

Objectives for SERA 041

1. Identify and prioritize beef-forage research and Extension issues in the Southeast. Develop multi-institutional research projects that will assist producers to achieve greater efficiency and productivity, and design develop and implement Cooperative Extension educational programs to maximize knowledge transfer and impact through local and regional county agents/educators.

Sub-Objective 1: Research Initiatives

(1) Seek input from stakeholders and create advisory groups that will help develop research programs which will aid in securing external funding.

Florida

The advisory committee of the RCREC met twice during 2012 to discuss research and extension priorities for 2013. The group has eight beef cattle producers that are active in political decisions related to agriculture in the State of Florida

South Carolina

Accomplishments: A progressive producer with close ties to the Clemson Extension system recently observed serious reproductive issues of young beef cattle grazing toxic tall fescue when subjected to estrus synchronization protocols. Two year old cows were previously naïve to toxic fescue and had timed AI conception rates of < 20% while older cows had timed AI rates over 40%. This producer reported the issues to his local Extension agent who sought answers/explanations from the Experiment station. The available applied cow-calf data addressing fescue toxicosis was found to be surprisingly sparse. Only a few studies existed and none adequately addressed how to solve or answer this producers problem.

Impact: The experiment station designed a three year research project to investigate the impact of toxic tall fescue on reproductive performance of young (2 and 3 yr old) cows. This research project was a multi-state effort and is outlined in more detail elsewhere in this project report. After two years of applied research and additional information acquired from an independent but concurrent study conducted at the University of Arkansas the producer has altered his pasture and cattle management practices to improve his overall conception rates. Currently conception rates from timed AI exceed 50% on this producer's farm and his overall conception rates in a controlled breeding season are now above 85%.

Texas

Stakeholder advisory groups have met on an annual or biannual basis at the various locations in which forage-beef research is being conducted (Overton & College Station)

(2) Evaluate the performance and production systems of beef cattle utilizing forage and biomass residues associated with cellulosic biofuel production.

Alabama

In 2012, a 2-year project stockpiled 'Tifton-85' bermudagrass for lactating, fall-calving cows under intensive grazing management. In August, forage from six paddocks were cut for hay, fertilized with 50, 100 or 150 lbs N/acre, and stockpiled for deferred grazing in late fall/early winter; a fourth treatment included *ad libitum* access to round bales of bermudagrass hay. Beginning in early November, cow/calf pairs were given access to strips of forage by movement of polytape approximately twice weekly to provide the equivalent of $1\frac{1}{3} \times$ cows' daily requirement for forage DM to maintain a target harvest efficiency of 75% as determined by biweekly sampling of pre-and post-graze forage availability. Cows maintained on stockpiled forage received no supplement, whereas hay-treatment cows received 6 lbs whole cottonseed/head daily per local industry practice. Cows and calves were weighed every 21 days, and cow body condition scores and calf hip heights were taken at each weigh date. Milk production of cows was determined by three weigh-suckle-weigh measurements corresponding to early, peak and mid-lactation. The first year of the experiment ended in mid-February 2013, cow/calf performance data are undergoing statistical analysis, and forage is being analyzed for nutritive value.

In 2012, a 2-year winter-grazing experiment with triticale + annual ryegrass, wheat + annual ryegrass, and triticale + wheat + annual ryegrass. Replicate 3.5-acre paddocks were each stocked initially with 4 yearling Angus \times Simmental test steers (initial BW, ~ 750 lbs) when forage dry matter (DM) availability had achieved ~1,000 lbs/acre. Steers will be weighed periodically throughout the trial, and grazing will be terminated in late Spring 2013 when forage availability and quality can no longer support satisfactory animal performance. Paddocks are continuously stocked and intensively managed using put-and-take steers to maintain a target forage DM availability of 1,500-2,000 lbs/acre corresponding to a forage allowance of ~1 kg DM/kg steer BW. Forages are harvested every two weeks for availability and nutritive quality determinations.

Florida

A project testing the effects of different sources of rumen-degradable protein supplementation on cow-calf pairs grazing stockpiled warm-season forage during the winter were concluded (2 yr). True protein resulted in slighter greater BCS than urea but there were no differences in ADG of cows and calves, BUN, and rumen fluid pH, ammonia, and VFA concentrations.

The effects of supplementing limited amounts of rumen-degradable protein to calves on creep feeding three months before weaning were measured and 400 g of SBM daily resulted in significant increase in calf ADG.

Sweet sorghum has been tested as a potential feedstock to ethanol production. We tested the use of sweet sorghum bagasse for silage and it was an acceptable low nutritive value feed for mature beef cows.

Louisiana

Accomplishment: An advisory committee of producers and agents was formed 4 years ago at the Iberia Research Station (IRS) led by Scaglia. This committee met twice in 2012. In NW Louisiana a beef producer advisory committee was identified and selected (10 producers) to work alongside the beef cattle researcher (Walker) at the Hill Farm Research Station to evaluate, discuss, and encourage the direction of beef cattle research in northern LA. The beef producer advisory committee has met twice in 2012. The beef producer advisory committee also provided input on a research project to be conducted by a graduate student at the Hill Farm Research Station.

