



ARCHBOLD OCTOBER 2019 NEWS for curious minds



Uncracking Tortoise Genetics



A Gopher Tortoise hatches at Archbold Biological Station.

Michael Yuan first came to Archbold as a Herpetology Intern in 2014 to study the conservation genetics of Gopher Tortoises from the longest running study of tortoises in their range (i.e., started by Dr. Jim Layne in 1967). Yuan (now at University of California, Berkeley) was curious about the genetic diversity in an isolated but long-lived species like a Gopher Tortoise. New insights from his research in collaboration with Dr. Betsie Rothermel (Archbold Herpetology Director), Nicole White (University of Georgia), Dr. Kelly Zamudio (Cornell University) and Dr. Tracey Tuberville (Savannah River Ecology Laboratory) found evidence for inbreeding depression. Published in the [August 2019 Journal of Evolutionary Biology](#), they write, "**We found that high parental relatedness results in offspring with lower quality and that high parental relatedness is correlated with reduced hatching success.**" Low hatching rates are suspected to play a role in the decline of western populations of Gopher Tortoises (e.g., Louisiana and Mississippi). Yuan's research suggests low hatching rates might correlate with closely-related parents mating. Maintaining genetic diversity is critical for all species, including tortoises, reduced to small, isolated populations because of habitat fragmentation. In a surprising twist, however, Yuan discovered highly inbred females did not suffer any inbreeding effects. Instead, they had more viable eggs and more robust offspring. The researchers speculate highly inbred



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"Archbold Biological Station is one of America's iconic centers of continuous research and education in field biology. It is a prototype of what we need all across America."

— Edward O. Wilson

females mated with less-related males, thereby mitigating the risk of inbreeding depression. Yuan shared, "I hope the insights from our work provides conservation tools elsewhere given the ongoing threats to Gopher Tortoises throughout their range."

Tracking Cows after the Burn



Cow at Archbold's Buck Island Ranch outfitted with a GPS collar.

African savannas, the Great Plains, and subtropical prairies of Florida all have something in common: These grassy habitats are shaped through a complex dance of fire and grazing (as well as flooding in Florida). Recently burned areas attract grazing animals to feed on the resprouting nutrient-rich grass shoots. Grazing reduces plant fuels which in turn alters fire behavior. With funding from the US Department of Agriculture's Long-term Agroecosystem Research Network (LTAR) and the National Institute of Food and Agriculture (NIFA), Archbold and University of Florida conducted a pioneering study of the relationship between fire and cattle grazing in subtropical pastures of Buck Island Ranch. **Dr. Raoul Boughton, University of Florida, led the development and deployment of GPS collars on 32 cows to study cattle behavior under two burn treatments:** 1) 'Fully-burned' pastures completely burned in year one; 2) 'Patch burn' pastures where 1/3 of the pasture was burned per year for three years. The GPS collars recorded the cow's location every five minutes and collected over 2 million locations in just one year! Dr. Britt Smith was hired by Archbold last year in October to analyze all this data. **Smith's analysis revealed that cattle grazed more intensely and evenly in the recently burned patches compared to unburned patches throughout the year.** Smith said, "Understanding cattle grazing has important implications for conservation. Patch-burn management creates greater heterogeneity which benefits biodiversity. For example, different vegetation heights increase bird diversity because short grass and tall grass areas each attract different species."

The Scrub Blog

Nature and Science from Florida's
Heartland

Explore [The Scrub Blog](#) by Archbold creative staff.

Grants-In-Aid of Research

\$2,000 award to be given to two visiting scholars for work involving field research at Archbold. Learn more [here](#).

Plant Ecology Research Internships

Beginning January 2020; running about 8 months. Applications due 11-1-19. Ideal for students with undergraduate degrees contemplating graduate school.

My Year as an Education Intern



Charles Browning ready to lead school children into the seasonal ponds in the Florida scrub.

