

UF/IFAS

Range Cattle Research & Education Center NEWS

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spring 2018

IN THIS ISSUE

Have you ever wondered what those wild hogs are rooting for?

Raoul Boughton, assistant professor and Wes Anderson, PhD graduate student



The wild hog (*Sus scrofa*) is one of the most widely distributed mammals in the world and is classified as an invasive species outside its native range (Barrios-García and Ballari 2012). One factor that has allowed this species to establish itself in many regions is its broad and adaptable omnivorous diet (Baubet et al. 2004, Irizar et al. 2004). Wild pigs also exhibit a wide range of feeding behaviors including browsing, grazing, foraging, rooting, and direct predation on animals (Loggins et al. 2002, Baubet et al. 2004). In both their native and introduced ranges, plants dominate their diet (Ballari and Barrios-García 2014). Both above-ground and below-ground food items are consumed – the latter made available through rooting.

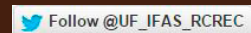
The wild hog is therefore well known for its generalist diet, a contributing factor to its successful invasion around the globe. Although, when asked

the question “What are wild hogs eating when they root around?” we have found it difficult to answer with confidence. Therefore we designed a study to figure out what those wild hogs consume. To do this we used DNA metabarcoding analyses of scat to examine wild hog diets on a cow-calf operation in south-central Florida. Regions of specific barcoding genes that targeted either animal DNA or plant DNA (CO1, trnL, and 12S rRNA marker genes) were selected for high throughput sequencing. These sequences (you can think of them as unique barcodes) were then identified using the reference database GenBank (Bensen et al 2012) housed at the National Center for Biotechnology Information (NCBI). This database is the main reference used to identify species and has over 260,000 banked sequences.

The study site was divided into five sampling areas to ensure dispersed sampling across the ranch. At least five freshly deposited scats were collected every two months from each sampling area for a year to allow a full picture of the annual diet. Two hundred nineteen scat samples were collected. Of those, we discarded 23 samples because six samples contained highly-degraded DNA and could not be used for analyses, and 17 were non-wild hog in origin. These included samples from five cattle, four raccoons, three deer, two

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opossums, one coyote, one alligator, and one human! From our specific barcoding genes we found the following.

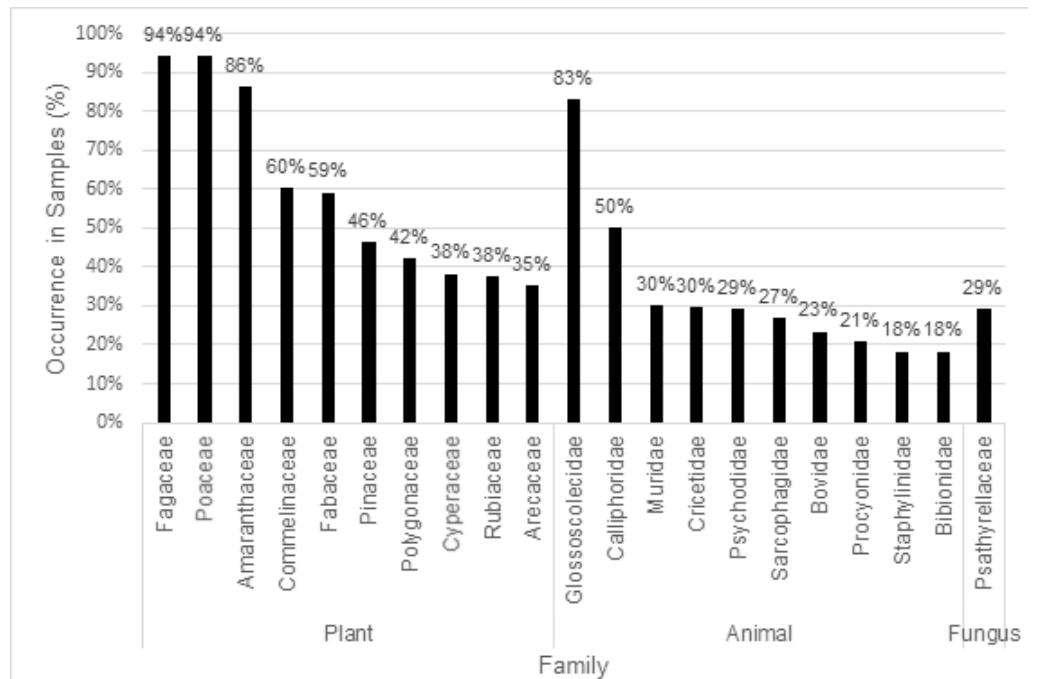
From the plant specific trnL gene eighty plant genera from 66 families were identified. Within the plant genera, 45 taxa were identified to species. The ten most commonly detected families in descending order were Fagaceae, Poaceae, Amaranthaceae, Commelinaceae, Fabaceae, Pinaceae, Polygonaceae, Cyperaceae, Rubiaceae, and Arecaceae (Figure 1). Oak (*Quercus* sp. [Fagaceae]), torpedograss (*Panicum repens* [Poaceae]), joyweed (*Alternanthera* sp. [Amaranthaceae]), Bahiagrass (*Paspalum notatum* [Poaceae]), dayflower (*Commelina erecta* [Commelinaceae]), southern watergrass (*Luziola fluitans* [Poaceae]), and other grasses (Poaceae) occurred in over 60% of the scat samples analyzed. An additional 11 taxa belonging to the families Pinaceae, Arecaceae, Polygonaceae, Fabaceae, Araliaceae, Asteraceae, Rubiaceae, Ceratophyllaceae, and Onagraceae were detected in over 25% of the fecal samples (see Table 1 for explanation of scientific family names).