Impact: Discussion of the progress of an AFRI-funded grant. The Committee at IRS collaborated in outreach activities including 2 pasture walks and a field day. Scaglia asked for input in terms of issues that are affecting beef and grass growers, which may serve as starting points for new areas of research. Having beef cattle producers involved with research being conducted and providing input on future projects to be conducted greatly improves the connection between the producer and the researcher and/or extension agent. In return, the producers will have more value out of the data that comes from these projects.

North Carolina

A North Carolina participant in the SERA-41 is working with a team from North Carolina, Georgia, Kentucky, Virginia, Tennessee, Mississippi, and California to present a CAP proposal to USDA on the use of Forage Sorghum and Camolina in cropping rotations to provide biomass and oil for cellulosic ethanol and biodiesel feedstocks. The biomass and byproduct meals will also be evaluated as cattle feeds as an alternative market for the products as the cellulosic biofuel industry scales up.

Tennessee

1) Stocker cattle were used to graze either switchgrass, eastern gamagrass or a mixture big bluestem and indiagrass for 30 days and forage was allowed to regrow for biofuel or for full season about 90 days. Steers daily gains were greater for big bluestem/indiagrass than switchgrass or eastern gamagrass. Grazing switchgrass produced more beef per acre because stocking rate was greater.

2) Summer grazing of switchgrass or combination of big bluestem and indiagrass by pregnant dairy heifers indicated that these native grasses provide adequate nutrition for these animals .

Texas

Comprehensive research on biofuel residues has been conducted by Dr. Jim McDonald at the Texas AgriLife Research and Extension Center at Amarillo. This research has been targeted at use of dry distillers grain and has received extramural funding.

(3) Evaluate forage systems that incorporate the use of native grasses and/or legumes in conjunction with perennial grasses on cow-calf, stocker, and

finishing cattle performance and products; forage nutrient availability; and optimizing fertilizer inputs.

Florida

A 2 yr study testing the effects of overseeding *Stylosanthes guianensis* cv. Ubon on bahiagrass pastures was conducted and stylosanthes was persistent during the grazing season and resulted in additional 40 kg N / ha in the above ground biomass when compared to control (bahiagrass pastures with no fertilization or overseeding).

Louisiana

1) Accomplishments: In May 2012 (third year of data), 18 steers from the forage fed project were harvested (6 steers/treatment), carcass data collected and steaks obtained. Shear force values were determined from each of the steaks and beef samples were analyzed for fat content and fatty acid profile. In June 2013, the fourth year (grazing season) began with a new group of steers. Steers grazed summer pastures until November, with conserved forages being fed thereafter until mid-December. Since then, they have grazed winter pastures (ryegrass, and ryegrass/rye/clovers mix. Performance has been as expected, with moderate gains during the summer months, limited gains during the hay-feeding period and appropriate gains when using winter forages.

Impact: Major relevance for established and new producers who are diversifying their enterprises or starting to market this product (direct marketing, retailers, restaurants) in Louisiana and neighboring states.

2) Accomplishment: Allowing the grazing animal to express free dietary choice between legumes and grasses during grazing might help achieve greater consistency of nutrient supply to the animal from pasture, greater control of intake, and production. Heifers grazing pastures with access to clovers (clover pure stand, mixed, or adjacent monocultures of ryegrass and clovers) gained on average 0.3 kg more when compared to grass monoculture (ryegrass). Heifers on mixed swards walked more than those grazing adjacent monocultures, notably explaining the search for the legume component.

Impact: Demonstration of the importance of partial preference and intake of mixed swards by grazing beef cattle

3) Accomplishment: Nutritive value of bermudagrass pastures can limit growth of nursing calves. We evaluated calf response to creep grazing alyceclover, aeschynomene, cowpea, and soybean species for 60 to 96 days at four Louisiana locations (Hill Farm, Red River, Dean Lee and Iberia Research Stations) from mid-summer to weaning (mid to late October). Initially, grazing varied by novelty of the legumes and location and, at one location, accumulated legume growth (> 1 m height and 15,000 kg DM/ha) despite 17% crude protein concentration of leaves of cowpea and aeschynomene. All legumes were grazed heavily at two locations with legume availability approximately 3,000 kg DM/ha in mid-season, declining through August. Calves creep grazing summer legumes gained more (76 vs. 71 kg/head) than control calves with not access to summer legumes at all but one location.

Impacts: Earlier grazing of legumes and increased legume availability in September should further increase calf weaning weights with creep grazing; however, creep grazing required substantially more intensive management than did the control. This intense management system may be more cost effective with first- or second-calving females with possibly early weaning.

