

Sustainable Agriculture

Looking forward for this generation
and the next...

at **UGA**



Fall 2020

Well this sure has been a heck of a year (to put it politely). As with every sector of the economy, farmers have faced a myriad of issues brought on by COVID-19. Whether it was the rapid loss of restaurant contracts in early spring or efforts to remain socially distant in crowded packing houses, farmers have had to quickly adapt as so many industries have in 2020. That's not even considering the record number of storms we have faced in the Southeastern U.S. this fall! Nearly all of my colleagues here at UGA that do field work quickly adapted as well. Plants and animals do not wait for our schedules, and when things shut down in March, we worked closely with The Office of the Vice President of Research here at UGA to implement plans to continue our research, while keeping everyone as safe as possible. I had a busy cropping season, with several trials in Watkinsville, Fort Valley, Tifton, and Moultrie – and I know my colleagues were just as busy – if not more so. Hopefully when we can meet again in person, we will have plenty of new data and information to share with growers.

On the teaching-side of things, due to a small class size and outdoor setting, we were fortunate to be able offer some in-person classes in horticulture this fall. With a lot of help from UGArden manager, JoHannah Biang, we were able to offer HORT 4125: Organic Agricultural Systems.

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If you've driven down Milledge Avenue past the UGArden you probably have seen the class's efforts. The students did a fantastic job in maintaining their plots this fall. I have also been fortunate to work with David Berle, Associate Professor of Horticulture, Sarah Rucker (UGArden Assistant Manager) and several great horticulture students to offer The Organic Horticulture Entrepreneurship class at the UGArden this fall. This new class was made possible due to funding support from The Cousins Foundation. In this class, students grow and sell crops through a farmer's market located at the UGArden (<https://hort.caes.uga.edu/news/story.html?storyid=8496&story=Organic-Entrepreneurship>).

In this class students have the opportunity to not



Class plots from Hort 4125 – Organic Agricultural Systems

only learn production strategies, but also the effort that goes into marketing and selling products that they grew themselves. Everyone has had to adapt to deal with everything that has been thrown at us this year. As we enter the holiday season and approach 2021, here’s hoping that next year, if anything, is a little more routine.

Sincerely,

Timothy Coolong, UGA SARE Coordinator

Research

Precision Sustainable Agriculture Cover Crop Research

Cover crops, in conjunction with conservation tillage (no-till, strip till), are becoming increasingly popular as a sustainable management technique in row cropping systems in Georgia. Cover crops benefit the soil by increasing organic matter, enhancing soil fertility, suppressing weeds, and increasing water infiltration. With fertilizer costs projected to rise and rainfall patterns expected to become more irregular, it is important to study and understand these benefits. Examples of commonly-grown cover crops in Georgia include cereal rye, crimson clover, oats, and winter wheat. Through the use of cover crops,

nitrogen and irrigation inputs may be able to be reduced, while maintaining or increasing yield, benefitting both farmers’ profit and their soil.

Led by, Drs. Miguel Cabrera and Jennifer Jo Thompson as well as Julia Gaskin prior to her retirement in June 2019, a team of researchers in the University of Georgia Crop and Soil Department, are part of a multi-state on-farm cover crop research network in conjunction with the Dr. Chris Reberg-Horton, NC State University and Dr. Steven Mirsky, University of Maryland funded through USDA-NIFA. The team is investigating the use of cover crops to increase water conservation, reduce fertilizer inputs, decrease yield risk, and provide resilience to corn, soybean, and cotton production systems throughout the U.S. Between the six core states, (NC, GA, MD, AL, VA, DE) 130 farm locations have served as sites for on-farm research over the past 3 years. Starting in fall 2021, the research will expand to include farms in 21 states.



Trial field in Bulloch County showing bare and cover treatment strips. February 2020.

The UGA team is currently working with 6 family farms in Greene, Burke, Screven, Morgan, and Bulloch Counties. In the fall, farmers designate a cover cropped field, approximately 80 feet wide by 500 feet long, that will be planted with corn, cotton, or soybeans the following season. In the fall/winter, following cover crop planting, farmers spray herbicide over half of the field, creating two treatments, a cover and no cover strip. By conducting this research on farms, the team is able to collect data on a wide range of farming techniques and regional variation that would be difficult to replicate on

university research stations. Data is collected on cover crop biomass and decomposition, soil moisture, and yield.

Under the direction of Dr. Miguel Cabrera, the research team is working to further validate the UGA Cover Crop Nitrogen (N) Availability Calculator (found here: <http://aesl.ces.uga.edu/mineralization>). The calculator is an important tool that growers in Georgia can utilize to determine nitrogen mineralization and availability from cover crops. Cover crops can often enhance soil N balances by scavenging residual N and then releasing that N into the subsequent cropping system as the cover crop decomposes, as well as by preventing leaching of N. Further, legume cover crops such as crimson clover also add N to the soil with the help of rhizobia bacteria by converting atmospheric N and releasing the nitrogen as the cover crop decomposes. The amount and rate of N release can be predicted using the UGA Cover Crop Calculator, which allows users to input locally-specific climate variables, soil type, cover crop biomass as well as several other parameters.



