

Sustainable Agriculture

Looking forward for this generation
and the next...

at **UGA**



Summer 2018

Summer is in full swing – hot with 100% humidity and the katydid chorus at night. There is still a lot going on in the fields and the weeds seem rampant this year after all the rain. These hot, long days can be a good time to reflect and let your mind wander through the past year – what went right and what went wrong. Agriculture is a funny enterprise. It's part science, part art and a lot of figuring out how to take the stitch in time to save nine- like getting the weeds out before they go to seed. A sustainable agriculture has to encompass so many different issues that touch on profitability, environmental friendliness and social concerns. We are serving up a taste of many of these issues in this newsletter – the Farm Bill, organic fertilizer effects on onion production, grazing cover crops, niche crops and marketing. We hope you enjoy.

Julia Gaskin
Sustainable Agriculture Coordinator

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Upcoming Events

August 14: Grass-fed Beef Workshop with University of Tennessee Extension

September 26: Food Evolution: Public Film Screening and Panel Discussion at the University of Georgia

Find more information on these events at
www.SustainaAgGa.org

Also find basic principles of sustainable agriculture, Extension bulletins, research publications as well as archived copies of this newsletter at the above website.

Extension

Farm Bill 2018: what the new bill could mean for Georgians

You've all probably been hearing a lot about the upcoming Farm Bill, and while some of us are familiar with this bill, many Americans are not familiar with the extent to which this bill effects their everyday lives. The farm bill is an omnibus, multiyear piece of authorizing legislation that governs an array of agricultural and food programs at the federal level. The farm bill governs a wide range of farming, conservation, and nutrition programs. The House and Senate will pass their separate versions of the bill which will then be reconciled in the committee conference. The compromised bill will then pass through each chamber a final time before heading to the White House for the president's signature. The last farm bill was passed in 2014 and one is generally passed about every five years. There have been 17 farm bills since the 1930s. The Congressional Budget Office estimated that the 2014 Farm Bill would cost almost \$500 billion over five years to enact. While this sounds like a HUGE amount of money, you may be interested to know, it's only around two percent of the total federal budget!

It's also interesting to note that of the 12 titles in the farm bill, the nutrition assistance for low-income families and individuals accounts for about 80 percent of it.

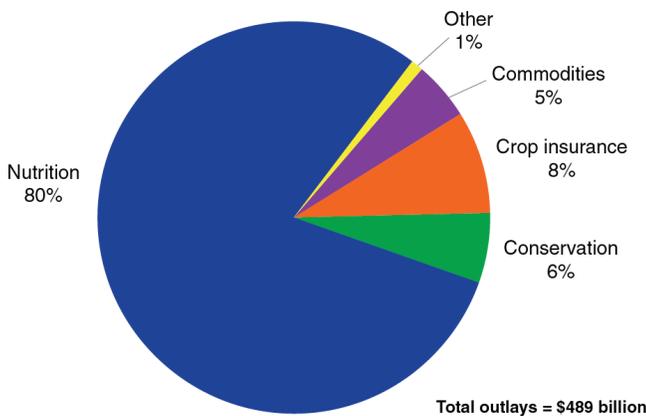


Figure 1: Projected outlays under the 2014 Farm Act, 2014-2018
Source: USDA Economic Research Service using data from the Congressional Budget Office Cost Estimates

Many argue that this should not be included with other farm and ag-related programs. The explanation for this is simple: 1) ag and farm commodities are used to supply the food assistance provided for in the nutrition title, and 2) without the 80 percent of the bill that deals with nutrition, it would lose much of its political clout. The pie chart in Figure 1 shows the distribution of the areas in the farm bill.

There are several programs critical to Cooperative Extension included in Title VII of the farm bill under "research." These include Smith-Lever funds, which support extension, and Hatch funds that support agricultural experiment stations and research. These funds support much of the applied research we do to help solve agricultural problems, and are also used to support extension specialists who work in focused areas of sustainable agriculture. This is in the 1 percent of "other" funding that is in yellow in Figure 1. Of that 1 percent, the research title accounts for a whopping 0.2 percent of the farm bill! Even though it's a small part, the "capacity" funding that serves as the base of our extension and research funds come from here.