Texas

New forage cultivars released from Texas AgriLife Research at Overton include two tetraploid annual ryegrasses, 'TAMTBO' and 'Nelson' (L. Nelson), and 'Neches' white clover and 'Sabine' crimson clover (G. Smith). Bermudagrass pastures overseeded with clover or ryegrass are components of a long-term nutrient cycling experiment for use by cows and calves at the Texas AgriLife Research at Overton (Rouquette). The F-1 (Angus or Hereford x Brahman) cows from two calving seasons provide for cow-calf, stocker, and feedlot-carcass data sets. Stockers have grazed on Tifton 85 bermudagrass (fall-calvers) under continuous vs rotational stocking, or on rye + ryegrass (winter calves) under stocking rate and stocking strategy regimens. All stockers have been ultrasound assessed prior to feedlot residence, and carcass traits are collected at time of harvest. The Brahman cow herd at Overton has had weaning heifers and bulls phenotyped for Residual Feed Index (RFI) (Randel). Heifers ranked as positive or negative were bred to RFI- positive and negative Hereford bulls. The F-1 (HxB) heifers have been assessed for RFI with a collaborative agreement with the Samuel Roberts Noble Foundation in Ardmore, OK (Ryan). The RFI-ranked Brahman bulls have been assessed for intake under grazing conditions using alkanes (Forbes, Rouquette, & Tedeschi). Various breeds of steers and heifers have been assessed for RFI via Growsafe technology at TAMU-College Station (Carstens). Bonsmara heifers were phenotyped for RFI at both the weaning stage and again at the bred heifer stage (Forbes, Carstens). Forage protein digesta kinetics and use of nutritive parameters have been used in modeling projects (Tedeschi, Wickersham).

(4) Evaluate the role of multiple industries' co-products as supplements for beef cattle offered forage-based diets and their impact on beef cattle production.

Arkansas

Multiparous, ruminally cannulated beef cows were given ad libitum access to bermudagrass hay with either no supplement (CONT) or 0.45% of BW (DM basis) from either conventional DDG (CDDG), a lower-fat DDG (LFDDG), or a heated LFDDG (HDDG).

Hay DMI was greater from CONT compared with CDDG and LFDDG, but total DMI, ruminal pH, total VFA, and in situ forage disappearance parameters were not different among treatments. Ruminal ammonia tended to be greater from CDDG compared with CONT and HDDG. Molar proportions of propionate, butyrate, and acetate:propionate were greater from cows receiving DDG compared with CONT, but no differences were observed among DDG types.

Impact: When offered at lower levels, variation in types of DDG does not seem to have a substantial effect on intake and ruminal fermentation by lactating beef cows offered medium quality bermudagrass hay thereby reducing the concern that in particular, heated DDGS may have reduced feed value for ruminants.

Florida

A research project was conducted to evaluate the level of additional soybean meal to supply rumen degradable protein to dried distillers grains supplements for growing beef heifers. The addition of soybean meal to dried distillers grains did not affect beef heifer growth or reproductive performance.

A research project was conducted to evaluate the effect of level of dried distillers grains supplementation on bermudagrass round bale silage use in beef steers. Increasing supplement amount of dried distillers grains displaced forage intake, increased total dry matter intake, and resulted in transitory changes in rumen pH and ammonia-N concentrations.

A research project was conducted to evaluate the use of a dried bakery-poultry bedding beef feed product manufactured by a Florida company. Different levels of the feedstuff was provided to backgrounding beef steers. Increasing the feed supplied increased calf bodyweight gain, resulted in greater economic return, and extended the grazable forage resource. Adaption to the product was required for lightweight calves.

Georgia

1) Byproducts increasing in availability in Georgia (sunflower meal and canola meal) were evaluated as supplementation for stocker cattle fed a corn silage-based diet.

Accomplishment: Two years of data are summarized and the second year's data is currently being collected.

Impact: Preliminary data indicate both meals maintained animal performance compared to soybean meal while decreasing cost of gain by \$2.90 and \$4.20/cwt. for canola meal and sunflower meal, respectively.

2) Diets utilizing bulk commodities (50:25:25 soybean hulls, corn, and corn gluten feed or dried distillers grains) were evaluated as a replacement for a commercial ration (traditionally used in the Georgia Bull Test Program) for developing yearling bulls.

Accomplishment: The second year of data is collected and currently being summarized.

Impact: Bulls consuming the corn gluten diet gained similar to the commercial diet while bulls on the distillers' grains gained less (3.9, 4.0, and 3.5 lb/d, respectively). However, all gains are acceptable for developing bulls, and both the corn gluten and distillers grains diets decreased the cost of gain compared to the commercial diet (\$75.70, \$76.30, and \$94.00/cwt).

Louisiana

1) Accomplishment: Recent droughts have forced producers to use carryover hay from previous years or purchase hay often times of low quality. We evaluated supplementing a liquid protein provided either in a lick tank free choice (TANK), poured into round bales at 10% (POUR10), or at 15% (POUR 15) of bale weight with low- to medium-quality warm-season grass hay on waste and animal performance. The amount and percent of hay waste from the POUR15 (132 kg/bale and 23.9%) was lower compared with the TANK (180 kg/bale and 31.7%) treatment; however both were similar to the POUR10 treatment (150 kg/bale and 26.8%). Positive differences in BW gain and ADG were observed among treatments within weight block.

Impact: Treating low- to medium-quality hay with a liquid protein supplement reduced hay waste and may offer opportunities to utilize carryover hay inventories without excessive waste. This research was conducted as a result of hay shortages, resulting in feeding of lower quality hay during the winter of 2011/2012 due to the severe drought in the south. As a result of this research, many producers in Louisiana and Arkansas utilized this practice to treat their poorer quality hay and reduce hay waste as much as possible.