From the CO1 gene seventy-eight animal genera from 63 families were identified. Within the animal genera, 56 taxa were identified to species. The ten most commonly detected families in descending order were Glossoscolicidae, Calliphoridae, Muridae, Cricetidae, Psychopodidae, Sarcophagidae, Bovidae, Procyonidae, Bibionidae, and Staphylinidae (Figure 1, Table 1). Animals were present across a wide taxonomic breadth, but generally encountered less frequently than plants (Figure 1) with the exception of an exotic earthworm (*Pontoscolex corethurus* [Glossoscolicidae]), which was detected in 84% of samples. Cattle (*Bos taurus* [Bovidae]), house mouse (*Mus musculus* [Muridae]), cotton mouse (*Peromyscus gossypinus* [Cricetidae]), raccoon (*Procyon lotor* [Procyonidae]), mole cricket (*Gryllotalpidae*), white-tailed deer (*Odocoileus*

Table 1: Biological description of scientific family names.

	Family	Description	Example(s)
Plant	Fagaceae	Oaks and Beeches	Live oak tree
	Poaceae	Grasses	Torpedograss, bahiagrass, Bluestem
	Amaranthaceae	Annual or perennial herbs or shrubs	Joyweed, Alligator weed
	Commelinaceae	Dayflower or spiderworts	Dayflower
	Fabaceae	Legumes	Peas and beans
	Pinaceae	Pines, cedars, firs, spruces	Slash pine tree
	Polygonaceae	Knotweeds or smartweed-buckwheats	Sea grape, Buckwheat
	Cyperaceae	Sedges	Nutsedge, Sawgrass
	Rubiaceae	Coffee, madder or bedstraws	Buttonbush, Milkberry
	Arecaceae	Climber trees or shrubs	Palm tree
Animal	Glossoscolicidae	Earthworms	Nightcrawler
	Calliphoridae	Blow Flies	Blow and Carrion Flies
	Muridae	Old world rodents and mice	House mouse
	Cricetidae	Bew world rodents and mice	Cotton mouse
	Psychodidae	Flies and gnats	Drain flies, sewer gnats
	Sarcophagidae	Flesh flies. Laying live young on flesh and dung	"Red-eyed" flies
	Bovidae	Cloven-hoofed, ruminant mammals	Cattle, sheep, goats
	Cervidae	hoofed, ruminant animals	Deer, Elk
	Procyonidae	Small omnivororus mammals, related to carnivores	Racoons
	Staphylinidae	Rove beetles	Hairy rove beetle
	Bibionidae	Flies - the march flies	Lovebugs
	Fungi	Psathyrellaceae	Dark-spored fungi

Figure 1. The top 10 most frequently occurring families for trnL (plants) and CO1 (animals and fungi).



virginianus [Cervidae]), and six fly taxa belonging to the families Calliphoridae, Bibionidae, Psychopodidae, and Sarcophagidae were recorded from over 10% of samples. This gene also identified fungi genera from 12 families. Within the fungi genera, two taxa were identified to species, *Amanita rubescens* and *Pleuotus*

ostreatus. A *Psathyrella* sp. was detected in 28.8% of samples.