Soil moisture sensors installed in cosaque oat cover strip in cotton. July 2020.

To determine the N credit, or potential deficit, that the cover crop will supply to the cash crop, a sample of cover crop must be collected just prior to cover crop termination. Cover crop biomass is measured and a sample of the cover crop is sent to UGA lab for analysis by near infrared spectroscopy (NIRS). NIRS analysis provides information on cover crop quality, nitrogen, carbohydrate, cellulose, and lignin content.

Using the NIRS and biomass data the UGA Nitrogen Availability Calculator can predict the release of N from the cover crop over a growing season. The current calculator is calibrated for incorporating cover crops into the soil as in conservation tillage system. One of the goals of the research is to further develop and validate the N calculator for unincorporated cover crops.

In addition to standard cover crop data, soil moisture and temperature dynamics are measured in research fields using sensors placed at 3 depths in the soil, in both the cover and no cover treatments. Researchers are using data from these moisture sensors, to compare the effects of cover crops on soil moisture levels and temperatures in both systems. Previous research has found cover crops to help to retain soil moisture, allow for better water infiltration, reduce surface runoff, and keep the soil cooler in the summer much like a mulch in home garden beds.

Social scientists under the direction of Dr. Jennifer Jo Thompson are gathering information from these family farmers to better learn the motivations behind using and integrating cover crops into their farmer systems. This information will be used to identify what decision support tools will most benefit farmers, and provide information to enhance policy decision making.

Data from this research is being used to create digital decision support tools that will enable farmers to more precisely and effectively incorporate sustainable farming techniques and practices, such as cover cropping, into their farm management plan.

For more information or to participate with our on-farm trials, contact Anna Birnbaum at annabirnbaum@uga.edu

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Educator's Corner

Grow It Know It

With each new school year, Georgia educators and students look forward to moving lessons out of the classroom and into gardens and kitchens for a hands-on connection to food. Since 2014, UGA's Grow It Know It program (GIKI), a collaborative effort between the Office of Service Learning and UGArden, has supported K-12 educators in their garden-to-classroom instruction.

The Grow It Know It mission is simple and powerful: to implement, sustain, and extend the engagement of students, teachers, and staff to address food insecurity, food waste, and climate change. Their approach has been to concentrate focus on five program areas, including 1.) School gardens 2.) The Kitchen Garden Corps – a summer program that builds community, garden, kitchen, construction, and entrepreneurial skills 3.) School cafeteria composting and resource conservation – an effort to divert cafeterias' unused food away from landfills and into the hands of hungry students 4.) School produce markets and 5.) Meals in the Middle community benefit dinners. Collectively, these programs have provided thousands of hours of skill development, several thousand dollars donated to local charities and reinvested into educational programs, and countless opportunities for engagement, community building, and human connection to food, Earth, and each other. Over the 2019 – 2020 school year, GIKI's work in Barrow and Clarke Counties was a huge success: a 2018 USDA PD-STEP grant has allowed GIKI to providing training, support, workshops, mentorships, and lessons for 53 educators and school nutrition staff, along with instructional support for over 1,200 students. In partnership with Barrow County School System's Center for Innovative Teaching, GIKI also delivered over 300 lessons that expanded students' experiential and service-based education opportunities, and increased their knowledge of agricultural sustainability, environmental resource management, and economic disparity.

But the 2020 – 2021 school year has looked much different than just a year ago. As schools began to halt in-person instruction in the wake of the COVID-19 pandemic, Grow It Know It faced the question of how to continue to support teachers and engage students in Barrow and Clarke counties. To address this challenge, GIKI has continued to maintain school gardens as a source of fresh produce and expanded their efforts to record digital renditions of gardening, nutrition, and other educational resources to supplement students' online learning. Even as in-person instruction resumes, this digital collection will prove a valuable tool for instructors to supplement their hands-on work. Another new development from the GIKI program due to debut in 2021 is a workshop, likely online, designed specifically to train county Extension agents to adapt/implement the GIKI model in their communities. The workshop will include sessions focused on building a farm-to-school network within your community, practical decisions for locating a school garden, and tips for developing agricultural and sustainability lessons for K-12 audiences. Keep an eye on future Sustainable Agriculture Newsletters for the workshop dates and contact GIKI Program Coordinator Wick Prichard at warwickp@uga.edu for more information about GIKI and future programming.

Grow it Know It website: <https://site.extension.uga.edu/growitknowit/>



Grow It Know It students

*Sarah Jackson Sarvis
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Meet the National Needs Fellows

The Sustainable Food Systems Initiative (SFSI) in UGA's Crop and Soil Sciences Department exists to provide a space for students, scientists, and practitioners to take an interdisciplinary approach to solving the grand challenges we face in developing sustainable food systems for a growing population. Through the SFSI's graduate certificate program and two USDA National Needs Fellowship grants, the SFSI supports graduate students in their interdisciplinary research and outreach, which cover a wide array of subjects. For more information on the Sustainable Food Systems Initiative and Graduate Certificate, visit <https://site.extension.uga.edu/sfsi/>.

