



UF/IFAS Range Cattle Research and Education Center
Research Update

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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 6 faculty programs with 20 support staff. In addition to research and extension projects, the Center's faculty mentor numerous MS and PhD graduate students as well as 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.

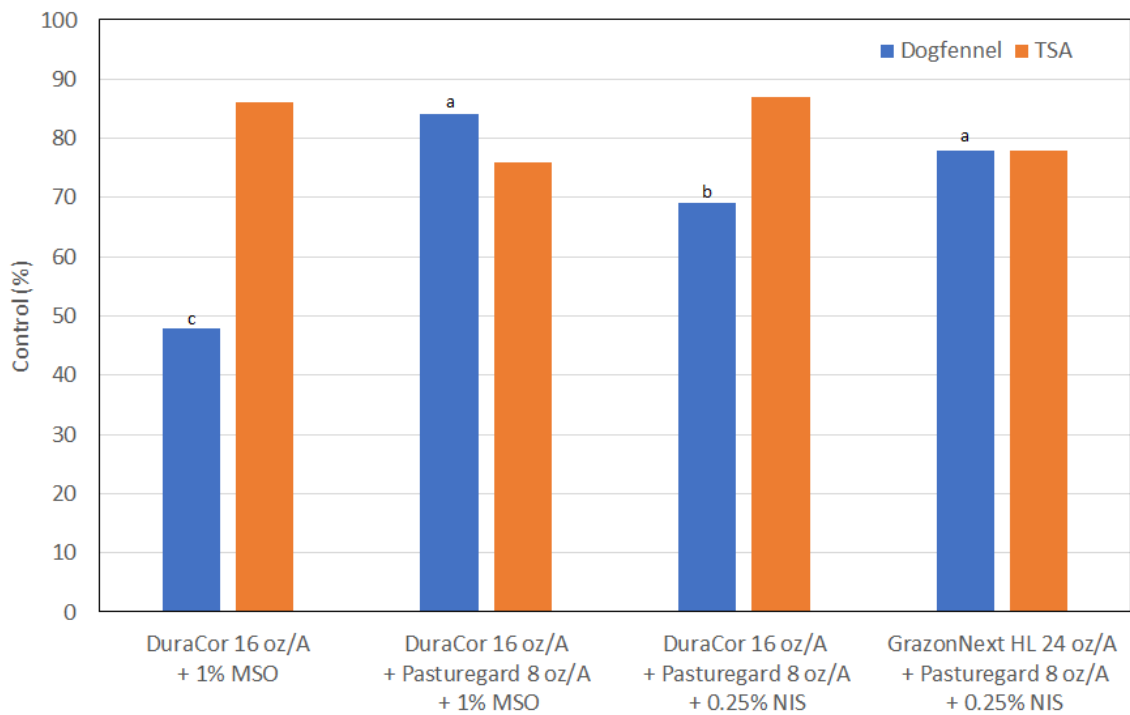


Brent Sellers, Professor and Center Director
Pasture and Rangeland Weed Management

It is not often that a new active ingredient is labeled for Florida pastures, but last year we started seeing DuraCor being marketed for weed control. DuraCor contains aminopyralid, the active ingredient in Milestone and GrazonNext HL (aminopyralid + 2,4-D), and the new active ingredient, florpyrauxifen-benzyl. Florpyrauxifen-benzyl was first commercially released for weed management in rice production in 2018. Since this is a new active ingredient for the pasture market, we knew very little about this product when it was labeled. We continue to evaluate the effectiveness of DuraCor for broadleaf weed control and hope to have concrete recommendations in the coming year or so.

At this point in time, we have primarily investigated the effectiveness of DuraCor on dogfennel and tropical soda apple, which are our two most problematic broadleaf weeds in pastures, at

the suggested use rates of 12, 16, or 20 fl oz/A. Our initial research indicated that 12 oz/A was too low to provide adequate control of tropical soda apple, and like GrazonNext HL, an additional tank-mix partner like Pasturegard HL, WeedMaster, or 2,4-D is necessary to obtain adequate dogfennel control. In fact, our research is showing that increased rates of these tank-mix partners may be necessary when using DuraCor to obtain the same level of control compared to when using GrazonNext with the same tank-mix partners; this appears to be especially true for goatweed. Additionally, the use of methylated seed oil (MSO) as the surfactant appears to provide better initial control of broadleaf weeds than when using non-ionic surfactant.