Using the vertebrate specific 12S rRNA gene 14 vertebrate genera and 15 families were retained. Within those genera, 15 taxa were identified to species. The five most commonly

Some of the more frequently consumed food choices: Southern Live Oak, grass, earthworms.



detected families in descending order were Bovidae, Muridae, Catostomidae, Cervidae, and Procyonidae (Figure 1, Table 1). Cattle (*Bos taurus* [Bovidae]) was detected in 37.2% of samples and house mouse (*Mus musculus* [Muridae]) was detected in 32.1%. Lake chubsucker (*Erimyzon sucetta* [Catostomidae]), white-tailed deer (*Odocoileus virginianus* [Cervidae]), and raccoon (*Procyon lotor* [Procyonidae]) were detected in greater than 5% of samples. The CO1 and 12S genes were both used because it is known that neither gene is comprehensively covered in the GenBank database. In our samples 12S detected six taxa that were undetected during our CO1 analyses and included three fish (lake chubsucker [*Erimyzon sucetta*], eastern shiner [*Notropis* sp.], and walking catfish [*Clarias batrachus*]), two amphibians (pig frog [*Lithobates gryllio*] and southern leopard frog [*Lithobates sphenoccephalus*]), and one mammal (nine-banded armadillo [*Dasypus novemcinctus*]).

In summary, among the three barcoding genes, 66 plant, 68 animal, and 12 fungal families were identified. In the fungi the most common was *Psathyrella* sp. with many species in the genus (Figure 2, example). Plant species dominated the diet with oaks (Figure 3), torpedograss, watergrass (Figure 4) joyweed, Bahiagrass, dayflower, and other grasses occurring in over half the samples analyzed. Other mast such as palm nuts was also found in the diet (Figure 5). Animals were present across a wide taxonomic breadth, but encountered less fre-

quently than plants with the exception of an exotic tropical earthworm (Figure 6). Cow, house mouse, cotton mouse (Figure 7), raccoon, mole cricket, Virginia opossum, and six species of fly were recorded from over 10% of fecal samples. In the case of some flies they were unlikely to have been consumed but rather eggs were laid on a hog scat after deposition. Flies larvae on carrion consumed by hogs may be another way flies become diet items for wild hogs. In addition, wild hogs may also undertake coprophagy and eat the dung of other species, such as cattle and deer, and this could be why these species turn up as diet items. Unexpected species such as pig frogs (Figure 8) and several fish (Figure 9) were also in the diet, but we cannot tell if these are caught or scavenged. Through this genetic study we have shown, as expected, that wild hogs have very wide breadth of diet items. This re-enforces the theory that wild hogs do have the ability to impact a large variety of native flora and fauna species, and that further knowledge of their direct impacts on susceptible species is sorely needed.

This collaborative project would not have been possible without the following people:

Samantha W. Wisely

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Antoinette J. Piaggio

USDA, Wildlife Services, National Wildlife Research Center, Wildlife Genetics Lab, Fort Collins, CO, USA

Literature Cited

- Barrios-García, M. N., and S. A. Ballari. 2012. Impact of wild boar (*Sus scrofa*) in its introduced and native range: a review. *Biological Invasions* 14:2283–2300.
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- Irizar, I., N. A. Askurain, and J. Herro. 2004. Wild Boar Frugivory in the Atlantic Basque Country. *Galemys* 16:125–133.
- Loggins, R. E., J. T. Wilcox, D. H. Van Vuren, and R. A. Sweitzer. 2002. Seasonal diets of wild pigs in oak woodlands of the central coast region of California. *California Fish and Game* 88:28–34.

April 5th Field Day Summary

The 2018 Field Day was held on April 5th at the Center with 198 in attendance. Guests had an opportunity to visit informative program displays and posters in the Grazinglands Education Building and visit with graduate students about their research. New this year, a competition was held amongst the students for the best display (content & creativity). Attendees were given 1 ticket to vote for their favorite. Many remarked it was too difficult to decide, as they all did a wonderful job. The winners were: 1st place, Animal Science Program including Miguel Mirando, Matheus Piccolo, Juliana Ranches; 2nd place, Agronomy Program including Joao Sanchez, Jhone Sousa, and Rhaiza de Oliveira; and 3rd place, Weed Science Program including Jose Dias. Also participating were the Soil and Water Science Program including Yanyan Lu, Dipti Rai, and Saroop Sandhu and the Rangeland Wildlife and Ecosystems Program including Wes Anderson. Also providing an educational display was Chris Prevatt with the Beef Cattle and Forage Economics Program.