Abigail Darwin



I feel like I grew up riding in the backseat of our car, my head pressed against the window, as we drove through the Southern countryside. We drove through bright cotton snowfields, passed peach tree forests, and raced the long, long legs of the green giant who ran alongside of our car as we passed rows planted perpendicular to the road. This is a collection of memories I hold near as I engage in research today.

My undergraduate degree in Public Health further set the stage as I focused on the relationship between diet, chronic disease, and barriers to food access. Now, as a USDA National Needs Fellow in the Department of Crop and Soil Sciences, my research focuses on the formation and daily operations of rural Southeastern grassroot food access programs, or programs that were begun by rural Southeastern communities to improve community access to healthy foods. Paradoxically, the rural communities that grow much of our nation's food do not see the same healthy and fresh options on their store shelves that their urban counterparts may. Furthermore, because there is often not enough food present in rural communities to meet residents' nutrient and caloric needs, residents travel to shop, increasing both the expense as well as the reliance on consistent transportation. These intersecting barriers leave many rural residents food insecure. Most efforts focused on improving food access have been directed at urban communities. However, because of the unique barriers faced by rural residents, the urban models fall short in addressing rural residents' needs. Additionally, while federal assistance, such as SNAP, can assist in the cost of food, it does not change the systemic issue of availability and accessibility to healthy food in the rural setting.

These grassroot food access programs, place-based and community derived, are often the most successful and sustainable long term because of their grounded understanding of their communities' needs and barriers. These are the types of food access programs that I am studying and learning from. My research is a two-step process. First, I conduct a literature review on all the information currently available on programs increasing locally sourced fruit and vegetable availability and accessibility. This is to develop an understanding of the program and identify the gaps that can be filled during the next step. Secondly, I conduct an interview with a representative of the program. The interviews help me understand concepts that are better captured through conversation and storytelling, such as community characteristics, identification of needs and assets, and how challenges were navigated. The sharing of firsthand experience has been invaluable. Lastly, both the complementary literature reviews and interviews will be analyzed to draw out patterns

that have contributed to the programs' successes.

In a way, my project is meant to set the table by creating a foundation of knowledge on rural, grass-root food programs. This setting can then be further developed and added on to by other researchers, who bring additional knowledge, or dishes, to the table. The end goal is to develop a tool that compiles all advice, actions, and lessons learned from successful rural programs into a format that supports similar aspiring communities in developing their own efficient and sustainable food programs. The hope is that aspiring communities would benefit from access to this shared knowledge, helping them set their own table.

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American Forage and Grasslands Council Conference

Coming up on its 77th year in operation, the American Forage and Grasslands Council (AFGC) has well established its reputation as an important source of education, innovation, and camaraderie for those interested in sustainable forage practices. With forage crops covering approximately 55% of land area in the U.S., the management of these crops has enormous impact on the environment and economy. Hay alone has contributed \$18 – \$22 billion annually to the U.S. economy in the last 5 years, and the forage-livestock industry was responsible for over \$110 billion in annual sales between 2013 and 2018 (Putnam, Cherney 2018). As consumer demands, environmental research, and technology change, AFGC is on the front lines of communication and distribution of information about sustainable forage practices.

The AFGC is made up of approximately 2,500 members in the U.S. and Canada and is the most

widely recognized forage-related organization in the world. Its mission is to advance forage agriculture and grassland stewardship, and it does so by encouraging cooperation and exchange of ideas among three groups: private forage and livestock producers, public sector educators and researchers, and forage-related industry groups such as seed and fencing companies. The premier stage for this collaboration is the AFGC Annual Conference that is held in a different U.S. location every winter. The AFGC Annual Conference draws hundreds of agriculture professionals, scientists, educators, students, producers, and industry experts to share ideas and promote the forage industry. Each year, conference attendees take part in intensive forage-related workshops, seminars, speaker and poster presentations, and even an auction, along with multiple competition opportunities such as the Youth Forage Essay, video, photo, hay judging, and Forage Bowl competitions.

This upcoming winter, the AFGC Annual Conference will offer these same great opportunities but will look a bit different than in the past. Due to limited in-person capacity and precautions taken in response to COVID-19, the 2021 conference will be offered as a hybrid conference, with an in-person meeting from January 3rd – 6th to be held in Savannah, GA, and a virtual conference to follow from January 11th – 12th. The virtual event will include on-demand online access to several workshops and presentations recorded during the in-person conference, as well as sessions by presenters who are not attending in person. Those attending the in-person conference will have access to the virtual conference at no additional cost, and the virtual session will be available for up to 60 days after the event. Both options will offer comprehensive education on profitable and sustainable forage practices and presentations from the field's top experts. Regardless of how attendees choose to participate, it is guaranteed to be an informative and enjoyable experience for all involved.

For more information on the AFGC and to register for the conference, please visit <https://www.afgc.org>.

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