2015

Proceedings of the 69th Southern Pasture and Forage Crop Improvement Conference

Apalachicola, FL
March 30-April 1, 2015

http://agrilife.org/spfcic/

Table of Contents

Workgroup Sessions

Florida Program

Florida Cattle Industry

Jim Handley
Executive VP, Florida Cattlemen's Association

BMPs to Address Florida Water Issues

Bill Bartnick

Florida Department of Agriculture

Description of Agricultural Best Management Practices (BMPs)

Agricultural BMPs are practical, cost-effective actions that agricultural producers can take to reduce the amount of pesticides, fertilizers, animal waste, and other pollutants entering our water resources, and to conserve water supply. BMPs are designed to benefit water quality and water conservation while maintaining or even enhancing agricultural production. The Florida Department of Agriculture and Consumer Services (FDACS) develops and adopts BMPs by rule for different types of agricultural operations. Most of the BMPs are outlined in specific manuals, which can be found on the website below.

Purpose of Agricultural Best Management Practices

Florida law provides for agricultural producers to reduce their impacts to water quality through the implementation of BMPs adopted by FDACS. In some cases, agricultural BMPs are required. The Florida Department of Environmental Protection (FDEP) is developing Total Maximum Daily Loads (TMDLs - target levels for specific pollutants in impaired waterbodies), and is adopting Basin Management Action Plans (BMAPs) for many of these TMDLs. Implementing BMPs benefits both the farmer and the environment, and demonstrates agriculture's commitment to water resource protection.

Rule-Adopted Agricultural Best Management Practices

- Citrus Groves
- Vegetable and Agronomic Crops
- Nurseries
- Cow/calf Operations
- Equine Operations
- Sod Farms
- Specialty Fruit and Nut Operations
- Conservation Plans for Specified Operations

http://www.freshfromflorida.com/Divisions-Offices/Agricultural-Water-Policy/Enroll-in-BMPs/BMP-Rules-Manuals-and-Other-Documents

Implementation of Agricultural Best Management Practices

Producers submit a Notice of Intent (NOI), with a BMP Checklist, to implement the FDACS BMPs that are applicable to their operations. In areas with FDEP-adopted BMAPs that include agriculture, producers must implement BMPs or conduct water quality monitoring. Implementation of FDACS-adopted BMPs provides a presumption of compliance with state water quality standards. FDACS has a long-term commitment to enlisting and providing assistance to farmers to implement BMPs.

FDACS also contracts with entities such as the University of Florida's Institute of Food and Agricultural Sciences (IFAS), the water management districts, the soil and water conservation districts, the resource conservation and development councils, and private-sector entities to provide cost-share, educational, and technical assistance.

Refinement of Agricultural Best Management Practices

Nearly all of the BMP research is conducted by land grant universities.
FDACS has an Implementation Assurance program, to follow up with producers and help ensure that BMPs are being implemented properly. This also provides a feedback loop for future revisions to BMP manuals.
As funding allows, FDACS will be working with FDEP, IFAS, the water management districts, and others to monitor the effectiveness of BMPs in protecting water quality.

Special Best Management Practices Challenges

There will be unique challenges going forward, such as growing multiple crops of hay in spring recharge basins that have an infinitesimally low nitrate-nitrogen standard for surface water. This will demand that producers, researchers and government interests are lockstep in their approach to problem-solving.

Contact: Bill Bartnick, William.Bartnick@freshfromflorida.com

Florida Forage Journey: How Our Soils Got Here and Impact on Forage Choices

Cheryl Mackowiak

Soils and Water Science Dept., NFREC, Quincy, FL

The geologic history of Florida is quite interesting. It is theorized to have formed as part of western Africa about 500 million years ago, which constituted the super continent, Gondwanaland (included South America, as well). Following this, North America combined with Gondwanaland to help form the super continent, Pangaea. When Pangaea broke apart (~ 300 million years ago), Florida remained with North America, but it was submerged, as part of the continental shelf. Over many millions of years, mineral deposits (and quartz sand) from the erosion of the Appalachian mountains, along with a build-up limestone and other marine deposits (via repeated submergence and re-emergence), has resulted in the Florida soils that we see today. Florida's history has been spent primarily underwater as shallow seas, which is illustrated by the immense amount of land associated with limestone or karst (remains of seashells and coral, etc). These porous limestone features make up the largest concentration (33) of first magnitude springs (over 64 million gallons per day) in the world. The springs, the porous karst topography, and a premier aquifer (the Floridan) that dominate the state, are why nutrient inputs (fertilizers and other land applications) are highly scrutinized.

Among most agricultural commodities, forage production likely loses fewer nutrients to the environment, when properly managed. Luckily, Florida has the climate and soils to support a thriving forage industry. Approximately 30% of its landmass is allocated to pasture and range. Florida soils are typically coarse or fine sand textured. They are represented by primarily three major soil types or orders: 1) the red clay soils of the Florida Panhandle (Ultisols), 2) the deep sands along the Florida Ridge (Entisols), and 3) the poorly drained sandy soils of the flatwood areas (Spodosols). We also have some organic soils (Histosols) in the Northern Everglades and shallow, lime rock type soils in extreme south Florida. All of these soils are naturally low in plant-available nutrients and are often acidic. However, each of the top 3 has a place in supporting good forage production when effectively fertilized and managed.

Soils, geography, and climate help to determine the natural vegetation in any given landscape in the world. The USDA-NRCS uses this information to help classify Land Resource Regions and Major Land Resource Areas (MLRAs) across the U.S. Descriptions within a given MLRA (encompassing multiple counties and often crossing state boundaries) can provide clues to help determine which forages may be most suitable for a given area. Conservation programs refine the MLRAs further with Land Resource Units (LRUs), and we are familiar with the use of soil surveys to distill forage adaptability down to the farm-scale, based upon soil series descriptions. The MLRAs can be a benefit to agroecological principles by providing a framework for determining adapted forage selections and successful management schemes, based upon soils, climate, and geography.

Florida is comprised of 8 MLRAs (Southern Coastal Plain, North-Central Florida Ridge, South-Central Florida Ridge, Eastern Gulf Coast Flatwoods, Atlantic Coast Flatwoods, Southern

Florida Flatwoods, Southern Florida Lowlands, and Florida Everglades and Associated Areas). Cool-season forage performance, in particular, is often reflective of the different MLRAs. For example, it is often difficult to grow dryland annual ryegrass or clovers in the ridge designations, due to droughty soils. In contrast, the Atlantic Coast Flatwoods are often too wet to support some forages. White clover and annual ryegrass may be more successful in this area.

For Florida alone, we might consider developing up to 8 different forage handbooks (hardcopy or electronic) tailored within each MLRA, or perhaps combine MLRAs (group one or more "Flatwoods" designations), based upon similar forage selections and management. The opportunity exists to develop the most well-defined forage production manuals to date, based upon existing geospatial classification schemes. Currently, each state has a single handbook (if any) that may utilize a couple of broad delineations. The SPFCIC community can have a major impact on southeastern forage production education by developing a successful model or method, based upon more practical and refined designations. Perhaps this is an area that the officers and membership will like to consider for further discussion.

Contact: Cheryl Mackowiak, echo13@ufl.edu

Florida Forage Journey-The UF Forage Program

Ann Blount

Forage Breeder, NFREC-Marianna and Quincy

Forage production in Florida is unique because of its mild, temperate to subtropical climate, which allows us to successfully utilize temperate, tropical and semi-tropical forage species. Forage production in the state is based on warm-season (C-4) perennial grass species (e.g., bahiagrass, bermudagrass, stargrass and limpograss). While these grasses support livestock throughout the major portion of the year, forage production declines during the fall. Hay or silage is often fed when perennial pastures turn dormant. Winter grazing of small grains, ryegrass, and cool-season clovers may be utilized during the late fall to early spring. Some annual forages are grown on cultivated land, particularly when high quality forages are needed. These annual forages include pearl millet, crabgrass, forage sorghum, sorghum-sudangrass, and sudangrass. Some annual legumes are also grown, such as, iron and clay pea, aeschynomene, alyceclover, hairy indigo, stylosanthes, phaseybean, sun hemp, and forage soybean. Warm-season perennial legumes are really limited in Florida to perennial peanut and leucaena, although leucaena is considered invasive and it is not legal to propagate.

The significant challenge with forage production throughout Florida is the distribution of forage production over the course of the year. During summer months, forage production is often excessive, while it drops off significantly during the fall months.

Lack of available forage for livestock is a relatively short duration in south Florida. In south Florida, livestock often graze on stockpiled forages, or in situations where natural moisture or irrigation is available, cool-season forages may be grown, such as oats, triticale, ryegrass and some clovers. There has been increased use of baleage and silage, particularly by dairy and large-scale beef operations. Corn, bermudagrass, stargrass, and some cool-season small grains can be ensiled.
In north Florida, the winter period typically extends from November to April. Winter grazing is often seeded on cultivated fields or overseeded on perennial grass pastures. There are many cool-season forages that can be successfully grown in the northern counties of Florida, depending on soil type and moisture regime. Ryegrass, oat, cereal rye, triticale and some wheat are well-adapted. Of the clovers, crimson and white clover are most common, while arrowleaf and red clover are gaining in popularity among some producers, since new southern developed cultivars are now on the market. Vetch and winter pea are not as common, probably because local seed availability has limited their ease of purchase. Alfalfa was once grown in Florida as a high quality hay crop. Today, few livestock enterprises grow alfalfa because of its high seed cost and short perennial lifespan. Recent new cultivars have renewed interest in this forage species as both a potential hay crop or for use in mixed swards with summer perennial grasses.

As extension specialists, we often recommend planting blends of cool-season forages to protect against inclement weather and offer an extended period for forage production. Grazing generally becomes available in mid- to late November or December. However, forage productivity depends on time of planting and weather conditions, particularly adequate soil moisture. Deferred grazing, hay, feed concentrates, and other supplements are often needed to support livestock throughout the winter months or until winter grazing is established.

Forage breeding in Florida has focused on tropical and temperate forage species. We have a long history of developing improved cultivars that result from intense selection among temperate species for disease and nematode resistances and tropical species for cold tolerance and winter hardiness. We often manipulate photoperiod and vernalization requirements in forages to adapt them to our Florida environment.

