the grazing season (Myer et al., 2009). As Table 2 illustrates, 0.31% Ca is not sufficient to support gains over 2.0 lbs/d. Consequently because of the high levels of TDN and CP and relatively low levels of Ca in cool-season annual grasses providing stockers with a complete mineral supplement can significantly improve ADG. Over a four-year period in Oklahoma, stockers grazing winter wheat and provided a mineral supplement gained 0.24 lbs/d more than stockers that did not receive a mineral supplement (Fieser et al., 2007).

Forage Options

Forage options for Florida stocker operations include warm-season perennials, warm-season annuals, and cool-season annuals; generally speaking there are no well-adapted cool-season perennials available in Florida (Chambliss et al.,...
When evaluating forage options ADG, gain/ac, grazing length, and the cost of gain must be considered.

**Warm-Season Perennial Grasses.** Generally speaking ADG of stockers grazing warm-season perennial grasses such as bahiagrass, hybrid bermudagrass (excluding Tifton 85), limpograss, stargrass, and digitigrass range from 0.75 to 1.25 lbs/d. Gains on stargrass are typically higher and gains on bahiagrass are generally the lowest of the forages mentioned. Given the low ADG of stockers grazing these forages they are generally better suited for cow-calf production than stocker operations.

Of the warm-season perennial grasses, Tifton 85 shows the most potential for use in stocker operations. Across three experiments at the Overton research center, gains of stocker cattle grazing Tifton 85 have ranged from 1.55 to 1.69 lb/d; gain/ac ranged from 465 to 551 lb/ac (Table 3).

**Warm-Season Annual Grasses.** Performance of cattle grazing warm-season annual grasses is typically superior to those grazing warm-season perennial grasses. Warm-season annuals that should be considered for stockers in Florida include: crabgrass, sorghum x sudangrass hybrids, sudangrass, and pearl millet. The grazing season of these annuals is typically 60 to 120 days with ADG of 1.5 to 2.75 lbs/d. Sorghum x sudangrass hybrids, sudangrass, and pearl millet should be planted on prepared seedbeds. Crabgrass can be planted on a prepared seedbed or broadcasted over a cool-season small grain that was planted in a prepared seedbed; if broadcasted, cattle should be used to walk the seed in while grazing out the cool-season annual. Of these annual grasses, crabgrass is the lowest yielding, but has the benefits of good reseeding potential.

Sorghum x sudangrass hybrids, sudangrass, and pearl millet have the potential to produce really large dry matter yields resulting in high stocking rates; however, these yields are usually not distributed evenly over the grazing season which can result in stocking rate challenges. Brown mid-rib (BMR) varieties of these species are commercially available and should be strongly considered. Lower lignin production and increased digestibility are typical of BMR varieties; this increase in digestibility leads to increased weight gains for cattle grazing BMR as compared with non-BMR near-isogenic varieties. Experiments in Amarillo with stockers grazing sorghum x sudangrass hybrids resulted in ADG of 2.94 lb/ds for stockers grazing the BMR variety compared with 2.62 lbs/d for stockers grazing the non-BMR near-isogenic variety (Banta et al., 2001). Numerous varieties of BMR sorghum x sudangrass are available with some of these varieties exhibiting a brachytic dwarf trait which results in shorter internodes and a greater leaf:stem ratio. To date all commercially available varieties of BMR sudangrass come from the Cal/West Seeds program in California; these varieties have only been available since 2007. There appears to be only one BMR variety of pearl millet available at this time; BMR 209 hybrid pearl millet is sold by Forage First Genetics.

**Cool-Season Annual Grasses.** Ryegrass and the small grains, wheat, oats, rye, and triticale have and will continue to play a major role in stocker operations. Stocker cattle grazing cool-season annuals in the Southeast will typically gain 1.75 to 2.75 lbs/d over a 80 to 120 day grazing season; gain/ac is generally between 300 and 600 lbs. Over a six-year period stocker cattle at the North Florida Research and Education Center located near Marianna gained about 2.3 lbs/d with an initial stocking rate of approximately 950 lbs/ac (initial stocking rate = stocking rate x initial animal weight; Table 4).

Cool-season annual grasses can be planted in a prepared seedbed or sod-seeded into bahia or bermudagrass. Prepared seedbed offers earlier grazing, more head-days/acre, and thus greater gain/acre as illustrated from the 4 years of data presented in Table 5 (Myer et al., 2005 and 2007).

**Grazing Considerations and Economics**

Grazing management is a key factor in determining the success of a stocker program. In order to optimize income, both ADG and gain/ac must be optimized through proper grazing.
management. As Figure 1 illustrates, ADG decreases as stocking rate (i.e. grazing pressure) increases. However, gain/ac increases as stocking rate increases until pastures become overgrazed at which time gain/ac starts to decrease. A good example of this concept is illustrated with steers that grazed rye and ryegrass pastures overseeded on bermudagrass at Overton (Table 6; Rouquette et al., 2000). The steers stocked at the lowest level had the highest ADG, whereas the steers that were stocked to heavy had the lowest ADG and produced the lowest gain/ac. There is a fine line between under grazing and over grazing and it is more economical to undergraze a little than to have pastures stocked to heavy.

While this concept sounds easy, proper grazing management can be challenging because forage production is not consistent over the grazing season especially in regards to annual grasses. Appropriate stocking rates of cool-season annual grasses can increase three fold from fall-winter grazing to spring grazing as illustrated by forage dry matter yield of cool-season annuals in Figure 2 (adapted from Myer et al., 2011). Consequently, producers should have a plan in place to deal with dramatic swings in forage production; that plan could involve using cows to graze excess forage, purchasing more stockers in the spring, purchase additional stockers in the fall and maintain them in a drylot until spring, cut hay, or make silage.

When weather conditions cooperate, grazing cool- or warm-season annual grasses can provide some of the lowest cost of gains in the industry. However, when budgets are developed it is important to realize that in some years weather conditions can result in low production or total failures of these systems and these bad years must figure into the budget.

Partial budgets that include only seed and fertilizer cost for the small grain rye are shown in Table 7. In this scenario, when only these two expenses are considered and the assumption is made that cattle will gain 1 lb for every 10 lbs of forage produced then cost of gain ranges from $20.54 to $24.75/cwt (in reality the amount of forage needed for 1 lb of weight gain will vary considerably depending on forage quality, cattle nutrient requirements, grazing utilization, etc.). In addition to seed and fertilizer costs, a budget should also include: health costs, death loss, equipment costs, land lease or opportunity costs, labor, interest, feed, and all other appropriate expenses.

References


Table 1. Days to gain 350 lbs

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Table 2. Estimated nutrient requirements of Brangus-type steers

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<th>% CP</th>
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1 All requirements are expressed on a dry-matter basis.
2 Estimated dietary requirements for Brangus type steer under typical production conditions (Beef Cattle NRC, 1996). These requirements will vary depending on numerous factors including body condition, health, breed, environmental factors, use of growth promotants, and others.
Table 3. Performance of stocker cattle grazing hybrid bermudagrass at Overton, TX

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<tr>
<th>Study</th>
<th>Forge Type</th>
<th>Grazing Length</th>
<th>Initial Weight, lb</th>
<th>Stocking Rate, hd/ac</th>
<th>ADG, lb</th>
<th>Gain/ac, lb</th>
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Study 1: Rouquette et al., 2002a  
Study 2: Grigsby et al., 1988  
Study 3: Rouquette et al., 2004  
Study 4: Rouquette et al., 2002b  
Study 5: Woods et al., 2004

Table 4. Performance of stocker cattle grazing cool-season annual grasses in Florida

<table>
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Study 1: Myer et al., 2005  
Study 2: Myer et al., 2007  
Study 3: Myer et al., 2011  
R = rye; O = oats, T = triticale, RG = ryegrass
Table 5. Performance of stocker cattle grazing cool-season annual grasses planted on prepared seedbed (PS) or sod-seeded (SS) into bahiagrass in Florida (Myer et al., 2005 and 2007)

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<tr>
<td>Gain/ac, lb</td>
<td>530&lt;sup&gt;a&lt;/sup&gt;</td>
<td>250&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>1</sup>Means within a row without a common superscript differ (<i>P</i> < 0.05).

<sup>2</sup>Means within a row without a common superscript differ (<i>P</i> < 0.05).

Table 6. Effect of stocking rate on performance of stockers grazing a mix of rye and ryegrass overseeded on bermudagrass at Overton (average of 2 years; Rouquette et al., 2000)

<table>
<thead>
<tr>
<th>Item</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stocking rate, hd/ac</td>
<td>1.6</td>
<td>2.2</td>
<td>2.8</td>
</tr>
<tr>
<td>Stocking rate, initial lbs/ac</td>
<td>960</td>
<td>1,320</td>
<td>1,680</td>
</tr>
<tr>
<td>ADG, lbs</td>
<td>2.95</td>
<td>2.12</td>
<td>0.96</td>
</tr>
<tr>
<td>Gain/ac, lbs</td>
<td>743</td>
<td>740</td>
<td>436</td>
</tr>
</tbody>
</table>

Table 7. Partial budgets for the small grain rye; only seed and fertilizer costs are included

<table>
<thead>
<tr>
<th>Forage Species</th>
<th>Rye (higher yield)</th>
<th>Rye (need P &amp; K)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seed, $/bag</td>
<td>$15.00</td>
<td>$15.00</td>
</tr>
<tr>
<td>Planting rate, lbs/ac</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Seed cost, $/ac</td>
<td>$30.00</td>
<td>$30.00</td>
</tr>
<tr>
<td>lbs of Nitrogen</td>
<td>125</td>
<td>175</td>
</tr>
<tr>
<td>Fertilizer (N only), $/ac</td>
<td>$81.25</td>
<td>$113.75</td>
</tr>
<tr>
<td>Fertilizer (P and K), $/ac</td>
<td>$0.00</td>
<td>$29.50</td>
</tr>
<tr>
<td>Total fertilizer, $/ac</td>
<td>$81.25</td>
<td>$143.25</td>
</tr>
<tr>
<td>Total cost, $/ac</td>
<td>$111.25</td>
<td>$173.25</td>
</tr>
<tr>
<td>DM yield, lbs</td>
<td>5,000</td>
<td>7,000</td>
</tr>
<tr>
<td>Forage cost, $/ton</td>
<td>$44.50</td>
<td>$49.50</td>
</tr>
<tr>
<td>Cost of gain, $/cwt&lt;sup&gt;1&lt;/sup&gt;</td>
<td>$22.25</td>
<td>$24.75</td>
</tr>
</tbody>
</table>

<sup>1</sup>Assumes 1 lb of gain for every 10 lbs of forage produced (in reality this will vary considerably depending on forage quality, cattle nutrient requirements, grazing utilization, etc.).
**Figure 1.** Effect of grazing pressure on ADG and gain/ac (as adapted by Hersom, 2011 from Mott and Moore, 1970)

**Figure 2.** Average pasture forage dry matter yield measured every 3 weeks during the grazing season (adapted from Myer et al., 2011)
Introduction
Stocker production is often touted as being a way for cattle producers to add value to their calf crop. It is also a way for other producers that have either excess high-quality forage or feedstuffs to add-value to those products by purchasing light-weight calves and adding weight (and value) to them before selling them at a later date.

