UF/IFAS Range Cattle Research and Education Center
Research Update
June 2020

The UF/IFAS Range Cattle Research and Education Center has a long history of service to the Florida Cattlemen. Since 1941, our research efforts have focused on relevant problems impacting beef production throughout Florida. We focus upon important issues spanning a broad scope of overlapping topics relevant to Florida's grazinglands such as forage and pest management, soil fertility and water quality, beef cattle management, wildlife, and beef cattle and forage economics.

Presently, the Center has 5 faculty programs with 20 support staff. In addition to research and extension projects, the Center's faculty mentor numerous MS and PhD graduate students and international exchange scholars. This article provides a highlight from each of the Center's faculty regarding work they are presently involved with in response to the research priorities of the Florida Cattlemen's Association.

Brent Sellers, Professor and Center Director
Pasture and Rangeland Weed Management

Smutgrass continues to be the most problematic weed in bahiagrass pastures. Although smutgrass management has been researched since the 1950s, adequate control continues to be difficult. Currently, hexazinone is the only herbicide that is used for selective control of smutgrass in bahiagrass pastures. While hexazinone is usually effective, lack of control following application of this herbicide is commonly observed.

Hexazinone is a herbicide that is typically soil active, especially on sensitive grasses, and it must be absorbed through the root system and translocated with water through the xylem to the active site in the plant where it interrupts photosynthesis. Since it must be absorbed through smutgrass roots, rainfall is necessary to move the hexazinone into the soil for uptake. However, too much rainfall can result in hexazinone movement across the soil surface, or below the root zone of smutgrass plants. Our research over the past two years has been attempting to determine ways to increase activity or make hexazinone more consistent.

In 2018 and 2019 we began investigating the strategy of using liquid fertilizer (equivalent to applying 50 lb N per acre) as a carrier instead of water when applying hexazinone. In 2018 we used 19% calcium-ammonium nitrate as the carrier and compared that with water as the carrier for hexazinone at 1 or 2 quarts per acre. This fertilizer had no impact on smutgrass control. In fact, it appeared that using 19% calcium-ammonium nitrate as the carrier resulted in less control than when hexazinone was mixed in water.

In 2019 we used 32% urea ammonium nitrate (UAN) as the carrier in place of 19% calcium-ammonium nitrate. In this scenario, the use of UAN as the carrier resulted in smutgrass control equal to or greater than that observed when mixing hexazinone in water. For example, smutgrass control was similar when hexazinone was applied at 2 quarts per acre when mixed in either water or UAN (Figure 1). However, smutgrass control was greater when hexazinone at 1 quart per acre was mixed in UAN compared to water. In fact, visually, control was similar between hexazinone at 1 quart per acre mixed in UAN to hexazinone at 2 quarts per acre in water.

