Spring 2018

The first week of April was the Our Farms, Our Future National Conference celebrating 30 years of work in sustainable agriculture by the USDA Sustainable Agriculture Research and Education Program (SARE). Despite the cold and rain in St. Louis, it was a vibrant conference with folks who have been involved in sustainable agriculture for more years than they care to tell and many, many new faces. If you want a better understanding of the significant investment SARE has made in sustainable agriculture, go to the SARE Learning Center and search for Our Farms, Our Future. Work in Georgia on native bees in apple production is a featured article.

There were a number of interesting presentations and discussions, but two things struck a deep chord in me. One was a presentation by Seth Watkins of Pinhook Farm in Iowa. He said, and I quote, "I did not begin making money until I put conservation first. I began working with nature instead of against her." He moved his calving season to early spring, restricted access to streams and ponds so the cattle have cleaner water and began rotational grazing. All these practices have reduced his input costs and increased calf weight gain. The added benefit has been an increase in the number of turkey and deer to the property, which has created a new income stream from hunting. His cattle still go to feed lots, as he decided he wants the people of his community who are not affluent to be able to afford quality beef.

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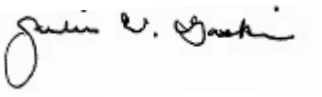
The second was a statement by Rick Gibson, an Extension Agent in Arizona. He talked about how we are asked to measure impacts within a couple of years, but it can often times take a generation for change to occur. That struck home with me. It's easy to only see the things that have not changed or that need to change, and much harder to let the deep, slow work happen that leads to a *sustainable* change.

Change can be slow, but after attending this conference, it feels like many of the seeds we have planted are, in fact, growing. Some are bearing fruit now, others will bear fruit in the future. So keep planting those seeds! What a privilege it is to be able to work in this field.

Happy growing.

Julia Gaskin
Sustainable Agriculture Coordinator



UNIVERSITY OF GEORGIA
EXTENSION

Grower's Corner

Spring Organic High Tunnel Lettuce Study

High tunnels or hoophouses can help protect crops from unfavorable weather, provide season extension, and potentially decrease pest and disease issues. The Southeastern region's mild winters present lots of opportunities to grow cool-season crops under high tunnels; however, managing excessive heat during late spring through early fall presents a challenge for growing vegetables such as lettuce. Therefore, the goals of this study were to compare high tunnel versus field production of spring lettuce, evaluate three planting dates (early March, late-March and mid-April), and assess multiple butterhead and romaine cultivars.

The project was completed on certified organic land at the Durham Horticulture Research Farm located in Oconee County in 2015 and 2016. The gothic arch high tunnels were 30 x 96' with 6' tall drop-down side walls and a 16' wide end wall opening. Side curtains and end walls were opened when temperatures were ≥50°F. Feathermeal was applied pre-plant at 100 lbs. N per acre along with other nutrients as recommended by a soil test.

Theekshana Jayalath harvesting high tunnel butterhead lettuce late April 2015 as part of his Master's thesis research.

Overall, the quality of the lettuce crop was similar across the high tunnel and field systems. A greater yield (i.e., marketable fresh weight) for both butterhead and romaine lettuce was observed under high tunnels compared to the field in 2016 but not in 2015. This indicates that the high tunnel advantage may depend on yearly weather conditions. High tunnel lettuce was harvested 2 to 7 days earlier than the field and later planting dates were quicker to mature than earlier dates. The butterhead cultivar 'Sylvesta' and the romaine cultivar 'Green Forest' performed the best in both the high tunnel and field systems. In addition, the butterheads 'Adriana', 'Mirlo' and 'Skyphos' along with the romaine 'Salvius' performed well.

Fig. 1. Romaine cultivars. Top row: 'Freckles', 'Red Rosie' and 'Super Jericho'. Bottom row: 'Green Forest', 'Coastal Star' and 'Salvius' (left to right).

Fig. 2. Butterhead cultivars. Top row: 'Skyphos', 'Mirlo' and 'Red Cross'. Bottom row: 'Adriana', 'Pirat' and 'Sylvesta'(left to right).

The high tunnel system prevented air temperatures from dropping below 32°F freezing (i.e., 6 to 9°F greater in high tunnels) and resulted in an additional 1 to 2°F heat gain on the hottest days. The 2015 spring was much wetter (50% more rain!) and slightly cooler than 2016. The high tunnel plants had less leaf wetness but the conditions were still

favorable for lettuce drop disease (e.g., Sclerotinia sclerotiorum, 'white mold') in both systems (i.e., ~60 to 80°F and >70% RH). This disease led to a 6 to 11% crop loss in 2015. Less humid conditions along with shorter irrigation intervals (<60 min. via drip tape) and the application of a parasitic fungus, Coniothyrium minitans, appeared to decrease disease incidence (<4%) in 2016. Physiological disorders of lettuce such as bolting and tipburn are often associated with increasing temperatures and daylength. No difference was present between the high tunnels and the field for these disorders in our study although the last planting date (mid-April) had greater bolting incidence. Hourly air temperatures suggested that May and June exceeded optimal lettuce crop production conditions. In conclusion, further development and evaluation of lettuce cultivar heat tolerance as well as methods to cool high tunnel environments would help expand and extend production in our region.