However, because of the very nature of the stocker business it is inherently risky. Traditionally there have been few risk management tools available to cattle producers, especially stockers. However, in recent years, there has been a noticeable increase in the number of insurance products available to cattle and forage producers.

The objective of this paper and the accompanying presentation is to equip Florida and southeastern cattlemen with information and tools that will allow them to better manage their risk.

Stocker Production
For the purposes of this paper, stocker production is generally defined as the process of adding weight to calves in a forage-based system between the cow-calf phase and the feedyard. Typically, this involves purchasing light-weight calves (approximately 300-400 pounds) placing them in some type of forage system for six to nine months and then selling them at approximately 700-800 pounds.

Certainly, there are many systems and scenarios that are dictated by current market condition and weather concerns, but the main point is that stocker production is forage based while backgrounding is generally a shorter-term proposition where the animals receive most of their nutrition from concentrates with very little grazing. Even though this discussion focuses on stocker production, virtually all of the principles and tools presented here can also be applied to backgrounding cattle.

Risk and Management
Stocker (and all agricultural) producers face five general types of risk. The five types of risk are:
1. Price
2. Production
3. Financial
4. Legal
5. Human Resources

This presentation will center on managing Price and Production Risks. However, Financial, Legal and Human Resources Risks should not be overlooked.

Risk is not uncertainty
However, risk does involve uncertainty. In layman’s terms, risk is the likelihood that something bad will happen. In order to manage risk, cattlemen must know what determines "bad" and what has to happen in order for “bad” to occur.

For example, if projected sales prices drop for a group of stockers, that is not good. However, at some point a price decline will change from being an inconvenience or not what one had hoped for, to causing severe cash-flow and repayment problems (risk). This point is different for every operation.

To develop an effective risk-management program, stocker operators should perform the following steps:
1. Determine your goals,
2. Determine the potential risks (critical and not so critical) to those goals,
3. Develop and implement a risk management plan for the critical risk factors,
4. Develop and implement a risk management plan for the critical risk factors,
plan for the other factors, and
5. Reevaluate periodically.

The remainder of this presentation will focus on price and production risk-management tools that are currently available to stocker operators in Florida and Georgia.

Managing Price Risk
For stocker producers the primary price risk factors are the changing price margins on stockers and changing input prices. To manage margin risk, stocker operators can either lock-in purchase and/or sales prices, or set some type of ceiling price for purchasing or establishing a floor price for selling. Obviously, each of these involves knowing something about production, cost of gain and potential market prices.

Using Futures and Options to Set Prices
To “lock-in” a purchase or sales price, stocker operators can use either cash contracts or futures. Typically, there is very little use of forward cash contracts in the cattle business, although some parties may agree to utilize basis contracts.

Futures contracts are the most-straight-forward way to establish a firm purchase or sales price. A comprehensive discussion of futures and options is beyond the scope of this presentation. Stocker producers interested in more information about using futures and options can either contact their local UF/IFAS office or the author. There are a few highlights that should be mentioned:

- Feeder Cattle (FC) futures are for 50,000 pounds.
- If you want to “pre-buy” cattle using futures you would buy or “go long” at the time you want to set the price and then offset or take an opposite position when you actually purchase the calves.
- If you want to “pre-sell” cattle using futures you would sell or “go short” at the time you want to set the price and then offset or take an opposite position when you actually sell the calves.

Options give the holder of the option the right but not the obligation to sell or buy a futures contract at a pre-set price called a strike price. Options provide the benefit of having a price ceiling for buyers and price floor for sellers without being “locked” into price. They work then very much like price insurance.

A few highlights on options:
- FC options are also for 50,000 pounds
- If you want to set a price floor (sellers) you would purchase a put option.
- If you want to set a price ceiling (buyers) you would purchase a call option.

Livestock Risk Protection (LRP): A Price Risk Alternative to Futures and Options
For numerous reasons, many cattle producers choose not to utilize futures or options. Two of the most often cited reasons are lack of understanding and less than 50,000 pounds to market. While most stocker producers in Florida will be moving multiple truck-load lots, many may still not feel comfortable with using futures or options.

In recent years, a new product called Livestock Risk Protection or LRP has become available to cattlemen in many states including Florida and Georgia. In a nutshell, cattle owners purchase price insurance against falling prices. Indemnities are paid based on the CME Feeder Cattle Index. So, what cattlemen are doing is purchasing insurance on the CME Feeder Cattle index which is a very tractable solution as calf prices in Florida and the CME Index usually move in the same direction.

The principle advantages of LRP are that it can be purchased on as few as one head and it is bought through a local crop insurance agent. Excerpts for the RMA-LRP Feeder Cattle worksheet are presented below:

Coverage Availability for LRP
Cattle producers submit a one-time application for LRP-Feeder Cattle coverage. After the
application is accepted, specific coverage endorsements may be purchased for up to 1,000 head of feeder cattle that are expected to weigh up to 900 pounds at the end of the insurance period. The annual limit for LRP-Feeder Cattle is 2,000 head per producer for each crop year (July 1 to June 30). All insured calves and cattle must be located in a State approved for LRP-Feeder Cattle at the time insurance is purchased.

The length of insurance coverage available for each specific coverage endorsement is 13, 17, 21, 26, 30, 34, 39, 43, 47, or 52 weeks.

Coverage is available for the calves, steers, heifers, predominantly Brahman, and predominantly dairy cattle categories. Feeder cattle producers may also choose from two weight ranges: under 600 pounds and 600-900 pounds.

Coverage Levels, Prices, and Rates
Cattle producers may select coverage prices ranging from 70 to 100 percent of the expected ending value. At the end of the insurance period, if the actual ending value is below the coverage price, the producer will be paid an indemnity for the difference between the coverage price and actual ending value.

The LRP-Feeder Cattle program’s coverage prices, rates, actual ending values, and per hundredweight cost of insurance may be viewed on the Risk Management Agency’s Web site. Actual ending values are based on weighted average prices as reported in the Chicago Mercantile Exchange Group Feeder Cattle Index. Actual ending values will be posted on Risk Management Agency’s Web site at the end of the insurance period.

LRP Coverage levels and rates for April 11 are included at the end of this paper as well a USDA Fact Sheet on the program.

Seasonal Prices
In addition to using futures and options, producers can also utilize seasonal price patterns to manage their price risk, especially when it comes to purchasing inputs such as feed. Figures 1 and 2 below indicate some of the seasonal price indices for some popular protein and energy feed co-products in the region. Using this information, stocker producers can combine anticipated feeding needs and expected feed prices to make prudent feed purchasing decisions.

Managing Production Risk
There are numerous ways that stocker producers can manage their production risks. The most obvious way is to follow extension and university recommendations.

Since stocker production is forage-based it is inherently dependent on weather. While floods and cold weather can occasionally be a problem for southeastern stocker growers, the predominant weather risk is dry weather.

Until just recently, cattle producers who wanted to purchase insurance on forage production were essentially limited to NAP insurance and government disaster declarations. However, in the last couple of years USDA-RMA has approved Pasture, Range and Forage (PRF) insurance. With a PRF policy, producers purchase insurance on NOAA’s rainfall index at production levels of 70-90 percent of normal at coverage levels of 100-150 percent of the value of the crop. In Florida, there are two types of crops for which one can purchase insurance: grazing and hay.

An excerpt from RMA’s PRF Factsheet is given below.

The Rainfall Index uses National Oceanic and Atmospheric Administration Climate Prediction Center (NOAA CPC) data and each grid is 0.25 degrees in latitude by 0.25 degrees in longitude. You must select at least two, 2-month time periods where rain is important to your operation in your area. These time periods are called index intervals. Your insurance payments will be calculated using NOAA CPC data for the grid(s) and index interval(s) you have chosen to insure. When the final grid index falls below your “trigger grid index” (coverage level multiplied by the expected grid index), you may receive a loss payment. This insurance coverage is for a single peril—lack of rain. Coverage is
based on the experience of the entire grid. It is
NOT based on individual farms or ranches or
specific weather stations in the general area.

(You can find more detailed information at the
NOAA Web site:
http://www.cpc.ncep.noaa.gov/products/
outreach/research_papers/ncep_epc_atlas/7/
toc.html)

To provide an illustration of how a policy would
have fared in 2011, an Ex-Ante (after the fact)
analysis for the Gainesville, FL grid is included
below. It should be pointed out that the example
below is for pasture. Hay land values are much
higher. Interested producers are encouraged to
utilize the evaluation tools found at:
http://agforceusa.com/rma/ri/prf/maps
to conduct their own analyses.

Summary
There is a tremendous amount of risk involved
in stocker production. Producers are encouraged
to determine those items that pose the biggest
risk to their operation. They should then
develop plans and strategies to mitigate these
risks.

Additional Resources
- Current market information, budgets and
decision-aids: www.secattleadvisor.com
- USDA Risk Management Agency
  website: www.rma.usda.gov
- Rainfall and Vegetation Insurance:
  http://www.rma.usda.gov/policies/ri-vi/
- Livestock Risk Protection (LRP):
  http://www.rma.usda.gov/livestock/
Figure 1. Seasonal indices for Whole Cottonseed (WCS), Soybean Hulls (SBH) and Corn

Figure 2. Seasonal indices for Corn Gluten Feed (CGF), Whole Cottonseed (WCS) and Soybean Meal (SBM)
<table>
<thead>
<tr>
<th>Index Interval</th>
<th>Insured Acres per Index Interval</th>
<th>Policy Protection per Unit</th>
<th>Premium Rate per $100</th>
<th>Total Premium ($/acre)</th>
<th>Premium Subsidy ($/acre)</th>
<th>Producer Premium ($/acre)</th>
<th>Actual Index Value</th>
<th>Indemnity ($/acre)</th>
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<td>17.94</td>
<td>$2.34</td>
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<td>$1.15</td>
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<td>18.08</td>
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<td>$1.16</td>
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<td>Apr-May</td>
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<td>May-Jun</td>
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<td>10.59</td>
<td>$1.38</td>
<td>$0.70</td>
<td>$0.68</td>
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<td>Jul-Aug</td>
<td>20</td>
<td>$261</td>
<td>5.61</td>
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<td>Sep-Oct</td>
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<td>$9</td>
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<td>Oct-Nov</td>
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<tr>
<td>Nov-Dec</td>
<td>20</td>
<td>$261</td>
<td>21.16</td>
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<td>Per Acre</td>
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<td>$1.92</td>
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<td>$94</td>
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<td>$215</td>
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</tbody>
</table>

Count Base Value per Acre: $14.49
Dollar Amount of Protection per Acre: $13.04
Total Insured Acres: 100
Total Policy Protection: $1,304
Subsidy Level: 51%
Maximum % of Insured Acres per Index Interval: 50.0%
The Risk Management Agency has modified the Pasture, Rangeland, Forage Pilot Insurance Program, which uses two separate Basic Provisions; the Rainfall Index Basic Provisions and the Vegetation Index Basic Provisions. Basic provisions are the terms and conditions included in all policies under these plans. These innovative pilot programs are based on vegetation greenness and rainfall indices, and are designed to give forage and livestock producers the ability to buy insurance protection for losses of forage produced for grazing or harvested for hay.

The original Pasture, Rangeland, Forage Program was designed as a risk management tool for the 588 million acres of pastureland and the 61.5 million acres of hayland in the United States. In 2007, Pasture, Rangeland, Forage insurance was available for testing in selected States. The program has been expanded and revised for the 2009 crop year. The Risk Management Agency has replaced its Group Risk Plan Basic Provisions with the Rainfall Index and Vegetation Index Basic Provisions. The new basic provisions will be applied to all Pasture, Rangeland, Forage crop policies.