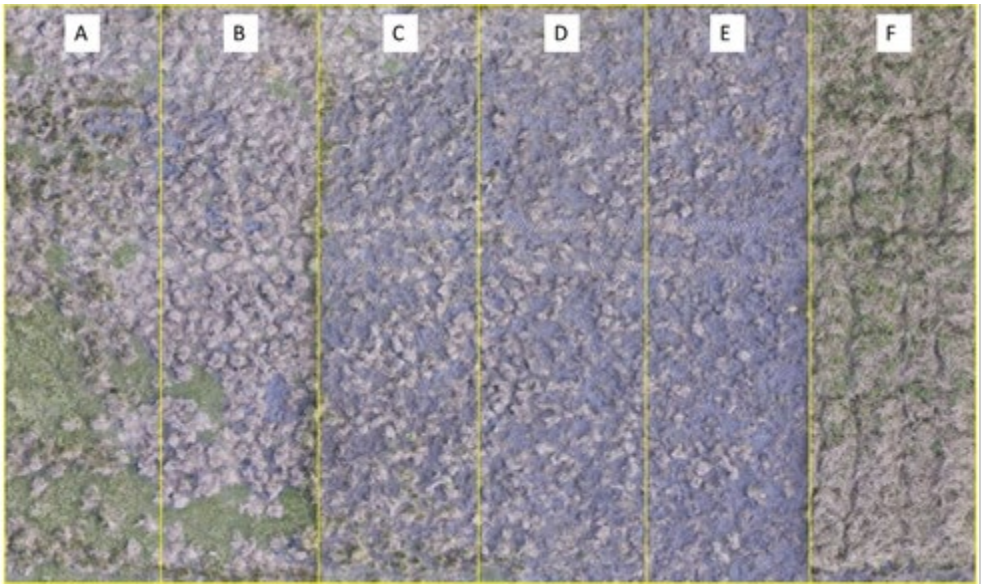

Figure 1. Aerial imagery response of smutgrass to hexazinone: A) 1 qt/A hexazinone mixed in water, B) 2 qt/A hexazinone mixed in water, C) 1 qt/A hexazinone mixed in 32% UAN, D) 1.5 qt/A hexazinone mixed in 32% UAN, E) 2 qt/A hexazinone mixed in 32% UAN, F) 32% UAN only. Note: When 32% UAN was utilized, the application rate was at 50 lb N per acre. At our output (30 gallons per acre), the mix was approximately 50% UAN solution and 50% water.

We plan to repeat this experiment in 2020 and to look at additional rates of UAN to see if the amount of nitrogen is necessary for the level of control we observed in 2019. At this point in time, we are not ready to make a recommendation for this practice, but it is showing some promising results at reduced application rates. Furthermore, we did not achieve 100% control, which suggests that a multi-year approach will still be required for managing smutgrass.

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Philipe Moriel, Assistant Professor
Beef Cattle Nutrition and Management

Nutritional Strategies for Developing Replacement *Bos indicus*-Influenced Beef Heifers

Modifying the growth pattern during the post-weaning phase has been used to enhance reproductive success of *Bos taurus* heifers. The supplementation strategy of low weight gain followed by high weight gain is called **Stair-Step strategy** and is usually implemented to explore compensatory gains that occur when nutrition level is increased after a period of nutrient restriction. Researchers elsewhere developed beef heifers to achieve an even weight gain from weaning until breeding (EVENGAIN) or achieve a low weight gain followed by a high weight gain in the final 45 days before breeding (LOW-HIGH). In that study, LOW-HIGH heifers had greater first-service conception rate (71% vs. 56%) and percentage of heifers calving early in their first calving season, which is associated with greater lifetime productivity. Using this Stair-Step strategy may allow producers to improve the reproduction of their heifers without increasing feed costs. Our on-going study will explore the Stair-Step strategy for Brangus heifers to determine if such a nutritional strategy may or may not be applied in Florida production systems.

The experiment is currently underway, starting in Sep 2019 to Jun 2020 (Year 1) and will be repeated from Sep 2020 to Jun 2021 (Year 2). The present article will show the results obtained in year 1 only. Treatments consisted of: heifers offered concentrate DM at 1.50% of body weight from September until the start of the breeding season in December (day 0 to 100; **CON**); or stair-step heifers initially offered concentrate DM at 1.05% of body weight from September to October (day 0 to 50), and then, concentrate DM at 1.95% of body weight (DM basis) from October until the start of the breeding season in December (**SST**; day 50 to 100). Concentrate contained 22% crude protein and 73% total digestible nutrients (DM basis).

In year 1, total supplement DM offered to heifers did not differ between treatments (903 vs. 892 lb/heifer for SST and CON; $P = 0.26$). In terms of growth, average daily gain from day 0 to 50 did not differ between treatments (1.39 vs. 1.37 lb/day; $P = 0.87$) but was greater for SST vs. CON heifers from day 50 to 100 (1.61 vs. 1.23 lb/day; $P = 0.01$), leading to a tendency for greater overall average daily gain (1.50 vs. 1.30 lb/day; $P = 0.07$) and body weight at start of estrus synchronization protocol for SST vs.