To read the full article, visit: http://hortsci.ashspublications.org/content/52/11/1518.full.pdf?ijkey=cHsCZtMLoNWK7u3&keytype=ref

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Extension

2018 Cover Crop Field Day: Making Cover Crops Work

For the third consecutive year, a cover crop field day was held at the UGA Southeast Research and Education Center at Midville. This educational event provides the opportunity for area farmers to have a hands-on look at utilization of cover crops in an on-farm setting. County Extension Agents in Jefferson, Jenkins and Burke Counties along with UGA Extension specialists worked together to put in research and demonstration plots throughout the year relating to efficient use of cover crops. Some of this year's highlights included: peanut production in conservation production systems, cover crop selection and varieties, crop rotation study, herbicides for managing cover crops, cover crop planting ideas and planting equipment demonstration.

Workshop attendees look at cover crop demonstration plots.

Peanut production is an integral part of the crop rotation in this area. Consequently, it is important for producers to understand the implications of incorporating cover crops into their production system. Dr. Scott Monfort, UGA Peanut Agronomist, and Dr. Mark Abney, UGA Peanut Entomologist, presented information highlighting the advantages and disadvantages of cover crops in peanuts. The focus was encouraging growers to evaluate cover crops on a systems level in order to optimize the benefits.

One of the most challenging issues to the effective utilization of cover crops is timely establishment as it relates to amount of biomass produced. Higher biomass production leads to better weed suppression and increases available nitrogen for the subsequent cash crop as these cover crops breakdown. Jason Mallard discussed the evaluation of various species of brassica and clover varieties and their fit in on farm situations.

Pam Sapp and Peyton Sapp highlighted the beginning of a long-term cover crop study in a corn, cotton and peanut crop rotation evaluating the impacts of rye, rye/clover and mixed species (oats/vetch/crimson clover/kale/radish) cover crops in comparison to conventional plots. Some of the parameters that will be measured will be crop yields, soil nematodes, soil organic matter, water holding capacity of soils, disease pressure and weed control benefits. Throughout the farm tour, Dr. Stanley Culpepper

was present to discuss various herbicide options for use in cover crop management. He discussed the importance of proper herbicide selection based on the up-coming cash crop to be planted.

'Dixie' crimson clover was compared to earlier flowering varieties like 'AU Robin' and 'AU Sunrise'. All varieties were planted October 19, 2017 at 20 lbs/ac.

Alternative planting methods were demonstrated. Agents coordinated a comparison between aerial seeding of rye into cotton prior to defoliation versus drilling rye seed after the cotton had been harvested. A three-way comparison looked at using a broadcast spreader to 1) seed rye into peanuts prior to digging, 2) after digging but prior to picking, and 3) seed drilling after harvest. Biomass samples taken indicated that broadcast seeding prior to picking and seed drilling after harvest were similar.

Alton Walker discussing his strip-till planter.

Attendees were again afforded the opportunity to see local producers run their planting rigs through standing cover crops. Each producer described their equipment and why they chose the particular set up. Eighty-three percent of those attending indicated that facilitating this type of producer sharing was extremely valuable.

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Research

Organic Nitrogen Fertilizer Calculator

Small scale vegetable growers in the Southeast use a wide range of organic inputs to meet their soil fertility needs. Organic growers use composts, poultry litter, commercially available fertilizers (such as animal and seed meals) to supply plant nutrients. However, determining exactly when these nutrients will be become plant available is difficult. This is especially true for nitrogen. For nitrogen to become plant available from organic sources, it must first undergo mineralization and nitrification to become inorganic ammonium and nitrate. These processes are driven by microbial activity, and the rate of plant available nitrogen is dependent on the organic material used and environmental conditions, such as soil temperature and soil water content. Currently, farmers use a "best guess" method to try to synchronize plant uptake with nitrogen availability but current research at UGA Crop and Soil Sciences Department is trying to change that.

Through a Southern Sustainable Agriculture Research and Education (SARE) Grant, Dr. Miguel Cabrera, postdoctoral researcher Dr. Kate Cassity-Duffey, and collaborating researchers Julia Gaskin, Dr. Dory Franklin, and Dr. David Kissel are creating an online nitrogen availability calculator for organic materials. This calculator will allow growers to determine the rate and amount of nitrogen released from a wide range of organic materials based on their local weather data (Figure 1), increasing the synchronization of plant uptake with nitrogen

release. This on-going project includes laboratory studies, field studies at the UGA Durham Horticulture Farm, and on-farm studies with four collaborating farms.

Figure 1. On-farm field study and weather station.

Figure 2. Soil cores to measure nitrogen release on-farm.