Response of dogfennel and TSA to DuraCor compared to GrazonNext HL 30 days after treatment. Different letters indicate significant differences among treatments for dogfennel control. There were no differences among treatments for TSA control.

Forage tolerance to DuraCor is also something that we are concerned about. We have seen no injury to bahiagrass or bermudagrass to date from any rate of DuraCor. We have also observed very little injury in limpograss following DuraCor applications and yield 60 days after treatment was similar to limpograss treated with Banvel (dicamba) and untreated limpograss.

This year we plan to expand beyond dogfennel and tropical soda apple to get a better understanding on how we can use DuraCor to control other common weeds like goatweed, flat-top goldenrod, and blackberry. We hope to have specific recommendations in the coming year.

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**Hance Ellington, Assistant Professor
Rangeland Wildlife Ecology**



The Eastern bluebird is an important cavity nesting bird in Florida. Bluebirds eat a wide variety of insects, including some pest species like mole crickets. Bluebird populations in Florida have been recovering in the last several decades, but changes in land use and climate remain threats for this species. Luckily, bluebirds readily use artificial nest boxes. For bluebirds, there are multiple nest box designs available, either commercially sold or provided as do-it-yourself plans (e.g., Florida Bluebird Society [FBS] North American Bluebird Society [NABS], Gilbertson). These designs often have crucial differences in dimensions or shape that could impact reproductive success of the birds. If bluebirds cannot distinguish between optimal and sub-optimal nest boxes, this could mean that well-meaning nest boxes lead to an ecological trap. Thus, our bluebird nest box research program has two objectives: 1) which nest box design is preferred by bluebirds and 2) which nest box design achieves the highest bluebird reproductive output.

Beyond the importance of providing a nest box design that maximizes productivity, constructing, deploying, and monitoring nest boxes can be an enriching activity for people. When habitat enhancement actions like deploying nest boxes are combined with a scientific study, it can also become a learning opportunity for people of all ages. Thus, we developed our nest box research program in conjunction with an extension program called, “Become a Bluebird Watcher.”



In January, we deployed 60 bluebird nest boxes across the Range Cattle REC (20 of each design type). Since then, there have been 18 completed nests with 78 eggs, including 4 bluebird couples that are raising a second nest. From these eggs, 35 young bluebirds have fledged, and 33 eggs are still being incubated. Bluebirds appear to prefer either the NABS design (53% of complete nests) or the FBS design (41% of completed nests) over the Gilbertson design (6% of completed nests). The Gilbertson box is made of wood and PVC pipe but the NABS and FBS boxes are made entirely from wood, perhaps making them more appealing to bluebirds in the natural

settings at the Range Cattle REC. Bluebird reproductive success is less clear. On average, bluebirds laid more eggs in the NABS boxes (4.8 eggs; SE = 0.2) than in FBS boxes (4.2 eggs; SE = 0.3). Young bluebirds, however, have a higher fledge rate from FBS boxes (100%) than from NABS boxes (58%). This result is driven by two nests in NABS boxes where the eggs failed to hatch. These results are preliminary and after the nesting season has ended, we will be able to more conclusively determine which nest box bluebirds prefer and which nest box maximizes bluebird reproductive success.

We have held five sessions in our Become a Bluebird Watcher program, these sessions have both been in-person at the Range Cattle REC and online. Through these sessions we have reached over 500 participants and generated over four hours of online video content.

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**Philippe Moriel, Assistant Professor
Beef Cattle Nutrition and Management**

Should we supplement beef cows before calving ?

Beef cattle production is constantly exposed to environmental and seasonal conditions that can lead to nutrient deficiency in pregnant beef females. **Even in Florida**, protein and energy deficiencies can occur during late-Summer and Fall, despite the adequate amount of forage available for cows. Late gestation is a critical period for fetal formation of muscle and adipose tissues as well as calf health following birth.

In 2020, our program completed a series of studies evaluating how maternal nutrition impacts the long-term performance of calves in Florida. Most studies were funded by the Florida Cattle Enhancement Board since 2016, and they are summarized herein. **Study 1:** Pregnant heifers were provided no supplement or 2.2 lb/day of molasses+urea during the last 57 days before calving (2.2 lb/day × 57 days = 125 lb per cow). **Study 2:** Pregnant mature cows were offered no supplement or 2.2 lb/day of molasses+urea during the last 47 days before calving (2.2 lb/day × 47 days = 103 lb per cow). **Study 3:** Pregnant mature cows were offered no supplement for the last trimester gestation, 2.2 lb/day of dried distillers grain (DDG) for the last trimester of gestation (2.2 lb/day × 84 days = 185 lb per cow), or 4.4 lb/day of DDG during the first half of the last trimester of gestation (4.4 lb/day × 42 days = 185 lb per cow). In all studies, cows and their calves were managed similarly from calving until calf weaning.



