

# Sustainable Agriculture

Looking forward for this generation  
and the next...

at **UGA**



## Fall 2017

Fall is finally upon us. Here in Athens at least, the leaves have turned and will be quickly disappearing, and we have all “fallen back” with the time change. The shorter days, cooler temperatures, and the approaching holidays turn us towards home, family and friends.

This is a season for reflection – on the blessings of the year, the good earth that sustains us, and the people who nurture us. It is easy to forget in the swirl of current events, the good that is around us...The eclipse this summer was a powerful reminder of how we depend - without even thinking about it - on the sun that powers life on our planet. How dependent we are on the web of life around us – oxygen from plants, micro-factories in the soil that are busy transforming nutrients and organic matter, birds eating pests, wetlands purifying water. How we can and do trust so many people around us, most of whom we will never know, to keep us safe, provide us nutritious food, and just keep the world running.

Let's take a moment and be grateful. Then, let's look at what we can do to make things better. Maybe on your farm it's taking a simple soil sample or planting cover crops to better manage nutrients. Or maybe its experimenting with a more intensive grazing rotation to give pastures a rest and improve forage growth. Perhaps it's looking for a way to help support your neighbors by buying from them. Maybe it's speaking out on an issue that's important to you. Or more simply, it's just thanking someone for what they for what they've done.

Wishing you all the best,

*Julia Gaskin*  
Julia Gaskin

Sustainable Agriculture Coordinator



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### Upcoming Events

- January 11-14: SE Regional Fruit & Vegetable Conference
- January 14: American Forage and Grassland Council's Annual Meeting
- January 17-20: Southern SAWG Annual Conference
- January 21-22: Southeast Soil Summit
- January - February: Georgia Ag Forecast
- February 16-17: Georgia Organics Conference and Expo

Find more information on these events  
at  
[www.SustainaAgGa.org](http://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.

## Grower's Corner

### *University of Georgia Cooperative Extension Helps You Enhance the Safety of Locally Produced Foods*

For many farmers on small and beginning farms, selling produce at the local farmers market or through CSAs is a great way to add to your income while serving consumers who want to purchase locally grown products. The goal is to keep these foods fresh, nutritious and safe. Food safety depends on how the food is grown and handled on the farm, as well as, during transport and at the market.



*Produce arriving at the farmers market in Henry County, GA.  
Photo by April Sorrow*

Many small farms selling at farmers markets or through CSAs may be exempt from regulation under the Produce Safety Rule that is a part of the Food Safety Modernization Act. This rule requires a set of nationwide science-based minimum standards for the growing, harvesting, packing and holding of fresh produce that will be food for human consumption. The standards in the rule are based on Good Agricultural Practices (GAPs). These include requirements specific to: (1) worker training, health and hygiene; (2) agricultural water, both pre-harvest and post-harvest; (3) biological soil amendments of animal origin (manures and composts); (4) domesticated and wild animals; and (5) equipment, tools, and buildings. For farmers who must comply with the Produce Safety Rule, training using the Produce Safety Alliance Grower Training recognized by the Food and Drug Administration (FDA) and a certificate from the Association of Food and Drug Officials is required.

Small growers that sell an average annual monetary value of \$25,000 or less of produce over the previous three year period are exempt from the Produce Safety Rule. Those who sell more than \$25,000 but less than \$500,000 may be eligible for a qualified exemption if their sales are directly to end users (defined as directly to consumers, and/or restaurants and retail establishments within the same state or Indian reservation and not more than 275 miles from the farm), and these direct sales exceed sales to all others. In other words, at least 51% of their sales must be to these end users.

Even if you are exempt from these rules, food safety still begins on the farm and is essential to protecting both your customers, as well as, your business. Farmers are encouraged to follow Good Agricultural Practices (GAPs) in order to prevent fresh fruit and vegetables from becoming contaminated with harmful microorganisms that could cause foodborne illness, regardless of the size of your operation.