Tennessee

Rye balage fed to stocker steers was supplemented by topdressing 4 lbs. of dried distillers grains, soybean hulls or a control supplement (80% ground corn and 20% cottonseed meal). Distillers grains provided the greater daily gains than the other supplements.

Texas

Supplementation (Overton-Rouquette) and/or forage conservation experiments have been conducted in previous years and are most likely to be initiated upon receipt of extramural grant funds.

(5) Evaluate methods of harvesting and conserving forage and the subsequent impact on forage quality and cattle performance.

SERA-41 (Multi-state project)

Evaluation of low and high management cow/calf systems for sustainable beef cattle production. Three states have implemented or are in the process of implementing long-standing research projects to evaluate best management practices and their effect of long term sustainability of beef cattle production. Current states include Arkansas, Louisiana, Georgia, and North Carolina. Other states have indicated their intentions to join the effort in coming years.

Arkansas

Large round hay bales of predominantly bermudagrass with varied degrees of caramelization among and within bales were identified, sampled, and the hay from within each bale was separated into 3 levels of heat-damage (LOW, MED, HIGH) based on visual color and olfactory characteristics that were verified by ADIN analysis. Dry matter intake, and the digestibilities of DM, NDF, and ADF, as well as digestible DM and OM intake were greater from LOW and MED compared with those from HIGH using 3 to 4-yr old Katahdin ewes. Organic matter digestibility and concentrations of serum urea nitrogen were greater from LOW compared with MED and from MED compared with HIGH.

Impact: Testimonials that ruminant animals preferentially consume caramelized hay may be due to greater shattering of this hay, giving the appearance of consumption. It is highly unlikely that severely caramelized hay will meet even the maintenance requirements of ruminants because of low intake and digestibility.

Florida

A research testing different additives and inoculants on Jiggs and Tifton 85 bermudagrass was conducted. There were no effects of three commercial inoculants on fermentation parameters and nutritive value of bermudagrass silage, however, the use of molasses as additive resulted in better nutritive value and fermentation parameters.

Kentucky

Due to the extreme heat and drought conditions, many areas suffered reduced pollination of corn and substantial yield losses. In an effort to salvage the crop as livestock forage, producers opted to harvest as silage. Stalks from fields that were non-irrigated or irrigated at least once were sampled. Stalks were measured for brix (sugar) and height. Stalks were chopped and then ensiled in vacuum bags to observe fermentation characteristics. We demonstrated that the silage would ensile fine. Next a portion of a field was either cut with a disk hay mower, a mower-conditioner or a brush rotary mower. Material was baled in large round bales, wrapped in 6-8 layers of plastic and allowed to ensile. Samples showed that the quality was 80-85% of normal silage. Fermentation profile showed that the silage ensiled well and would make good beef cattle feed.

Louisiana

1) Accomplishment: The use of hay as a strategy to reduce the area of ryegrass needed to sustain a profitable stocker system is under evaluation (2011 was the first year). Hay is offered: 1) no hay, control, only grazing ryegrass; 2) ad libitum access to a round bale of bermudagrass hay; 3) when forage mass (ryegrass) is below 1000 kg DM/ha, a round bale of hay is provided; 4) alternate days of grazing ryegrass and hay fed using calan gates; 5) 4 days on ryegrass and 3 consecutive days in the barn when hay is fed. We are on the third year of evaluation and steers in treatments 4 and 5 (which grazed half the land area than treatments 1 through 3) had reduced performance (0.27 kg less ADG than treatment 1) but greater production per unit of land (25% more).

Impact: Positive results in beef produced by unit of land may help small producers to maximize their income.

2) Accomplishment: The mature size of beef cows in the United States has increased approximately 136 kg in the last 30 years; however, little is known if the increase in size has affected feed efficiency. We evaluated if differences in dry matter intake and residual feed intake exist based on cow size. When cows were sorted into a light (558 kg) or heavy weight (626 kg) group, dry matter intake was greater for the heavy (16.7 kg) versus light (15.6 kg) cows with no difference in RFI based on cow weight group. However, when cows were classified as either a positive RFI (1.65) versus a negative RFI (-1.48), mean cow body weights were similar. In addition, when cows were classified as either a high (2.35), medium (-0.04), or low (-2.28) RFI, mean cow body weights were similar.

Impacts: While differences in dry matter intake were associated with cow size, mature body weight is not a good predictor of feed efficiency in beef cows using RFI. The increase in cow size has not positively affected feed intake, potentially reducing the amount of dry matter intake required to maintain a heavier weight cow over a lighter weight cow. However, there are bigger cows that are just as efficient as smaller cows based on the amount of actual forage consumed

minus the predicted forage intake requirement. Thus selection must not be based just on cow size.