The University of Florida's Forage Breeding Program is based at both, the North Florida Research and Education Center (NFREC-Marianna and Quincy), the Range Cattle Research and Education Center (Ona) and at Gainesville. We focus breeding on sub-tropical forages, specifically bahiagrass, bermudagrass, perennial peanut and limpograss, and temperate species that include triticale, cereal rye, oat, ryegrass, alfalfa and clover.

The University of Florida supports four forage breeders that work as a team to develop and test new forages for Florida and areas of similar climate. Ann Blount, Patricio Munoz, Kevin Kenworthy and Ken Quesenberry (Professor Emeritus) comprise the work group. Ann Blount is located at the NFREC. Patricio Munoz, Kevin Kenworthy and Ken Quesenberry are located at Gainesville. Our cultivars are also grown world-wide because of their adaptation to areas of the world with similar climates. Recently, we added a new small grains breeder, Ali Babar, at Gainesville, who works with us on forage-type small grains.

Forage management specialists in the state evaluate new, experimental forages for nutritional quality, persistence and management strategies. Our forage management faculty includes Joao Vendramini at the RCREC-Ona, Jose Dubeux at the NFREC, and Lynn Sollenberger at Gainesville. Ann, Joao, and Jose are also the state forage extension specialists. Many articles related to forages utilized in the state, our recommendations, management and integration into pasture or conserved forage systems are available on-line at EDIS, our extension publication site for UF-IFAS.

In addition to our forage team, we work closely with Cheryl Mackowiak and Maria Silveira, our state research and extension soils specialists, and weed specialists, Brent Sellers, Ramon Leon and Jay Ferrell.

The University of Florida's Forage Breeding Program has been very successful in forage cultivar development and in basic research related to forage and small grain improvement. Since 2005 through 2015, of new southern forage cultivars released by public institutions in the southeastern U.S., 80 % were developed or co-developed by the University of Florida's Forage Breeding Program.

Because of our unique location in northern Florida we have developed a strong multi-state forage program across state lines. We are very actively involved with forage researchers at the University of Georgia, University of Kentucky, North Carolina, Clemson, Auburn, Texas A&M, and Louisiana State Universities, and with scientists at the USDA-ARS (CPES, Tifton, GA) and USDA-NRCS (Brooksville, FL). The University of Florida's Forage Breeding Program is an active member of the

SUNGRAINS consortium, a six-university cooperation of plant breeders who work collaboratively on small grains (oat, wheat, triticale and rye) variety development.

We also partner on several international projects. At present, we are developing a long-term research agreement with the UNNE, at Corrientes Argentina to co-develop forages for North and South America. Similarly we are working with EMBRAPA forage specialists in Brazil on *Paspalum* and *Arachis*. Recently, we began a collaboration to develop forage small grains for Western Australia. We have also been a major contributor and active participant with the PepsiCo-Quaker Oat Program.

Contact: Ann Blount, paspalum@ufl.edu

Forage Ecology/Physiology

The Management and Value of Cover Crops

Danielle Treadwell

Dept. Horticultural Sciences, University of Florida

The national call for awareness and improvement of soil health combined with the realities of a changing climate and uncertainty of future water availability are motivating factors for increasing adoption of cover crops in all types of farming systems. The NRCS's goal of two million acres of cover crops in production by the year 2020 is an aggressive one, and it will require a coordinated effort among farms, agencies, and institutions to achieve. Cover crops are mandated in certified organic farming systems and are well-integrated in row crop systems but consistent integration in vegetable systems is rare. Despite the volume of published reports on yield responses of row crops following cover crops, data that describe the complex interactions observed by experienced farmers are limited, and even fewer reports attempt to explain the underlying mechanisms for these interactions. A review of current literature on cover crop integration into farming systems focused on the relationships among cover crop management practices, the value of cover crops to the cropping system, and the impact to the surrounding landscape provided limited results. Especially pressing is the need for a coordinated documentation of observations regarding cover crop responses to environmental conditions and their ecological and economic impact (positive or negative) on the cropping system. Examples of cover crop integration strategies and lessons learned will be discussed. Next steps include a coordinated effort, including standardization of methods and shared data sets among researchers that could be a game-changer, resulting in a refinement of recommendations and a reduced risk of adoption.

Contact: Danielle Treadwell, ddtreadw@ufl.edu

Soil Management for Soil Quality: Linking Microbial Communities and Ecosystem Functions

Lisa M. Fultz

Louisiana State University AgCenter

"We know more about the movement of celestial bodies than about the soil underfoot."
--Leonardo DaVinci

Central to the definition of "health" is that it can only be assessed for living things, supporting the idea that "soil" is a living, breathing part of the landscape. Soil quality, or soil health, is the capacity of a soil to function within ecosystem boundaries to sustain biological productivity, maintain environmental quality, and promote plant and animal health (Doran and Parkin, 1994). Critical functions performed by the soil include promoting plant growth, water holding and filtration, nutrient cycling, and physical stability. Standard physical and chemical soil tests have been available at a number of commercial and research labs for a number of years, however widespread recognition of the importance of biological properties is more recent. The billions of organisms found in soil are an intricate and vital component, promoting soil ecosystem functions. The response of the dynamic microbial community and biogeochemical processes to anthropogenic changes make them excellent indicators of soil quality.

Evaluation of ecosystem functions and the individuals responsible allow for us to assess how land use decisions and environmental shifts influence overall ecosystem sustainability and human well-being. Soils are the most biological diverse ecosystems on Earth, however only a small fraction (<5-10%) of the microbial population has been identified. Tools to characterize microbial communities range from biochemical techniques (fatty acid profiles, FAMEs or PLFAs) to cutting edge molecular methods including deep-sequencing of extracted DNA. The impacts of genetically diverse populations function at a global level by contributing to the release and uptake of major greenhouse gases (CO_2, N_2O, and CH_4), degradation of soil organic matter, and the mineralization and immobilization of nutrients. Process performed by the microbial community are critical to supplying soil nutrients and facilitating water uptake to support plant productivity. While traditional chemical analyses provides important information on nutrient status; biological assays that specifically target enzymatic transformations of organic and inorganic constituents into plant available forms provide insight into nutrient cycling within the soil. Microorganisms are also critical for the formation of stable soil aggregates promoting resistance to erosion and subsequent environmental and health issues. Physiochemical techniques are used to assess aggregate stability, while molecular tools can be used to quantify populations of organisms known to promote aggregate stability through the production of chemicals and hyphae. The integration of physical, chemical, and biological soil properties provides a detailed analysis ecosystem functionality, which can in turn be used to assess decline or aggradation overtime based on management practices.

Interest in soil quality or soil health has grown and in turn resulted in the advancement of several field and lab tests that integrate soil physical, chemical, and biological properties (most common ones listed below) to quantify soil quality/health. The most robust tests allow for assessment of soil properties over a variety of managements, climates, and soil types. But what makes a good soil quality indicator? Indicators are selected based on their potential to affected one or more simultaneous function, their sensitivity to changes in land use, variability over time, and whether or not they are a measureable soil property. While some labs take a direct approach, reporting the measured values, others assign rankings or use scoring functions. The use of scoring functions, like those used by the Cornell Soil Health Assessment and the Soil Management Assessment Framework, allow for comparison across multiple soil types, climates, land uses, and management conditions.

Common physical indicators include:
- Aggregate stability & slaking
- Bulk density
- Water holding capacity
- Soil texture

Common chemical indicators include:
- Soil nutrient status (N and P)
- pH and EC
- Reactive C

Common biological indicators include:
- Potentially mineralizable N
- Soil respiration
- Enzymatic assays
- Earthworms
- Particulate organic matter (labile C fractions) and total organic C

Available soil quality/health assessments:
Cornell Soil Heath Assessment - http://soilhealth.cals.cornell.edu/
Soil Management Assessment Framework - http://soilquality.org/tools/smaf_intro.html
NRCS Soil Health - http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/assessment/
NRCS Soil Quality Test Kit -
http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/health/assessment/?cid=nrcs142p2_053873
Haney Soil Health Test - http://www.wardlab.com/haney/haney_info.aspx

Findings from research in the semi-arid Southern High Plains:

- ✓ 13 years under integrated crop-livestock management increased soil organic carbon (SOC) by 31% and decreased nutrient and water inputs and losses due to soil erosion (Allen et al., 2012; Fultz et al., 2013a).
- ✓ Integrated crop-livestock management increased protected pools of SOC from 100-150% compared to continuous cotton (Fultz et al., 2013b)
- ✓ While, deficit irrigated grazed grasslands significantly increased SOC (3x's) compared to a dryland cotton and forage system, it also significantly increased greenhouse gas fluxes (2x's) (Fultz et al., 2013b).
- ✓ Mean weight diameter (a proxy for aggregate stability) was 3x's greater under perennial grasses relative to annual crops and significantly increased by the presence of arbuscular mycorrhizal fungi (Fultz et al., 2013b).
- ✓ Perennial grasslands increased overall enzymatic activity for C, N, P, and S enzymes.
- ✓ Enrollment in the Conservation Reserve Program increased particulate organic matter (POM) over 26 years, but these increases have not as yet translated into increases in whole SOC.

- ✓ Fields taken out of CRP and converted back to agricultural production had lower fungal populations and greater populations of Gram positive bacteria.
- ✓ The use of high residue crops increased microbial biomass within 1 year (16-17%) and metabolic functioning (up to 75%) within 2 growing seasons (Cotton et al. 2013).
- ✓ Short-term impacts of prescribed fire included increased fluxes of CO_2 and shifts in microbial communities (Fungi → Gram positive bacteria → Gram negative bacteria and actinomycetes). Wildfires reduced biochemical cycling (C and N enzymes) particularly under high severity burns.

Current research:

- ➢ Soil health and ecosystem improvements following overseeding of cool-season species into a warm-season perennial grassland
- ➢ Microbial communities and ecosystem functions following projected shifts in soil temperature and moisture
- ➢ The role microbial populations play in increased yield in newly cultivated sugarcane fields
- ➢ Short- and long-term impacts of residue management on microbial populations and nutrient cycling (tilled, no-till, and prescribed fire)
- ➢ Microbial communities and nutrient cycling under winter cover crops
- ➢ Assessing soil quality and microbial assemblages in relation to cover crops
- ➢ Soil health and forage production benefits of interseeding summer-annual legumes and irrigation in bermudagrass pastures
- ➢ Alternative invasive species management practices and their influence on ecosystem function and soil quality
- ➢ Rhizobiome – root-microbe interactions in sweet potato and their response to abiotic stressors

References:

Allen, V.G., Brown, C.P., Kellison, R., Green, P., Zilverberg, C.J., Johnson, P., Wein-heimer, J., Wheeler, T., Segarra, E., Acosta-Martínez, V., Zobeck, T.M., Conkwright,J.C., 2012. Integrating cotton and beef production in the Texas Southern HighPlains. I. Water use and measures of productivity. Agron. J. 104, 1625–1642.