University of Georgia Cooperative Extension has resources on food safety best practices for small and very small farms exempt from the Produce Safety Rule and for farmers markets. To access Self-Help Forms that you can use to do self-inspections of your farm and market to identify practices that may need changing to improve the safety of your products, visit [www.fcs.uga.edu/extension/local-food-safety](http://www.fcs.uga.edu/extension/local-food-safety). A series of how-to factsheets are also available. Two free on-line courses are available through the National eXtension Website. Links to information on how to access the on-line Enhancing the Safety of Locally Grown Produce - On the Farm course and the Enhancing the Safety of Locally Grown Produce - At the Market course are also included at [www.fcs.uga.edu/extension/local-food-safety](http://www.fcs.uga.edu/extension/local-food-safety). For those interested in obtaining a Cottage Foods License in Georgia, links are available to an informational webinar and cottage foods materials at [www.fcs.uga.edu/extension/local-food-safety](http://www.fcs.uga.edu/extension/local-food-safety).

*Judy A. Harrison, PhD  
UGA Extension Food Safety Specialist*

# Grower's Corner

## Pasture Rental Rate Calculator

It is well recognized that for a farm to be sustainable, it has to be profitable as well as address environmental and social issues. Pasture rent is an important component of the cost of doing business in the cattle industry, but determining an appropriate rate can be complicated. There are several factors, some of which are not obvious, that are required to compute what we typically consider a “fair” rental rate. To fill this need for Georgia producers, I worked with the UGA Beef Team to adapt a spreadsheet tool developed by my colleagues at Kansas State University that simplifies the process of determining a rental rate range that reflects the costs and benefits of an individual pasture. Below I’ll explain how the tool works and how you can use it as a starting point to negotiate a fair rate. The tool can be downloaded, along with a full set of instructions, at <http://bit.ly/UGAagtools>.

The first step in the process is determining the stocking rate of the pasture. Inputs required here are bull, calf, and cow weights, pounds of forage production per acre, forage consumption rates, and other information. The tool has been prepopulated with this information as a starting point, but producers should input their own figures if available.

The tool then allows producers to calculate the amount a producer can pay and the landowner’s cost of the pasture for stockers and for cow-calf operations. These two numbers provide a range over which producers and landowners can negotiate to arrive at a fair rental rate. The cow-calf calculation requires the following information: weaning percentage, annual cow costs, expected calf sale price, and pasture maintenance expenses. Information on average weaning percentage and annual cow costs can be found in the UGA extension budgets at the link above. Expected calf sale prices can be estimated using the forecasting tools at <http://www.beefbasis.com>. Pasture maintenance expenses can be allocated to either the producer or landowner.

As with the stocking rate calculator, values are pre-populated, but producers are encouraged to update the tool with data most relevant to their situation. After entering all this information, the tool calculates the amount producers can pay per acre, per pair, and per animal unit month (AUM) given favorable, normal, and unfavorable pasture conditions. More favorable pasture conditions result in more forage production which allows for higher stocking rates. Thus, producers can pay higher rates given better pasture conditions.

Budgeting a Rental Rate-Cow/Calf Pairs			
	Unfavorable	Normal	Favorable
Producers Share of Cost	\$ 964.80	\$ 964.80	\$ 964.80
Gross Income	\$ 5,146.40	\$ 7,719.60	\$ 9,327.85
Return over Producer Cost	\$ 4,181.60	\$ 6,754.80	\$ 8,363.05
<i>Amount Producer Could Afford to Pay</i>			
Rent per Acre	\$ 26.14	\$ 42.22	\$ 52.27
Rent per Pair	\$ 130.68	\$ 140.73	\$ 144.19
Rent per AUM	\$ 15.90	\$ 17.12	\$ 17.34
Landowner Share of Cost	\$ 2,862.40	\$ 2,862.40	\$ 2,862.40
Gross Income	\$ 5,146.40	\$ 7,719.60	\$ 9,327.85
Return over Landowner Cost	\$ 2,284.00	\$ 4,857.20	\$ 6,465.45
<i>Landowner Cost</i>			
Rent per Acre	\$ 17.89	\$ 17.89	\$ 17.89
Rent per Pair	\$ 89.45	\$ 59.63	\$ 49.35
Rent per AUM	\$ 10.88	\$ 7.26	\$ 5.94

Budgeting Spreadsheet

The share of pasture maintenance expenses paid by the landowner, such as water source maintenance, weed control, fertilizer, fence construction and maintenance, corrals, and other expenses, are used to calculate the landowner’s cost. Using the example information, in a normal year, the producer can afford to pay up to \$42.22 per acre and the landowner’s cost is \$17.89 per acre. A fair rent would be less than the maximum the producer can pay and more than the landowner’s cost. The Pasture Rental Rate Calculator is a useful tool designed to assist producers and landowners with the process of negotiating a fair rent. Please contact me if you have questions about how to use the tool.