The House passed its version of the farm bill in mid-June after weeks of negotiations following their first bill's defeat. Their bill proposes big changes by moving the educational component of SNAP (Supplemental Nutrition Assistance Program Education) to the U.S. Department of Agriculture to be combined with EFNEP (Expanded Foods and Nutrition Education Program) in order to have one coordinated nutrition education program. Currently in Georgia, we receive about \$2.2 million in EFNEP and \$3.5 million in SNAP-Ed funding to deliver nutrition education. The new farm bill has also proposed a very controversial work requirement for some SNAP recipients. A week after the House passed their bill, the Senate passed their own version of the bill, which among several differences from the House version of the bill, does not include changes for SNAP recipients who receive nutrition assistance from food stamps. With the current farm bill set to expire on September 30th, the House and Senate will have to reconcile their differences on many topics in order to send the final legislation to the White House for President Trump's signature

before several farm and nutrition programs expire. There are many opinions as to where all of this will end up and when we will have a new farm bill. The curious thing is that the farm bill is one of the most bipartisan bills in Washington!

I hope this overview gives you a clearer picture of what the farm bill is and why we should care. I would be remiss if I did not mention that since we live in a state with an agriculture-based economy, all Georgians should be aware of farm bill policy that is favorable to our farmers. As they go, so goes the rest of the economy of the state! The 10 other titles in the farm bill that relate to trade, production ag, forestry and the like are also very significant to Georgia's overall well-being.

*Last edited on July 17th, 2018

*Dr. Laura Perry Johnson
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Research

'Vidalia' Onion Bulb Yield as Affected by Organic Fertilization Rate

Georgia 'Vidalia' onions (*Allium cepa* L.) are sweet, short-day, low pungency, yellow Granex-type bulbs that are popular in the U.S. because of their mild flavor. 'Vidalia' onions are exclusively grown in Southeastern Georgia, U.S., in a region that includes at least parts of 20 counties, where there are mild winters and low-sulfur soils (<0.001 mg·L⁻¹). Production of organic fruits and vegetables, including onions, has doubled in the last ten years in response to growing demand. There is, however, limited information about application rates of organic fertilizers to vegetable crops. One of the challenges in organic vegetable production is to achieve a timely nutrient release from organic fertilizers. The majority of fertilizer recommendations for vegetable crops were developed for crop production with synthetic chemical fertilizers. With synthetic chemical fertilizers, there is precise and ready nutrient availability.

In contrast, soil nutrient release and availability particularly that of N, is complex and variable with organic fertilizers, which makes chemical fertilizer recommendations difficult to use in organic production. The availability of N may differ depending on source of organic fertilizer and environmental conditions. Insufficient soil N availability is frequent in organic vegetable production due to unpredictable N release.



'Vidalia' onion in bloom

We conducted a study intended to evaluate the effects of organic fertilizer rate on sweet onion bulb yield and bulb quality before and after storage. Experiments were conducted at the Horticulture Farm, Tifton Campus, University of Georgia, in the winters of 2012-2013 and 2013-2014. There were five organic fertilization treatments (organic fertilizer 3-2-3 equivalent to 0, 53, 107, 160 and 214 lb·ac⁻¹ N). Total and marketable yields increased quadratically with increasing organic fertilization rate and responses failed to reach a plateau. The fraction of extra-large bulb increased with increasing organic fertilization rate.



Organic onions in the field. Plastic mulch is used for weed suppression.

With organic fertilizers, N requirements can be determined but the amount of fertilizer needed is difficult to calculate because N in organic fertilizers may not be readily available when present in an organic form. Nitrogen in organic form needs to be mineralized (i.e., converted from organic to inorganic form, such as nitrate and ammonia) before being accessible to plants. It has been reported that it takes 3-6 months for N in organic fertilizers to be fully available to crops. In the present study, the fact that plants were chlorotic five months after application of organic fertilizer suggests that the majority of soil N in mineral form was already taken up by the crop or leached deeper into the soil in April (about five months after planting). In April, both the shoots and the bulbs grew rapidly because of the increasing spring temperatures. It is necessary to have adequate soil N levels during the period of rapid bulb growth to allow plants to have high bulb yields.

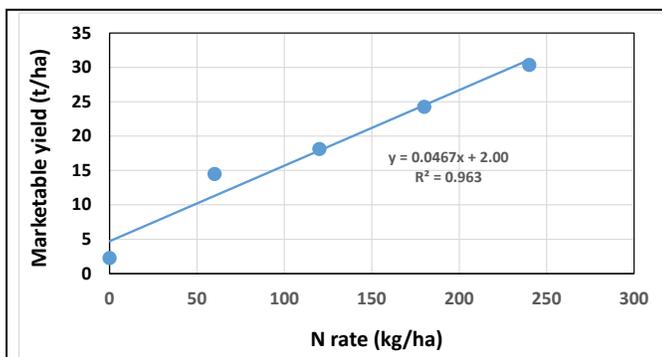


Figure 1: Yields are maximal at 133 lb/ac (150 kg/ha) N in conventional onion, but did not plateau in the organic trials, as seen in this figure. Original measurement units in kg/ha, figure is used here to demonstrate trend of yield to rate of N.

