



ARCHBOLD JUNE 2019 NEWS for curious minds



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Tortoises & Climate Change



Georgia Southern University researchers temporarily uncover a Gopher Tortoise nest on Red Hill.

A team of researchers from [Georgia Southern University](https://www.gsu.edu/) led by Dr. Elizabeth Hunter and Dr. Kevin Loope is exploring how climate change impacts the Gopher Tortoise, listed as state-threatened in Florida, by collecting life history data from five sites throughout the Southeastern Coastal Plain. In Gopher Tortoises, like many other reptiles, offspring sex is determined by egg incubation temperatures. When temperature stays ~ 29 °C during the middle of the developmental period in the nest, about half the offspring will be male and half will be female. Just a couple degrees warmer will produce all females. **Rising temperatures could skew nest sex ratios and timing of nesting** which has already been reported in [sea turtles](#) and some [freshwater turtles](#). But less is known about nest temperatures here in rural central Florida where climate modeling for projected temperature and precipitation is less predictable than further north. With assistance from Archbold's Herpetology program, the researchers found 15 tortoise nests on Archbold's Red Hill in May. After deploying iButton dataloggers in each nest to measure nest temperatures over time, the team reburied the nests. They will return in 6-8 weeks to obtain blood samples from hatchlings for sex hormone assays. Combining data from Archbold on sex ratios and hatching success with similar data from other populations



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in the southeast, Hunter will construct computer models exploring the resilience of Gopher Tortoises under our changing climate.

The Phosphorus Legacy



Instruments measure water inflows/outflows and phosphorus concentrations in water used for forage production on Buck Island Ranch.

Fertilizers make modern agriculture possible on Florida's nutrient-poor sandy soils. Today's best management practices ensure that no more fertilizer is applied than needed. However, **between the late 1940s-1980s, use of fertilizers created a phosphorus problem in our soils still affecting our water quality today.** Dr. Hilary Swain, Archbold's Executive Director, explains, "A study from 1998-2003 at Archbold's Buck Island Ranch found pastures not fertilized with phosphorus since 1986 still had 5-7 times the amount of phosphorus in drainage ditches compared to unfertilized pastures. A US Geological Survey study showed ~85% of phosphorus leaving pastures came from past fertilizer use, and is not 'naturally occurring' phosphorus in the soils. The fertilizer-phosphorus still remaining in soils is known as 'legacy phosphorus'." There are large amounts of legacy phosphorus within the soils and waters of the Headwaters of the Everglades from Orlando to Lake Okeechobee. Many native plants evolved under low phosphorus conditions and are outcompeted by other plants, including non-natives, that can uptake excess phosphorus. In collaboration with the South Florida Water Management District, Archbold is experimenting with pumping water from Harney Pond Canal into an abandoned orange grove field at Buck Island Ranch to grow a winter forage grass for cattle. Last year, **we harvested 1.5 million pounds of forage grass containing almost 3,800 pounds of phosphorus from the 180-acre field.** This harvest also reduces the amount of supplementary feed we bring into the ranch. Still in the early stages of assessing the land phosphorus budget, we are learning best management practices to remove legacy phosphorus from off-site water.

"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

Pioneering Bee Scientist



[Dr. Suzanne Batra](#) sharing her knowledge at Batrafest in the US Department of Agriculture Log Lodge.

Last month, Dr. Jay Evans, [USDA-ARS Bee Research Laboratory](#), helped organized 'Batrafest' to honor the life's work of **Dr. Suzanne Batra in a wonderful symposium** held in Beltsville, Maryland. **In addition to Batra's many discoveries about bees and the environment, she coined the widely-used term 'eusocial'** in 1966 to describe the highly cooperative, specialized nesting behavior of Halictine bees. Archbold Director Dr. Hilary Swain and Dr. Beth Norden, visiting retired entomologist and colleague of Suzanne, both filmed shout-outs from Archbold that were shown at Batrafest. Swain noted, "We were so fortunate that Archbold was one of the places that Suzanne Batra first visited as a young student. She came to create scientific illustrations of ants for Dr. Neil Weber from Swarthmore. This art-ecology tradition has continued at Archbold with Dr. Mark Deyrup who specializes in the social lives of ants and scientific illustrations. **Suzanne was one of Archbold's first interns** visiting in 1959. We've now trained more than 500 interns. Among the early cohorts, she was one of our first female interns with many young women following in her footsteps going on to terrific science careers. Suzanne has stayed in touch with Archbold for years as an ardent supporter because she believes in our mission, fieldwork, and field stations. Congratulations Suzanne! Such a well-deserved recognition for an inspiring life's work."

Batrafest

Learn more about Dr. Suzanne Batra's amazing bee science career by watching her wonderful [interview](#) and tribute by [Dr. Jay Evans](#) at Batrafest.

The Future of Wildlife Tracking is Here



Mike Lanzone and Young Ha Suh, a PhD student from Cornell University working on scrub-jay movement, install the base station antenna for a system to track the movements of Florida Scrub-Jays from Archbold's water tower.

A technological revolution is underway that will forever change how we track small animals. Wildlife biologist Mike Lanzone, founder and CEO of [Cellular Tracking Technology](#) (CTT), has "always been interested in developing technical solutions to solve data collection problems for scientific research programs."

Working with engineers and scientists at Cornell University, Lanzone developed a lightweight, solar-powered tag that can last the lifetime of a bird. Lanzone came to Archbold in May to work with the Avian Ecology Program staff to install a grid of antennae and 42 receivers to track the daily movements of Florida Scrub-Jays. **Any bird with a tag moving within the grid will be detected by 3-4 or more receivers simultaneously which will allow calculation of an accurate, GPS-quality, location.** Dr. Reed Bowman, Avian Ecology Program Director, said, "We've been waiting for a technological solution to answer questions about fine-scale explorations of animals searching for a place to breed or how they interact with other individuals during these explorations. CTT's solution can address these and many more questions. And, this technology is adaptable to a variety of animals including Gopher Tortoises. We hope to eventually expand the grid to cover the entire study area on Archbold and follow all young birds for the first few years of their lives. This system opens up an entirely new world of discovery!"

Giving Done Right



Young camper shares her beautiful 3D butterfly art at Archbold's Summer Ecology Camp.

Thank you to Warren 'Abe' and Chris Abrahamson for your continued support of Archbold's Education Program, making possible the Jill Abrahamson Memorial Environmental Education Internship for another year in 2019-2020. What was once a two-month internship is now a full nine+ month internship. And with additional generous support from Abe and Chris, Archbold is also able to reprint our beloved children's Scrub Coloring book, a favorite take-home treasure for kids. Further, Archbold is pleased to announce that once again, the summer camp for Costa Farms, a large nursery company down the road from Archbold, will be in session this summer thanks to a generous donation from Archbold Board of Trustee Robert Lloyd George and wife Donna. In a model partnership between a private company and a non-profit, Costa Farms helps by supporting some costs of the camp to offer this experience for the children of their employees. And, with generous support from Sam and Joyce Machotka, 2019 will be the second year we will offer a custom summer camp for children attending the 6th grade class at St. Catherine Catholic School, a K-7th grade private school with a focus on S.T.R.E.A.M. education. All of these donors have meaningful reasons that inspire their gifts to Archbold. **Giving can help connect people with 'doing good' for others.** When done right, giving should leave you with a feeling of great joy. **We honor our special friends who are helping to serve the future of our community—our children.**

If you enjoy these stories from Archbold, please consider a gift to support our research and education programs. [Donate now](#). Your gift really makes a difference.

Directions to Archbold Biological Station

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



Archbold

123 Main Drive, Venus, FL 33960