The Pasture, Rangeland, Forage Pilot Insurance Programs are only available in selected States and counties. To test each index in various climates, soils, and weather conditions, these pilot programs are available in six regions across the country: the warm and humid Southeast, the cool and humid Northeast, the Northern Great Plains, the Southern Great Plains, the semi-arid Southwest, and the intermountain region of the Northwest. You can see the States and counties where the Rainfall Index and the Vegetation Index pilot programs are available at: http://www.rma.usda.gov/policies/pasturerrangeforage/2011availabilitymap.pdf

The Rainfall Index uses National Oceanic and Atmospheric Administration Climate Prediction Center (NOAA CPC) data and each grid is 0.25 degrees in latitude by 0.25 degrees in longitude. You must select at least two, 2-month time periods where rain is important to your operation in your area. These time periods are called index intervals. Your insurance payments will be calculated using NOAA CPC data for the grid(s) and index interval(s) you have chosen to insure. When the final grid index falls below your “trigger grid index” (coverage level multiplied by the expected grid index), you may receive a loss payment. This insurance coverage is for a single peril—lack of rain. Coverage is based on the experience of the entire grid. It is NOT based on individual farms or ranches or specific weather stations in the general area. (You can find more detailed information at the NOAA Web site: http://www.cpc.ncep.noaa.gov/products/outreach/research_papers/ncep_cpc_atlas/7/toc.html)

The Vegetation Index uses data from the U.S. Geological Survey Earth Resources Observation and Science data center called the Normalized Difference Vegetation Index (NDVI). The NDVI is a measure of vegetation greenness and is used to estimate plant condition in approximately 4.8 x 4.8 mile grids. This index is not a direct measure of your production. It is a measure of all vegetation in a grid. In general, the healthier the plants in a given grid, the higher the NDVI value will be. With this insurance plan, you may select one or more 3-month time periods that represent your pasture, rangeland, or forage practices. These time periods are called index intervals. Coverage is based on losses within the 4.8 x 4.8 mile grid rather than on an individual producer's losses. Losses for the Vegetation Index are paid based on the difference between the normal NDVI data (expected grid index) and the actual grid index experience during the index interval(s) you have chosen to insure. When the final grid index falls below your “trigger grid index” (coverage level times the expected grid index), you may receive a loss payment.

The process of developing these products included determining the value of forage for

Risk Management Agency
Pasture, Rangeland, Forage/PA-1896
grazing and haying for each county in the program. RMA and its partner used USDA Farm Service Agency Grassland Reserve Program prices for grazing land, USDA National Agricultural Statistics Service State hayland rates, U.S. Geological Survey landcover estimates, and regional forage and hayland values determined by experts to establish a county base value for each location.

While developing these new insurance products, the Risk Management Agency considered public land versus private land, warm- and cool-season plants, different grazing patterns, and various forage species representing a wide range of relative feed values.

Pasture, Rangeland, Forage insurance was designed for maximum flexibility. You are not required to insure all your acres, but you cannot exceed the total number of grazing or haying acres you operate. This allows you to insure only those acres that are important to your grazing program or hay operation. By selecting a Protection Factor, you can establish a value between 60 and 150 percent of the County Base Value and match the amount of your protection to the value of forage that best represents your specific grazing or hay operation, as well as the productivity of your land.

You will be asked to make several choices when insuring your grazing or hay production, including coverage level, index intervals, protection factor, and number of acres. You should work with your crop insurance agent to view the Grid ID Locator map and index grids for your area, and assign acreage to one or more grids based on the location and use of the acreage to be insured. **The Vegetation and Rainfall indices do not measure your direct production or loss.** You are insuring a rainfall or vegetation index that is expected to estimate your production. **Please review the historical indices for your area to make sure that this product will be helpful to you.**

The Pasture, Rangeland, Forage Rainfall Index and Vegetation Index pilot programs are being tested in select counties and States. You can view a map and a list of the counties and States where each index is available at: [http://www.rma.usda.gov/policies/pasturerangeforage](http://www.rma.usda.gov/policies/pasturerangeforage).

Please visit your crop insurance agent for more information. If you do not have an agent, you can find one online using the RMA agent locator at: [http://www.rma.usda.gov/tools/agent.html](http://www.rma.usda.gov/tools/agent.html) or at any USDA Service Center.

**Contact Us**

**USDA/RMA**

**Mail Stop 0801**

**1400 Independence Ave., SW**

**Washington, DC 20250-0801**

**Web site:** [http://www.rma.usda.gov](http://www.rma.usda.gov)

**E-mail:** rma.cco@rma.usda.gov

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<th>Commodity</th>
<th>Type</th>
<th>Practice</th>
<th>Crop Year</th>
<th>Exp. End Value</th>
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<th>Rate</th>
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USDA subsidizes 13 percent of total LRP premium

4/13/2012 9:58:47 AM
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Notes:
- Some endorsement lengths may not be available due to insufficient pricing or rating information.
- For LRP Fed Cattle, Feeder Cattle and Swine, sales open from the time sales data is available (approximately 3:30 P.M. central time) until 9 A.M. central time the next day.
- For Lamb, sales available MONDAY ONLY. Sales open from the time of official release of coverage prices and rates on Monday morning (approximately 10 A.M. central time) until 7 P.M. central time Monday.
- For Lamb, preliminary coverage prices and rates may be available for viewing Friday evening and over the weekend but are subject to change at the official release time on Monday. Coverage prices and rates may also be available for viewing following sales during the week.
- Purchase of LRP must be made through an authorized livestock insurance agent.
- For LRP Fed Cattle, Feeder Cattle, and Swine, coverage levels and rates shown are available only on the selected effective date until 9 a.m. the following day.
- For LRP Lamb, coverage levels and rates shown are available only on the selected effective date until 7 p.m.
- For the Formatted Print option, Adobe Acrobat is required. For unformatted printing, use the File->Print option from your browser menu.
- Use landscape mode when doing unformatted printing for best results.
General Background
Livestock Risk Protection (LRP)-Feeder Cattle is designed to insure against declining market prices. Cattle producers may select from a variety of coverage levels and insurance periods that match the time their feeder cattle would normally be marketed (ownership may be retained).

LRP-Feeder Cattle insurance may be purchased throughout the year from approved livestock insurance agents. Premium rates, coverage prices, and actual ending values are posted online daily.

Coverage Availability
Cattle producers submit a one-time application for LRP-Feeder Cattle coverage. After the application is accepted, specific coverage endorsements may be purchased for up to 1,000 head of feeder cattle that are expected to weigh up to 900 pounds at the end of the insurance period. The annual limit for LRP-Feeder Cattle is 2,000 head per producer for each crop year (July 1 to June 30). All insured calves and cattle must be located in a State approved for LRP-Feeder Cattle at the time insurance is purchased.

The length of insurance coverage available for each specific coverage endorsement is 13, 17, 21, 26, 30, 34, 39, 43, 47, or 52 weeks.

Coverage is available for the calves, steers, heifers, predominantly Brahman, and predominantly dairy cattle categories. Feeder cattle producers may also choose from two weight ranges: under 600 pounds and 600-900 pounds.

LRP-Feeder Cattle insurance is available to producers with feeder cattle in the following 37 States: Alabama, Arizona, Arkansas, California, Colorado, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Mexico, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Washington, West Virginia, Wisconsin, and Wyoming.

Coverage Levels, Prices, and Rates
Cattle producers may select coverage prices ranging from 70 to 100 percent of the expected ending value. At the end of the insurance period, if the actual ending value is below the coverage price, the producer will be paid an indemnity for the difference between the coverage price and actual ending value.

The LRP-Feeder Cattle program’s coverage prices, rates, actual ending values, and per hundredweight cost of insurance may be viewed on the Risk Management Agency’s Web site. Actual ending values are based on weighted average prices as reported in the Chicago Mercantile Exchange Group Feeder Cattle Index. Actual ending values will be posted on Risk Management Agency’s Web site at the end of the insurance period.
About the Application Process
LRP-Feeder Cattle insurance must be purchased through a livestock insurance agent. An application can be filled out at any time; however, insurance does not attach until a specific coverage endorsement is purchased. Coverage will not attach unless the premium is paid on the day coverage is purchased. Multiple specific coverage endorsements may be purchased with one application. Insurance coverage starts the day a specific coverage endorsement is purchased and the purchase is approved by Risk Management Agency. There are funding limitations for all livestock programs; therefore, Risk Management Agency tracks total policy sales against available underwriting capacity using a real-time, Web-based program. Sales will cease when underwriting capacity is reached.

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Strategies for Beef Cattle Winter Feeding in the Southeast
Nicolas DiLorenzo, Ph.D.¹

¹North Florida Research and Education Center, University of Florida, Marianna, FL

Introduction
The profitability of beef production is as many other production systems, a function of a balance between inputs and outputs. Outputs can be more easily defined than inputs and can be simplified as pounds of beef sold in one way or another: carcass, replacement heifers, yearlings, weaned calves. However, inputs can be more challenging to define and vary greatly with different production systems. In addition, inputs can be present in forms that make it very complicated to put a dollar value to, such as labor cost (especially when we consider our own time, which is often not accounted for!), fertilizer savings due to grazing, and opportunity cost among others. Questions such as: “Should I sell now or should I background them for a while waiting for better prices?” or “Should I precondition my calves this year?” always carry hidden an opportunity cost that is often left out of the equation when making important decisions in beef production.

In the current scenario of volatility in fuel, grain, and fertilizer prices, it is not surprising that the focus of the beef industry has been turning to the inputs side of the equation. Several strategies have been developed to attempt to mitigate the ever raising costs of production and we may be experiencing a shift in paradigms in the beef industry. The developments of feeding strategies that rely on a more efficient use of forages or the increased use of forage varieties that produce well under drought conditions or under reduced soil fertility is proof of that change in paradigms. Perhaps the more recent signal of concerns regarding increasing input costs is the increased interest in the potential for selecting animals based on their residual feed intake (Koch et al., 1963; Herd et al., 2003 and 2009).

Cattle producers know that feed costs represent a major portion of the total costs in a livestock operation, however the exact proportion of the total costs that feed is responsible for varies with the production system and geographic location. Depending on forage availability and the duration and severity of the winter, the feed cost of maintaining a cow in the herd can range from $120/year in south Florida to $290/year in North Dakota (Hughes, 2011). The total operating cost of maintaining a cow in the herd (including labor, fuel, interest, etc.) plus all other direct costs excluding feed is less variable and was an average of $175/year for 2010 (Hughes, 2011). Considering that figure ($175/year) as the average for all direct costs minus feed, the annual feed cost of maintaining a cow in the herd can represent 41%–62% of the total costs on a yearly basis, depending on location and other factors. In the finishing segment of the beef industry, the proportion of feed costs to total costs of production is even greater because nutrient-dense diets cost more than the diets used in stockers or cow/calf operations.

