UF/IFAS Range Cattle Research and Education Center
Research Update
June 2019

The UF/IFAS Range Cattle Research and Education Center, has enjoyed a long history of service to the Florida Cattlemen. Since 1941, our research efforts have focused on relevant problems impacting beef production throughout Florida. Unique among the UF IFAS RECs, our focus is on a single clientele group, the owners and managers of Florida's grazinglands. At our Center, we address important issues spanning a broad scope of overlapping topics relevant to Florida's grazinglands, such as forage management, fertilization, soil and water, beef cattle management, invasive animal and plant management, wildlife, and the economics of livestock and forage production.

Presently, the Center houses 6 faculty programs with 20 support staff including biological scientists, technicians, program coordinators, and administrative support personnel. 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.

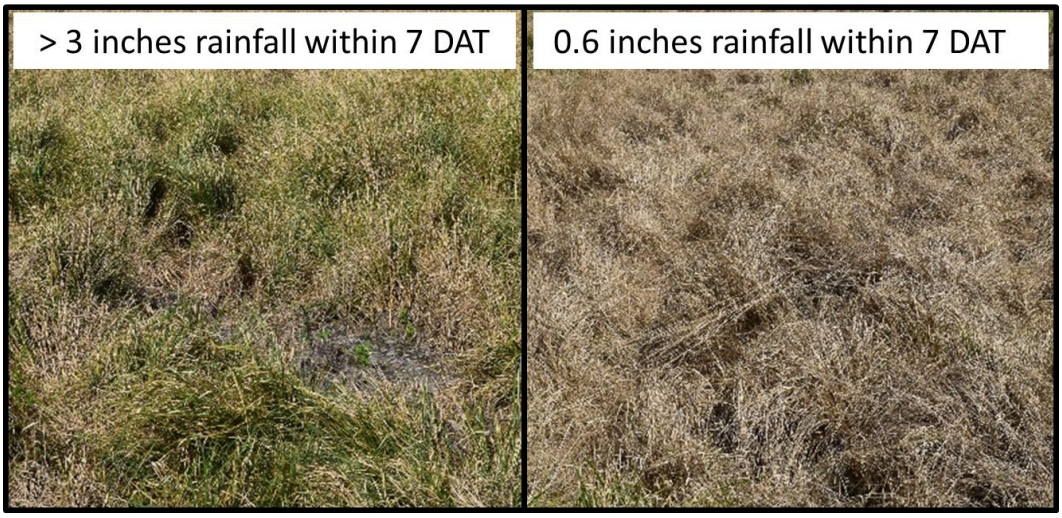
Brent Sellers, Professor and Interim Center Director
Pasture and Rangeland Weed Management

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 the amount of rainfall that is needed for optimum kill while using hexazinone.

Hexazinone was applied weekly at 2 quarts/A beginning in May until the end of September in 2017 and 2018 onto a smutgrass infested pasture near Ona for a total of 22 application timings per year. Rainfall was recorded weekly. Smutgrass control was evaluated visually at 35 days after treatment (DAT) as well as by recording the number of living plants at application and at the beginning of the next growing season to determine smutgrass density reduction. Although we want all smutgrass to be dead, we feel that at least 70% visual control or 70% reduction in density by the beginning of the next growing season should be considered acceptable in most cases.

Smutgrass control at 35 DAT was estimated to be at least 70% for 13 of the 22 application timings in 2017 and 18 of the 22 timings in 2018. However, density reduction at the beginning of the following growing season was at least 70% for only 9 of the 22 application timings in 2017 and 10 of the 22 application timings in 2018. While the initial results appeared to be promising for many of the application timings in both years by 35 DAT, density reduction the following spring is probably a better indicator of long-term activity. In those situations where density was not reduced the following spring, rainfall often exceeded 3 inches. Overall, the best activity occurred when rainfall ranged from 2 to 3 inches within the first 7 days after application.