Charles Browning first came to Archbold in September 2018 to be an Education Intern. "This was my first time living at a field station", he recalled, "So, I wasn't sure what to expect." Browning grew up in Lakeland, Florida and was familiar with oak hammocks and wetlands, but this was his first "real deep look at the scrub". Browning was in charge of running the school field trips to Archbold and coordinating with the "amazing" Archbold Education volunteers who make many of the programs possible. He shared, "Many of the local children were familiar with Archbold before they arrived which really showed in their enthusiasm for the environment. And, I was able to visit some of the schools that were unable to come to us." Browning is not sure what will come next, but he knows his experience at Archbold cemented his choice to continue work in the environmental field. He added, "**I think it took me actually living in the Florida scrub to truly appreciate it.** At first glance, you see the bright open sands and scrub oaks or palmettos. But the longer you look at it, the more you see. I'll always remember the volunteers, staff, my fellow interns, and Warren 'Abe' and Chris Abrahamson who made my year-long 'Jill Abrahamson Memorial Internship' possible. I am forever thankful and I hope to stay in touch with all the wonderful people I met during my time at Archbold."

Public Events

Nov 7: 3:30-4:30 PM

'From Pigs to Mangroves, the Complex Problem of Ecosystem Restoration in Hawaii'

Jed Sparks, Cornell University

Nov 14: 3:30-4:30 PM

'Community Dynamics and Restoration in a Warmer and More Invaded World'

Katie Stuble, Holden Arboretum

Nov 21: 3:30-4:30 PM

'Environmental Impact Assessment of U.S. Beef Systems'

Jasmine Dillon, Colorado State University

Archbold Goes to Belgium



Hilary Swain

Ecotron at University of Hasselt in Belgium.

Archbold Executive Director Dr. Hilary Swain and Board Chair Dr. Mary Hufty attended the annual meeting of the Organization of Biological Field Stations (OBFS) at the University of Hasselt's Field Research Centre in Belgium September 9-13. This was the first ever OBFS meeting held in Europe. Field trips focused on large-scale ecological restoration since this part of Flanders was formerly an industrialized coal mining area. Other trips visited the dramatic heathland of the Hoge Kempen National Park. One outstanding science feature is the University's Ecotron, a massive fully-instrumented chamber system where interdisciplinary science teams manipulate environmental conditions to monitor and forecast environmental responses of heathlands to a changing climate. There were inspiring talks and a poster session in which Archbold presented the beautiful childrens portrait initiative conducted by Dustin Angell (Archbold Education Director) during summer camp. OBFS attracts a knowledgeable crowd. Many good ideas for Archbold come from OBFS meetings with opportunities to learn about challenges and solutions at other stations. Both Swain and Hufty (who serves as OBFS historian) also had the chance to sample some very fine Belgium beer and chocolates!



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2019 Vaughn-Jordan Intern



Megan Verner-Crist poses with pink flags, used with a pin frame to quantify cover of ground lichens.

Since the 1980s, Archbold has provided hundreds of recent college graduates with post-baccalaureate internships. In recent years, **some of these internships have received generous support from the [Vaughn-Jordan Foundation](#)**. This year's Vaughn-Jordan intern, Megan Verner-Crist, explains, "I was looking for an in-depth research experience before attending graduate school. The Archbold internship fit the bill". The core of Megan's internship was designing and executing her independent project studying plant phenology, or the timing of ecological events for plants. Dr. Eric Menges, [Archbold Plant Ecology Program](#) Director, summarized Megan's research: "**Megan's results show the unexpected and subtle ways that climate change may be affecting plant phenology, highlighting the importance of long-term data collection and archival**". Megan's rich intern experience at Archbold is just one possible way outside support helps fuel research at Archbold. Menges added, "We are so thankful that the Vaughn-Jordan Foundation has supported our internship program over the years and helped jump-start the scientific careers of many bright young scholars."

Directions to Archbold Biological Station

Eight miles south of Lake Placid. Entrance is 1.8 miles south of SR 70 on Old SR 8.



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