Cotton, J., Acosta-Martinez, V., Moore-Kucera, J., Burow, G., 2013. Early changes due to sorghum biofuel cropping systems in soil microbial communities and metabolic functioning. Biol. Fertil. Soils 89, 403-413.

Doran, J.W., Parkin, T.B., 1994. Defining and assessing soil quality. *In* Doran et al. (eds) Defining Soil Quality for a Sustainable Environment, pp. 3-22, SSSA/ASA, Madison, WI.

Fultz, L.M., Moore-Kucera, J., Zobeck, T.M., Acosta-Martinez, V., Allen, V.G., 2013a. Aggregate carbon pools after 13-years of integrated crop-livestock management in semi-arid soils. Soil Science Society of America Journal 77, 1659-1666. doi: 10.2136/sssaj2012.0423.

Fultz, L.M., Moore-Kucera, J., Zobeck, T.M., Acosta-Martinez, V., Wester, D.B., Allen, V.G., 2013. Organic carbon dynamics and soil stability in five semiarid agroecosystems. Agriculture, Ecosystems, and Environment 181, 231-240. doi: 10.1016/j.agee.2013.10.004.

Contact: Liza Fultz, LFultz@agcenter.lsu.edu

Forage Breeding/Forage Utilization

Warm-season Grass Conservation

Melanie Harrison

USDA, ARS
Plant Genetic Resources Conservation Unit
Griffin, Georgia

The National Plant Germplasm System (NPGS), administered through the USDA, Agricultural Research Service, was established in 1949 to safeguard plant genetic resources for research and educational purposes. The mission of the NPGS is to acquire, preserve, evaluate, document and distribute plant genetic resources. The system is comprised of 20 repositories located throughout the United States including four main Plant Introduction Stations located in Griffin, GA; Geneva, NY; Ames, IA; and Pullman, WA. One of the distinguishing characteristics of the genebank is the immense diversity preserved in the collection. Currently, there are 217 families, 2384 genera, and 14932 species represented in the 570349 accessions preserved in the genebank (USDA, 2015). The grass germplasm is maintained as two separate collections - the warm-season grass collection located at the Plant Genetic Resources Conservation Unit (PGRCU) in Griffin, GA and the cool-season grass collection located at the Western Regional Plant Introduction Station in Pullman, WA.

The warm-season grass collection consists of material suitable for forage, turf, bioenergy, soil erosion, habitat restoration, landscape ornamental and grain. The collection at PGRCU has 7524 unique warm-season grass accessions representing 106 genera and 495 species. The majority of the germplasm is preserved as seed while 396 accessions are maintained vegetatively in the greenhouse or field plots. Seeds are stored in two separate samples. A distribution sample is stored at 4 ^{o}C at 25% humidity, and a long term storage sample is stored at -18^{o}C. Seeds are backed up at the National Center for Genetic Resources Preservation in Fort Collins, CO and at the Global Seed Vault in Svalbard, Norway. When requested for research or educational purposes, 200 seeds per accession are distributed. Viability testing has been performed on 92.3% of the accessions maintained as seed in the collection. Additionally, as seed increases are performed to maintain seed quantity and quality, viability tests are conducted to document initial seed quality prior to storage. Passport data and characterization data on every accession is available at the Germplasm Resources Information Network (GRIN) - http://www.ars-grin.gov/npgs/index.html.

The majority of species preserved in the collection are represented by less than five accessions. There are 202 single accession species, 168 species with 2-5 accessions each, and 49 species represented by >20 accessions. The larger collections (>100 accessions per species) are listed in Table 1. In regards to the number of species maintained in the collection, the main genera include Bothriochloa, Chloris, Digitaria, Panicum, Paspalum, Pennisetum, and Urochloa. There are 23 species of Bothriochloa in the collection. Most of the available accessions belong to the following species: B. alta (10), B. decipers (16), B. barbinodis (85), B. bladhii (132), B. ischaemum (234), B. insculpta (22), B. macra (10), B. pertusa (28), and B. sacchariodes (55).

There are 20 species of Chloris (210 accessions) in the collection. The main species is C. gayana with 112 available accessions collected from 28 different countries. There are 591 accessions (489 available) of Digitaria representing 35 different species. The predominant species include D. eriantha (382), D. milanjiana (108), and D. natalensis (28). There are 28 species of Panicum in the collection including P. coloratum (167). Panicum maximum is listed as Megathyrsus maximus according to GRIN taxonomy and is not included in the Panicum. However, M. maximus has 270 accessions collected from 37 countries – mainly South Africa (137). There are 61 species of Paspalum in the collection (1421accessions) including P. dilatatum (232), P. guenoarum (29), P. nicorae (35), P. notatum (182), and P. plicatulum (85). There are 22 species of Pennisetum in the collection including P. ciliare (863), P. clandestinum (25), P. purpureum (52), and P. setigerum (17). The P. purpureum is maintained in field plots and distributed as rhizomes. There are 18 species of Urochloa (99 accessions) including U. brizantha (23), U. mosambicensis (22).

Table 1. Species in the warm-season grass germplasm collection maintained at the Plant Genetic Resources Conservation Unit, Griffin, GA with >100 total accessions.

Taxon	Total Accessions	Total Available
Andropogon gerardi	230	98
Bothriochloa bladhii	137	132
Bothriochloa ischaemum	246	232
Chloris gayana	133	112
Cynodon dactylon var. dactylon	261	125
Digitaria eriantha	382	307
Digitaria milanjiana	108	96
Eleusine coracana	750	721
Megathyrsus maximus	270	246
Panicum coloratum	155	141
Panicum virgatum	391	94
Paspalum dilatatum	230	216
Paspalum notatum	168	158
Paspalum scrobiculatum	336	314
Pennisetum ciliare	863	847

Acquisition efforts in the past decade have focused on increasing the availability and diversity of germplasm native to the United States. Five switchgrass collection trips funded by the USDA, ARS, Plant Exchange Office have resulted in the acquisition of 132 accessions of switchgrass from the southeastern United States. An additional 82 accessions collected in New York and Pennsylvania were donated by the USDA, Natural Resources Conservation Service (NRCS), Big Flats Plant Material Center. Future switchgrass collection trips are planned for the New England area (September, 2015) and the mid-Atlantic coastal area (2016). The U.S. Department of the Interior, Bureau of Land Management's Seeds of Success (U.S. Dept. of Interior, 2015) program has collected over 14,000 native seed populations. Many of the Bouteloua species or other native warm-season grass species in the NPGS are donations from these efforts. NRCS Plant Material Centers also deposit a sample in the NPGS of all Conservation Plant Releases.

The NPGS warm-season grass collection is a valuable resource to plant breeders, researchers and educators globally. Within the past five years, over 8300 warm-season grass germplasm samples have been distributed to state and federal agencies, universities, commercial organizations, and foreign cooperators. Efforts will continue to improve the quality and availability of the germplasm and expand the diversity and characterization of the collection.

References:

U.S. Department of the Interior. 2015. Bureau of Land Management. Seeds of Success. 20 March 2015.
http://www.blm.gov/wo/st/en/prog/more/fish__wildlife_and/plants/seeds_of_success.htm

U.S. Department of Agriculture. 2015. National Genetic Resources Program. Germplasm Resources Information Network (GRIN). 20 March 2015. http://www.ars-grin.gov

Contact: Melanie Harrison, Melanie.Harrison@ARS.USDA.GOV

Breeding Forages in the SE USA: Some Successes & Some Not So Much

Kenneth H. Quesenberry

Department of Agronomy. University of Florida, Gainesville, FL

This outline of this presentation will be as follows:

A. A brief review of successful forage releases prior to 1965. This will include the successful grass releases – particularly from the 1940s and 1950s, and a discussion of why these were so successful
B. A listing of the Vets & "Baby Boomer" breeders. This will be a listing by states of where programs were in the mid-1970s and current status of forage breeders in the SE.
C. Examples of successful forage releases since 1965 and why. Discussion will include major releases that have either dominated the market or changed usage patterns of forage cultivars in the SE.
D. Examples of "Not so Much" success in cultivar releases and why. Examples will be given of good cultivars that failed to make an impact and a discussion of perhaps why they did not succeed.
E. Lessons learned from 40 years personal experience + a few friends. This will be a summary of lessons learned from the above experiences that hopefully can guide breeding efforts for the future.
F. Some thoughts for the future. I will close with a projection for where future impacts can and should be made.

Contact: Kenneth H. Quesenberry, clover@ufl.edu

Forage Extension

Extension for the Southeast

Tom Obreza
UF-IFAS, Extension Associate Dean

Seed Coatings for Legumes

Joe Bouton

Professor Emeritus, University of Georgia and Bouton Consulting Group, LLC,
Athens, GA 30606

It was not until the late 1800s that a German scientist, H. Hellriegel, reported that peas could only be productively grown when nodules formed on their roots. A Dutch scientist, M.W. Beijerinck, next isolated the main causal bacterium from the nodule that was later called Rhizobium. Once Rhizobium could be isolated and identified the next step was for microbiologists to grow the Rhizobia in quantity and for agriculturalists to determine the best method to supply them to the roots of all legume crops in a process called "inoculation". Early inoculation practices included spreading soil from land where the crop had previously grown. Over time, seed inoculation became more science based and exact. Close seed placement of live, effective strains grown and packaged as sterile, peat-based media and applied to the seed with a "sticker", or directly into the planter box, became the main inoculation practices. When done by farmers at the time of planting, poor results became common place due to everything from using the wrong Rhizobium species or poor handling that led to bacterial desiccation and death. To overcome these on-farm problems and provide less inoculation risk to the farmers, seed companies began to pre-inoculate seed with a polymer adhesive during conditioning and bagging. Adding a lime or clay coating around the pre-inoculated seed also became widely practiced. The disadvantage of pre-inoculation is the potential loss of bacterial numbers and/or viability during the entire process from culturing, inoculation, and bagging to shipment, sales, and planting. The advantages put forward for coating pre-inoculated seed are better bacterial protection from desiccation, better seed flow through the planter, a hydrophobic layer to prevent early germination, and supplying lime and even fungicides in the germinating root zone creating a better "micro-environment" for the young seedling roots. The main disadvantages for the coating are that by adding inert matter to the bag seed weight, farmers pay seed prices for coating; and if seed is planted by weight per area of land, without adjusting for the coating weight, it may deliver less initial number of seedlings than desired.