Conclusions

1. ‘Vidalia’ onion total and marketable yields increased with increasing organic fertilization rate suggesting that at rates above the highest used in this study (214 lb·ac⁻¹ N) there would be a bulb yield increase.
2. A single application of organic fertilizer at planting time (as done in our study) may result in nitrogen leaching. Thus, to reduce nitrogen leaching, it may be necessary to do split applications of organic fertilizers, one before planting and one or two during the season. Further stud-

ies may be necessary to determine adequate organic fertilization protocols in ‘Vidalia’ onions.

This report is based on the following article: Díaz-Pérez, J.C., J. Bautista, A. Bateman, G. Gunawati, and C. Riner. 2018. Sweet onion (*Allium cepa* L.) as influenced by organic fertilization rate: 2. Bulb yield and quality before and after storage. *HortScience* 53:459-464.

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Research

Cattle Grazing Preferences on Cover Crops: preliminary results

Winter annual cover crops can complement the perennial, warm-season grasses (i.e. bermudagrass) that dominate grazing systems in the Southeastern U.S. The objective of this research was to determine which cover crop species beef cattle would prefer to graze when forage availability was non-limiting. This research consisted of two small-plot trials, one that exclusively compared oats to rye and one that compared thirteen cover crop options in a demonstration trial (Figure 1).



Figure 1: Grazing demonstration trial set-up

Both trials were planted in Tifton, GA in November 2017 into a prepared seedbed. The forages were fertilized with 100 lbs N/ac (split applications) and 70 lbs K/ac (at planting). Each trial was grazed sepa-

rately with four open beef cows until one plot was grazed to 3” (Figure 2). This usually only took 1-3 hours depending on the trial and forage available. Excess forage was removed after each grazing event to avoid confounding results at subsequent grazing events.



Figure 2: Cow grazes plot to 3”

Trial 1: Oats vs. Rye

The first trial compared the grazing preferences in ‘Coker’ (forage-type oat), ‘Cosaque’ (black-seeded oat), ‘Horizon 720’ (grain-type oat), and ‘Wrens Abruzzi’ rye. The cattle grazed this trial four times. On average, cattle grazed 72% of the available oats compared to 47% of the rye (Figure 3).



Figure 3: Cattle prefer oats over rye (third plot from left)

There were no statistical differences between the oat varieties, but numerically the cattle grazed the most in the ‘Coker’ (76%) followed by ‘Cosaque’ (71%) and ‘Horizon 720’ (67%) (Figure 4). Another season of grazing is planned for next winter. Future work will focus on determining the nutritive value of these forages to see if that could have impacted grazing preferences.

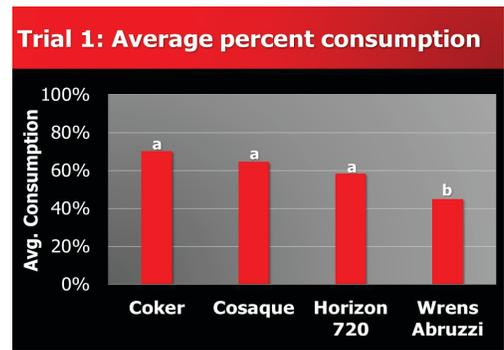


Figure 4: Cattle prefer oat varieties over rye

Trial 2: Demonstration Trial

The second trial compared the grazing preferences of thirteen different cover crop species/combinations including:

- Triticale (‘Trical 342’)
- Black-seeded oats (‘Cosaque’)
- Rye (‘Wrens Abruzzi’ and ‘Winter Grazer’)
- Crimson clover (‘AU Robin’, ‘AU Sunrise’, and ‘Dixie’)
- Brassica (‘T-Raptor’)
- Radish (‘Soil Buster’)
- ‘Wrens Abruzzi’ + ‘Dixie’
- ‘Cosaque’ + ‘Dixie’
- ‘Cosaque’ + ‘Dixie’ + ‘Soil Buster’
- ‘Cosaque’ + Austrian winter peas

These plots were grazed three times, except the crimson clover plots that were grazed twice because of insufficient forage availability at the first grazing event. The cattle grazed heaviest in the clovers, removing more than 80% of the available forage on average (Figure 5).