In the Southeastern U.S. some advantages exists in terms of climate and forage availability when compared with production schemes in the Midwest or Western U.S. Despite those advantages, feeding a cow through the winter in the Southeast continues to be the most costly event in a cow/calf operation because of the simple reason that production systems in this area rely heavily on tropical and subtropical grasses and forage production of these pastures declines greatly during the winter. A further challenge exists when defining Southeast conditions because differences exist in production systems both between and even within states. A classic example of this is the difference that exists in management of winter feeding between North and South Florida. North Florida beef producers can benefit from a relatively longer duration of cooler winter temperatures that can justify planting annual
winter forages such as rye, oats, ryegrass or triticale. In contrast the relatively short duration of the winter in South Florida often leads producers to rely more in stockpiling options due to the increasing cost of planting an acre of annual winter pastures.

The relative abundance of certain byproducts in different regions of the Southeast also plays a role in planning winter feeding strategies. The availability of byproducts from the citrus and sugarcane industry in the south can provide unique pricing opportunities for inclusion in beef cattle diets. The increased use of distillers grains in Central and North Florida or peanut and cotton byproducts in the panhandle of Florida are a result of a relatively abundant supply of those commodities. Regardless of geographic location, a common theme in winter feeding strategies in the Southeast is the use of large quantities of forage reserves in the form of hay, haylage, or stockpiling.

The objective of this paper is to review the options for winter feeding in the southeastern U.S. highlighting the challenges and opportunities that each system provides.

**Winter grazing options**

Despite the continued increased in fertilizer prices, planting of winter annuals continues to be a very appealing strategy for winter feeding. Perhaps the greatest single factor behind the decision of winter grazing vs. hay feeding (often along with supplement feeding) is labor. Finding qualified labor to work in animal agriculture continues to be one of the top challenges of our industries and as a result, decisions that involve savings in labor and becoming more and more important. Winter grazing can be a great complement of row crops if irrigation is available, and the beneficial effects of rotating cattle with annual crops have been well documented and continue to be researched (Katsvairo et al., 2006). However, while the planting of winter annuals in dryland can represent a significant risk as it leaves any grazing potential at the mercy of the weather, there are options for winter grazing such as triticale and rye that are more drought tolerant than oats or ryegrass. Figure 1 shows the yield of dry matter (DM) of different winter forages grown in dryland conditions.

Because of the initial investment that winter grazing requires, grazing management to maximize pasture production and quality becomes essential. Overgrazing should be avoided by allowing sufficient herbage mass before each grazing event and by removing cattle from the pasture as needed to allow regrowth. Herbage allowance is the amount of forage than a pasture offers at a given time and it is typically measured as lb of forage DM per lb of cattle body weight (BW). Sollenberger and Moore (1997) recommended a minimum herbage allowance of 1 lb of forage DM per lb of BW to avoid limiting animal performance when grazing is the sole feed source. This figure can be used to calculate the necessary stocking rate and to decide when to pull animals from the pasture.

The use of rotational grazing as a means to increase the efficiency of pasture utilization has been extensively documented; however, its benefits have to be weighed against the increased labor needed. The advantage of rotational grazing is that by grazing paddocks with a high stocking density for a short period (can vary from 3 to 28 days) there is less selection and trampling. In addition cattle rotational grazing constantly consume the pasture regrowth which has typically much greater nutrient quality than more lignified portions of the forage.

**Stockpiling**

Stockpiling can be an alternative to reduce input costs and maximize forage utilization. Forages with desirable characteristics for stockpiling are those in which the rate of quality decline as maturity approaches is slower. Some of the best forages for stockpiling in the Southeast are tall fescue and limpograss, however little fescue is used in Florida beef cattle systems. Limpograss is the stockpiled forage of choice, especially in South Florida because of its excellent productivity and because it contains greater total digestible nutrients (TDN) concentration than other warm-season grasses at late maturity during the fall and winter (Vendramini and
Forage digestibility and crude protein concentrations can be around 48% and 4.8%, respectively, for a limpograss pasture stockpiled to graze in November (Sollenberger et al., 1988). While this may not be sufficient to support high levels of productivity, especially in terms of protein nutrition, those values represent a slight decline from the nutrient content of the limpograss if grazed in July.

Winter grazing vs. hay and supplement: Results of a NFREC study

A constant dilemma that beef producers face every year is whether to plant winter forages or use any other feeding strategy that relies on supplementation of hay or grain byproducts. In order to determine the effects of different winter feeding strategies on beef cattle performance and winter feeding economics, a study was conducted at the North Florida Research and Education Center during November of 2010 and April of 2011.

A total of 48 crossbred heifers (weighing on average 734 ± 34 lb) and 12 dormant bahiagrass pastures (3 acres each) were used in the study and each pasture contained a total of 4 heifers for a total of 4 pastures per treatment. Experimental treatments were:

1. **SUP** = Heifers received ad libitum access to bahiagrass hay plus a supplement of 50:50 mixture of soybean hulls:corn gluten feed pellets fed 3 times/week at a rate of 1% of their body weight/day

2. **T+RG** = Heifers continuously grazed a pasture planted with 85 lb/acre of Trical 342 triticale + 15 lb/acre of ryegrass (cv. Diamond R).

3. **R+RG** = Heifers continuously grazed a pasture planted with 70 lb/acre of FL401 rye + 15 lb/acre of ryegrass (cv. Diamond R).

All winter grazing pastures were planted on November 9 and 10, 2010 directly into a dormant bahiagrass sod using a no-till planter. All winter grazing pastures were fertilized on December 2, 2010 with 50 lb/acre of N (NH₄NO₃) and 10 lb/acre of S. Cattle started grazing on January 26, 2011 (d 0 of the study) after obtaining an initial shrunk body weight, when pastures reached 8 to 10 inches in height, and the study ended on April 20, 2011 (d 84 of the study). Cattle were individually weighed every 28 days after a minimum of 16 h fast (no feed/pasture or water) and at this time blood samples were taken to be analyzed for blood urea nitrogen (BUN) to provide an idea of the protein nutrition of the heifers.

Cattle average daily weight gain (ADG) was computed both for each 28-day weight interval and cumulative from d 0 to each weight date. Every 28-day, when heifers were weighed forage samples were obtained from each pasture by grass clippings inside and outside of exclusion cages (total of 3 per pasture). All exclusion cages were rotated to different places in the pasture every 28 day after samples were taken. In addition, one hand-pluck sample per pasture was taken in each 28-day period to be analyzed for nutritive value.

For the economic analysis of cost of gain, all variables were considered including cost of supplements, labor cost of feeding, seed, fertilizer, fuel cost of supplement deliveries, hay, etc.

The results of the study are shown in Tables 2 and 3, and Figures 1 and 2.

In terms of cost of gain, triticale + ryegrass showed a significant advantage over the other treatment options, with a total cost of gain of $1.06 per lb of BW gained. This was largely due to the high ADG rates observed with triticale (Table 3 and Fig. 1) when compared with the other treatments. Supplementing heifers with 1% of their BW three times per week with a 50:50 mix of soy hulls and corn gluten feed pellets led to rates of weight gain in the order of 1.2 lb/day. This was not sufficient to dilute the high costs associated with feed purchase and delivery as well as hay feeding costs. Because of the poor weight gains in the heifers grazing rye + ryegrass, this treatment showed the highest total cost of gain ($1.99/lb).
Conclusions
The cost of winter feeding continues to be the largest single cost in a beef cattle operation. Price volatility in grain byproducts, fertilizer and fuel has shifted the paradigm of production to place more emphasis on the inputs costs of an operation. Stockpiling of forages such as limpograss can be an excellent alternative for cattle operations in the southeast, especially in South Florida. Developments in terms of forage varieties have provided cattle producers with more options for winter forages and blends of species to be able to produce enough quality and quantity of forage to support high rates of weight gain. Grazing a blend of triticale and ryegrass was shown to be a promising strategy to reduce the cost of winter feeding.

Literature Cited


Table 1. Yield of forage for different winter annual pastures in Southeastern U.S.

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<td>Oat</td>
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1. Average of plot trials conducted in Georgia, Florida and Alabama.
2. Replicated small plot trial conducted in North Florida in 2008.

Table 2. Herbage mass accumulation rate and total herbage mass produced during an 84-day winter feeding study conducted at NFREC.

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<td>d 84</td>
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Total herbage mass produced during the study, lb of DM/acre:

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a,b,c Row means with different superscripts differ, P < 0.05.
1. No day effect (P = 0.34), treatment effect (P = 0.14), or day × treatment interaction (P = 0.99).
2. 85 lb/acre of Trical 342 triticale + 15 lb/acre of ryegrass (cv. Diamond R).
3. 70 lb/acre of FL401 rye + 15 lb/acre of ryegrass (cv. Diamond R).
Table 3. Cumulative data of beef cattle performance under different winter feeding strategies in a study conducted at NFREC.

<table>
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<td>Final body weight, lb</td>
<td>869</td>
<td>809</td>
<td>832</td>
<td>33.8</td>
</tr>
<tr>
<td>Average daily gain, lb</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d 0 to 28</td>
<td>0.78</td>
<td>0.73</td>
<td>0.99</td>
<td>0.265</td>
</tr>
<tr>
<td>d 0 to 56</td>
<td>1.16</td>
<td>0.75</td>
<td>0.99</td>
<td>0.194</td>
</tr>
<tr>
<td>d 0 to end</td>
<td>1.57(^c)</td>
<td>0.88(^a)</td>
<td>1.18(^b)</td>
<td>0.181</td>
</tr>
</tbody>
</table>

\(^{a,b,c}\)Row means with different superscripts differ, \(P < 0.05\).

\(^1\)85 lb/acre of Trical 342 triticale + 15 lb/acre of ryegrass (cv. Diamond R).

\(^2\)70 lb/acre of FL401 rye + 15 lb/acre of ryegrass (cv. Diamond R).

\(^3\)Heifers in the supplemented control treatment received a supplement of a 50:50 mixture of corn gluten feed:soybean hulls 1% of their body weight daily and ad libitum access to bahiagrass hay.

\(^4\)Pooled standard error of treatment means, \(n = 4\) pastures/treatment.

Figure 1. Partial average daily gain (ADG) of heifers throughout the study, under different winter feeding strategies. Treatment x day interaction observed \((P = 0.003)\). T+RG = heifers grazing a pasture planted with 85 lb/acre of Trical 342 triticale + 15 lb/acre of ryegrass (cv. Diamond R); R+RG = 70 lb/acre of FL401 rye + 15 lb/acre of ryegrass (cv. Diamond R); SUP = Heifers supplemented with a 50:50 mixture of corn gluten feed:soybean hulls at 1% of their body weight daily and with ad libitum access to bahiagrass hay.
Figure 2. Total cost of gain ($/lb of BW gained) under different winter feeding strategies in an 84-day study conducted at NFREC during Nov-April of 2010-11 in yearling heifers (average initial weight = 734 lb). Means without common superscript differ ($P < 0.05$).
Introduction
The maternal system can be influenced by many different extrinsic factors, including nutritional status, which can program nutrient partitioning and ultimately growth, development and function of the major fetal organ systems (Wallace, 1948; Wallace et al., 1999; Godfrey and Barker, 2000; Wu et al., 2006). The trajectory of prenatal growth is sensitive to direct and indirect effects of maternal environment, particularly during early stages of embryonic life (Robinson et al., 1995), the time when placental growth is exponential. Understanding the impacts of the maternal environment on placental growth and development is especially relevant as the majority of mammalian livestock spend 35-40% of their life within the uterus, being nourished solely by the placenta. Moreover, pre-term delivery and fetal growth restriction are associated with greater risk of neonatal mortality and morbidity in livestock and humans. Offspring born at an above average weight have an increased chance of survival compared with those born at a below average weight in all domestic livestock species, including the cow, ewe, and sow. Just as growth restricted human infants are at risk of immediate postnatal complications and diseases later in life (Barker et al., 1993; Godfrey and Barker, 2000), there is increasing evidence that production characteristics in our domestic livestock may also be impacted by maternal diet (Wu et al., 2006). Some of the complications reported in livestock include increased neonatal morbidities and mortalities (Hammer et al., 2011), intestinal and respiratory dysfunctions, slow postnatal growth, increased fat deposition, differing muscle fiber diameters and reduced meat quality (reviewed in Wu et al., 2006).