Results: Calf body weight at the time of weaning was, on average, 21 lb greater for calves born from cows that received precalving supplementation (**Study 1** = +20 lb; **Study 2** = +18 lb; **Study 3** = +31 lb when supplement was offered during the entire third trimester and +13 lb when supplement was offered during the first half of third trimester) compared to calves born from non-supplemented cows. Assuming a calf price at weaning of \$1.30 per lb, the added calf body

weight (BW) at the time of weaning was sufficient to cover the extra cost of supplementing cows before calving, except when supplementing DDG for only the first 42 days of last trimester of gestation. In **Studies 1 and 3**, we also observed that calves born from cows that were offered precalving supplementation also had stronger response to vaccination (more calves responded to the vaccine and also produced greater amount of antibodies) compared to calves born from non-supplemented cows. A stronger vaccine response suggests that the immune system of these calves is better prepared to deal with pathogen infections after weaning.

Therefore, this data overview highlights the importance of good maternal nutrition before calving. **Our studies indicate that precalving supplementation can be an economic feasible strategy and should be implemented by Florida beef producers.** For more details about each study, please contact me.

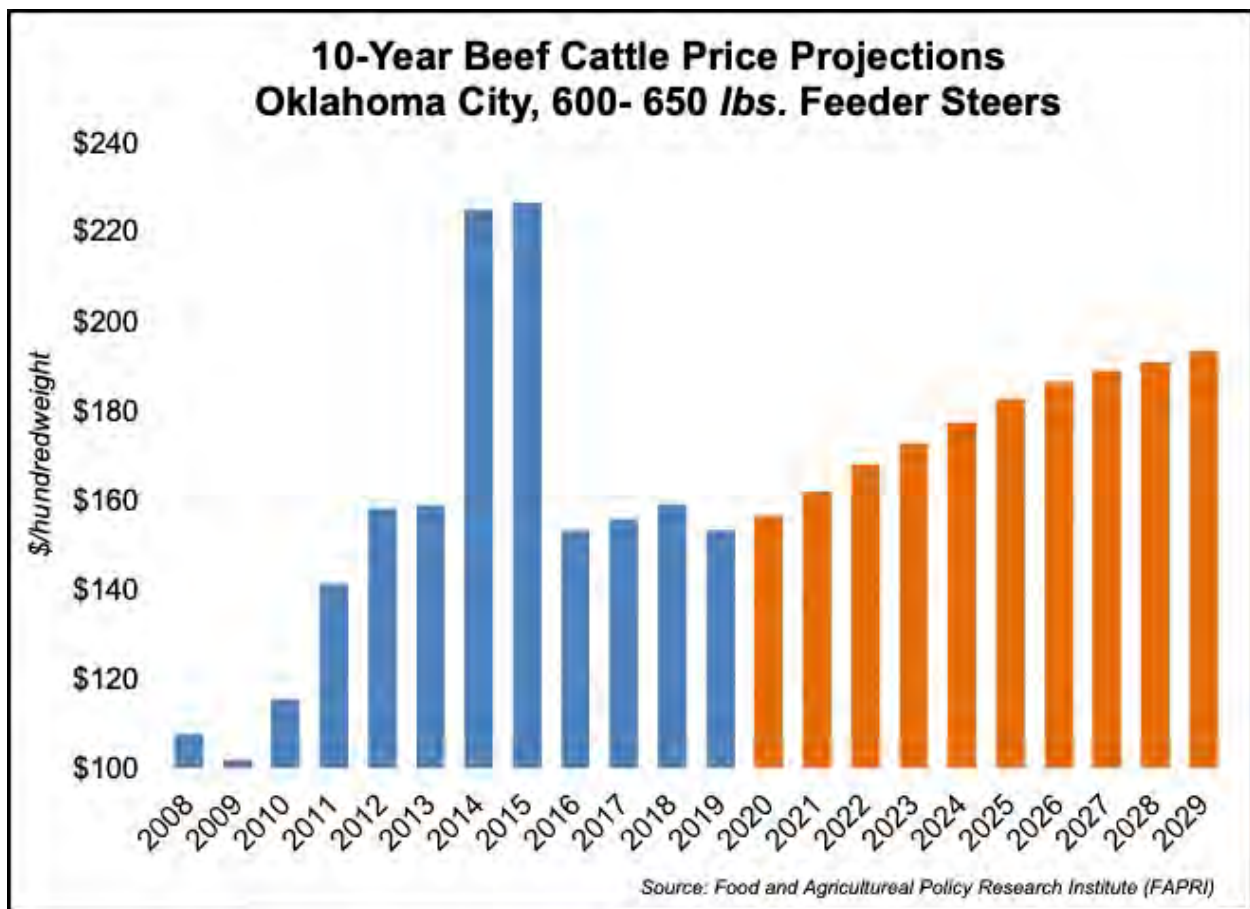
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**Chris Prevatt, State Specialized Agent II
Beef Cattle and Forage Economics**