Oklahoma

The goal of this trial was to determine the effect of combining feeder type, ionophore supplementation, and limit feeding on hay waste and cow performance. Angus and Angus X Hereford cows ($n = 72$; $532 \pm 59\text{kg}$) were allotted by BW and assigned to 1 of 2 treatments. Treatment 1) (CONT; control) included ad libitum access to an open bottom steel ring feeder and .45 kg/d of a 38% CP cottonseed meal based supplement. Treatment 2) (LIMIT; limited) included limited access to a modified cone feeder with and 45 kg/d of a 38% CP cottonseed meal based supplement with 200 mg/hd inclusion of monensin (MON, Rumensin 90®; Elanco Animal Health; Greenfield, IN). Cattle were assigned to 1 of 6 pens, 3 pens per treatment. Supplementation and hay feeding began September 25, 2012 and ended December 15, 2012. Cattle were weighed and body scored on d 0, d 56, and d 84, and a final shrunk weight was taken on December 20, 2012. The 4 pens where hay collection was measured were equipped with a 12.2 x 7.6 m² concrete pad where the hay feeder was placed. Hay waste was expressed as any hay remaining on the pad and outside of the round bale feeder at the time of collection. Orts were collected prior to the waste collection bale being placed in the feeder as well as at the end of the collection period. Hay waste collection periods lasted for the duration of 1 round bale and collection occurred at 1400 h daily. Hay waste was collected 3 times beginning on d15, d 36, and d 79 respectively. The hay waste was separated into wet and dry sub groups and weighed during each collection. Grab samples were taken from each sub group of wet waste, dry waste, and Orts for analysis. Bales were weighed and core sampled prior to feeding. Fecal grab samples were taken at 0800 h and 1700 h on each day of waste collection. Fecal samples were composited within pen per day for each collection period. Bale cores were composited within pen. Waste grab samples were composited within pen per collection period. All samples were analyzed for ADF, Ash, CP, DM, NDF and OM. There was no significant difference observed between treatments for d 0-84 BW change ($P = 0.33$), d 0-84 BCS change ($P = 0.43$), or off test shrunk BW ($P = .86$).

Round bale feeding is a very common practice in beef cattle production in the Southern region. This study shows great potential for increasing round bale feeding efficiency by reducing feeding waste using a combination of technologies previously shown to improve efficiency independently

South Carolina

Accomplishments: A three year multi-state research project was conducted to examine the impact of toxic tall fescue exposure on reproductive performance of 2 and 3 year old beef cows (see basis for this study in subobjective 1 from South Carolina). After one year of data were collected the study was expanded to include impacts of tall fescue on semen quality of bulls grazing this forage. This expansion addressed potential issues observed with clean up bulls breeding cows following timed AI. Cow studies examined the impacts of either nontoxic or toxic tall fescue grazed either pre- or post-insemination as well as interactions. Bull studies examined the impacts of exposure to either nontoxic or toxic tall fescue (via seed feeding or grazing) on semen quality. Data collected to date indicate that exposure to toxic tall fescue prior to insemination has a substantial detrimental impact on timed AI conception rates even when

cows are removed from fescue at insemination. In addition, exposure to tall fescue only during post-AI time periods also impacted the conception rates of females, and data appeared to indicate that fertility of clean up bull may be impacted as well. There were no impacts of toxic tall fescue on abortion rates of fetuses when compared to cows that grazed nontoxic tall fescue. We are currently waiting for final calving dates in year three to complete this cow study and publish results. Two bull studies have been conducted to examine the impact of feeding toxic vs nontoxic fescue on semen quality. In study one, seed was fed in a concentrate-based diet programmed to provide approximately 1 kg/day gain. Impacts on semen motility and velocity were observed and there was significant vasoconstriction of the caudal vein as well as vasculature supplying the testicles. Results from this study are currently accepted pending revision for the Journal of Animal Science. In study two, bulls grazed either toxic or nontoxic tall fescue during summer months and semen was collected via electroejaculation at regular intervals. There were also significant impacts observed on semen quality measures in this study and significant vasoconstriction was also observed. Currently, bulls are grazing toxic and nontoxic fescue and semen collected from these bulls will be evaluated to measure semen quality parameters as well as actual fertility using timed AI procedures on cows grazing nontoxic tall fescue (no cow exposure to tall fescue to define impacts of fescue on semen). The purpose of this upcoming trial is to determine if male fertility is impacted by grazing toxic tall fescue.

Impacts: Conducting the reported cow and bull studies above required extensive collaboration across state lines and institutions. Clemson University provided animal and pasture resources along with semen analysis and real time ultrasound. University of Tennessee faculty has provided laboratory and experimental design expertise, prolactin analysis, and served on two Ph.D. graduate committees. USDA-ARS in Lexington KY has provided Doppler ultrasound equipment, analysis and overall expertise in study design and data interpretation. All of the above collaborations have uncovered a more fundamental understanding of the mechanisms responsible for fescue toxicosis on male and female reproduction. Because of this collaboration, further studies using sheep as a gestational model have begun at Clemson University and multiple (4) USDA grants have been submitted with varying degrees of multi-state collaboration between NC State, University of Tennessee, Clemson University and USDA-ARS. Information has been delivered widely in Extension programs and production changes have been made on multiple farms to improve conception rates and increase overall animal production while decreasing economic risk. Specific data can be supplied upon request, we are now in the process of submitting two journal articles with one other article accepted pending revisions.