The objective of this proceedings paper is to highlight some of our laboratories investigations on how maternal environment can impact fetal and placental development, impacts on uterine and/or umbilical blood flow in cattle and sheep, and potential timing of intervention, or potential therapeutics, that may increase uteroplacental blood flow.

Placental vascular development
The placenta plays a major role in the regulation of fetal growth. In ruminants, the fetal placenta attaches to discrete sites on the uterine wall called caruncles. These caruncles are aglandular sites which appear as knobs along the uterine luminal surface of non-pregnant animals, and are arranged in two dorsal and two ventral rows throughout the length of the uterine horns (Ford, 1999). The placental membranes attach at these sites via chorionic villi in areas termed cotyledons. The caruncular-cotyledonary unit is called a placentome and is the primary functional area of physiological exchanges between mother and fetus. In the ewe, the growth of the cotyledonary mass is exponential during the first 70 to 80 days of pregnancy, thereafter slowing markedly until term (Stegeman, 1974). In the cow, the cotyledonary growth progressively increases throughout gestation (Reynolds et al., 1990; Vonnahme et al., 2007). Using the same vascularity determination techniques, capillary area density (CAD; a flow-related measure), capillary number density (CND, an angiogenesis-related measure), capillary surface density (CSD, a nutrient exchange-related measure), and capillary size were determined in the sheep and cow. In sheep caruncular tissue, CAD, CND, CSD, and capillary size increased 214, 37, 140, and 45% from d 50 to 140 in normal pregnancy (gestation length of sheep = ~147 days; Reynolds et al., 2005; Borowicz et al., 2007). In the ovine cotyledon, CAD, CND, CSD increased 437, 1,093, and 576%, and capillary size decreased 25% from d 50 to d 140 in normal pregnancy.

In cows, caruncular CAD and capillary size
decreased by 30 and 68%, whereas CND and CSD increased 151 and 32% from d 125 to 250 of gestation in control animals (gestation length in cattle ~280 d; Vonnahme et al., 2007). Furthermore, cotyledonary CAD, CND, CSD, and capillary size increased by 186, 80, 172, and 71% from d 125 to 250 of gestation, respectively. Thus, the pattern of placental angiogenesis (particularly in the maternal tissue) appears to differ between the cow and sheep.

Placental nutrient transport efficiency is directly related to uteroplacental blood flow (Reynolds and Redner, 1995). All of the respiratory gases, nutrients, and wastes that are exchanged between the maternal and fetal systems are transported via the uteroplacenta (Reynolds and Redner, 1995, 2001). Thus, it is not surprising that fetal growth restriction in a number of experimental paradigms is highly correlated with reduced uteroplacental growth and development (Reynolds and Redner, 1995, 2001). Establishment of functional fetal and uteroplacental circulations is one of the earliest events during embryonic/placental development (Patten, 1964; Ramsey, 1982). It has been shown that large increase in transplacental exchange, which supports the exponential increase in fetal growth during the last half of gestation, depends primarily on the dramatic growth of the uteroplacental vascular beds during the first half of pregnancy (Meschia, 1983; Reynolds and Redner, 1995). Therefore, an understanding of factors that impact uteroplacental blood flow will directly impact placental function and thus fetal growth.

**Nutritional impacts on placental function**

Reports of changes in placental vascularity in response to realimentation of nutrient restricted ewes and cows are very limited. In cows nutrient restricted from d 30 to 125 of gestation, there was a decrease in total placentome weight on day 125 versus control cows. This suppression in total placentome weight was still observable even after realimentation until day 250 (Zhu et al., 2007; Vonnahme et al., 2007). Looking more closely at placentome weight in the cow, both the cotyledonary and caruncular portions were decreased in nutrient restricted versus control cows at the end of the nutrient restriction (day 125), however, only the weight of the cotyledonary tissue remained suppressed at d 250. In contrast, several sheep models of maternal nutrient restriction from early to mid-pregnancy followed by realimentation showed significant compensatory growth of the entire placentome (Foote et al., 1958; Robinson et al., 1995; Heasman et al., 1998; McMullen et al., 2005). The differences in the impacts of nutrient restriction and realimentation in the cow (Vonnahme et al., 2007) and the sheep models described above may result from inherent species differences in placental development between sheep and cattle, the duration or intensity of the restriction, or the duration or intensity of the realimentation.

While maternal nutrient delivery during pregnancy has been shown to program the growth and development of the fetus, both during pregnancy and later into adult life, it appears that maternal nutrition also programs the development of the placenta. In the cow, realimentation after ~90 days of nutrient restriction is the stimulus not only for altering placental vascularity and development but also placental function (Vonnahme et al., 2004a,b). The ability to impact the plasticity of the placenta by dietary, or other managerial means, has caused our laboratory to focus on how modulating placental function can impact fetal and postnatal growth and development.

**Uterine and umbilical blood flows**

Adequate uteroplacental blood flow is critical for normal fetal growth, and therefore, not surprisingly, experimental conditions designed to investigate fetal growth retardation and placental insufficiency, be it overnutrition, nutrient restriction, hyperthermia, or high altitude, commonly share reduced uterine and umbilical blood flows (for review see Reynolds et al., 2006). Therefore, modifying uterine blood flow and nutrient transfer capacity in the placenta allows for increased delivery of oxygen and nutrients to the exponentially growing fetus. Fowden et al. (2006) reviewed key factors affecting placental nutrient transfer capacity, which were size, nutrient transporter abundance, nutrient synthesis and metabolism, and hormone synthesis and metabolism. Discovery of novel
therapeutic agents that improve placental function would decrease the incidence of morbidity and mortality as well as suboptimal offspring growth performance in livestock species.

Therapeutic agents targeting placental blood flow increased fetal growth in compromised pregnancies (Reynolds et al., 2006). For example, supplementing arginine, the precursor for nitric oxide production (an important regulator of blood flow), increased birth weights in compromised pregnancies (Vosatka et al., 1998). Kwon et al. (2004) nutrient restricted ewes from day 28 to 135 of gestation and reported lowered amino acids and polyamines in maternal and fetal plasma as well as fetal allantoic and amniotic fluids at both mid and late gestation. There is an ever-increasing wealth of data that are demonstrating how realimentation, or other therapeutic agents, may be used to rescue at-risk pregnancies. In our laboratory, we have investigated the role that realimentation, protein supplementation, melatonin supplementation, and maternal activity has on uteroplacental blood flow and/or vascular reactivity of the placental arteries. In order to perform the former, we have employed the use of Doppler ultrasonography. Other methods of determining blood flow are very invasive and require increased numbers of animals to determine blood flow at different time points during pregnancy. While these are effective, they are also labor intensive and time consuming resulting in decreased animals monitored throughout a study. By continuously monitoring the same animal, which has not undergone surgical manipulation, we feel that we can effectively determine how different interventions may regulate uteroplacental blood flow. Our current animal models are outlined below.

**Nutrient Restriction**

In normal pregnancies, resistance of the uteroplacental arteries have been documented to decrease as gestation advances. Our laboratory has reported that when pregnant ewe lambs are nutrient restricted, lamb birth weight is reduced compared to control fed animals (Swanson et al., 2008; Meyer et al., 2010). Moreover, we have demonstrated that when ewes are restricted, there is ~33% decrease in endothelial nitric oxide synthase mRNA expression on d 130 of gestation in the maternal portion of the placenta compared to control-fed animals (Lekatz et al., 2010a). We hypothesized that this reduction in birth weight was due to a greater placental vascular resistance in restricted ewes compared to control ewes. In order to evaluate the effects of maternal nutrition on the percentage change in pulsatility and resistance indices (PI and RI, respectively) pregnant ewes receiving either 100% of NRC recommendations, or 60% of the controls were fed to individually housed ewes once daily from d 40 to 108 of gestation. Umbilical cord hemodynamics were assessed by using a duplex B-mode (brightness mode) and D-mode (Doppler spectrum) program of the color Doppler ultrasound instrument (Aloka SSD-3500; Aloka America, Wallingford, CT) fitted with a 5.0 MHz finger transducer (Aloka UST-672). Ultrasonography was performed on d 40, 45, 52, 80, 94, and 108 of gestation. In B-mode a longitudinal section of the umbilical cord was visualized and the pulsatile umbilical artery was confirmed by switching to a duplex screen containing B-mode imaging and Doppler spectrum waveform plots. Measurements were obtained by placing the sample cursor over the vessel in B-mode while simultaneously recording pulsatile waves in D-mode. Pulsatility index (PI; PI = [peak systolic velocity (cm/s) – end diastolic velocity (cm/s)] / (mean velocity (cm/s)), and resistance index (RI = peak systolic velocity (cm/s) – end diastolic velocity (cm/s))/ (peak systolic velocity (cm/s)), were calculated using preset functions on the ultrasound instrument. Maternal diet altered the percentage change of both PI and RI with restricted ewes having increased (P = 0.01) PI and RI compared to control ewes. We are continuing to evaluate how maternal restriction may impact vascular function and nutrient delivery in pregnant ewes. Moreover, we are developing methodologies to reverse the negative effects of nutrient restriction.

In cattle, nutrient restriction, followed by realimentation, resulted in alterations in placental vascularity and function (Vonahme et al., 2004 a,b; Vonahme et al., 2007). Our
hypothesis was that, upon realimentation, the vascular resistance of the uterine artery would over-compensate for the previously nutrient restricted dam. In order to test this hypothesis, pregnant cows (n = 18) were randomly assigned to receive no restriction (Control), or either a short (55 d) or long (110 d) period of nutrient restriction (60% intake of control). Nutrient restriction began on d 30 of gestation. Uterine artery RI was measured every 14 days from d 30 of gestation and continuing until d 254 of gestation. While there was no treatment by day interaction in RI, there was a main effect of treatment. Cows restricted for the longer duration had an overall decrease in RI compared to the short-restricted and control cows, which did not differ (Camacho et al., 2011).

Interestingly, the RI decreased upon realimentation in those cows which experienced the longer duration of restriction. The ability of the uteroplacenta to compensate upon realimentation is quite intriguing and we are continuing our studies to determine which portions of the placenta (i.e. maternal or fetal) may contribute to compensatory prenatal growth of the fetus.