*Levi A. Russell, Ph.D.*  
Assistant Professor & Extension Livestock Economist

## Extension

### Advanced Grazing School

Most Grazing School programs focus on measuring, monitoring, and managing the forage produced above the soil surface. The Advanced Grazing School program put on by University of Georgia Extension taught the forage growers in attendance to dig deeper.

Many of the attendees at the September 19 and 20, 2017 program held near Athens, Georgia are experienced graziers who have participated in Grazing Schools and GrassMasters programs over the years. This year's Advanced Grazing School was more in-depth, highlighting university research on the impact that grazing systems have on building healthier soils.

Dr. Dennis Hancock, UGA Forage Extension Specialist and coordinator of the program, promised attendees that they would dig deeper, “both figuratively and literally.” The program culminated in participants examining the root systems of summer annual forage mixtures in a soil pit dug through forage plots at UGA's Iron Horse Plant Sciences Farm.

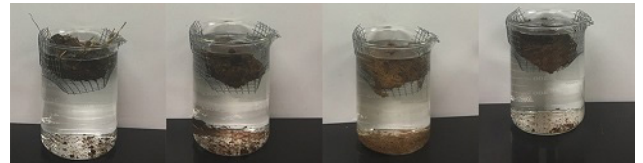


Dr. Dennis Hancock, UGA Forage Extension Specialist, breaks up aggregates in a soil pit to show participants the root systems of several summer annual forage mixtures

“This program is more advanced than our typical grazing programs because we are showing folks how the forage produced above ground feeds the roots and soil below the ground,” Hancock said. “The soil is alive. Understanding how it feeds and breathes is crucial to forage management.” Talks centered around improving soil health through a variety of methods, including soil organic matter and nutrient cycling.

Organic matter influences several other soil properties, including cation exchange capacity, water holding capacity, aggregation, and nutrient availability.

A major focal point of the Advanced Grazing School was the hands-on soil demonstrations, coordinated by Tayler Denman, a Master's Student in the Department of Crop and Soil Sciences. Demonstrations highlighted a range of soil properties from soil pH and aluminum toxicity to aggregate stability (Figure 1).



managed pasture overgrazed pasture conventional till 40 years no-till

Figure 1. The soil glue exercise shows how soil glomalin, a compound that binds soil aggregates, is affected by management practices. Soil clods were taken from (left to right) a well-managed pasture; an overgrazed, high-traffic pasture; conventionally tilled land; and 40 years of no-till land management. This gave participants a first-hand look at how intensely managed soils are less stable, thereby reducing the number and size of soil pores available for water and nutrient storage.

The effects of soil pH were shown with bermudagrass grown in root tubes (Figure 2). In a highly acidic soil, plant growth can be stunted due to limited nutrient availability, leading to shorter roots with fewer root hairs for nutrient uptake.



Figure 2. Root tube demonstrations of bermudagrass in a sandy soil, clay soil, and acidic soil (pH ~5) show producers the importance of soil pH and texture on root systems. Typically, a sandy soil (top) will show a deep-rooted system with little branching, while the clay soil (center) is characterized by vertical roots and horizontal branching. The acid soil (bottom) demonstrated how poor soil pH can stunt both root and foliar growth because of limited nutrients.

Dr. Dory Franklin, an associate professor focusing on sustainable agriculture, and Laura Ney, a PhD student in her lab, highlighted the importance of “bio-management” and biodiversity to promote soil health and agricultural sustainability. Bio-management is employing strategies that seek to create an intricate and balanced web at every level – from the bacteria to the cattle – to achieve sustainability and production goals on the farm.

Bio-management, however, does not just include the microbes. It also affects the way the forages and cattle are managed. Additional forage root tubes showed participants how their grazing management program might affect the forage resiliency in their pastures. Pearl millet and bermudagrass were grown in root tubes and then cut at 2, 7, and 21 days to simulate the improvements when forage crops are given more rest between grazings. When the tubes were opened, participants could see how the over-grazed plants were prevented from building deeper and larger roots. The short, stunted roots on the over-grazed plants contrasted with the roots of plants given proper rest. More rest resulted in a deeper, more-extensive root system with fine lateral roots and mycelia growth extending through the soil profile (Figure 3).