While rainfall is an important factor for hexazinone activity, it does not appear to be the only factor. Hexazinone activity on smutgrass was less than 70% when applied in May, regardless of the amount of rainfall. Therefore, even though giant smutgrass may be growing early in the season, it is advisable to apply hexazinone no earlier than the 3rd week of June and stop applications in early September. Also, if rainfall within 7 days of application is less than 0.25 or exceeds 3 inches, hexazinone is more likely to fail in controlling smutgrass. **sellersb@ufl.edu**

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Raoul Boughton, Assistant Professor
Rangeland Wildlife and Ecosystems

As part of the USDA Long Term Agroecosystem Research Network, in collaboration with Buck Island Ranch, we conducted a study on how ecosystems services, including plant diversity, forage quantity and quality, carbon storage, and cattle use change during patch burn grazing management compared to full burn management. Fire to improve forage availability, control woody vegetation, and enhance wildlife habitat is a common management tool used on subtropical humid grazing lands, but the potential to manipulate cattle behavior via patch-burning in subtropical grasslands is not well understood. Our objective was to understand how patch-burning affects cattle use of improved and semi-native pastures in subtropical grasslands. We expected that cattle use would be higher in recently burned patches compared to unburned areas within patch-burned pastures. These patterns were expected to weaken as time since fire increased.

The experiment was established in 2017, with 16 pastures (16 ha each) in two different pasture-types (improved and semi-native) at the Buck Island Ranch. In 2017, eight pastures were completely burned ("full-burned"). The remaining eight pastures followed a fire regime of one-third burned yearly with the first third burned in 2017. Eight herds of cattle with four GPS collars each (see photos) were rotated between four pairs of full-burned and patch-burned pastures within each pasture-type. Using GPS fixes and speed of movement we categorized behavior as rest, grazing or travel.

Results of grazing behavior in 2017 show that in both improved and semi-native pasture-types, there was a significant effect of patch-burning, with the percent of use by cattle during grazing periods was higher in burned patches versus unburned patches. During rotational grazing periods of 4-6 weeks with 4 weeks rest, the effect of grazing in the patch-burned area more than unburned patch remained for the whole year. On each rotation the cattle would initially prefer the burned areas for several weeks with a slow decline to even use across burned and unburned patches at the end of the rotation period. The magnitude of the effect was greater in the semi-native pasture systems.

A second question we asked was "Do cattle graze more of the pasture area in a burn compared to a non-burned patch?" We expected a more aggregated non-random grazing pattern to form as time since fire increases and unpalatable, less preferred forage increased. This was a much more difficult question to

answer and initial results, although not conclusive, suggest that cattle do indeed increase the area they forage across in burns, creating a more even grazing pattern after fire with less aggregated grazing patches. Although, there is still some aggregation, this affect may be caused by small changes in topography with different water and nutrient availability driving forage quality.

The information we gain from this study is evaluating management tools that impact the dynamics of the subtropical grasslands. Stay tuned for future updates and visit https://www.rangelandwildlife.com/ for more information. **rboughton@ufl.edu**

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Philipe Moriel, Assistant Professor
Beef Cattle Nutrition and Management

In this edition, our nutrition program would like to highlight 1 of 2 studies (*Evaluating cost-effective supplementation programs for cows during late-gestation*) *funded by the Florida Beef Enhancement Funds.*

Nutrient deficiency often occurs in grazing cattle due to seasonal variation in forage quality and quantity, which may reduce reproductive success of cows and calf performance after birth. Published studies were conducted with *Bos taurus* cows grazing cool-season forages, and not with cows having *Bos indicus* genetic influence and fed low-quality, warm-season forages. It is unknown if similar results will be observed in our environment conditions. Thus, this 2-year study is:

(1) evaluating if dry distillers grains (DDG) supplementation of Brangus cows during the entire late-gestation (2.25 lb/day for 12 weeks = 189 lb per cow; August to November) will increase cow reproductive success and calf performance after birth to levels higher than the cost of this supplementation strategy, and (2) investigating if concentrating cow DDG supplementation during the period of lowest nutrient demand (4.50 lb/day for 6 weeks after weaning; August to October) will be more cost-effective than cows supplemented during the entire late-gestation.