Contact: Joe Bouton, jhbouton1@gmail.com

Poster Session

Incorporation of Gray Leaf Spot Resistance into Annual Ryegrass Germplasm and Development of a Low-cost Portable Screening Approach

Laxman Adhikari[1], Chang Hyun Khang[2], Kiersun Jones[2], and Ali Missaoui[1]

[1] Institute of Plant Breeding, Genetics and Genomics
[2]Department of Plant Biology
University of Georgia, Athens, GA, 30602

One major challenge to the early fall establishment of annual ryegrass (*Lolium multiflorum* Lam.) in the southeast is potential outbreaks of ryegrass blast, also known as gray leaf spot, caused by the fungal pathogen *Magnaporthe oryzae* (anamorph *Pyricularia oryzae*). Currently, blast resistant cultivars are not available, and to avoid blast damage, growers resort to planting late in the fall thus reducing the production season. Incorporating "blast" resistance into ryegrass cultivars provides a durable solution to the disease and will increase the growers' ability to extend the production season of annual ryegrass. The overall objective of this research is to incorporate genetic resistance to blast in annual ryegrass germplasm and to develop genomic resources for marker-assisted selection of blast resistant cultivars. From our ongoing work, we have isolated a blast strain designated MoGA1, from a natural infection of annual ryegrass in Athens, GA and screened 147 annual ryegrass accessions from the NPGS collection. Only two accessions displayed resistance/tolerance to the pathogen. Surviving plants were polycrossed to generate a population that will undergo recurrent selection for several cycles to maximize the frequency of resistance alleles and develop a mapping population. We also have optimized a low-cost portable whole plant based inoculation and screening system amenable to high throughput. In this method, we use 120-cell trays (15 x 8) which will allow the screening of 15 different populations with 8 replications.

Contact: Laxman Adhikari, la53359@uga.edu; Ali Missaoui, cssamm@uga.edu

Impact of No-till in Cotton-sorghum Crop Rotations in a Semi-arid Environment

Matthew E. Bean[1*], Jamie L. Foster[2], and Cristine L.S. Morgan[1]

[1]Department of Soil and Crop Sciences, Texas A&M University, College Station TX
[2]Texas A&M AgriLife Research, Beeville, TX

Conventional tillage exposes soil to erosion and is usually associated with less soil moisture and organic matter than conservation tillage. After transitioning to no-till (NT) soil organic matter and water infiltration and permeability increase; however, the integration of this tillage practice has yet to be adopted in the semi-arid regions of south Texas. The objective of this four-year study was to evaluate the effects of NT in a dryland cotton (*Gossypium hirsutum* 'DPL 1044')-sorghum (*Sorghum bicolor* 'DKS 53-67') compared to conventional tillage (CT) cropping rotation system on soil moisture, bulk density, compaction (soil penetration resistance), C:N, NPK, and crop yields. The long-term goal is to determine whether increased soil moisture from NT can support the integration of forage cover crops and/or livestock into the semi-arid cropping system. This research was conducted at Corpus Christi, TX, on a Victoria clay, in a randomized block design with four replicates (48 × 16 m) with 1-m rows spacing. Soil moisture, C:N, NPK, and compaction were measured before planting and after crop harvest in 2014 after four years of tillage treatment. Soil moisture was greater at harvest than at planting (484 mm greater precipitation during the crop growing season), but was not impacted by tillage. After four years of NT, bulk density increased by 30% compared to CT. Soil penetration resistance was greater with NT versus CT and cotton versus sorghum, but was not biologically significant. The C and N content, increased 13% and 14%, respectively, with NT. On average there was no significant difference in soil NPK between tillage practices for 2014. Tillage did not impact sorghum yield, but environment (year) did because of precipitation (yield each year was 4050, 3690, 0, and 1130 kg ha^{-1}). Cotton performed similarly and yields were 1100, 1730, 424, and 1000 kg ha^{-1} for 2010-2014. No-till is influencing soil; however, subsequent years of research are necessary to determine the impact of tillage practices on soil nutrients and crop yield potential in this region. Integrating legume cover crops as a subplot treatment will speed evaluation of integration of both no-till and forage cover crops in semi-arid south Texas.

Contact: Matthew Bean, matthew.bean@ag.tamu.edu

Evaluation of Cool-season Forages to Improve Nutrient Management, Forage Productivity and Quality for Southeastern Dairies

Ann Blount[1], Cheryl Mackowiak[1], Jose Dubeux[1], Nicolas DiLorenzo[1], Ali Babar[2], Mary Sowerby[3], Elena Toro[3], Courtney Davis[4], Bill Smith[5], and Ted Henderson[6]

[1]North Florida Research and Education Center, University of Florida, Quincy and Marianna, FL
[2]Agronomy Department, University of Florida
[3] Suwannee County Extension, University of Florida, Live Oak, FL
[4] Okeechobee County Extension, University of Florida, Okeechobee, FL
[5] Syngenta, Union, KY
[6] Shenandoah Dairy, Live Oak, FL

Our goal has been to breed for and evaluate seasonal production, forage quality and environmental attributes of cool-season forages in the southeastern U.S. Specifically, evaluating advanced breeding lines of cool-season grass forages targeting both confinement and grazing dairies. This has been successful because it has allowed us to develop and screen forages directly on-farm, across a wide-range of soil and environmental conditions under a variety of producer-run-management systems. Replicated trials of advanced oat, triticale, rye and ryegrass breeding lines have been tested annually on dairy farms in South Georgia, north, central and south Florida. Disease, insect, growth habit, forage production and quality have been evaluated at each of these locations. Annual demonstrations have been planted of side-by-side comparisons (typically 20-30 varieties) of oat, triticale, rye and ryegrass varieties to offer producers a chance to see how well commercial varieties perform at these locations and under "real-world" management. Field days and site visits are common at each location. On-farm testing of advanced forage breeding lines has led to the release and co-release of four new forage oat varieties, "Horizon 201", "RAM LA 99016", Legend 567", and a new released oat-"FL0720". The tetraploid ryegrass, "Earlyploid", also released by UF, was developed specifically for dairies, as it was developed under dairy effluent fertigation. Three triticale varieties, "Trical 342", "Monarch", and "FL01143" awnless triticale also were developed for cool-season silage crop production for our southern dairies. The efforts from this research and extension outreach aids us with proof-of-concept for dairy BMPs and in making cool-season forage recommendations for Southeastern dairy operations.

Poultry Litter Use in Forage Systems

Greg Flint and Rocky Lemus

Department of Plant and Soil Sciences, Mississippi State University

Poultry litter (PL) has long been recognized as a useful source of fertilization in both forage and crop land. Forage and livestock producers have adopted the use of PL as a nitrogen source in hay and grazing land. When using PL as a fertilizer, it is important to follow the same basic steps that are used when selecting any fertilizer and rate. Testing the PL for nutrient value is considered the first step in determining the correct rate of application based on soil test recommendations and crop requirements. However, the use of PL is not a viable source of N due to the organic status of the nutrient. N is only available for plant uptake in the inorganic state. Organic N must be mineralized into inorganic N before becoming plant available. Mineralization of organic N is performed by soil microbes and is affected by temperature, soil moisture and soil pH, among other factors. Therefore, the timing of PL application is critical. The application of PL to meet nitrogen requirement of the grasses means more phosphate (P) added to the soil than the plants use. Although over 90% of the P in the litter is available for plant uptake, approximately 13% of the phosphorus in PL is water soluble. P solubility can create an opportunity for P loses through runoff, making PL applications based on P needs a recommended management practice. Proper application of PL requires a nutrient management plan. A nutrient management plan is essentially a collection of best management practices (BMP) that assures the appropriate use of PL to provide the crop the necessary nutrients and decreasing the effect on the environment. A key component of a proper nutrient management plan includes soil testing to determine nutrient load. Another BMP is to not apply PL in excess of 3 tons per acre which will increase P and K in the soil. In this case study a forage production system included grazing pasture and hay production paddocks. The amount of nutrients in the system was evaluated for three consecutive years to determine overloading in the soil of P and K. In the hay production system, the P load was kept lower, compared to the grazing paddocks, due to the removal of dry matter biomass, but levels where still kept high due to the constant use of PL. The same was seen with the K levels over the course of the three years. In order to mitigate future nutrient overloading alternatives such as alternating the use of PL and a commercial fertilizer source for N can be implemented. Another practice would be to apply the PL to meet the P needs for the forage based on the soil test and to use commercial fertilizer to meet the N crop requirement. Using BMP’s can help reduce the impact on the environment with the excess P in the soil.

Contact: Greg Flint, GFlint@pss.msstate.edu

Wasteland Recovery Utilizing Alfalfa and Ryegrass as Cover Crops – a Case Study in Central South Florida

Gamble[1], J.H. Walter[2*], Y.C. Newman[3]

[1] Extension Agent, Volusia County
[2] Extension Agent, Brevard County, Newman
[3]Extension Forage Specialist, UW-River Falls

High pH shell borrow pits exist throughout coastal Florida, which hinder establishment of bahiagrass and favor the invasive nature of cogongrass/smutgrass. This case study area had three unsuccessful landowner attempts to establish bahiagrass. These 20 acres presented with 95% coverage of well-established cogongrass/smutgrass mix due to unfavorable soil conditions for bahiagrass. Mechanical treatment of cogongrass/smutgrass combined with planting of annual crops tolerant of high pH may provide high value forages while suppressing invasive grass weeds.To gain insight through a case study about the use of high value crops such as alfalfa and ryegrass, either grazed or mechanically harvested in high pH wasteland to reduce cogongrass and smutgrass infestations. A 20 acre field, which was over-burden from a shell borrow-pit infested with cogongrass and smutgrass was used for this case study. Soil was calcareous with a pH of 7.3. UF/Extension recommended experimentally planting forages adapted to high pH to utilize the otherwise wasteland. The field was disked 3 times, starting September 2014. One month was allowed for green up between diskings in an effort to reduce stored rhizome carbohydrates and to dry out plant material. Following land preparation, a combination of Alfalfa 805 and Oregon ryegrass was broadcast seeded at 15 and 25 lbs/acre, respectively, and roller packed on December 1, 2014. Fertilizer application of 300 lbs/acre of 10-10-10 was delayed until March 1, after alfalfa established to minimize competition by ryegrass and cogongrass/smutgrass. Complete field high-value forage coverage occurred within 6 weeks of planting with a 75:25 alfalfa/ryegrass ratio. Grazing commenced March 1, with a stocking rate of 2 acres per 1 cow/calf unit to maintain thick stand density. Neither cogongrass or smutgrass bloomed, which is typical flowering response for these weeds during March. Re-sprouting has not yet been observed. The landowner stated it is the first time they have been able to utilize the 20 acres in a productive capacity. Alfalfa/ryegrass mixes as evidence in this case study may be a methodology minimizing invasive species vegetation utilizing unproductive, high pH over-burden sites for the production of high quality forage for livestock.