The last year has 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 significant rallies. 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 learning opportunities that help producers understand the various opportunities available when marketing feeder calves. 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 long-term projections for feeder calf prices as well as 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 that each Florida cattle operation faces. 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.

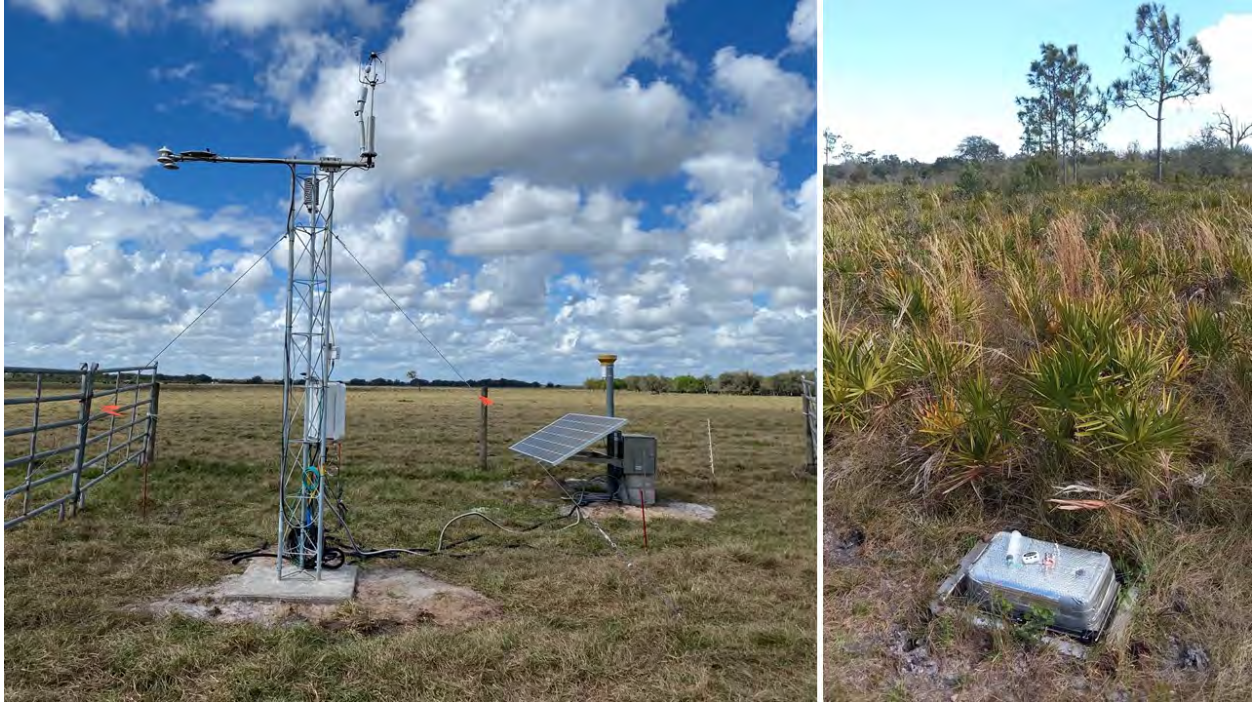
Questions, contact me at: prevacg@ufl.edu or 334-663-4606.