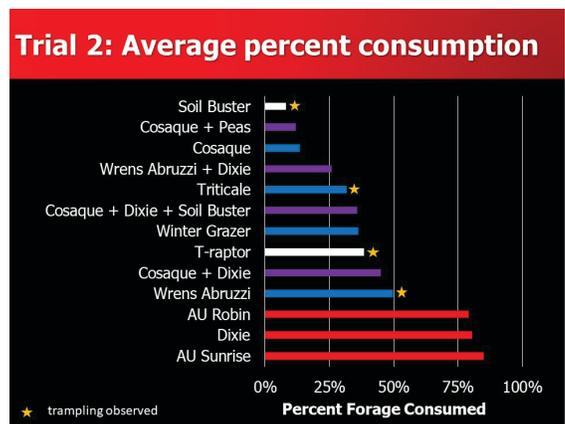


Figure 5: While heaviest grazing occurred in clover varieties, other factors make it difficult to determine grazing preference

It was difficult to determine grazing preference beyond this because of (1) trampling and (2) inadequate grazing pressure on the remaining plots. For example, 40% of the available forage in ‘T-raptor’ was “consumed”; however, the cattle never stopped to graze in this plot. Since the cattle were removed from the plots once the first forage was grazed to 3 inches, they were not allowed to preferentially graze the remaining forages. Another season of grazing is planned for this trial and the project set-up will be adjusted to better capture differences in these forages. Future work will also include measuring the nutritive value of these cover crops and determining their economic viability. Stay tuned for updates on this research.

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Grower’s Corner

Sunn Hemp: soil-building cover crop with forage potential

Originally from India, sunn hemp is gaining popularity among farmers in the U.S. as a cover crop or green manure. It’s easy to see why; it produces biomass at high rates, suppresses plant root nematodes, can produce 120 lbs. of total nitrogen per acre, and can suppress weeds up to 90%. It is also adapted to a wide variety of soil and environmental conditions, thriving through hot, dry summers and continuing to grow to frost. But sunn hemp isn’t just a soil builder: it offers benefits to forage producers as well. Recent on-farm grazing trials have yielded an abundance of information on harvesting this crop for forage.

Sunn hemp is highly palatable and recovers from grazing pressure quickly. In leaves, the neutral detergent fiber (NDF) reaches 22 – 28%, acid detergent fiber (ADF) reaches 22 – 27%, and crude protein reaches 25 – 30 %. This rivals the nutritive

value of other forage legumes, including crimson clover. Stems are lower forage quality, so the key to management is grazing early before lower leaves begin to drop. Removing the top shoot also promotes branching, increasing leaf production. Plants can be grazed when they reach 1.5 to 3 feet tall to within about a foot of the ground without suffering mortality. After 4 – 6 weeks, forage quality declines rapidly. As long as animals can still reach leaves, it remains suitable for grazing until flowering.



Sunn hemp branches prolifically, making it resistant to grazing pressure.

There is one point of caution for using sunn hemp as a forage: it is a member of the *Crotalaria* genus, notorious for toxic pyrrolizidine alkaloids in the seeds. Ingesting the seeds at a high enough rate can cause damage to the liver, lungs, heart, and nervous system. Susceptibility depends on the animal species; pigs are most susceptible, followed by chickens, horses, cattle, and sheep. Goats are at lowest risk.

Although the total content of toxic compounds in sunn hemp is much lower than other *Crotalaria* species, it is still present in amounts that warrant special management. Plants begin to flower 5 – 6 weeks after planting. At this point animals should be removed to avoid exposure to toxic compounds in seeds, especially if stock are prone to grazing seed heads. This isn’t a major loss, as forage quality begins to drop at this point anyway. Because plants are photoperiod sensitive, flowering in response to shorter days, a killing freeze usually will occur before the plants are able to produce seeds in most of Georgia. However, one variety – AU Golden – has been bred to flower in our region and can set seeds.

One farmer in Alabama found that the plants began to flower while animals were still grazing in the late summer.

Sunn hemp is easy to grow and shockingly productive. For forage production, a seeding rate of 30 – 50 lbs. per acre is recommended. Seed should be drilled at ½ inch depth for best germination. Because plants can reach 4 – 6 feet in height, wide spacing between rows may make plants susceptible to lodging. With adequate moisture, temperature, and fertility, researchers have recorded a growth rate of 1 foot per week. Plants can return to or exceed this growth rate if slowed by temporary drought.



Grazing must be timed appropriately or sunn hemp will grow beyond the reach of foraging livestock.