Contact: Joe Walter, jwalter@ufl.edu

Early Spring Herbicide Application on Bermudagrass Forage Yield and Quality

Kun-Jun Han and E.K. Twidwell

LSU School of Plant, Environmental and Soil Sciences
104 M.B. Sturgis Hall, Baton Rouge, LA 70803

Bermudagrass [*Cynodon dactylon* (L.) Pers] is a highly productive warm-season perennial grass that is commonly grown for hay in the southeast region of the USA. Bermudagrass has the potential to produce high quality hay, but the presence of winter annual grassy and broadleaf weeds in the spring months can often diminish the forage quality of the first cutting of bermudagrass hay. A management strategy used by bermudagrass hay producers to control these weeds is to make herbicide applications in the spring (February or March) when bermudagrass is still in a dormant state. The objective of this study was to evaluate five herbicide treatments on the forage yield and quality of bermudagrass. Herbicide treatments evaluated included Pastora (1 or 1.5 oz/acre); Glyphosate (11 oz/acre); Plateau (4 oz/acre) and Journey (10.6 oz/acre). Treatments were applied in mid-February of 2013 and 2014. Herbicide treatments were applied using a CO_2-powered backpack sprayer with an 8 ft boom and calibrated to deliver 15 gallons/acre. A control with no herbicide treatment applied was also included. A hayfield with a ten-year old stand of 'Sumrall 007' bermudagrass was used as the test site. Plot size was 8 ft x 25 ft and replicated four times in a randomized complete block design. Each treatment plot was separated by an 8 ft wide buffer plot to aid in minimizing herbicide drift during application. Before the herbicide treatments were applied in each year, an inventory of the test site indicated weed populations of Carolina geranium (*Geranium carolinianum* L.), dandelion (*Taraxacum officinale* G.H. Weber in Wiggers), curly dock (*Rumex crispus*), annual ryegrass (*Lolium multiflorum* L.) were the dominant species present, while smaller amounts of common vetch (*Vicia sativa* L.) and white clover (*Trifolium repens* L.) were also present. Herbicide treatment had no effect on total forage yield across the three harvests. Dry matter digestibility and crude protein content were affected by herbicide treatment and harvest. Results suggest that early spring herbicide treatments may be beneficial in improving pure stand bermudagrass yield but may not be beneficial in total forage yield and its feed value.

Contact: Kun-Jun Han, Khan@agcenter.lsu.edu

Evaluation of Legume Cover Crop and Seedbed Preparation Impact on Sweet Sorghum Productivity

K. J. Han[1], M. W. Alison[2] and D. Day[3]

[1]School of Plant, Environmental & Soil Science, LSU
[2]LSU AgCenter Macon Ridge Research Station
[3]LSU AgCenter Audubon Sugar Institute

Sweet sorghum (*Sorghum bicolor (L.) Moench*) is currently recognized throughout the world as a highly promising bioenergy crop. Optimization of production systems and management practices for sweet sorghum have not been fully developed for the USA, although sporadic research efforts during recent decades have provided some insights into production of sweet sorghum primarily for fermentable sugar production. Field plot experiments were conducted at northern and southern regions in Louisiana to assess biomass and sugar yield responses to different seedbed preparation and nitrogen sources such as commercial nitrogen fertilizer, crimson clover (*Trifolium incarnatum*) or hairy vetch (*Vicia villosa*). The legumes were planted in appropriate plots in late October or early November. The experiment at each location was arranged in a split plot design with four replications. Minimum tillage and conventional tillage were whole plots and the nitrogen sources were arranged as sub-plots. The cultivar Dura Sweet was planted at rates of approximately 6 seeds per 12 inches of row in mid to late April. Soils were a Tangi silt loam (fine-silty, mixed thermic Typic Fragiudult) at the Southeast Research Station and a Gigger silt loam (fine-silty, mixed, thermic Typic Fragiudalf) at the Macon Ridge Research Station. Plots of each experimental unit consisted of 4 rows with 36 or 40 inches inter-row spacing. Legumes in both tillage systems and all minimum tillage plots were treated with glyphosate (N-(phosphonomethyl) glycine) herbicide approximately 2 weeks prior to sweet sorghum planting and at planting. At each experimental site, atrazine (2-chloro-4, ethylamino-6 isopropylamino-1,3,5-triazine) was applied at the rate of 1 lb acre^{-1} for weed control immediately after planting. When sweet sorghum seedlings were 6 to 8 cm tall, atrazine and metolachlor (2-chloro-N-(2-ethyl-6-methylphenyl)-N-(2-methoxy-1-methylethyl) acetamide) herbicides were applied at the rate of 1 lb acre^{-1} to provide additional weed control. Clover and hairy vetch biomass was measured and samples were analyzed to determine available nitrogen from the cover crops. Accumulated nitrogen from legume biomass ranged from 99 to 110 lbs acre^{-1}. Both sweet sorghum biomass and sugar yield responses were obtained. Total sweet sorghum biomass, juice production, and bagasse yield from legume or commercial nitrogen fertilizer treatments were greater than the productivity from non-N treated sweet sorghum. Enhancement of total sugar production was realized from the 100 lbs acre^{-1} commercial nitrogen application and from the two legume treatments. The yield difference obtained from minimum or conventional tillage was not consistent. Results indicate legume cover crops can provide the nitrogen and minimum tillage can be utilized in sweet sorghum production systems.

Contact: Kun-Jun Han, Khan@agcenter.lsu.edu

Year-Round Beef Cattle Grazing Systems in the Southern Great Plains

Sindy M. Interrante*, Jimmy D. Stein, Penny M. Sparks, and Twain J. Butler

The Samuel Roberts Noble Foundation, 2510 Sam Noble Pkwy., Ardmore, OK

Year-round grazing by beef cattle (*Bos* spp.) is an attractive option for producers interested in reducing costs associated with purchased feed and increasing flexibility when purchasing cattle. However, research is limited on forage species that are compatible in grazing systems in the Southern Great Plains of USA. The objective of this research was to evaluate different cool- and warm-season forage species in beef cattle grazing systems in Ardmore, OK in 2013-14, with the goal of achieving 365 days of pasture grazing. Paddock (2 acre) treatments were 1) NF101 wheat (*Triticum aestivum* L.) followed by NFCG07-1 crabgrass [*Digitaria sanguinalis* (L.) Scop.], 2) 'Bulldog 505' alfalfa (*Medicago sativa* L.), 3) 'Flecha' tall fescue {*Festuca arundinacea* Schreb. [syn. *Schedonorus arundinaceus* (Schreb). Dumort]} fertilized with 100 lb N acre^{-1}, 4) alfalfa-tall fescue, and 5) alfalfa-tall fescue-'Commander' chicory (*Cichorium intybus* L.). There was no difference in steer average daily gain (average 2.1 lbs d^{-1}) among the treatments, indicating that all these systems have very high nutritive value and potential for stocker production in the region. There were more grazing days (242 d) associated with the wheat-alfalfa-crabgrass system, but the wheat-crabgrass system had the most grazing days acre^{-1} and gain acre^{-1} (365 d acre^{-1} and 795 lbs acre^{-1}, respectively). Based on this first year of data, utilizing wheat, alfalfa, and crabgrass in a beef cattle grazing system offers a promising option for producers interested in year-round grazing. This research will continue for at least two additional years, and will include nutritive value and economic analyses to identify the optimal system.

The "Forage Focus Webinar Series:" A Web-based, Interactive Learning Opportunity Focused on Forage Related Material

Johnson, J.M., M.K. Mullenix, and K. L. Flanders

Auburn University, Auburn, Alabama

The realization that we are transitioning into a society which obtains information in a less traditional format has become apparent in Extension. Through the utilization of social media applications, the internet, educational webinars, and short instructional videos, we are able to disseminate applicable forage management information to a broader multi-generational audience quickly. This is consistent with the long standing practice of Extension provide science-based information to the public in readily accessible formats. The "Forage Focus Webinar Series" began as a trial run in 2013 as a way to offer seminars on timely forage related topics, in an interactive web-based meeting, with access free to all entities public, private, and producer. The webinars are focused on addressing production problems and management techniques and combine the expertise of a number of ACES Extension Specialists. Archive videos are posted online for later access. In 2013 six webinars were held at sporadic times throughout the year. Web-based analytics from Oct. 11 – Dec. 31, 2013 indicated the webinars page to be the 9th ranked page on the www.alabamaforages.com website. In 2014 the "Forage Focus Webinar Series" became a regular program as a result of the previous year's success. Webinars are offered the second Wednesday of each month at 10:00 am CDT. Information, schedules, connection information, and archive videos are posted online at www.alabamaforages.com. The 2014 series consisted of 7 webinars covering a wide variety of forage related topics. Webtrend analytics from Jan. 1 – Dec. 31, 2014 reported the 2014 Webinars page ranked as the 2nd highest page with 565 total visits and 631 views. The Webinars entry page ranked 5th with 411 visits and 468 views, and the 2013 webinar archive page had 200 visits and 216 views. Results of web-based analytics suggest that the use of interactive webinars can increase impact and visibility of forage related educational information through either live viewing of programs or through archived posts. Extension educators can successfully increase the reach of research-based educational information through online lecture-based programming.