Tennessee

Tall fescue and switchgrass cut at two week intervals from early May to late July were successfully preserved as haylage in laboratory silos. This provides producers with alternatives for preserving nutrients produced during growing season. Higher moisture (60%) haylage was more consistent in quality than lower moisture (40%) haylage.

- (6) Evaluate the use of supplemental nutrients to enhance animal immunity and health being grown on southern forages.**

Florida

An experiment was conducted to compare the inclusion of different feed additives (antibiotic, ionophore, or yeast extract product) for fresh-weaned beef calves during a backgrounding growth period. Calf weight gains and acute phase protein response, and economic outcome were optimized for calves that were provided a supplement that contained a yeast extract product.

Texas

Stocker experimentation on wheat pastures has been conducted at Texas AgriLife Research at Vernon (Pinchak) that has characterized parameters of bloat. Collaborative research related to immune function has been enhanced by Drs. Randel (Overton) and Welsh (College Station) with scientists at Mississippi State (Vann) and USDA/ARS Lubbock (Carroll).

(7) Meet annually to discuss ongoing research, Extension programs and build collaborations for future programs.

Florida

Faculty members from the University of Florida met with other faculty members from cooperating universities during the Annual Southern Section Animal Science Meetings in Birmingham, AL.

Georgia

Attended the annual SERA-41 meeting.

Accomplishment: Information was exchanged from various states regarding extension and research activities.

Impact: Contacts were identified in different states as a source of information.

Kentucky

Attended the annual SERA-41 meeting in conjunction with the Southern Section American Society of Animal Sciences. Actively participated in the meeting sharing information and views from our state's perspective.

Louisiana

Attended the annual SERA-41 meeting.

Accomplishment: Information was exchanged from various states regarding extension and research activities. Scaglia and Boland from MS worked together on grazing behavior studies at the Iberia Research Station (LSU AgCenter) and the Prairie Unit (Mississippi State University). This collaboration led to publication of abstract and manuscripts in preparation. Personal contacts with scientists open the door to future talks trying to identify common ground for future projects. This effort led to the participation of Scaglia in a Grantsmanship Workshop (Atlanta,

GA) together with research and extension Faculty from South Carolina (Andrae), Arkansas (Beck), Kentucky (Lemhkhuler), North Carolina (Poore), and Georgia (Stewart).

Impact: This group of scientists (mentioned above) will submit at least 2 proposals to AFRI during the course of 2013. We also discussed the idea of evaluating cow-calf systems with emphasis on what the stakeholders demand in each state (hay feeding strategies, reduce N fertilization costs, use of legumes, etc.).

North Carolina

Matt Poore attended a grant writing workshop with the group from SERA-41, the Southern Section of the American Society of Animal Science meeting, and the NCBA national convention. Each of these provided opportunities to discuss research opportunities and a multistate research/extension proposal is being developed as a result of the interactions.

Texas

The Texas Pasture & Forage Work Group and the Texas Beef Work Group meets once a year to report/update scientists on existing and future programs. These two workgroups meet at the same place and date to make efficient use communication, of time, and funds. Meeting sites are rotated among College Station and Texas AgriLife Research and Extension Centers that have forage and/or beef research projects.

Sub-Objective 1: Extension Initiatives

- (1) Seek input from stakeholders in developing educational programs priorities as well as securing financial support for developing and implementing Extension educational programs in beef cattle and forage management.**

Arkansas

The University of Arkansas Department of Animal Science Extension Faculty has a county agent advisory committee. This committee meets once or twice a year and the purpose of this committee is to determine the direction of the state-wide animal science extension programs (including beef/forage). This stakeholder input is vital to insure that the programs implemented are pertinent and timely.

For the past 10 years, the Department of Animal Science Extension secured grants from Farm Credit of Western Arkansas specifically for supporting educational programs related to beef and forage production management.

Dr. John Jennings is a board member of the American Forage and Grassland Council and Dr. Shane Gadberry served on the Production Management and Environment Joint Program Committee (American Society of Animal Science).

Dr. Tom Troxel represents the Department of Animal Science with the Arkansas Cattlemen's Association, Arkansas Cattlemen's Foundation, Grazing Land Coalition, Arkansas Farm Bureau Beef Cattle and Equine Divisions, Arkansas Milk Board, Arkansas Livestock and Poultry Commission, Arkansas Beef Council, and Veterinary medical Examining Board.

Georgia

An advisory group consisting of producers, specialists and industry representatives from Georgia, Alabama, Florida, and South Carolina was assembled to develop the Southeastern Cattle Advisor. Funding was secured for FY 2013 through a grant from the Southern Risk Management Education Center. A multifaceted program was developed that included a website, seminars, and mobile applications to help producers manage risk in marketing and production (including forage systems).

Kentucky

The IRM Beef Team secured more than \$300,000 for 2011 and 2012 in conjunction with the Kentucky Beef Network from the Kentucky Agricultural Development Fund to support Beef Extension educational programs that include Master Stocker, Master Cattleman, Master Grazer and Applied Master Cattleman programs.