After 2 years, we observed cows supplemented during late-gestation, regardless of length of supplementation, had greater body condition score (BCS) at calving (6.0 vs. 5.2) and maintained this difference throughout the entire breeding season compared to non-supplemented cows. We also did not observe differences in BCS at calving between cows supplemented for 6 or 12 weeks after weaning. This response indicates a 6-week period of supplementation was more cost effective than a 12-week period, because cows supplemented for 6 weeks achieved the same BCS at calving with half the feeding labor costs.

Interestingly, we observed that calves born from cows supplemented for 12 weeks before calving had a 25-lb greater weaning weight compared to calves born from cows that did not receive supplementation pre-calving and cows that were supplemented for only 6 weeks (no difference in weaning weights between these last 2 groups). By choosing the shorter supplementation period (6 weeks), labor cost was reduced by $5 per cow, but we did not harvest $38 per cow in additional calf weaning weight (25 lb x $1.50/lb). Therefore, the best supplementation strategy for the cows (supplementation for 6 weeks pre-calving) was not the strategy that led to the best calf performance at weaning (cow supplementation for 12 weeks pre-calving). Performance of these calves is currently being evaluated. Steers have been sent to a feedlot for performance and carcass quality evaluation, while heifers are being developed to evaluate their reproductive performance during their first breeding season. **pmoriel@ufl.edu**

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Prevatt, State Specialized Agent II
Beef Cattle and Forage Economics

Over the past decade cattle producers have seen significant price increases and declines. These volatile markets have 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 feeder calves. Proper marketing can be the difference between making a profit or loss in the cattle business. 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 marketing their product. However, time spent 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 is often the difference between implementing a well-researched market strategy and accepting what the cash market will provide. Producers should ensure they are continually evaluating their marketing plan and establishing a contingency or backup plan should market prices or market availability differ from their original expectations. More information on this topic will be available in the July 2019 Ona Report.

Cover crops have recently been a focal point of soil health discussions. This year a major focus has been placed on the use of warm-season and cool-season annual forages as cover crops to maintain or increase soil health. These cover crops can help increase soil organic matter content, control erosion, weed suppression, break pest cycles, improve soil moisture, regulate soil temperature, increase nutrient cycling, minimize soil compaction, reduce water quality degradation by utilizing excessive soil nutrients, and bridge forage production gaps in agricultural systems throughout the state. From an economic standpoint, it is very difficult to estimate the long-term economic value of soil health benefits that cover crops provide to producers as they perform differently from location to location due to management, forage species, animal performance, soil, weather, and input differences. One of the ways we are analyzing these systems is by working on-farm with producers who are growing and grazing cover crops. Grazing cover crops allows the opportunity to calculate the short-run benefits annually. Extension, industry, and farmers are working as a team to evaluate the elements of Florida's cover crop economics: revenue generated, cost of production, net returns, value of gain, and cost of gain. The goal for 2019 is to use the data collected to develop a long-term economic model to guide producers on making decisions that can improve their operation and implementation of cover crop systems. More information on this topic will be available in the October 2019 Ona Report. **prevacg@ufl.edu**

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Maria Silveira, Associate Professor
Soil and Water Science