Residual Effect of Herbicides used in Pastures on Clover Establishment and Productivity

A.S. Laird[1], J.L. Griffin[2], D.K. Miller[1], E.K. Twidwell[2], M.W. Alison[1] and D.C. Blouin[3]

[1] Macon Ridge Research Station, LSU AgCenter, Winnsboro, LA
[2] School of Plant, Soil and Environmental Science, Louisiana State University, Baton Rouge, LA
[3] Experimental Statistics Department, Louisiana State University, Baton Rouge, LA

Field experiments were initiated in 2013 to evaluate residual effects of PastureGard®, Grazon P+D®, Grazon Next®, Cimarron Max® and 2,4-D herbicides on establishment and growth of ball (*Trifolium nigrescens* viv.) and white (*Trifolium repens* L.) clovers. Herbicides were applied at the full recommended rate in July and clovers were planted in October, November, and March. Experiment sites were in Winnsboro, LA and St. Joseph, LA. Soils were a Gigger silt loam at Winnsboro, LA and a Commerce silt loam at St. Joseph, LA. Experimental design was a randomized complete block with factorial arrangement of clovers, herbicides and planting dates replicated four times. Stands were evaluated quantitatively by counting emerged seedlings and also visually rated periodically. Yield measurements were taken once from each planting date treatment. Proc mixed of SAS was used for statistical analyses with clover, herbicide, planting date, and rate considered fixed effects while location and block were considered random effects. Tukey tests were used to compare means at the 0.05 level of significance. For October planting, averaged across clovers, ground cover for GrazonNext® and Grazon P+D® were less than for the nontreated. For the March planting, ground cover for all herbicides was equivalent to the nontreated. Averaged across clover species and planting date, GrazonNext® was the only herbicide treatment to exhibit a reduced stand rating 2 to 3 mo after planting. GrazonNext® and Grazon P+D® had fewer living seedlings after emergence. Only GrazonNext® resulted in yield reduction compared to the nontreated. Results indicate Cimarron Max®, 2,4-D and PastureGard® may all be applied in early summer without hampering establishment of fall planted clovers. When used for summer weed control, GrazonNext® and Grazon P+D® will detrimentally impact clover establishment in the fall. Ball clover appears to be more sensitive to herbicides than white clover.

Contact Suzanne Laird, slaird@agcenter.lsu.edu

Delivery of Beef-Forage Educational Information in Alabama through Web-Based Platforms

Mullenix, M. K., and J. M. Johnson

Auburn University, Auburn, AL

Given the changing generation of Extension professionals and clientele in Alabama, the Alabama Forages and Alabama Beef Systems Extension Programs have launched several web-based tools for disseminating forage management and beef cattle-related information to clientele including websites, Facebook, and Twitter accounts. The websites www.alabamaforages.com and www.alabamabeefsystems.com serve as a host for Extension-related publications, fact sheets, current events, and decision tools related to forage management in Alabama. A WebTrends analysis was conducted from August 2014 through February 2015 to evaluate the use of these websites to enhance the reach of research-based information to clientele. Social media metrics from Facebook were assessed from this same time period to determine the efficacy of integrating these platforms into website outreach plans. The total number of visitors was 7,529 for Alabama Forages and 2,310 for the Alabama Beef Systems website during this time period. Currently, the Forage Focus and AL Beef Systems pages have achieved 461 and 368 organic likes, respectively, on Facebook, and 337 and 232 followers on Twitter, respectively. Three forage fact-sheet publications with links to these host sites were posted to these social media platforms between August 2014 and February 2015. Publications focused on timely information related to collecting forage samples for laboratory analysis, grazing methods, and forage management strategies during cold weather, with an average number of 175 views according to WebTrends. Average reach of these resources was 327 organic followers and 25 individual post clicks on Facebook during this time period, indicating a broadening reach of forage-related information to clientele by using this platform. Topic areas were also posted to Twitter, and had an average of 90 impressions across these publications. Thus, creation of Facebook and Twitter accounts for each program has increased traffic driven to these websites through the use of embedded links. Results of web-based analytics suggest that the use of content-specific websites and social media can increase impact and visibility of forage and beef cattle management practices in Alabama. Extension educators can successfully increase the reach of research-based educational information through online-based programming.

Contact: Kim Mullenix, mullemk@auburn.edu; 334-844-1546; 303A Upchurch Hall
Auburn University, AL 36849

Effects of Cattle Diets on Nutrient Concentrations in Fecal Patches and Runoff from Small Plots

D. Philipp, B. Haggard, A. Sharpley, M. Savin, T. Simmons, and R. Rhein

Division of Agriculture, University of Arkansas

High concentrations of N and P in cattle feces stemming from supplemental feed may lead to elevated nutrient levels in runoff. To evaluate nutrient concentrations in artificially induced runoff events, we obtained feces from a previously conducted intake experiment comprised of the following diet treatments: bermudagrass hay (HAY); soybean hulls (LSH); dried distiller's grain (LDG); and an iso-energetic mixture of LSH and LDG (MIX). Average N and P concentrations (%) in feces resulting from each diet were, respectively: HAY (2.4, 0.6), LSH (4.3, 0.5), LDG (3.4, 1.5), and MIX (3.0, 1.8). Fecal material was stored in a freezer at -4°F until being thawed in a refrigerator at 39°F prior to plot application in form of round patties with a diameter of 12 inches and a weight of 4.85 lbs. Plot size was 7 × 3.5 feet. Rain at 2.75 inches/h was applied immediately after feces application (D0) and again after 2 and 7 d on the same undisturbed fecal patch. Ensuing runoff was collected each time after 30 min of rain from the lower end of the plots at a distance of 56 inches away from the fecal patch. Concentrations of N in runoff water were similar for all diet treatments (6.2-6.3 mg/L) except hay (3.8 mg/L; $P<0.05$). Diet treatments did not interact ($P>0.05$) with time of rain. Rain application on d 7 resulted in higher ($P<0.05$) N concentration (6.9 mg/L) than on D0 or d 2 (5.3 and 4.7 mg/L, respectively); no differences between the first two rain applications were observed. Similar to N, P concentrations were independent ($P<0.05$) of time of rain application, but both LDG and MIX (~2.0 mg/L) were higher ($P<0.05$) than HAY and LSH (0.9 and 1.1 mg/L, respectively). In comparison to N, P concentration in runoff after D0 was higher (2.1 mg/L) than on d 2 or d 7 (1.3 and 1.2 mg/L, respectively). Proportions of N and P in fecal patches and runoff followed closely those in diets, but results do not allow speculation regarding the ultimate quantity of edge-of-field losses of these nutrients.

Contact: Dirk Philipp, dphilipp@uark.edu; AFLS B114 1, University of Arkansas, Fayetteville, AR 72701

Herbaceous Mimosa Potential as a Pasture Legume

W.D. Pitman[1], Alan Shadow[2], and Stacia Davis[3]

[1]Louisiana State University Agricultural Center, Hill Farm Research Station, Homer, LA; [2]USDA-NRCS East Texas Plant Materials Center, Nacogdoches, TX; and [3]Louisiana State University Agricultural Center, Red River Research Station, Bossier City, LA

Herbaceous mimosa (*Mimosa strigillosa*) is a perennial, warm-season, native legume adapted to a wide range of soil types across the Gulf Coast region of the southeastern USA. Low, dense growth from spreading stolons is supported by a deep, extensive root system. Crockett Germplasm was released for conservation uses by the USDA-NRCS East Texas Plant Materials Center in Nacogdoches, Texas, and landscape use has been recommended for the species by the University of Florida Environmental Horticulture Department (IFAS Extension Publication ENH 1075). Evaluations at multiple locations across Texas and Louisiana demonstrated wide adaptation, and, despite the low growth, forage production exceeded that of selected upright-growing native legume species with forage nutritive value comparable to available warm-season forage legumes. Recent evaluations provide preliminary assessments of seed production, stand establishment, and response to grazing by beef cattle. Seed increase at the East Texas Plant Materials Center has provided insights for production, harvest, and processing seed. Plantings on 5 ha of pasture area on clay bottomland in northwestern Louisiana have allowed preliminary assessments of stand establishment, seedling response to irrigation, and plant response to grazing. Some key aspects of seed production include requirements of a level soil surface and weed-free production fields because of cutting heights near the soil surface and limited available herbicides for selective weed control. Cattle readily grazed the herbaceous mimosa, and selective grazing within bermudagrass pasture resulted in gradual defoliation of herbaceous mimosa to only 2 to 3 cm above the soil surface. In 2012 and 2013, irrigation of seedling stands enhanced seedling survival and plant spread compared to non-irrigated areas during extended dry periods on clay soil. In 2014, irrigation increased weed competition which was detrimental to herbaceous mimosa seedling survival compared to non-irrigated areas with less weed competition. Even though wide adaptation and forage characteristics of this native legume indicate usefulness as a pasture species, stand establishment and grazing management require appropriate strategies. Planting approaches to minimize both drought hazards and excessive weed competition are needed. Grazing management will require appropriate stocking rates and perhaps periods of grazing deferment to maintain plant vigor.

Contact: W.D. (Buddy) Pitman, wpitman@agcenter.lsu.edu

Evaluation of Three Perennial Warm-season Grass Forage Systems for East-central Mississippi

J. Brett Rushing[1], J. Daniel Rivera[2], and Brian S. Baldwin[3]

[1]Coastal Plain Branch Experiment Station; 51 Coastal Plain Road, Newton, MS
[2]White Sand Branch Unit, Poplarville, MS
[3]Department of Plant and Soil Sciences, Mississippi State, MS

Increased awareness for grazing land sustainability and biodiversity has caused many livestock producers across the South to reevaluate their forage production systems. Several factors have contributed to this, including expanded federal environmental regulations, consumer perceptions on livestock production, and the continuous need to reduce costs associated with grazing livestock. One management practice that has the potential to alleviate the aforementioned problems is the incorporation of native warm-season grasses (NWSG) into a rotational grazing system. Currently in Mississippi, approximately 30% of perennial grass forage systems are comprised of bahiagrass (*Paspalum notatum*). Bahiagrass can be quickly established, and is somewhat tolerant to low pH soils, which is typical for this area of state. In comparison to NWSG, essentially no wildlife habitat is associated with bahiagrass. Research also suggests that only modest gains can be expected for this species for cattle production in the Coastal Plain. In order to promote on-farm sustainability, increased plant biodiversity, and the expansion of the grazing season for Mississippi producers, the adoption of NWSG into traditional low-input forage systems may prove cost effective. The objectives of this project are: 1) establish permanent grazing areas for future forage research with NWSG; 2) procure initial data comparing combinations of NWSG and bahiagrass for pasture productivity and animal performance; and 3) preliminary data will then be used for the submission of larger proposals. To evaluate the performance of NWSG in East-central Mississippi, a grazing trial will be established to compare varying NWSG species combinations to bahiagrass. The trial is a randomized complete block (RCB) design replicated three times with two acre paddocks. Grass treatments include bahiagrass (BG), big bluestem, indiangrass (*Sorgasthrum nutans*), and little bluestem (BBS+IG+LBS), and indiangrass (IG). Grazing animals used in this study will consist of 500 lb commercial crossbred steers. Animal response (average daily gain and body condition) and forage production (quantity and quality) will be measured. Very little information is available for pasture productivity in re-established native habitats in the South. This information is critical for the validation and promotion of NWSG as a viable forage crop for Mississippi livestock producers.