CON heifers (685 vs. 665 lb; *P* = 0.009). From day 25 to 31, SST heifers had significantly lower intravaginal temperatures from 9:30 am to 6:00 pm compared to CON heifers (0.25 to 0.32ºC lower for SST vs. CON), which is a result of lower heat increment and partially explains the lack of treatment effects on heifer average daily gain from day 0 to 50 despite the drastic differences in supplement DM offered. From day 85 to 91, supplement DM amount (*P* = 0.39) did not affect intravaginal temperature of heifers, which likely prevented energy waste to cope with heat stress and allowed for greater weight gain of SST vs. CON heifers. Reproductive tract scores and percentage of pubertal heifers at the start of the synchronization protocol did not differ between treatments. Based on data from year 1, the SST strategy offered an opportunity to harvest greater growth performance before the start of the breeding season without increasing feed costs. This enhanced growth performance did not lead to any advantage on heifer puberty attainment before breeding in year 1 of our study but might be important in situations when heifer post-weaning body weight are lighter than those reported herein.
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Chris Prevatt, State Specialized Agent II
Beef Cattle and Forage Economics

The last four months have been extremely stressful for all participants in the U.S. cattle industry as extreme volatility from both the knowns and the unknowns have created chaos in our livestock markets. The entire U.S. cattle and beef supply chain has been impacted by COVID-19 (coronavirus). During this time, producers have seen extreme declines in price, followed by rallies that have failed to materialize. This volatile marketplace has made paying close attention to prices on a daily or weekly basis extremely important. Therefore, a major focus of the Beef Cattle and Forage Economics Extension Program has been placed on marketing cattle. As is true of production programs and management practices, many marketing alternatives are available to cattle producers. Many producers spend most of their time and effort improving production practices while spending minimal time developing a marketing plan for their product. However, time spent on marketing feeder cattle in today's complex economic environment can pay larger dividends than time spent on improving or implementing most production practices. Anyone can sell, but few producers can

market feeder calves with skill. Profit can be the difference between implementing a well-researched market strategy or accepting what the cash market provides. Moving forward, our goal will be to provide virtual learning opportunities that evaluate alternative marketing scenarios that are available to cattle producers, helping them understand the various opportunities that may be available. These alternatives can help producers develop a market plan for each year, as well as a contingency or backup plan should market prices, or availability to market, differ from original expectations. Another major project that the Beef Cattle and Forage Economics Extension Program is focused on is utilizing the long-term price and profitability projections from the Food and Agricultural Policy Research Institute (FAPRI). These projections can be a valuable guide in the decision-making process that can help in the development of a long-term plan, or vision, for the future. The goal of this project will be to evaluate the projected cattle revenue, cost of production, and net returns over costs for Florida cow-calf operations. These economic projections will provide a guide from which many questions can be answered such as: how much can I pay for replacement heifers? Is now the time to expand the size of my cattle operation? Is my cost of production reasonable compared to others in the industry? What level of net returns are expected in the Florida cow-calf industry moving forward? This economic model can be used to guide producers and help them begin to answer these difficult questions we face. Developing a written long-term plan can be a time consuming and repetitive process, but it will improve the decision-making and competitiveness of your cattle operation. **prevacg@ufl.edu**

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Maria Silveira, Professor
Soil and Water Science