**Protein Supplementation**

While the literature is now booming with increasing evidence of how nutrient restriction impairs several physiological parameters, few concentrate on enhancing postnatal growth in livestock species. In a recent series of papers in cattle, cows gestated on range (where crude protein of forage is < 6%) that were protein supplemented during late gestation had calves similar in birth weight, but had calves with increased weaning weight compared to protein unsupplemented cows (Stalker et al., 2006, Martin et al., 2007; Larson et al., 2009). It is valuable to note that the protein supplementation enhanced growth after birth. Furthermore, the pregnancy rates in heifer calves born from protein supplemented cows were enhanced compared to control cows (93 vs 80%; Martin et al., 2007). It was our hypothesis that the increased fertility and growth rate of the calves from supplemented dams may be due to enhanced uterine blood flow and/or placental nutrient transfer. Ongoing studies in our laboratory are investigating how protein supplementation during late gestation can impact uterine blood flow. Studies are currently underway to determine how protein supplementation in the beef cow can alter uterine blood flow. We hypothesize that uterine blood flow would be increased to enhance nutrient transfer to the fetus, and while birth weights may not be altered (as reported by Stalker et al., 2006; Martin et al., 2007; Larson et al., 2009), growth trajectory of the musculoskeletal and reproductive systems of the offspring may be enhanced.

In order to more fully understand the impacts of maternal protein on uteroplacental blood flow and placental vascular development, we are currently utilizing an ovine model where the diets are isocaloric, with differing levels of protein in the diet. Singleton fetuses from ewes consuming the high protein diet are heavier on d 130 of gestation compared to fetuses from ewes consuming the low protein diet, with no differences in placental weight apparent (Camacho et al., 2010). When uterine blood flow was obtained from a single time point (d 130 of gestation), ewes consuming the high protein diet had a decrease in uterine blood flow compared to the low group, with the control being intermediate (Camacho et al., 2010). Moreover, when investigating the ability of the fetal placental arteries to vasodilate to increasing concentrations of bradykinin, placental arteries from high protein ewes had a decreased responsiveness compared to control and low protein ewes (Lekatz et al., 2010).

Understanding if additional calories (i.e. cow study), or a greater proportion of total calories coming from protein (i.e. sheep study), needs to be elucidated, and further work is underway in our laboratory.

**Melatonin**

Therapeutic supplements thought to target placental blood flow and nutrient delivery to the fetus have been shown to increase fetal growth in animal models of intrauterine growth restriction (Vosatka et al., 1998; Richter et al., 2009; Scatterfield et al., 2010); however, few studies have addressed uteroplacental hemodynamics in models of improved fetal growth. For instance, melatonin supplementation
was shown to negate the decreased birth weight in nutrient restricted rats (Richter et al., 2009), which was attributed to increased placental antioxidant enzyme expression in nutrient restricted rats supplemented with melatonin. Our hypothesis was that dietary melatonin treatment during a compromised pregnancy would improve fetal growth and placental nutrient transfer capacity by increasing uterine and umbilical blood flow. The uteroplacental hemodynamics and fetal growth were determined in ewes that received a dietary supplementation with or without melatonin (5 mg) in adequately fed (100% of NRC recommendations) or nutrient restricted (60% of control) ewes. Dietary treatments were initiated on d 50 of gestation and umbilical blood flow, as well as fetal growth (measured by abdominal and biparietal distances) were determined every 10 d from d 50 to d 110 of gestation. By d 110 of gestation, fetuses from restricted ewes had a 9% reduction (P = 0.01) in abdominal diameter compared to fetuses from adequately nourished ewes, whereas fetuses from melatonin supplemented ewes tended to have (P = 0.08) a 9% increase in biparietal diameter (Lemley et al., 2012).

We did observe a significant melatonin treatment by day interaction (P < 0.001) for umbilical artery blood flow which was increased in melatonin supplemented ewes from day 60 through 110 of gestation compared to control (no melatonin supplementation). Moreover, at day 110 of gestation melatonin supplemented ewes had a 20% increase in umbilical artery blood flow compared to control ewes. In addition, a significant nutritional plane by day interaction (P < 0.0001) was observed for umbilical artery blood flow, which was decreased in restricted ewes from day 80 through 110 of gestation compared to adequately fed ewes. Moreover, at day 110 of gestation restricted ewes had a 23% decrease in umbilical artery blood flow compared to adequately fed ewes (Lemley et al., 2012). While we are continuing our investigations into the impacts of melatonin supplementation in at-risk pregnancies, we feel that melatonin treatment may be useful in negating the consequences of intrauterine growth restriction that occur due to specific abnormalities in umbilical blood flow.

Summary and conclusions
We hope to improve approaches to management of livestock during pregnancy which may impact not only that dam’s reproductive success, but her offspring’s growth potential and performance later in life. Future applications of this research may be used to develop therapeutics for at-risk pregnancies in our domestic livestock. If these therapeutics can be used on-farm, producers would have the ability to increase animal health while also reducing costs of animal production. While each species is unique in its placental development and vascularity, comparative studies may ultimately assist researchers in understanding how the maternal environmental impacts placental, and thus fetal, development.

Literature cited


Godfrey, K.M., and Barker, D. J. (200). Fetal


effects in the overnourished adolescent sheep. J. Reprod. Fertil. Suppl. 54,385-399.


The Brahman Project

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Introduction

The subtropical environmental conditions of the southern region of the U.S. present severe challenges to the survival, reproduction, and growth performance of beef cattle. Because of its superior adaptability to hot and humid conditions, Brahman cattle are widely used to produce crossbred animals with good reproductive and growth characteristics that exhibit substantial levels of heterosis. Brahman cattle have good postweaning feed efficiency, but carcass and meat palatability characteristics need improvement to be competitive with Bos taurus breeds. Thus, there was a need for a research project that combined the efforts of ranchers and researchers with a goal of improving Brahman genetics for reproduction, growth, feed efficiency, and carcass and meat palatability characteristics. These objectives were at the core of a series of meetings that took place in Brooksville at the end of 2009 and beginning of 2010 whose outcome was the Brahman project. The first meeting occurred in November of 2009 and it was attended by Florida cattlemen, University of Florida (UF) faculty and administrators, and USDA-Agricultural Research Service (USDA-ARS) scientists and administrators. This meeting was followed by three meetings between animal breeding faculty from UF, ARS scientists from Brooksville, and invited scientists from Texas A&M, New Mexico State University, Louisiana State University, and the USDA-Meat Animal Research Center. These meetings produced a document specifying specific plans for the Brahman project. The central idea from these meetings was the construction of a large Brahman herd that would be housed in Brooksville and it would have ties to multiple private and experimental herds in Florida and the Southern region. The Brooksville herd and cooperating herds would result in a large connected population representative of the Brahman population in Florida and the Southern region, allow for improved selection efforts for reproduction, growth, feed efficiency, carcass, and meat quality traits, and have a positive impact in the Brahman population through the dissemination of genetic material from animals with superior genetic predictions.

Objectives

The objectives of the Brahman project are: 1) To develop a Brahman population that includes animals from various subpopulations to conduct genetics and genomics evaluation and selection for reproduction [e.g., age at puberty, stayability (cows with 3 or more consecutive calves)], growth (preweaning and postweaning), feed efficiency, ultrasound, and carcass and meat palatability traits (e.g., ribeye area, marbling, tenderness); 2) To construct a database with pedigree, genomic, and phenotypic information (reproduction, growth, ultrasound, carcass traits as available) from all participating herds; 3) To conduct genetic and genomic evaluation of animals in the population for reproduction, growth, feed efficiency, ultrasound, and carcass and meat palatability traits using pedigree, genomic, and phenotypic information; and 4) To identify and disseminate genetics from animals with the best predicted genetic and genomic values for reproduction, growth, feed efficiency, and carcass and meat palatability traits in the research Brahman population and elsewhere.

Population Structure

The population (Figure 1) will be formed by a group of connected experiment station and private Brahman herds from Florida (Brooksville, private herds), Texas (contributing
experimental stations, private herds), Louisiana (contributing experimental stations, private herds), and other states in the Southern region, and herds with purebred and crossbred Brahman cattle (including the UF Angus-Brahman multibreed herd). We are currently at the stage of constructing the Brahman herd at Brooksville and in the process of establishing working relationships with experimental stations and private producers. Starting this year (2012), the organization responsible for the Brooksville station will change from the USDA-ARS to UF.

Herds will be genetically connected by using several common sires across herds each year. These sires will create geographic and time connections needed to conduct genetic and genomic evaluation of all animals from all participating herds using information from all years. Arrows in Figure 1 indicate genetic connectedness created across herds through common sires and dams. Connectedness would be accomplished by semen, embryo transfer (ET), and in-vitro fertilization (IVF) for sires, and by ET and IVF for cows. Although during the initial years of the construction of the foundation Brahman herd in Brooksville most of the connectedness would occur from contributing herds towards Brooksville, this is expected to change after the Brooksville herd is established. Thus, connections among all cooperating herds are expected to increase in the future. Table 1 shows the list of sires used for ET and IVF during the first two years of this project (2010 to 2011). Of the 20 sires used in Table 1, four of them were used in 2010 and 2011, and four sires used in 2011 are planned to be used again in 2013. Table 2 contains the list of natural service (NS) sires used in Brooksville from 2009 to 2012. One common NS sire was used in 2009 and 2010, and another one in 2011 and 2012 creating connections among these years. Thus, at this stage the Brahman population formed by the Brooksville and cooperating herds is currently well connected across herds and years.

The foundation Brahman herd in Brooksville is currently intended to have 500 cows. This number of cows may need to be revised in future years depending on the carrying capacity of the Brooksville station and funding resources. It will be composed of females from the Brahman herd in 2010, females donated or purchased from other herds (experimental stations, private herds), and animals produced by embryo transfer (ET cows) and in-vitro fertilization (IVF cows). Table 3 shows the current status of the Brooksville Brahman herd by herd of origin and age of female (cows, two-year olds, yearling, and calves) produced by natural service (NS), ET, and IVF. There are 75 adult cows (65 originating from Brooksville and 10 from Overton, TX), 11 two-year olds, 26 yearlings from Brooksville (NS and ET) and three cooperating herds from Florida (ET), and 54 heifer calves from Brooksville (NS and ET) and five cooperating herds from Florida and Texas. Table 4 shows the number of donor cows producing heifer calves in 2010, and heifer and bull calves (in parenthesis) in 2011. Donor cows that were used for ET matings, during these years also contributed to connectedness among herds.

The procedure currently used by Brahman producers to contribute to the Brooksville herd has followed an outline specified in 2010. This outline suggested donations, purchases and temporary transfer of cows that had shown desirable characteristics of early maturity and consistent fertility for at least the first three calvings. Currently, genetic material from at least 14 herds of origin is represented in the Brooksville herd. Considering the current numbers of cows, two-year olds, yearlings, and calves in 2012 and all forms of reproduction (AI, NS, ET, and IVF), it would take at least five years to construct a herd of 500 adult cows in Brooksville (i.e., 2012 to 2016). To achieve this goal, Brahman breeders would need to continue to contribute with females, embryos, and (or) ova for IVF during the establishment period of the Brooksville herd, and in subsequent years as needed. To obtain a representative sample of the Brahman population in the Southern region, a proportional representation from each cooperating private herd in the foundation herd could be pursued. However, because this may be difficult to achieve, a more realistic goal would be to establish a good degree of connectedness among cooperating herds and
Brooksville by appropriate representation of sires and dams across herds and across years. Because 2012 is a transitional year, the mating plan for Brooksville will only use natural service (Table 5).

Data and Tissue Sample Collection and Storage
A complete pedigree file with information on all animals in the population will need to be maintained. This file would include information of all calves, sires, and dams present in all cooperating experimental and private herds.