Contact: Brett Rushing, brushing@pss.msstate.edu; 662-679-9963

Evaluation of Cool Season Annual Crops as Alternative Forage Production on Southern Pastures

Dustin Smith, Bae Hun Lee, and Kun-Jun Han

LSU School of Plant, Environmental and Soil Sciences, Baton Rouge, LA

Warm-season perennial grass pasture is the base forage resource for the Louisiana livestock industry, fulfilling summer grazing demand and providing hay through winter. However, during the winter growing season, these warm-season grass hays do not meet the energy and protein requirements of heifers or milking cows. Recent studies show that cool-season annual cover crop cultivations may be an alternative forage source when warm-season grass pastures are unavailable. In addition to providing nutritive boosts, cool-season cover crops may also serve soil conservation purposes by inhibiting soil erosion, maintaining soil organic matter, and possibly reducing fertilization needs. The overall goal of this project is to evaluate the production potential of cool-season annual cover crop based forage in the southeastern U.S. Field trials are being conducted at two Louisiana locations: the LSU AgCenter Southeast Research Station in Franklinton with Tangi silt loam (fine-silty, mixed thermic Typic Fragiudult), and the Ben Hur Research Station in Baton Rouge with Cancienne silt loam (Fine-silty, mixed, hyperthermic Fluvaquentic Epiaquepts). The plots are 6' wide by 14' long and were planted in mid-November with combinations of rye (Secale cereal), tillage radish (*Raphanus sativus*), annual ryegrass (*Lolium multiflorum*), hairy vetch (*Vicia villosa*), oats (*Avena sativa*), triticale (*Triticale hexaploide*), and crimson clover (*Trifolium incarnatum*), along with their monocultures. These plots were randomized and replicated four times. A mower with a 30" cutting width fixed with a collection bag was used for uniform harvesting of the forage. From these samples, forage yield and nutritive values were determined. Late winter/early spring forage production indicates that oats and oats/radish combination produced more than 1000 lbs/acre. The monoculture radish produced nearly 650 lbs/acre. Vetch and crimson clover were less productive than other treatments. NIRS feed value analysis of the forage harvest indicates utilization of cool-season annual cover crops is a feasible alternative to warm-season perennials.

Crude Protein and Dry Matter Yield Response to Nitrogen Fertilization in Bermudagrass, Tall Fescue, and Wheat using Remote Sensing Technologies

Penny M. Sparks*, Jeremy J. Pittman, Sindy M. Interrante, and Twain J. Butler

The Samuel Roberts Noble Foundation, 2510 Sam Noble Pkwy, Ardmore, OK

Measuring crude protein (CP) and dry matter yield (DMY) in forages has historically been a labor- and time-intensive job. The objectives of these experiments were to determine forage yield and CP of 'Midland 99' bermudagrass (BG) [*Cynodon dactylon* (L.) Pers.], NF101 wheat (*Triticum aestivum* L.), and 'Flecha' summer-dormant tall fescue (SDTF) [*Festuca arundinacea* Schreb. [syn. *Schedonorus arundinaceus* (Schreb.) Dumort] as affected by N fertilization. Prediction equations for DMY were developed from forage height measurements from the 120 MHz ultrasonic and laser distance sensors, while CP predictions were developed using the normalized difference vegetation index from the Greenseeker® radiometer. The sensor data collected was validated by traditional quadrat hand-clipping and mechanical harvesting methods. Sensors were driven over the field using a golf cart or high-clearance Spider tractor (LeeAgra Inc.) prior to each harvest. In the BG experiment, N fertilizer was applied at 0, 25, 50, 75, and 100 lbs N acre^{-1}, which were split-applied monthly beginning 1 May to an existing established (>10 yr) stand. Wheat was drilled into a conventionally tilled seedbed in 2012, and N fertilizer was applied at 0, 50, 100, 150, and 200 lbs N acre^{-1}. The SDTF study was initiated on an established stand (1 yr) in late August 2014 with N fertilizer was applied at 0, 50, 100, 150, and 200 lbs N acre^{-1}. Bermudagrass and SDTF DMY exhibited positive linear responses to N fertilization treatments (R^2 = 0.8469 and 0.7587, respectively), while wheat exhibited a logarithmic response (R^2 = 0.6317). Bermudagrass, SDTF, and wheat CP exhibited similar positive linear responses to N fertilizer (R^2 = 0.6576, 0.6689, and 0.6324, respectively). These positive correlations indicate that these sensors have the potential for DMY and CP prediction. Future research will evaluate additional sites in order to improve and expand the DMY and CP prediction models.

Effects of Planting Date and Seedbed Preparation on the Establishment of Summer Dormant Tall Fescue

J.D. Stein[1], P.M. Sparks[1], S.M. Interrante[1], D. Malinowski[2], J.J. Pittman[1], and T.J. Butler[1]

[1] Forage Improvement Division, The Samuel Roberts Noble Foundation, Inc., 2510 Sam Noble Parkway, Ardmore, OK
[2] Texas AgriLife Research Center, Vernon, TX

Field experiments were initiated in the autumn of the 2013-14 and 2014-15 growing seasons near Vernon, TX and Vashti, TX, to investigate the effects of three planting dates and four seedbed preparations on the establishment of summer-dormant tall fescue (SDTF) [*Festuca arundinacea* Schreb. [syn. *Schedonorus arundinaceus* (Schreb.) Dumort]. These experiments followed imazamox-tolerant wheat (*Triticum aestivum* L.) to facilitate control of winter grassy weeds for the subsequent tall fescue (TF) plantings. Main plots included (1) harvesting wheat for grain plus summer chemical-fallow, (2) glyphosate at boot-stage but no forage removal plus summer chemical-fallow, or (3) wheat hay removal at boot-stage plus summer chemical-fallow or (4) wheat hay removal at boot stage followed by conventional tillage plus summer chemical fallow. Sub-plot treatments were three planting dates (early September, October, and November), and sub-sub-plot treatment included TF varieties (summer-dormant: NFTF1700, NFTF1800, and ‘Prosper’ and summer-active: ‘Texoma MaxQ II’). There were no differences in TF seedling density between locations but there were planting date x variety and seedbed preparations x planting date interactions. The latter interaction was attributed to the clean-tilled seedbed having fewer seedlings in the November treatment (10.5 seedlings ft^{-2}) while the wheat for grain seedbed treatment had fewer seedlings in the October treatment (19.7 seedlings ft^{-2}), however these differences do not appear to have biological importance. Planting date was the major factor affecting seedling density. Across varieties and seedbed preparations, the early October planting date (23.7 seedlings ft^{-2}) had greater seedling counts compared to November (14.3 seedlings ft^{-2}) and September (5.4 seedlings ft^{-2}). The low seedling density in September may most likely be attributed to high-temperature dormancy. Although seedling density was adequate initially, planting in November is generally not recommended since summer-dormant TF seedlings are susceptible to freeze damage, especially until they reach the 5-leaf stage of growth. There were small differences in seedling density among seedbed preparations therefore both no-till and clean-tilled planting could be considered viable management options.

Herbicide Use in Native Warm-Season Grass Stands Managed for Forage Production

Matthew Thornton[1] and J. Brett Rushing[2]

[1]Graduate Assistant; Dept. of Plant and Soil Sciences, Mississippi State University
[2]Assistant Research/Extension Professor; Coastal Plain Branch Experiment Station, Mississippi State University

Native warm-season grasses (NWSG) are characterized by their bunch-type growth, drought-tolerance, and ability to be high yielding, quality summer forage crops. Research on NWSG as forages has focused primarily on four species including switchgrass (*Panicum virgatum*), big bluestem (*Andropogon gerardii*), indiangrass (*Sorghastrum nutans*), and little bluestem (*Shizachyrium scoparium*). Weed control during establishment and post-establishment of these species is crucial in maximizing both yield and forage quality. During establishment these species are typically slow growing and vulnerable to weed competition. Chemical weed control prior to stand establishment is an important technique for ensuring a successful stand. This can be accomplished with pre-planting and pre-emergent applications of herbicides, such as glyphosate and imazapic. Following successful establishment, a variety of herbicides and application timings can be used in order to control a wide range of weed species, both grassy and broadleaved. Important considerations for producers applying herbicides, particularly in mixed species NWSG stands, include: what weed species are present, what desirable species are present, and how the herbicide and rate of application will impact the stand as a whole. Understanding proper herbicide selection, application rates, and correct timing of applications is key to establishing and maintaining perennial NWSG stands as a high quality forage crop.