North Carolina

In North Carolina, participants in SERA-41 worked with the North Carolina Cattlemen's Association to develop a state assessment program that would provide funding for Adult Education, Youth Education, and Applied Research Projects through a statewide assessment program in addition to the national beef checkoff. The program was first authorized by a producer referendum in 2009 for three years and was authorized by an additional 6 years referendum in 2012. The strategy of using a program where guidelines for expenditure of funds was developed ahead of the referendum, using producer panels to evaluate proposals, and workshops in 2012 that highlighted impacts of the program during the first 3 years resulted in the referendum passing with a 92% favorable vote.

Tennessee

The Beef and Forage Center was launched with Dr. Gary Bates of Plant Science named as Director. The center will serve the beef industry as a portal for research and extension activities and aid in communication between beef producers and university research and extension personnel. The center has an advisory group representing the beef industry and agribusinesses supporting the beef and forage industries.

Texas

County-wide stakeholders representing commodities of forage, pastures, and beef cattle meet annually with County Extension Agents and Specialist to develop educational program priorities.

- (2) Develop educational programs that can be delivered via web-based technology and distance education through regional and multi-state efforts to address forage management for cow-calf, stocker, and finishing systems for county agents/educators and ultimately clientele.**

SERA-41

From discussions originating at the 2012 SERA-41 meeting, the team developed and delivered three webinars during the late fall of 2012. Members of SERA-41, plus invited members, participated in delivering information related to coproduct feedstuffs in a two-part series as feed prices escalated this fall. A technical program on using calcium oxide/hydroxide for improving forage digestibility was also hosted with guest speakers from industry presenting. Close to 300 participated or viewed the recorded sessions.

Arkansas

Beginning in November of 2009, the University of Arkansas Department of Animal Science Extension began video recording of conference presentations and posted on the internet. From November 2009 through December 2012 39 videos were posted. Total videos loads were 51,371 with 5,237 played.

Georgia

The Southeast Cattle Advisor (described in EXT-1) utilized a web-based seminar series and website to deliver risk management education via distance technology.

Texas

Web-based technology continues to be developed to enhance the delivery efficiency for county and multi-county meetings. Texas AgriLife Extension Forage & Livestock Specialists have been involved with Texas Beef Quality Producer Programs; Hay and supplementation strategies; CEU's and pasture management; Cattlemen's College; and fee-based Pasture & Livestock Management Workshop.

- (3) Design and deliver multi-state and multi-disciplinary educational programs that address southeast specific issues for beef production systems including cattle nutrition, marketing, health, genetics, and management decisions.**

SERA-41

Alternative feeds webinar series (see EXT-2)

Florida

The 2012 Florida Beef Cattle Short Course was conducted in May of 2012. This program addresses a comprehensive array of issues that affect the beef cattle industry including: cattle markets, nutrition, management strategies, and forage production. Annually, attendees report an increase in knowledge regarding the topics, indicate a desire to implement changes on their enterprise as a result of attending the program, and regard the opportunity for change as having a positive impact on their enterprise.

Georgia/Alabama/Mississippi

The Cooperative Extension Services of Mississippi, Georgia, and Alabama collaborate to produce the Deep South Stocker Conference. This conference rotates between states and was

hosted by Mississippi State University in 2012 in Meridian, MS. The educational program topics included forage production systems for southeastern stocker producers, use of by-product feeds for stocker production, strategic parasite control for stocker cattle, health management strategies for high-risk calves, and an economic analysis of Mississippi Feeder Calf Board Sales. The conference was well received by participants with an overall rating of 4.45 on a Likert-type scale, where 1= poor and 5 = excellent. Of the educational topics included in the program, participants rated the talk on health management with highest score at 4.69, followed closely by forage production systems at 4.66.

Kentucky/Tennessee

A collaborative effort between the University of Kentucky, the University of Tennessee and industry partners delivered the Mid-South Stocker Conference. Presenters from multiple states delivered educational material related to the stocker and backgrounding segments of the industry. Approximately 125-175 producers and vendors engage in this conference. Topics covered include health, nutrition, economic outlook, and other management related topics.

Louisiana

Accomplishment: Participation (Scaglia, presenter) in different activities including the Acadiana Cattle Producers Spring and Fall Field Day (Iberia Research Station and Vermilion parish), 2 pasture walks at producers' farms, and the Louisiana Forage and Grassland Council Annual Meeting.

Impact: Approximately 280 producers were reached in these presentations.

North Carolina

Virginia and North Carolina Cooperative Extension and Agricultural Research Services combined efforts with the NC and VA Forage and Grasslands Councils to hold a field day near the NC/VA border in the Central Piedmont. The program focused on several important topics including 1) use of summer/winter annuals in a endophyte infected fescue conversion project, 2) reducing stress on cattle through low stress handling techniques, 3) identifying common forages and management strategies related to each, 4) use of stream buffers to develop wildlife habitat. Total attendance at the field day was 265 and a high percentage of producers surveyed indicated an intent to implement at least one of the management practices introduced.

(5) Share education program evaluation tools to improve data capture, demographics, and information needs of clientele within states and the region.

(6) Develop and publish translational science-based information for distribution via websites and eXtension community of practice.