Biosolids have clear agronomic benefits, but concerns over nutrient accumulation in soils and subsequent impacts on water quality can limit land application in Florida. The project described in this article addresses FCA Priorities # 9 "Land Application of Biosolids on Pastures" and # 1 "Fertilization (Alternative Fertilizer Sources). The main objective was to establish a long-term, instrumented field trial designed to evaluate the agronomic and environmental impacts of land application of biosolids to bahiagrass pastures. Biosolids (Class AA and B materials) were surface applied to the experimental area on April 2016, 2017, and 2018 and compared to nutrition provided with inorganic fertilizers. Biosolids were applied either alone or in combination with biochar (a fine-grained carbon-rich residue produced through the pyrolysis of wood biomass) to supply an estimated rate of 160 lb plant available N/A/yr, which correspond to UF/IFAS high N option for established bahiagrass. Forage, water, and gas quality samples were collected and analyzed during the 2018 growing season. Results obtained during the 2018 growing season demonstrated no differences in cumulative bahiagrass herbage accumulation or

nutritive value between inorganic fertilizer and biosolids treatments. Although inorganic fertilizer resulted in greater initial bahiagrass herbage accumulation (May through June, 2018), at the end of the 2018 growing season greater bahiagrass herbage accumulation was associated with biosolids treatments. This response was due largely to the slow release nature of nutrients present in biosolids. No effect of biochar on cumulative herbage accumulation was observed in 2018. Similarly, no differences in bahiagrass crude protein and digestibility were observed among fertilizer and biosolids treatments. Results from this study indicated that biosolids application can supplement or replace inorganic fertilizer in bahiagrass pastures, with the added benefit of providing a more continuous supply of nutrients throughout the growing season. Application of biosolids (either alone or in combination with biochar) had no significant impact on water quality and greenhouse gas emissions. However, when bahiagrass received inorganic fertilizer, large pulses of N and P were observed immediately after fertilizer application. Similar responses were also observed for nitrous oxide emissions. Greater nitrous oxide emissions were generally associated with the treatments receiving inorganic fertilizer, particularly during the first few weeks following fertilization application. These results indicated that N and P losses associated with treatments receiving biosolids can be lower than inorganic fertilizer. Results also indicated no potential benefit of biochar in reducing N and P losses. Fertilizer and biosolids are expected to be land applied in spring 2019 and forage and environmental responses will be evaluated during the 2019 growing season. **mlas@ufl.edu**

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Joao Vendramini, Associate Professor
Forage Management

Aeschynomene

Aeschynomene is the most planted warm-season legume in South Florida; however, it has been challenging to maintain the stands of aeschynomene due to poor re-seeding in the fall. Two research projects have been established in 2019 to test the effects of different fertilization strategies on forage production, persistence, and nitrogen fixation of Aeschynomene Americana overseeded into bahiagrass pastures.

Bahiagrass

In collaboration with the UF/IFAS Agronomy Department, a selection of new tetraploid bahiagrass (Argentine type) cultivars has been conducted at Ona. We have observed that tetraploid bahiagrass has been more productive and persistent than diploid bahiagrass (Pensacola type) in South Florida. In addition, tetraploid bahiagrass has been more valuable for sod and seed production. This research project is testing 7 cultivars developed in Florida, Argentina, and Uruguay.

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 in November with or without annual ryegrass was tested. Plots established with limpograss only had an excellent establishment with 85% ground cover in April, whereas plots planted with limpograss and overseeded with annual ryegrass have greater forage production in the winter; however, limpograss cover was only 35% in April. These projects are being repeated in 2019.

Limpograss

The forage management program has also focused on the development and utilization of new limpograss cultivars in South Florida. Current research projects are evaluating nitrogen use efficiency of Gibtuck, Kenhy, Floralta, and "1" cultivars. It was observed that Gibtuck had greater herbage production and nitrogen use efficiency than the other cultivars at Ona. Plots fertilized with greater levels of nitrogen fertilizer (80 vs. 40 lb/acre) had greater forage production; however, they were significantly less efficient in converting nitrogen fertilizer into forage production. The Rubisco and Dof- 1 genes had significant correlation with nitrogen use efficiency and may be a useful tool to select limpograss cultivars. Limpograss entry "1" did not present favorable traits compared to the other cultivars and may not have merit to be released as a new limpograss cultivar in Florida. **jv@ufl.edu**