*Figure 3. Grazing interval root tubes demonstrate the importance of rotational grazing and pasture rest for pearl millet root development. Management ranges from a 2-day cutting interval, representing overgrazed pastures (bottom) with short, stunted roots and little forage top growth to a well-rested, 21-day cutting interval (top) that show an extensive rooting system with root hairs and fungal mycelium. The 7-day cutting interval (center) represents a typical continuous management scenario.*

This soil health-focused Advanced Grazing School offered producers the opportunity to have an in-depth look at the whole system, not just the forages and the cattle. The goal was to encourage them to look beneath their feet and dig deep.

The participants were left with a greater appreciation for how good grazing results in deeper roots and builds better soils, and they were challenged to use the principles to positively and sustainably influence soil health on their farms.

*Taylor Hendricks, Ph.D. Student  
Animal and Dairy Sciences Department  
University of Georgia*

## **Extension**

### *Thoughts on Beekeeping*

**S**lade Jarrett is a commercial beekeeper and an educator with the UGA Beekeeping Institute, which is held each year at Young Harris College. Slade is invited each year to teach about beekeeping because of his vast knowledge and experience with migratory beekeeping.

Slade began his beekeeping experience as most beekeepers do – raising bees in his backyard with only a few beehives. Slade, his wife Kristie and their three children now own and operate a family business, Jarrett’s Apiaries, in Banks County in northeast Georgia. The business sells award-winning honey and handmade gift items that Kristie constructs from the beeswax byproduct.

As commercial beekeepers, they practice migratory beekeeping, which means they move their hives to different locations throughout the year to facilitate pollination of food crops and to take advantage of nectar flows. In most years, migratory for the Jarretts means moving hives to and from south Georgia where the winters are shorter, which facilitates a longer honey harvest. As their business grows, so too does their migratory range. Just last year, Slade was asked to make a trip to California with truckloads of beehives to help pollinate some of the over 1.2 million acres of almond trees in that state.



Back from south Georgia, Slade Jarrett notes that the best way of stacking hives is to use 4-way pallets which makes loading and unloading much easier. Bees are less active at night which makes the evening and night-time the most opportune time to move the bees.

The business also sells “Nuc packages” of bees to both new beekeepers who are just getting started as well as established beekeepers who are looking to increase the size of their operation or replace colonies that have not survived. A package consists of about three pounds of bees secured in a screen box, with the queen caged separately. Then, once the package is sold, the bees must be placed into a hive along with the queen so the hive can begin growing and producing honey.



A beehive holding yard with “Nuc packages” for pick-up.

Slade reflected on his time of backyard beekeeping and noted several differences in how he manages his business now as a migratory beekeeper. As backyard beekeepers, they had only one nectar flow of honey harvested each year. Now as commercial beekeepers, they harvest up to four nectar flows. They travel practically all over the state as commercial beekeepers setting up hives near good flower populations, quite unlike their days of backyard beekeeping with only a limited number of hives and a short window of flower bloom.

As for pesticides, the Jarretts practice caution when setting up their hives on the road, as certain pesticides can be particularly harmful to bees, especially when people are not educated on proper pesticide application practices. Backyard beekeepers can educate their neighbors about the negative impacts misusing pesticides has on bee and other pollinator species, and can promote sustainable landscape practices that help attract bees and other pollinators to their yards and gardens. Slade warned that the biggest threat to bee populations is the varroa mite, and without proper control of the parasitic mite, both backyard and commercial beekeepers will surely lose their hives.



The Varroa mite (*Varroa destructor*) is an external parasitic mite of the honey bee, *Apis mellifera*. They are visible to the naked eye and look somewhat like a tick. Varroa mites are transported from colony to colony by drifting or robbing bees. Most infected colonies die within 1 – 2 years if not promptly treated for.

Slade and Kristie know first-hand that beekeeping is an uncertain agricultural enterprise, having experienced both good years and bad years with many long, hard days of work. Just like with any farming enterprise, weather, insects, and diseases can change the outcome of a harvest, and they predict that based on the erratic weather conditions of the past year they are bracing for another tough year.

For more information on honeybees and their benefits to agriculture, visit the UGA Honey Bee Program website at: <http://caes2.caes.uga.edu/bees/>

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