**Maria Silveira, Professor
Soil and Water Science**

Ecosystem carbon balance and sequestration potential of Florida native grazing lands

Grazing lands (including both native rangelands and cultivated pastures) act as an important sink or source of atmospheric carbon (C) and play an important role in climate change regulation. In the U.S., grazing lands can offset ~ one fifth of carbon dioxide (CO₂) released by other land uses (Follett and Reed, 2010). However, the ability of grazing lands to sequester C is strongly influenced by management. Previous research has documented both positive and negative impacts of pasture management on ecosystem C balance. While management can result in C losses and subsequent increase in greenhouse gas emissions, positive effects of management on soil C sequestration have also been reported when proper management practices are implemented. Most previous studies addressing ecosystem C responses to management have been mainly focused on temperate ecosystems with much less effort on subtropical regions. Florida grazing lands have unique climate and soil characteristics, thus, a better understanding of the potential effects of management on C balances is a necessary component in predicting and understanding soil C sequestration potential in this region. Moreover, a significant portion of grazing lands in Florida is being replaced by more intensive agriculture and urban development and, therefore, continuation of this trend is expected to have major impacts on net C balance in this region. In this study, we evaluated the impacts of prescribed fire on ecosystem C balance and global warming potential of Florida native rangelands using a combination of eddy covariance technique and chamber measurements to estimate ecosystem carbon exchange and greenhouse gas (CO₂, methane, and nitrous oxide) emissions. To our knowledge this study represents the first attempt to quantify multi-year carbon balance and soil greenhouse fluxes of a native Florida rangeland subjected to a typical a four-year fire cycle.



Eddy covariance tower and chamber used for gas exchange measurements.

Results indicated that over 60% of the aboveground biomass was combusted during a single fire event, which resulted in native rangelands temporarily shifting from a net C sink to a net C source. However, our data demonstrated that 60 days after fire plants recovered their photosynthetic capacity resulting in negative net C balance (C sink). Our 4-yr study also showed that native rangelands represent a small methane sink offsetting between -21 and -51 kg CO_{2eqv} ha⁻¹ yr⁻¹ as methane. Although negligible nitrous oxide emissions were detected, particularly following fire, global warming potential was offset by strong ecosystem carbon sink. Results from this study demonstrated that Florida native rangelands are well-adapted to seasonal droughts and, therefore, represent a viable C mitigation alternative to climate-vulnerable ecosystems.

This research was a contribution from the Long-Term Agroecosystem Research (LTAR) network. LTAR is supported by the United States Department of Agriculture. We thank Dr. Rosvel Bracho (UF, School of Forest Resources and Conservation) for his substantial contribution including data acquisition, analysis, and interpretation. We also thank the Ona LTAR team, Drs. Raoul Boughton, Marta Kohmann, and Joao Sanchez for their help with data collection and interpretation.

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**Joao Vendramini, Professor
Forage Management**

New forage cultivars

The forage management program has been focusing on identifying new forage species and cultivars adapted to South Florida. Two new forage cultivars, 1 brachiariagrass and 1 guineagrass, have been tested at Ona and Citra for 2 years. 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. These cultivars will be tested under grazing conditions in 2021 and there is potential for the future release of a new warm-season perennial grass propagated by seed, adapted to Florida.



New brachiaria cultivar.

Argentine has been the most productive bahiagrass cultivar in South Florida and in association with forage breeding program in Gainesville, 5 new cultivars of tetraploid bahiagrass (Argentine “type”) have been tested at Ona for 2 years. There are 2 cultivars with superior forage production and similar persistence to Argentine. The cultivars will be tested under grazing conditions in the next 2 years, and it is expected that a new tetraploid bahiagrass will be released in the near future.

Forage legumes

Aeschynomene is a warm-season annual legume forage adapted to South Florida; however, there is limited information about the ecosystem services provided by aeschynomene. The forage management program has tested the effect of overseeding aeschynomene and N fertilization on forage characteristics, N fixation, and greenhouse gas emissions on established bahiagrass pastures. The study has been conducted at Ona for 2 years. Treatments included the split-plot arrangement of overseeding aeschynomene or control (no legume, main plot) and N fertilization levels, 60 lb/acre or control. Plots overseeded with aeschynomene had greater forage production than control (1.0 vs. 0.7 lb DM/acre/harvest). The N fertilization increased average forage production from 0.6 to 0.9 lb DM/acre. The aeschynomene nitrogen atmospheric fixation was the equivalent of 40 lb N/acre. Nitrogen fertilization in this trial did not result in greater N₂O emissions.



Sunn hemp

Sunn hemp is a warm-season annual legume that has been extensively used as cover crop by vegetable producers in southern Florida. However, there is a potential to use sunn hemp as forage for beef cattle. Research has been conducted to test the nutritive value, forage intake, and animal performance of heifers receiving sunn hemp hay. It has been observed that heifers receiving sunn hemp hay had less forage intake than bermudagrass hay, with potential decrease in animal performance.

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