Phenotypic data to be collected include: a) reproduction (e.g., age at puberty, calving interval), growth (weights at birth, weaning, yearling, post-yearling weights; cow weights), temperament, and ultrasound data (area of the longissimus muscle, marbling, backfat thickness); b) feed efficiency data; c) carcass and meat palatability data (carcass weight, area of the longissimus muscle, marbling, backfat thickness, shear force, tenderness, connective tissue, juiciness, flavor, off-flavor). Phenotypes would be collected in the Brahman herd at Brooksville, the UF Angus-Brahman multibreed herd, contributing experimental stations, and private herds. Phenotypes that are an integral part of herd management will likely be collected at all locations (e.g., health data, calving dates, weights), whereas available funding will be a determining factor for the collection of other phenotypes (e.g., feed efficiency, carcass, and meat palatability traits). Thus, a realistic objective will be to collect data on as many traits as possible at each location.

Tissues to be sampled would be semen (4 straws) or blood (10 cc) from sires and blood (10 cc) from females and calves. It would be desirable to collect tissue samples from the Brooksville herd, the UF Angus-Brahman multibreed herd, and all cooperating experimental and private herds. At least all bulls used in the population should be sampled (four straws of semen or 10cc of blood). These samples will need to be maintained in a repository for long-term storage and retrieval (e.g., ICBR at the University of Florida, or other suitable reliable site). Provided that funding is available, a genomic analysis of tissue samples would be conducted prior to performing a genetic-genomic evaluation of animals in the population using chips of suitable density depending on amount of funding and cost at the time of analyses (e.g., Illumina 50K, 770K, other).

A flexible database structure for records collected in Brooksville, the UF Angus-Brahman multibreed herd, and cooperating experimental stations and private herds will need to be established. As indicated above, information collected at each location need not necessarily be the same, but there would need to be traits in common to be able to conduct joint analyses for the complete population. Data would need to be forwarded and stored at a central location (e.g., Brooksville or UF). Computer software used for this purpose would need to be simple and flexible. Initially, spreadsheet files (e.g., Microsoft Excel) will suffice. Later on, a database system with dedicated computer programs for data access through the internet could be implemented so that producers could enter and manage data from individual herds. This implies the construction of a homepage for this project. At least one computer technician would need to be hired to accomplish these tasks (programming, database entry and maintenance, data analysis).

Genetic and Genomic Evaluation
Animals will be genetically evaluated for reproduction, growth, feed efficiency, ultrasound, and carcass and meat palatability traits using pedigree, phenotypic and genomic information. After the foundation population is established, genetic and genomic predictions for these traits could be used to construct indexes that emphasize: a) primarily reproduction and growth traits, and secondarily carcass traits, and 2) primarily carcass and growth traits, and secondarily reproduction traits. Selecting animals based on these indexes will effectively create two selection lines within the Brahman herd. These indexes would need to be further discussed with cooperators in the Brahman project.
**Culling, Mating, and Selection**

Females will be culled for health, reproduction, and production issues as in any commercial cow-calf operation. Heifers will be given two opportunities to get pregnant (spring at 2-years of age and spring at 3-years of age). Heifers not pregnant at 3-years of age will be culled. Cows will be culled after failing to become pregnant or to wean a calf in two consecutive breeding seasons.

Cows will be mated by artificial insemination and subsequently placed in groups of 35 to 40 cows with a natural service sire for a period of 60 days. Mating will be designed such that inbreeding is minimized. To maintain connectedness across years, a fraction of the sires used in a given year (e.g., 25%) sires will be used for a second year. Similarly, sires used at Brooksville will also be represented in the UF Angus-Brahman multibreed herd and cooperating experimental and private herds, and vice versa. This will create connectedness across herds and across years among all participating herds in the project and permit the evaluation of all animals in the population.

Bulls and cows could be selected using the indexes outlined above. Again, further discussion on these selection indexes is warranted. Animals in line 1 would be selected based on an index that emphasized primarily reproduction and growth, and secondarily carcass, whereas animals in line 2 would be selected based on an index that emphasized primarily carcass and growth, and secondarily reproduction. Traits included in these indexes and weight for each trait would need to be researched using information from the foundation Brahman herd in Brooksville.

Bulls could be evaluated for age at puberty by postweaning monthly breeding soundness evaluations, including measurement of scrotal circumference and semen sperm count (50 million sperm/ml and 10% motility minimum). In addition, if feed efficiency measurements were taken for each calf crop every year, young bulls could also be evaluated after finishing the feed efficiency trial as follows: a) Line 1: based on an index that has higher weight for reproductive information of their female relatives (dam and collaterals, and older relatives), and lower weight for carcass information (relatives), ultrasound information (animal and relatives), and growth (animal and relatives; pre and postweaning growth); and b) Line 2: based on an index that gives higher weight for carcass (relatives) and ultrasound information (animal and relatives), and lower weight to reproductive information of their female relatives (dam and collaterals, and older relatives), and growth (animal and relatives; pre and postweaning growth).

Heifers could be evaluated when they are 3-years of age, after testing for pregnancy, using the same indexes used for males for lines 1 and 2, except that their own reproductive information would also be taken into account. During the initial period of formation of the Brooksville Brahman herd, indexes based on phenotypic information could be used to choose replacement animals instead of indexes based on predicted breeding values.

**Assessment of Genetic Change**

Genetic change over time for individual traits or indexes in the Brahman Brooksville herd, other individual herds and for the complete Brahman population could be assessed by using weighted and unweighted herd means for calves, sires, and dams. Yearly means per selection line could also be compared within years and with respect to the foundation Brahman herd in Brooksville.

**Data Analysis**

Prior to any data analysis in the Brahman project, pedigree and phenotypic information from all animals in the Brooksville foundation herd, the UF Angus-Brahman multibreed herd, and cooperating experimental and private herds needs to be collected and merged into a single set of files for genetic and genomic analyses. These files will be used to conduct analyses of research and development interest including (phenotypic and genomic data permitting): 1) determination of factors to be included in contemporary groups for reproduction, growth, feed efficiency, ultrasound, and carcass and meat palatability traits; 2) comparison of groups of animals produced by all reproductive systems.
used to create the Brooksville Brahman herd (AL, NS, ET, and IVF) for growth, reproduction, and carcass traits (as available); 3) comparison of groups of Brahman cattle in Brooksville from different geographical origin for reproduction, growth, feed efficiency, and carcass and meat palatability traits (as available); 4) prediction of genetic and genomic values and estimation of genetic and genomic parameters for reproduction, growth, feed efficiency, ultrasound, and carcass and meat palatability traits; 5) comparison of groups of Brahman cattle by geographical origin using means of predicted genetic and genomic values.

**Expected Outcomes**

Genetic and genomic evaluation of animals from all cooperating herds in the population. Within-herd and across-herd ranking of animals by their genetic and genomic expected breeding value for reproduction, growth, feed efficiency, ultrasound, and carcass and meat palatability traits. Improvement of these traits within herds and in the complete Brahman population by preferential use of animals with superior expected breeding value as parents of subsequent generations (reduction of cow losses due to fertility and stayability problems, faster growth rates, improved feed efficiency, and increased tenderness and marbling). Determination of genetic trends for males and females over time for all traits and comparisons of Brahman cattle grouped by various criteria (e.g., selection lines, geographic origin). *

It should be emphasized that availability of funding for the collection of some phenotypes (e.g., feed efficiency, carcass and meat palatability traits) and for genomic analysis with high density chips (e.g., Illumina 50K and 770K) will determine if these aims of the Brahman project will be accomplished.

**Acknowledgements**

Authors would like to acknowledge the contributions of cooperating private ranches and experimental stations to the Brahman project: Barthle Brothers Ranch, FL, Doc Partin Ranch, FL, D Bar Ranch, LA, Double C Bar Ranch, FL, Gray Shadow Ranch, FL, Kempfer Cattle Company, FL, J. D. Hudgins, Inc., TX, New Mexico State University, NM, Partin & Partin Heart Bar Ranch, TX, Rocking S Ranch, FL, Texas AgriLife Research & Extension Center, Overton, TX, and Treasure Hammock Ranch, FL. Authors also acknowledge the support of the American Brahman Breeders Association and the Florida Brahman Association.
Table 1. Sires used in Brooksville for embryo transfer or in-vitro fertilization sires (2010 to 2012)

<table>
<thead>
<tr>
<th>Year</th>
<th>Sire Reg #</th>
<th>Sire Name</th>
<th>Herd of Origin</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>794506</td>
<td>REP SIR MANSO MANGUM 420</td>
<td>DOC PARTIN RANCH</td>
<td>FL</td>
</tr>
<tr>
<td>2010</td>
<td>306428</td>
<td>+BL LITTLE BOZO 1/8</td>
<td>BERCHMAN LAVERGNE</td>
<td>LA</td>
</tr>
<tr>
<td>2010</td>
<td>800995</td>
<td>JDH MR MANSO 236/3</td>
<td>J.D. HUDGINS-FORGASON DIV.</td>
<td>TX</td>
</tr>
<tr>
<td>2010</td>
<td>854694</td>
<td>MR TAES 6087</td>
<td>TEXAS A &amp; M UNIVERSITY</td>
<td>TX</td>
</tr>
<tr>
<td>2010</td>
<td>863297</td>
<td>MR TAES 7145</td>
<td>TEXAS A &amp; M UNIVERSITY</td>
<td>TX</td>
</tr>
<tr>
<td>2011</td>
<td>794506</td>
<td>REP SIR MANSO MANGUM 420</td>
<td>DOC PARTIN RANCH</td>
<td>FL</td>
</tr>
<tr>
<td>2011</td>
<td>804549</td>
<td>KCC SUTTON DUBO 135</td>
<td>KEMPFER CATTLE COMPANY</td>
<td>FL</td>
</tr>
<tr>
<td>2011</td>
<td>832506</td>
<td>KCC EMPEROR DUBO</td>
<td>KEMPFER CATTLE COMPANY</td>
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<tr>
<td>2011</td>
<td>306428</td>
<td>+BL LITTLE BOZO 1/8</td>
<td>BERCHMAN LAVERGNE</td>
<td>LA</td>
</tr>
<tr>
<td>2011</td>
<td>877366</td>
<td>SCD DIDOR ESTO 623</td>
<td>D BAR RANCH</td>
<td>LA</td>
</tr>
<tr>
<td>2011</td>
<td>894378</td>
<td>STARS 09-212</td>
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<tr>
<td>2011</td>
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<td>NMSU 6X CLOVERDALE 5129</td>
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<td>NM</td>
</tr>
<tr>
<td>2011</td>
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<td>MSP SPECIAL RELOAD 945</td>
<td>PARTIN &amp; PARTIN HEART BAR RANCH</td>
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<tr>
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<td>MR TAES 7145</td>
<td>TEXAS A &amp; M UNIVERSITY</td>
<td>TX</td>
</tr>
<tr>
<td>2011</td>
<td>890628</td>
<td>MR. TAES 0107</td>
<td>TEXAS A &amp; M UNIVERSITY</td>
<td>TX</td>
</tr>
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</table>