Our field day sponsors were on hand with displays before and after the morning presentation. We are very grateful for the support of our wonderful sponsors:

Boehringer Ingelheim Animal Health

Creel Tractor Company

Farm Credit of Florida

Florida Farm Bureau Federation – ‘This Farm CARES’

Florida Fence Post, Inc.

Florida Feral Hog Control, Inc.

Merck Animal Health

Mutimin USA, Inc.

Organic Maters, Inc.

Wedgworth’s, Inc.

Westway Feed Products, LLC

Zoetis

The busy day continued after the morning presentations. John Arthington and Dean Elaine Turner spoke at the ribbon cutting ceremony officially opening the new labs, which were completed in March. This was followed by a steak lunch prepared by the Cloverleaf Foundation of Hardee County. After lunch many loaded tour wagons to ride out to field sites for informational updates from Brent Sellers, Joao Vendramini, and Maria Silveira. The tour groups returned and the day was complete around 3:30 p.m.

The opening remarks and faculty

presentations were recorded by UF/IFAS Communications. Click the links below or visit <http://rcrec-ona.ifas.ufl.edu/vclassroom/video/vcmedia.shtml> to view these recordings.

Opening remarks

John Arthington, Professor and Center Director at the UF/IFAS Range Cattle Research and Education Center
Elaine Turner, Dean, University of Florida College of Agricultural and Life Sciences

Ken Griner, President, Florida Cattle-men’s Association.

Chris Prevatt

‘Beef Cattle Market Outlook’

Philippe Moriel

‘Florida beef enhancement studies - Will nutritional management of pregnant beef cows impact future calf performance?’

Raoul Boughton

‘Florida calf loss: Summary of 2017-2018 herd results’

Ribbon Cutting Ceremony for New Lab BuildingsBrent Sellers

‘Smutgrass Management Update’

Maria Silveira

‘Application of biosolids to Bahia-grass pastures’

Joao Vendramini

‘Warm-season perennial grass establishment’

View the photos

Go to:

<http://universityoffloridaifas-photography.zenfolio.com/p405220199#ha7f40506>

to view the photos from this event taken by UF IFAS Communications photographer, Tyler Jones.

Faculty News

Raoul Boughton, assistant professor specializing in rangeland wildlife and ecosystems at the UF/IFAS Range Cattle REC and Taylor Davis, natural areas and livestock agent for the Highlands County Extension Office, ran the first BIRDS workshop. On the morning of 4/30, 22 participants learnt about the basics of how to find and identify wild birds of Florida, some of the common birds in Highlands County, and the importance of private lands and ranches for avifauna. On 5/1 the group spent a gorgeous morning in Highlands Hammock State Park putting their new skills to the test. The group identified over 20 species of birds with highlights being close

up looks of Northern Parula Warbler, Great Crested Fly Catchers, Downy Woodpeckers, a pair of newly fledged Red-Shouldered Hawks, flyovers by Swallow-tailed Kites, and a cacophony of bird calls dominated by Northern Parula, Carolina Wrens, Red-eyed Vireos, Pileated Woodpeckers and Great Crested Flycatchers. If you want to learn more, don't miss the next BIRDS course and field trip.

Contact Raoul (rboughton@ufl.edu) or Taylor (tpohl@ufl.edu) learn about the next event.



Student News

Joao Marcelo Dalmazo Sanchez graduated on 5/4 with his PhD degree in Agronomy. During his studies, he was advised by Dr. Joao Vendramini. His research projects were related to the evaluation of management strategies to improve the establishment, persistence, productivity and nutritive value of perennial peanuts in grasslands of South Florida. Joao will be returning to Brazil where he intends to proceed with an academic career in agricultural research.



Joao Vendramini with Joao Sanchez



Allison Smith, a MS student working with Raoul Boughton, is partnering with Audubon. She ran a program on Marco Island to explain to participants about threatened species enforcement and how it is practiced. Both Allison and Liz White (PhD student) are working hard on studying how urban and rural owls behave differently and how their populations may or may not be connected.