From farmers' experience, sunn hemp should be used sparingly, if at all, in mixes with other cover crop species. It has a tendency to hog nutrients and sunlight, suppressing growth of other plants. The benefit of this growth rate is that it is highly competitive with weeds, even outpacing crabgrass in on-farm trials. Sunn hemp itself has a low potential to become a weed, unlike other *Crotalaria* species.

Even after grazing, sunn hemp leaves a substantial amount of organic matter in the field. It may be necessary to cut and chop up the fibrous stems before the pasture can be replanted. Sunn hemp has the potential to fill an important gap in summer annual grazing. Its hardiness, productivity, and palatability make it an option worth considering for farmers looking to build their soil and grow their stock. Sunn hemp isn't just a cover crop, after all.

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Grower's Corner

The Lavender Business in Georgia

The lavender business is a strong and growing segment in U.S. agriculture, and is an ever-increasingly popular herbal product in Georgia as well. According to the 2014 Census of Horticultural Specialties, there were 1163 lavender farms in the U.S., with 419 wholesale operations and 875 retail operations. Sales of lavender were around \$13.8 million in 2014 making it the tenth-highest selling perennial plant in the U.S. based on retail sales (USDA, 2015). The U.S. production of lavender is still at an early stage of development compared to Bulgaria and France - the top 2 producers of lavender worldwide. Lavender growers in the U.S. tend to be small-scale operations, relying on value-added sales and capitalize on the recent boom in agritourism.

The lavenders (botanic name *Lavandula*) are a genus of 39 species of flowering plants in the mint family, Lamiaceae, with cultivars numbering in the hundreds. It is an Old World genus, found in semi-arid to arid locations, and typically do not tolerate extreme temperatures or high humidity as we find in the southeast with hard frosts in the winter, and high temperatures and humidity in the summers. That said, there are a few varieties that fare better in our climate and with proper care and attention, lavender can do quite well in Georgia. Extension

in Georgia and bordering states have a few horticultural specialists who are knowledgeable about growing different lavender varieties.

One Georgia lavender farm has been expanding since their start in 2014. Tina Misko of Red Oak Lavender Farm, is a lavender grower who started the farm business after taking an online course and receiving advice from a farmer mentor. The farm currently has 2000 plants in the field and 1000 under greenhouses. The plants are among 22 varieties including English, French and Intermedia.

Preferred varieties for Georgia farmers are hardy to very hardy lavender like “Angustifolia” (English lavender) or the “Lavandula x Intermedia” cultivars (Lavandin or French lavender). Misko is in zone 7a. She warns that soil drainage, pH, irrigation and especially air flow (to avoid higher humidity) will impact the plants growth from one farm to another (even if located in the same geographic region). Moreover, diseases such as phytophthora root or crown rot that are soil-borne, will affect lavender because of the plants’ sensitivity to humidity.

Misko knew that lavender would attract people’s attention. In 2015, she opened a lavender shop on site, where she sells her own lavender products, as well as imported products from France and other U.S. farms. Red Oak Lavender products run the gamut, from lavender bouquets and pot-pourri, to anti-aging cream, insect repellent, and lavender-inspired jewelry. She’s also partnered with Paul Thomas Chocolates in Dalhonega, GA to make lavender-flavored chocolates.



Tina Misko and husband outside of lavender shop

In June 2016, Misko launched the first lavender festival. As part of the experience, visitors can cut

lavender stems to make a bouquet (U-pick), purchase from her shop and from other invited craft businesses, listen to music and eat lavender ice cream. Farm tours are also part of the experience, allowing festival-goers the opportunity to learn about growing lavender. Summers are booked with photo shoots for website promotionals and weddings. The rest of the year Misko supplies local businesses with her products, teaches introductory lavender classes, and hosts farm tours.



Red Oak Lavender Festival 2018, Dalhonega, GA

Misko recalls that Red Oak Lavender Farm started with a mere \$1,000, and has become self-sustainable and profitable after only two years of operation. Profits have allowed her to invest in more lavender plants, a greenhouse, two tractors, a chicken house and a trip to Provence, France in 2017. The farm is getting a State Agritourism sign from the Georgia Department of Agriculture, but Misko believes that word-of-mouth and social media have been incredibly powerful in her marketing efforts.

There are around six lavender farms in Georgia and numerous other farms that grow lavender as part of their marketable crops. Knowing your potential markets and marketing are key to the success of these types of specialty crop operations. Value-added operations such as cosmetics, essential oils and agri-tourism can also be essential to making a farm profitable. The UGA Center for Agribusiness and Economic Development has several publications that can help farmers develop good marketing strategies in this area. To find helpful resources and publications, visit: caes2.caes.uga.edu/center/caed/

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