Yield and Forage Quality Components of Soft Leaf Tall Fescue Hybrid Populations

Michael Trammell, Malay Saha, Dennis Walker, Lynne Jacobs, Kenny Word, Dusty Pittman, and Brian Motes[1]

Forage Improvement Division, Samuel Roberts Noble Foundation, Ardmore, OK

Tall Fescue (*Lolium arundianceum*) is a persistent cool-season grass in the southern USA, but it has lower forage nutritive value than ideal for many livestock enterprises. Improving nutritive value, while maintain persistence and forage yield is a key objective of our tall fescue breeding program. The objective of this study was to assess seasonal yield and forage quality of soft leaf germplasm hybridized with a persistent, high yielding cultivar. We obtained soft leaf germplasm from the National Plant Germplasm Collection. In the winter of 2011, reciprocal crosses were made between soft leaf genotypes and PDF/AR584 (i.e. Texoma MaxQ II) genotypes. Seed of each soft leaf population was produced from isolated poly-cross nurseries in 2011-12. The study was conducted at the Noble Foundation's Dupy farm. Seasonal yield and forage quality were collected from sward plots during the 2014 growing season. Plots were harvested twice, once in the fall and once in the summer. Summer harvest of plots occurred at variable times due to differences in maturity. Forage quality components were determined using NIRS from dried and ground biomass samples collected during each harvest. Overall, soft leaf hybrid populations tend to yield less than PDF/AR584 which is also earlier maturing. During summer, crude protein (CP) content concentrations of later maturing populations were higher than early ones. Soft leaf hybrid populations were 3.1 % higher in CP than PDF/AR584 on average. *In vitro* true dry matter digestibility (IVTDMD) of fall and summer harvested forage was similar across all populations. However, the high CP content in the soft leaf hybrid tall fescue populations at full maturity while maintaining high IVTDMD demonstrate they are highly nutritious. Neutral detergent fiber (NDF) values were lower in the soft leaf hybrid populations when compared to PDF/AR584. Also the neutral detergent fiber digestibility (NDFD), the portion of NDF digested in the rumen at a specified level of feed intake, was higher in soft leaf hybrid populations. Phenotyping of the soft leaf germplasm is very difficult. Water soluble carbohydrates could be used as a phenotyping mechanism and a distinct Brix reading between traditional continental and soft leaf germplasm was detected. Currently trials with soft leaf tall fescue hybrid populations are under grazing in an effort to gauge their persistence with a future cultivar release anticipated.

Thistle Management in North Florida

B. Wilder[1], T. Wilson[2]

[1] Extension Agent, UF/IFAS Extension Alachua County, Gainesville, FL 32609
[2] Extension Agent, UF/IFAS Extension Bradford County, Starke, FL 32091

Thistles are one of the most troublesome cool season weeds that ranchers and hay producers face in north Florida. Thistles often go unnoticed by ranchers in winter. Then in the spring, these weeds bolt, begin to flower, and, if left unchecked, spread. The goal of the demonstration was to exhibit to ranchers and hay producers which pasture herbicide provides the most cost effective thistle control. The 1,000 square feet demonstration plots were treated using a CO_2 backpack sprayer with a 10 foot boom calibrated to deliver 20 GPA. The plots were treated in Alachua County on February 14 and in Bradford County on March 19. The following herbicides were tested: 2,4-D at 1 quart per acre, 2,4-D+dicamba at 1 quart per acre, GrazonNext® H/L (aminopyralid +2,4-D) at 1.5 pints per acre, 2-4-D at 2 quarts per acre and 2,4-D+dicamba at 1.5 quarts per acre. The final plot was an untreated check. In Alachua County, one week after treatment (WAT), none of the herbicides provided more than 40% control. At 4 WAT, the plots treated with GrazonNext® H/L had 90% control. At 7 WAT, the GrazonNext® H/L plot had 100% control. 2,4-D+dicamba at 1.5 quarts and 1 quart rate both provided 90% control. 2,4-D at 2 quarts resulted in 90% control and at 1 quart provided 80% control. In Bradford County, GrazonNext® H/L was the only herbicide to provide more than 80% at 6 WAT. At 7 WAT, GrazonNext® H/L provided 100% control. Both rates of 2,4-D+dicamba provided more than 80% control. GrazonNext® H/L provided the most effective control of the thistles at a cost of $7.16 per acre. It was the only herbicide to provide 90% control at 4 WAT and controlled 100% of the thistles at 7 WAT. 2,4-D+dicamba also provided good control but costs between $11.87 and $17.81 per acre, depending on the rate. 2,4-D at 1 quart per acre provided acceptable control if applied in winter. Spring applications, when the thistles have begun to bolt, will result in poor control.

Herbicides for Establishment of Seeded Pearl Millet x Napiergrass Hybrids

Greg B. Wilson[1], Byron L. Burson[2], Paul A. Baumann[1], and Russell W. Jessup[1]

[1]Department of Soil & Crop Sciences, Texas A&M University, College Station, TX
[2]USDA-ARS, Southern Plains Agricultural Research Center, College Station, TX

The establishment of warm-season grasses in pastures from seed is difficult partly because of competition from both annual broad leaf and grass weed seedlings. Use of herbicides is often problematic because many that kill annual grass seedlings are detrimental to seedlings of the desired species. This study was conducted to evaluate the phytotoxicity of multiple herbicide groups on pearl millet x napiergrass (PMN) hybrid seedlings to develop a strategy for establishing commercial plantings of PMN hybrids. Field and greenhouse experiments were conducted from 2012 through 2014. In two greenhouse experiments, Plateau®, Aim®, Prowl®, Dual®, Metribuzin®, Huskie®, Permit®, Aatrex®, Warrant®, and Direx® were foliar applied post-crop emergence to PMN hybrids at the 3-5 and 5-7 leaf stages. A chlorophyll content meter was used to determine total chlorophyll content of the leaves and visual ratings were made up to 30 days after treatment to assess the toxic effects. Chlorophyll contents were correlated to herbicide activity through declining chlorophyll values which reached zero upon plant death. Of the herbicides tested, Dual® (s-metolachlor; 0.10 lb a.i. /acre) and Direx® (urea; 0.53 lb a.i. /acre) were lethal to the PMN plants. A field study was conducted in 2014 to evaluate phytotoxicity of Plateau®, Aim®, Prowl®, Dicamba®, Huskie®, Permit®, Aatrex®, Warrant®, and Direx®. These herbicides were applied individually and in nine specific combinations over-the-top of PMN plants at the 5-8 leaf stage. Chlorophyll content was highly variable and could not reliably be used to detect differences. However, visual ratings, morphological measurements, and yield data revealed differences among treatments and confirmed findings from greenhouse studies. Results from both greenhouse and field studies indicate Atrazine®, Aim®, Huskie®, Warrant®, Prowl®, and Dicamba® and in combination with one another did not have detrimental effects on PMN seedlings; therefore, they have potential in a weed management strategy.

Contact: Russ Jessup, rjessup@tamu.edu

Evaluating Newly Developed Cool-season Forages at Multiple Locations in Northeast Florida

Tim Wilson[*1], Ann Blount[2], James DeValerio[1], Cheryl Mackowiak[2], Barton Wilder[3], Derek Barber[4] Allen Shaw[5] and Amanda Burnett[6]

[1]UF/IFAS Bradford County Extension
[2]UF/IFAS North Florida Research and Education Center
[3]UF/IFAS Alachua County Extension
[4]UF/IFAS Columbia County Extension
[5]Bradford County High School
[6]UF/IFAS Nassau County Extension

The objective of the study was to provide practical training on cool season winter forage crops that can be grown in Northeast Florida. Winter forage food plots (18 varieties) and/or wildlife food plots (21 varieties) were planted by County Agents from four Northeast Florida counties (Alachua, Bradford, Columbia and Nassau). Each planting location provided the county extension agent with practical experience related to forage demonstration design, site preparation, planting, establishment, nutrient management, and forage performance. At one location, FFA students participated in each stage of the planting process. Differences in soil type, disease and pest loads were observed at each location. Two locations failed to provide suitable growth for evaluation, due to flooding and un-intended grazing. However, two workshops were conducted at the other sites. One was held in the morning and the other in the evening on the same day to facilitate travel time for specialists. Planned, multi-site demonstrations provided an opportunity to demonstrate hands-on learning experiences tailored to address farmer and land manager needs. New relationships were developed between the extension agents, specialists, farmers, and high school agriculture teachers and students. Eighty-five participants (from 10 different counties) attended the two field days. The popularity of these demonstrations have grown from four counties in 2014 to seven counties in 2015. Data compiled from on-farm demonstration projects like these, contribute to extension publications that serve farmers and general public.

Contact: Tim Wilson, timwilson@ufl.edu

69th SPFCIC (2015) Officers

Executive Committee

Dr. Dirk Philipp ***(Conference Chair)***
Assistant Professor
Department of Animal Science
University of Arkansas

Dr. Pat Keyser **(*Chair-elect*)**
Professor and Director,
Center for Native Grasslands Management
Department of Forestry, Wildlife, and Fisheries
University of Tennessee

Dr. Wink Alison **(*Secretary/Treasurer*)**
Professor, Forage Agronomist
LSU Ag Center – Macon Ridge Research Station
Louisiana State University

Dr. Ann Blount (***Florida Local Program Co-chair***)
Professor, Forage Breeding and Genetics
North Florida Research and Education Center
University of Florida

Dr. Cheryl Mackowiak (***Florida Local Program Co-chair***)
Associate Professor, Soil Nutrient Management and Water Quality
North Florida Research and Education Center
University of Florida

Dr. Rocky Lemus ***(Past Conference Chair)***
Leader, Center for Forage Management | Extension Forage Specialist
Department of Plant & Soil Sciences
Mississippi State University

Workgroup Officers

Forage Breeding/Forage Utilization

Dr. Brett Rushing ***(Co-chair)***
Assistant Professor
Coastal Plain Experiment Station
Mississippi State University

Dr. Dirk Philipp ***(Co-chair)***
Assistant Professor
Department of Animal Science
University of Arkansas

Forage Ecology/Physiology

Dr. Jamie Foster (*Co-Chair*)
Assistant Professor, Forages
Texas A&M AgriLife Research – Beeville
Texas A&M University

Dr. Jim Muir (*Co-Chair*)
Professor, Forages
Texas A&M AgriLife Research – Stephenville
Texas A&M University

Forage Extension

Dr. John Andre (*Co-chair*)
Associate Professor, Forage Crops Specialist
Department of Animal and Veterinary Sciences
Clemson University

Dr. Dennis Hancock (*Co-chair*)
Associate Professor, Forage Extension Specialist
Department of Crops & Soil Sciences
University of Georgia

Dr. Vanessa Corriher-Olson (*Co-chair*)
Associate Professor & Extension Forage Specialist
Texas A&M AgriLife Research and Extension Center, Overton
Texas A&M

Nominations Committee

Dr. Wink Alison (***Chair***)
Professor, Forage Agronomist
LSU Ag Center – Macon Ridge Research Station
Louisiana State University

Resolution Committee

Dr. Dirk Philipp ***(Chair)***
Assistant Professor
Department of Animal Science
University of Arkansas

Proceedings Editorial Committee

Dr. Rocky Lemus ***(Chair and Editor)***
Associate Professor, Extension Forage Specialist
Department of Plant & Soil Sciences
Mississippi State University

Dr. Vanessa Corriher Olson (***Editor***)
Associate Professor & Extension Forage Specialist
Texas A&M AgriLife Research and Extension Center, Overton
Texas A&M