Connect with us



Joao with Scot Eubanks

Listen or download the latest **Joe What? Podcasts:**

- **Chris Hardee** of Hardee Farms in Cheifland, Florida. Chris, a 5th generation cattleman, discusses their cattle operation including the changes he's seen over the last 3 decades.

- **Scot Eubanks** the Assistant Director of Agricultural Policy Division at Florida Farm Bureau Federation. Listen in as Scot explains Florida Farm Bureau's structure, current programs like CARES, how they give Florida agriculture a voice in state and federal government, educational programs they offer, and how to get involved with them. Visit their website for additional information: <http://www.floridafarmbureau.org/>.

These monthly podcasts can be found at: <http://ufifasrcrec.podbean.com>.

Upcoming Ona Program Highlights

- attend in person or by webinar!

May 16	Brent Sellers, Weed Science Program
June 12	Mario Binelli, UF Animal Sciences
July 10	Chris Prevatt, Beef Cattle & Forage Economics

These informative presentations are held in the Grazinglands Education Building. They begin at 11:00 a.m. and last about 30 minutes. You may attend in person (call to register: 863-735-1314) or by webinar. Visit <http://rcrec-ona.ifas.ufl.edu/events.shtml> to register online.

Past webinars (recordings and slides) are available on the RCREC website, go to the "[Virtual Classroom](#)."

Recent recordings:

Animal Science Highlight with Philippe Moriel - **"An Update on the Florida Cattlemen's Association Projects & a Summary of the Body Condition Score Extension Programs Recently Completed"** - 3/13/2018

Ona Ph.D. Student Highlight with Joao Sanchez - **"Evaluation of management practices to improve pinto peanut productivity and nutritive value in South Florida"** - 4/10/2018

Upcoming Events

Weed Science Program Highlight with Brent Sellers

- May 16, 11:00 a.m.

Webinar, register at: <https://register.gotowebinar.com/register/2593716432567835393>

Smutgrass Management in Pastures: An Update on Current Research in Florida

- May 24, 8:30 a.m. - 3:00 p.m.

Grazinglands Education Bldg., Ona

See the flyer attached

Register online by 5/21 for this free program:

<https://rcrec-smutgrass-update-2018.eventbrite.com>

2018 Corn Silage and Forage Field Day

- May 24, 8:00 a.m. - 3:00 p.m.

UF/IFAS Plant Science Research and Education Unit, Citra - 2556 W Hwy 318, Citra, FL

Register online at <https://www.eventbrite.com/e/2018-corn-silage-and-forage-field-day-tickets-45022578745?aff=es2>

2018 UF/IFAS Range Cattle REC Youth Field Day

- June 7, 8:00 a.m. - 2:00 p.m.

RCREC, Ona

See the flyer attached.

Register online by 6/5: <https://rcrec-yfd-2018.eventbrite.com>

Ona Featured Guest Presenter - Dr. Mario Binelli, Asst. Professor of Physiology, UF Animal Sciences Topic: The UF Brahman Project

- June 12, 11:00 a.m.

Webinar, register at: <https://attendee.gotowebinar.com/register/8568349369777324291>

Ona Beef Cattle and Forage Economics Highlight with Chris Prevatt

- July 10, 11:00 a.m.

Webinar, register at: <https://register.gotowebinar.com/register/4642487027969373697>



Video recordings of the Jan. 25 presentations are now available for viewing. Visit: <http://rcrec-ona.ifas.ufl.edu/vclassroom/video/vcmedia.shtml#training> or click on the titles below.

- Welcome and Florida Cattlemen's Association Update - Ken Griner, FCA President

- UF IFAS Update - Saqib Muktar, UF IFAS Extension Associate Dean
- Responsible Beef - Jessica Finck, Merck Animal Health
- Global Roundtable for Sustainable Beef Panel Discussion - Don Quincy, Moderator
 - Rae Marie Knowles - Ranchers Connecting Ranchers
 - Todd Clemons - Okeechobee Livestock Market
 - Phillip Clark - Seminole Tribe of Florida, Inc.
 - Carl McKettrick, Jr. - Arcadia Stockyard
- Dennis Mudge Recognition
- Matching Her Nutrition with Her Production Cycle - Matt Hersom, UF/IFAS Animal Science
- Beef Quality Assurance Live Demonstration - Todd Thrift, UF/IFAS Animal Science