Table 2. Natural service sires used in Brooksville from 2009 to 2012

<table>
<thead>
<tr>
<th>Year</th>
<th>Sire Reg #</th>
<th>Sire Name</th>
<th>Herd of Origin</th>
<th>State</th>
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<tbody>
<tr>
<td>2009</td>
<td>857614</td>
<td>BB MR WEST BERCH 508</td>
<td>BARTHEL BROTHERS RANCH</td>
<td>FL</td>
</tr>
<tr>
<td>2009</td>
<td>842143</td>
<td>STARS 03-048</td>
<td>STARS</td>
<td>FL</td>
</tr>
<tr>
<td>2009</td>
<td>856461</td>
<td>TH BURMA BEN 182-04</td>
<td>TREASURE HAMMOCK RANCH</td>
<td>FL</td>
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<tr>
<td>2010</td>
<td>856461</td>
<td>TH BURMA BEN 182-04</td>
<td>TREASURE HAMMOCK RANCH</td>
<td>FL</td>
</tr>
<tr>
<td>2010</td>
<td>828050</td>
<td>JCC DAK Charley 109/1</td>
<td>DOUBLE C BAR RANCH</td>
<td>FL</td>
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<tr>
<td>2011</td>
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<td>MR TAES 7145</td>
<td>TEXAS A &amp; M UNIVERSITY</td>
<td>TX</td>
</tr>
<tr>
<td>2011</td>
<td>894378</td>
<td>STARS 09-212</td>
<td>STARS</td>
<td>FL</td>
</tr>
<tr>
<td>2012</td>
<td>863297</td>
<td>MR TAES 7145</td>
<td>TEXAS A &amp; M UNIVERSITY</td>
<td>TX</td>
</tr>
<tr>
<td>2012</td>
<td>890628</td>
<td>MR. TAES 0107</td>
<td>TEXAS A &amp; M UNIVERSITY</td>
<td>TX</td>
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</table>
Table 3. Numbers of Brahman females by herd of origin and age

<table>
<thead>
<tr>
<th>Herd of origin</th>
<th>Repro System</th>
<th>Cows</th>
<th>2-Year Olds</th>
<th>Yearlings</th>
<th>Calves</th>
<th>Total</th>
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<tbody>
<tr>
<td>Brooksville</td>
<td>NS</td>
<td>65</td>
<td>11</td>
<td>7</td>
<td>27</td>
<td>110</td>
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<tr>
<td>Texas AgriLife</td>
<td>NS</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Barthle Bros Ranch</td>
<td>ET</td>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Brooksville</td>
<td>ET</td>
<td>8</td>
<td>4</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doc Partin Ranch</td>
<td>ET</td>
<td>9</td>
<td>7</td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kempfer Ranch</td>
<td>ET</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Texas AgriLife</td>
<td>ET</td>
<td></td>
<td></td>
<td>12</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>75</strong></td>
<td><strong>11</strong></td>
<td><strong>26</strong></td>
<td><strong>54</strong></td>
<td><strong>166</strong></td>
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</tr>
</tbody>
</table>

Table 4. Numbers of donor Brahman cows producing heifers by herd of origin and year of mating¹

<table>
<thead>
<tr>
<th>Herd of origin</th>
<th>2010</th>
<th>2011</th>
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</thead>
<tbody>
<tr>
<td>Barthle Bros Ranch</td>
<td>3 (4)</td>
<td></td>
</tr>
<tr>
<td>Brooksville</td>
<td>3</td>
<td>2 (5)</td>
</tr>
<tr>
<td>Doc Partin Ranch</td>
<td>3</td>
<td>3 (4)</td>
</tr>
<tr>
<td>Kempfer Ranch</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Texas AgriLife</td>
<td></td>
<td>8 (9)</td>
</tr>
<tr>
<td>Gray Shadow Ranch</td>
<td>0 (3)</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>7</td>
<td>16 (25)</td>
</tr>
</tbody>
</table>

¹Total number of donor cows in parenthesis

Table 5. Natural Service Matings for 2012

<table>
<thead>
<tr>
<th></th>
<th>MR TAES 7145</th>
<th>MR TAES 0107</th>
<th>KCC 272OF 185-176</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heifers</td>
<td>0</td>
<td>26</td>
<td>0</td>
<td>26</td>
</tr>
<tr>
<td>Cows</td>
<td>33</td>
<td>7</td>
<td>31</td>
<td>71</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>33</strong></td>
<td><strong>33</strong></td>
<td><strong>31</strong></td>
<td><strong>97</strong></td>
</tr>
</tbody>
</table>
**Figure 1.** Structure of the population of the Brahman project (arrows indicate genetic connectedness among herds)
Comparison of Jiggs to Other Bermudagrass Alternatives

Joe Vendramini, Ph.D.¹

¹Range Cattle Research and Education Center, University of Florida, Ona, FL

Bermudagrass is one of the most important warm-season perennial grasses in the southern U.S. Coastal bermudagrass was the first hybrid bermudagrass released in 1943 and, since then state agricultural experiment stations and private companies have released a massive number of new bermudagrass cultivars. Despite the large number of cultivars released, it has been challenging to find a bermudagrass cultivar adapted to South Florida, primarily because of the poorly drained soils. Coastal, Tifton 85, and the “Central Florida Tifton 44” (which is different from the true Tifton 44) are cultivars well adapted to North-Central Florida and have superior drought tolerance; however, they are not productive and persistent when planted in poorly drained soils.

A private company, owned by J.C. Jiggs, released Jiggs in southeast Texas in the 1980’s but the exact date of the release is unknown. Jiggs has been included in bermudagrass variety trials in Overton, TX and Ardmore, OK for several years and it had showed decreased herbage production when compared to Tifton 85 and Tifton 44. It is important to mention that these sites are located in northern latitudes (30-31°), where the duration of the cool season is prolonged and the number of freezing events is much greater than in South Florida (27°). Nonetheless, these variety trials have proven that Jiggs is as cold tolerant as many of the commercial bermudagrass cultivars.

Dr. Paul Mislevy brought Jiggs to the Range Cattle Research and Education Center, Ona, FL approximately 10 years ago to conduct research and compare Jiggs with the existing improved warm-season grass species adapted to South Florida. A study was conducted in Ona, FL to compare the herbage production and nutritive value of different stargrass (Florona, Okeechobee) and bermudagrass (Tifton 85, World Feeder, Bermuda 2000, and Jiggs) cultivars at different grazing frequencies (2, 4, 6, and 7 weeks). Jiggs and Bermuda 2000 (cultivar not released) were generally the two highest yielding entries at grazing frequencies of 2 (3.4 and 3.1), 4 (6.5 and 5.7), 5 (6.9 and 7.9), and 7 weeks (9.3 and 8.2 ton/acre), respectively, and the most persistent. The winter forage production was highest for Bermudagrass 2000 and Jiggs averaging 1.1 ton/acre when harvested after 12 weeks regrowth. It was noted that the early spring and fall forage production of Jiggs was greater than the other cultivars.

A recent study conducted in Wauchula, FL compared several species and cultivars of warm-season grasses commonly planted in South Florida. Jiggs was among the most productive entries with similar nutritive value (Table 1). As a result of standing water conditions for two weeks during the summers of 2007 and 2008; many entries did not persist throughout the three-year trial. Jiggs persisted under those conditions and maintained 95% of the stand after the experimental period.

A haylage study was conducted at the UF/IFAS Range Cattle Research and Education Center in Ona to compare nutritive value and fermentation characteristics of Jiggs and Tifton 85 ensiled at two dry matter concentrations, 30 and 50% DM. The plots were fertilized with 80 lb N/acre and harvested at four weeks regrowth interval. There was no difference in nutritive value and fermentation characteristics between Jiggs and Tifton 85 haylage. The average crude protein, in vitro digestibility, lactic acid concentrations, and pH were 13, 55, and 3%, and 4.5 respectively.

A grazing study was conducted at the UF/IFAS Range Cattle Research and Education Center to test the effects of Jiggs stubble height on forage and animal performance. Jiggs grazed at approximately seven inches stubble height had crude protein and in vitro digestibility of 15 and 57%, respectively. Early weaned calves grazing Jiggs and receiving 1% body weight in
concentrate had average daily gains of 1.3 lb/day.

In addition to the desirable characteristics described above, it has been observed that Jiggs has faster establishment than stargrass and other cultivars of bermudagrass, when planted with mature tops. Jiggs also has thin stems, which allow the grass to dry faster under field conditions when harvested for hay or haylage. The faster drying time is necessary to decrease the chances of adverse climatic conditions and maintain the green color of the dried material. The thin stems and green color are desirable attributes in the hay market, primarily for horse hay.

As with many bermudagrass cultivars in South Florida, Jiggs is susceptible to leaf rust when regrowth periods between harvests or grazing exceed approximately six to seven weeks. The appearance of rust is conditional to the plant maturity and climatic conditions. Nitrogen fertilization can stimulate new growth and eventually decrease the rust symptoms; however, it is an expensive solution for the problem. Spraying copper sulfate has also been tried by producers with highly variable results. The best management practice to alleviate the rust problem is to harvest or graze the stand and allow new regrowth.

Recently, it was observed in Ona and Okeechobee that Jiggs stands were damaged by “bermudagrass stem maggot”. The common symptom is the death of the top leaves of the plant. The products used to control the maggot are similar to the products currently used for army worms, with the exception of Dimilin.

It needs to be emphasized that Jiggs is a bermudagrass; like all bermudagrasses, Jiggs requires adequate pH and fertilization program, and will not tolerate overgrazing for long periods. Overgrazing Jiggs often results in an infestation of common bermudagrass, which is extremely difficult to control. A minimum of four inches stubble height is recommended for grazed Jiggs pastures, and recent research finding have indicated that five to six inches may increase forage production.

Although it was mentioned that Jiggs is adapted to poorly drained soils, it is not recommended to plant Jiggs in areas with frequent long periods of flooding (several weeks) because the persistence of Jiggs under this condition is unknown.

Table 1. Herbage production and nutritive value of warm-season grasses harvested in the summer with 6 weeks regrowth interval

<table>
<thead>
<tr>
<th>Item</th>
<th>Bahiagrass</th>
<th>Stargrass</th>
<th>Mulato</th>
<th>Limpograss</th>
<th>Jiggs</th>
<th>Coastcross 2</th>
<th>Tifton 85</th>
<th>Florakirk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forage Production (lb/acre)</td>
<td>2600&lt;sup&gt;c&lt;/sup&gt;</td>
<td>3670&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3200&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3870&lt;sup&gt;b&lt;/sup&gt;</td>
<td>4600&lt;sup&gt;a&lt;/sup&gt;</td>
<td>3090&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2970&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3800&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>CP, %</td>
<td>14.9</td>
<td>12.0</td>
<td>12.6</td>
<td>12.5</td>
<td>11.6</td>
<td>12.9</td>
<td>10.2</td>
<td>11.6</td>
</tr>
<tr>
<td>IVTD, %</td>
<td>56.3&lt;sup&gt;b&lt;/sup&gt;</td>
<td>61.7&lt;sup&gt;b&lt;/sup&gt;</td>
<td>67.0&lt;sup&gt;a&lt;/sup&gt;</td>
<td>60.1&lt;sup&gt;b&lt;/sup&gt;</td>
<td>58.4&lt;sup&gt;b&lt;/sup&gt;</td>
<td>63.2&lt;sup&gt;a&lt;/sup&gt;</td>
<td>63.9&lt;sup&gt;a&lt;/sup&gt;</td>
<td>58.0&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

CP = crude protein and IVTD = in vitro true digestibility
<sup>a, b, c</sup> Means with different superscripts differ, <i>P < 0.05</i>