Arkansas

The Animal Science electronic newsletters continue to grow and become more important to transferring information to clientele. The Animal Science Unit sent out 8 electronic newsletters to 74,925 subscribers and 18,878 (25%) readers opened the email. News letter include Animal Science E-News, Dairy E-News, Beef Management Tips, Beef Champs, Small Ruminants E-News, Equine E-News and the Beef Cattle Research Update. Animal Science developed a Facebook page and launched a blog site in 2012. The blog will allowed Animal Science to reach agents and clientele more directly with timely information. Currently there are 182 followers on the Animal Science blog.

Kentucky

Utilized eXtension Beef CoP to help promote SERA-41 webinars.

North Carolina

In North Carolina in 2012 a number of hands-on beef cattle workshops were created to highlight educational and research projects funded over the first 3 years of the NC Cattle Industry Assessment Program. One key to this program was the use of an evaluation tool that asked producers if they intended to implement the specific practices demonstrated, and also that enumerated the number of acres and total head of cattle impacted by the program. This information is key to determining economic impact of an educational program, and the concept was shared with specialists from other states as part of the ASAS Southern Section meeting.

Tennessee

The Master Beef Producer Program continues to be very popular with Extension Agents and Stakeholders. Eleven thousand cow-calf producers have completed the 13-topic program. Plans are underway to revise and provide more in depth modules for producers after they complete the initial program. Eleven thousand cow-calf producers have completed the 13-topic program. The Eight Annual Mid-south Stocker Conference was a success and virtual tours of stocker operations were used at the program site and a panel discussion was used to provide additional information to producers. The Tri-State Beef Conference was held for producers from TN, NC and VA.

(7) Coordinate a Beef-Forage symposium at the annual meeting of the Southern Section American Society of Animal Sciences (ASAS) meeting.

SERA-41 coordinated an interdisciplinary Beef Cattle Symposium at the Southern Section Animal Science meetings in Orlando, FL. The focus topic was the impact of climate change and associated heat stress on forage-based beef production systems. The symposium was well attended with the audience ranging from 60 to 80 persons, and the activity stimulated discussion of forage-based production systems by faculty from multiple states and institutions.

North Carolina

Participated in the organizational team that developed the most recent symposium on the impact of climate change and associated heat stress on forage-based beef production systems. Worked with the SERA-41 group and the leadership of ASAS Southern Section to develop a strategy to maintain the symposium through a dynamic program committee and a perennial sponsor.

2. Enhance relationships between the Land-Grant University missions of research and extension with beef cattle commodity groups through State Beef Cattle Associations and other beef cattle related organizations.

SERA-41

A subcommittee (G. Scaglia, LSU; J. Andrae, Clemson; P. Beck, UAR; J. Lehmkueller, UKY; M. Poore, NCSU, and L. Stewart, UGA) was nominated from the SERA-41 to attend a grant-writing workshop in Atlanta. From this meeting, a multi-state and multi-discipline team has submitted a letter of intent for a USDA AFRI Climate Change proposal and was asked to submit a full proposal.

Arkansas

University of Arkansas Department of Animal Science faculty assisted the Arkansas Cattlemen's Association in planning and making presentations at the Producer Education Seminars conducted at their annual Convention. Dr. Tom Troxel serves on the Arkansas Cattlemen's Education Committee.

University of Arkansas Department of Animal Science faculty assisted with the Arkansas Farm Bureau Beef Cattle Commodity Committee.

Florida

Participants from Florida attend quarter and annual meetings of the Florida Cattlemen's Association. Develop, deliver, and attend large and small educational programs for cattle enterprise owners. Develop, deliver and attend field days and demonstrations within the state of Florida.

North Carolina

Attended the NCBA national convention and participated in the Region II caucus meeting where strategies to improve the funding and support for education and research were discussed.

- 3. Develop strategies for funding high-priority integrated research and extension programs.**

Kentucky

Attended a grant writing workshop in Atlanta with other members of the SERA-41 group. Submitted a letter of intent for a USDA AFRI Climate Change proposal and were asked to submit a full proposal. This workshop has spurred on other grant submissions that are multi-state focused on beef production in the southeast. The grant workshop was highly productive and it would be ideal if members of SERA-41 could attend a grant writing workshop together in next couple years.

North Carolina

The SERA-41 team sent a team to a grant writing workshop to develop several ideas for future multistate research and educational programs. This workshop has resulted in one grant proposal that has been submitted to the Southern Risk Management Education Center (North Carolina State University and Clemson) for a project that will teach producers about pasture ecology, and conduct on-farm grazing demonstration projects focused on working to assist mainstream producers adopt advanced grazing management. This educational strategy has been used in the past three years in North Carolina with over 95% of producers that participated in a demonstration adopting the practice long-term. There have been reciprocal efforts in North and South Carolina for the last several years, but this project will formalize that connection. Forage-Beef Extension Specialists in North Carolina and South Carolina also combined efforts to produce a "Spotlight on Forages" edition of the Carolina Cattle Connection that has a circulation of 7000 in the two states. This edition used articles provided by a variety of states including Georgia, Virginia, Tennessee, South Carolina and North Carolina.

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