Recent Publications

Merrill, M. M., Boughton, R. K., Lord, C. C., Saylor, K. A., Wight, B., Anderson, W.M., and Wisely, S. M. (2018) Wild pigs as sentinels for hard ticks: A case study from south-central Florida. *IJP: Parasites and Wildlife*, 7:161-170

Moriel, P. (2018) Ruminant nutrition symposium: Improving the efficiency of nutrient utilization to optimize livestock performance. *Journal of Animal Science*, 96, 751

Piccolo, M. B., Arthington, J.D., Silva, G. M, Lamb, G. C., Cooke, R. F., and Moriel, P. (2018) Preweaning injections of bovine ST enhanced reproductive performance of Bos-indicus-influenced replacement beef heifers. *Journal of Animal Science*, 96, 618-631.

Quesenberry, K. H., Sollenberger, L. E., Vendramini, J. M. B., Wallau, M. O., Blount, A. R., and Acuna, C. A. (2018) Registration of 'Kenhy' and 'Gibtuck' Limpograss Hybrids. *Journal of Plant Registrations*, 12:19-24.

S Spiegel, B T Bestelmeyer, D W Archer, D J Augustine, E H Boughton, R K Boughton, M A Cavigelli, P E Clark, J D Derner, E W Duncan, C J Hapeman, R D Harmel, P Heilman, M A Holly, D R Huggins, K King, P J A Kleinman, M A Liebig, M A Locke, G W McCarty, N Millar, S B Mirsky, T B Moorman, F B Pierson, J R Rigby, G P Robertson, J L Steiner, T C Strickland, H M Swain, B J Wienhold, J D Wulfhorst, M A Yost and C L Walthall. (2018) Evaluating strategies for sustainable intensification of US agriculture through the Long-Term Agroecosystem Research network. *Environmental Research Letters*, <https://doi.org/10.1088/1748-9326/aaa779>

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ABOUT THIS NEWSLETTER

This newsletter is a publication of the UF/IFAS Range Cattle Research and Education Center (RCREC) located in South Central Florida in the heart of Florida's cattle country. Our goal is to keep you up to date on RCREC happenings, publications, research, faculty & student news, upcoming events and bring you beneficial information you can use in your beef cattle or forage operation.

CONTACT INFORMATION

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Newsletter Contact: Andrea Dunlap



Smutgrass Management in Pastures: An Update on Current Research in Florida

Date: May 24, 2018

Time: 8:30 AM – 3:00 PM

Location: Range Cattle REC Grazinglands Building

Cost: Free

Registration link: <https://rcrec-smutgrass-update-2018.eventbrite.com>

Agenda

- | | |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8:00 – 8:45 | Registration |
| 8:45 – 9:00 | Opening Remarks and Introduction
-Brent Sellers |
| 9:00 – 9:45 | Smutgrass Basics
-José Dias |
| 9:45 – 10:00 | Break |
| 10:00 – 11:15 | Smutgrass and Grazing
-José Dias, Aaron Stam, Lindsey Wiggins |
| 11:15 – 12:00 | Current and Future Management Strategies
-Brent Sellers |
| 12:00 – 1:00 | Lunch |
| 1:00 – 3:00 | Field tour <ul style="list-style-type: none">-Use of hexazinone at different output volumes-Impregnating dry fertilizer with hexazinone-Use of Milestone/GrazonNext HL with hexazinone-Impact of rainfall on hexazinone activity |

UF/IFAS RANGE CATTLE RESEARCH AND EDUCATION CENTER

2018 Youth Field Day

This year you will have an option during registration to select an early morning (8:00 AM) Wildlife Rangeland & Ecosystems wagon tour! The tour will return and everyone assemble at 9:20 AM just prior to the morning class rotations. Afterwards there will be lunch and the ag learning expo where various community & industry booths will be available to visit from 12:00 - 2:00 PM.

Class Stations

"Gut Check"

"Grass Ain't Free"

"SCORE! How to win at knowing the body condition of your cow herd."

"How good is your forage? - how you can know"

"Does your cattle's diet have what it takes?"

WHEN

June 7, 2018
8:00 AM-2:00 PM

WHERE

3401 Experiment
Station, Ona, FL

WHO

Students ages 8-18,
parents and youth
leaders

Register: <https://rcrec-yfd-2018.eventbrite.com>

Now: \$10

May 8: \$15

Day of Event: \$20

Questions? Contact us at

ona@ifas.ufl.edu or 863-735-1314

Space is Limited!

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