An on-farm study highlights both the variation in materials and the effects of weather on nitrogen availability. For the summer tomato season, the farmer chose to apply feather meal at a rate of 50 lbs of N per acre. As shown in Figure 3, the feather meal rapidly released plant available nitrogen, where 100% of the total nitrogen applied from the feather meal was available within the first 2 weeks. In contrast, the fall application of layer pellet fertilizer for broccoli (Figure 4), showed a slower release, where only 50% of the total nitrogen applied was available after 6 weeks of application. This illustrates that both material selection and weather played a large role in the nitrogen availability for these studies.

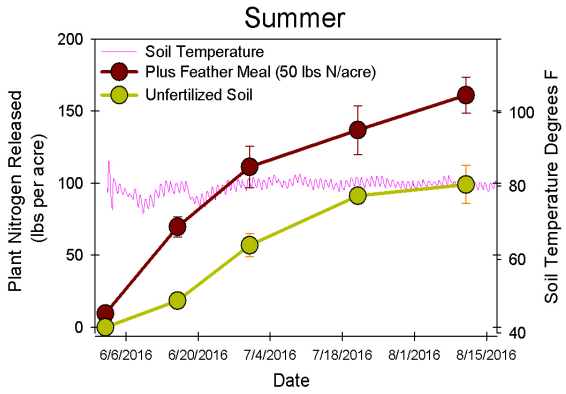

Figure 3. Plant available nitrogen released from unfertilized soil and the soil plus the application of feather meal during summer.

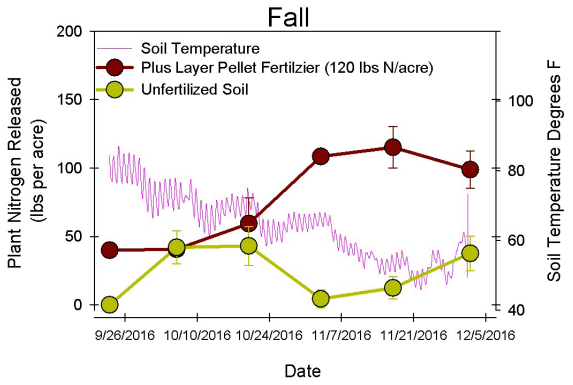

Figure 4. Plant available nitrogen released from unfertilized soil and the soil plus application of layer pellet fertilizer during fall..

Warm soil temperatures combined with a quick release product lead to rapid nitrogen release, while cool temperatures and medium release product lead to delayed nitrogen release. These release patterns have been backed up by our laboratory studies and highlight the need for real time and in-field estimates of nitrogen availability from these products. Predicting release will allow for better material selection (dependent weather conditions) as well as the application of additional nutrients in season as needed. Overall, we hope to reduce costs for farmers and reduce the potential for environmental degradation from the application of excessive nutrients. Please stay tuned as we continue our research and share more information on these organic materials and the release of our nitrogen calculator.

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Education

Middle School Students Reap Social and Educational Benefits from Farm to School Program

Farm to School (FTS) programs have been gaining traction in the United States for the past 20 years. They are a conduit for teaching both environmental and nutrition education in K-12 schools. As part of her master's thesis research, Andie Bisceglia and advisor Dr. Jennifer Jo Thopson completed a yearlong study of a FTS program located at Hickory Middle School (HMS)*. The program at HMS is multifaceted with a variety of activities that are integrated both into classwork and the school cafeteria. The study consisted of a baseline survey of the 6th grade class at the beginning of the school year, a series of interviews with both staff and students, student focus groups, and participant observation of the FTS activities. Research was aimed at characterizing the different program components and understanding how they affected the student's understanding of food insecurity and sustainability.

Students harvesting potatoes from the HMS garden.

The FTS activities at HMS integrates various aspects of food systems into the school experience. Students help maintain a large vegetable garden, fruit orchard, and farm animals as a part of their agricultural science and special education classes. They use garden produce as part of their family and consumer science classes, and in the lunchroom, students both eat garden produce at a monthly 'garden bar' and participate in a waste reduction program. Students share their unwanted fruit in bowls at the center of each table, and compost their food waste near the school garden, which is then spread on the garden to replenish nutrients. Our study of this robust FTS program demonstratesd several main social and educational outcomes. In terms of educational outcomes, the FTS program created a collaborative learning environment that redefines school success to be more collective rather than individual-based. Furthermore, at the end of the school-year, students demonstrated increased understanding in the structural causes of food insecurity, such as cost and access, and a knowledge of environmentally sustainable farming practices. For social outcomes, students expressed they experienced an increased ability in the FTS program to form personal relationships despite differences. In the cafeteria, students and staff took collective responsibility for waste reduction.

Students cooking with produce from the school garden.

Similar research has also demonstrated that school gardens provide a unique environment for students to form personal relationships despite differences and has shown that non-traditional students experience success in school through FTS programs. This study was unique in its demonstration of the potential for FTS programs to be a tool for discussing social and economic sustainability, as well as teach about the underlying issues of access and food affordability that are critical for food security. This study will help inform future research methods as the researchers intend to replicate the study in a neighboring county.

*The name of the school has been changed to protect confidentiality

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