Despite the numerous agronomic benefits of biosolids, concerns over nutrients [mainly nitrogen (N) and phosphorus (P)] losses restrict the extent that biosolids can be beneficially reused, especially in environmentally-sensitive Spodosols in Florida where water quality is a prominent concern. A relatively novel approach to minimize the likelihood of nutrient transport from soils is the co-application of biosolids or other organic and inorganic fertilizers with biochar. A 3y-r field study was designed to investigate the potential impacts of co-applying biochar with biosolids or inorganic fertilizer on N and P leaching losses. Nutrients were surface-applied as biosolids (aerobically digested Class B) and inorganic fertilizer (ammonium nitrate and triple superphosphate) to an established perennial pasture at equivalent annual rates typical of field practices. Biochar was surface applied at an annual rate of ~ 10,000 lb per acre. Leachate N and P were monitored using passive-capillary drainage lysimeters installed in the center of each

plot at a depth of 12 inches. Results indicated that application of biosolids resulted in significant lower risks of N and P losses via leaching than inorganic fertilizer. Repeated application of biosolids at levels to meet crop N requirement showed no impacts on N and P leaching compared with the control treatment. However, inorganic fertilizer generally resulted in greater leachate N and P losses than biosolids. Soils in this study exhibited moderately high P-sorbing capacity that prevented significant P leaching, however, fluctuation in water table levels favored N and P leaching. Approximately 1% of applied N was lost via leaching from biosolids treatments vs. 16% for inorganic fertilizer. Regardless of the P source, negligible (0.1 to 0.2% of applied P) cumulative P leaching occurred during the 3-yr study. Biochar had no effect on P leaching, but reduced N leaching from treatments receiving inorganic fertilizer by 60%. Our results indicate that biosolids represents a feasible fertilizer option to established perennial pastures with no impact on water quality. Prudent nutrient management is possible even on biosolids-amended Spodosols with high water tables.

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Joao Vendramini, Professor
Forage Management

‘Mislevy’ - a new bermudagrass cultivar

Mislevy bermudagrass was selected at the Range Cattle REC and a series of research projects were conducted to evaluate the merit of Mislevy to be released as a new bermudagrass cultivar in Florida. Mislevy had similar early-spring and fall production to Jiggs and greater winter production than Jiggs, Tifton 85, and stargrasses at Ona. In addition, Mislevy showed greater forage production when harvested at longer regrowth intervals (7 weeks). Due to the unpredictability of Florida weather, this may be an important characteristic to give flexibility to producers to delay forage harvest. Considering hay production, Mislevy will be attractive to producers because it has thinner stems than

Tifton 85 and dries faster in the field. In addition, hay with thin stems have a better appearance for marketing due to the perception that thinner stems result in better nutritive value. Mislevy is propagated by mature tops and sprigs and plant material will be available at limited quantities at Ona, Gainesville, and Marianna in 2020.

New forage cultivars

Two new forage cultivars,1 brachiariagrass and 1 guineagrass, have been tested at Ona and Citra. The brachiariagrass is propagated by seed, tolerant to spittlebugs, and has greater forage production and nutritive value than Jiggs bermudagrass. The guineagrass is propagated by seeds, but it does not produce seeds in Florida, therefore, it has decreased invasive potential. The guineagrass had greater forage production than brachiariagrass and Jiggs bermudagrass, with greater nutritive value than Jiggs. The study will be repeated in 2020.

Pasture Establishment

Establishment of new pastures and hayfields is one of the most costly management practices in forage and livestock operations. It is estimated that the cost to establish a warm-season perennial grass in Florida is approximately $600.00/acre. In addition, a detrimental factor in establishing new forage fields is the extended time required for the grass to fully establish and be productive; which can take from 2-6 months. Therefore, three research projects have been conducted to test the effects of mixing warm-season annual grasses and legumes with warm-season perennial grass at the time of establishment to increase the utilization of the pasture during the first year after seeding. Bahiagrass plots mixed with pearl millet had similar ground cover and 35% more forage production than pastures seeded only with bahiagrass. Lastly, establishment of limpograss and Jiggs in November with or without annual ryegrass was tested in 2019. Plots established with limpograss only had an excellent establishment with 80% ground cover in April, whereas plots planted with limpograss and overseeded with annual ryegrass had greater forage production in the winter; however, limpograss cover was only 45% in April. Jiggs bemudagrass establishment was not affected by annual ryegrass overseeding but the ground cover was only 45% in April. **jv@ufl.edu**