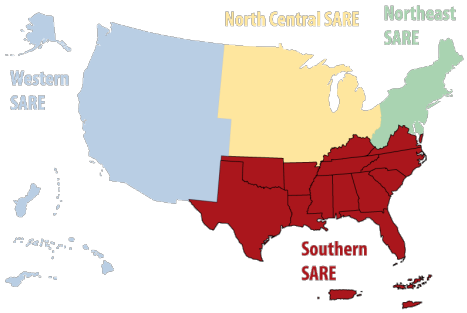
SOUTHERN SARE
Sustainable Agriculture Research & Education



Index 2021

Annual report of SARE-funded grant projects in the Southern region

Southern SARE has been fostering sustainable agricultural production and marketing efforts for over three decades, primarily through grant programs for farmers/ranchers, researchers, NGOs, government agenices and graduate students. To date, Southern SARE has funded over 1,200 grants, totaling more than $68 million.

In 2021, $5.6 million and 64 grants were awarded across five grant programs: Research & Education, Professional Development Program, Graduate Student, On-Farm Research, and Producer.

This publication provides a list of presently funded SARE projects throughout the Southern region. To find a complete list of projects funded in each state, visit the Southern SARE website (southern.sare.org) and search the Projects Database.

Grants awarded in 2021through-out the Southern region

AL	$107,008	3
AR	$64,789	2
FL	$1,324,285	16
GA	$789,176	5
KY	$220,731	4
LA	$23,482	2
MS	$144,646	3
NC	$969,826	10
OK	$75,574	1
PR	$62,921	2
SC	$649,915	4
TN	$30,780	2
TX	$1,127,531	6
VA	$67,733	4
USVI	$0.00	0
Total:	$5,658,397	64

History of Southern SARE Grants (1988-2021)

State	R&E	OFRG	PDP	Graduate	Producer	SCIG	Total
AL	$2,738,514.00	$107,779.00	$783,870.00	$108,743.00	$195,625.00	$144,956.00	**$4,079,487.00**
AR	$5,207,880.00	$179,458.00	$1,211,917.00	$217,784.00	$96,767.00	$49,829.00	**$6,963,635.00**
FL	$5,446,978.00	$453,474.00	$651,193.00	$779,971.00	$247,100.00	$87,296.00	**$7,666,012.00**
GA	$9,978,305.00	$148,325.00	$526,896.00	$213,236.00	$226,360.00	$96,594.00	**$11,189,716.00**
KY	$2,448,968.00	$166,906.00	$1,614,759.00	$79,398.00	$215,246.00	$58,312.00	**$4,583,589.00**
LA	$1,119,833.00	$14,308.00	$271,966.00	$129,333.00	$84,857.00	$19,930.00	**$1,640,227.00**
MS	$1,144,200.00	$14,997.00	$1,041,533.00	$47,722.00	$122,783.00	$64,348.00	**$2,435,583.00**
NC	$10,902,057.00	$202,532.00	$2,285,252.00	$460,430.00	$402,069.00	$220,117.00	**$14,472,457.00**
OK	$2,464,653.00	$113,934.00	$710,963.00	$19,969.00	$122,429.00	$16,864.00	**$3,448,812.00**
PR	$953,889.00	$42,473.00	$158,684.00	$10,000.00	$98,518.00	$10,000.00	**$1,273,564.00**
SC	$2,199,566.00	$142,377.00	$648,853.00	$73,864.00	$171,910.00	$43,620.00	**$3,280,190.00**
TN	$1,622,395.00	$94,772.00	$429,818.00	$151,561.00	$240,606.00	$126,198.00	**$2,665,350.00**
TX	$7,196,602.00	$278,413.00	$703,658.00	$315,704.00	$241,676.00	$40,000.00	**$8,776,053.00**
VA	$4,313,501.00	$195,110.00	$526,040.00	$304,489.00	$406,943.00	$112,727.00	**$5,858,810.00**
USVI	$892,423.00	$14,957.00	$87,833.00	$0.00	$21,089.00	$10,000.00	**$1,026,302.00**
Total	$58,629,764.00	$2,169,815.00	$11,653,235.00	$2,912,204	$2,893,978	$1,100,791	$79,359,787

ALABAMA

Biofertilizers a Viable Alternative to Synthetic Nitrogen in Forage Production

Beneficial soil microbes applied to bermudagrass in a livestock forage production system have been found to be a viable alternative to synthetic nitrogen applications for fertilization and forage quality enhancement, based on Auburn University research.

"Nitrogen fertilizer accounts for the majority of variable-input costs associated with forage production, and can potentially negatively impact soil, water and air resources," said associate professor and Extension specialist Leanne Dillard. "Sustainable production of livestock from both grazed and conserved forage production is critical to economic and environmental viability of the livestock industry."

In two years of a three-year, small-plot study, funded by a SARE Research and Education Grant, researchers found that bermudagrass applied with plant-growth promoting rhizobacteria yielded similar results to synthetic fertilizer treatments in forage dry matter yield and nutritive value. Those results suggest that plant-growth promoting rhizobacteria may be a viable option for biofertilization of fall-stockpiled bermudagrass, but the researchers stress that further investigation into the effect of beneficial soil microbe inoculants on a larger scale is needed.

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Experimental treatments on 18 bermudagrass plots included a negative control, synthetic fertilizer, a single strain of plant-growth promoting rhizobacteria, a blend of three Bacillus species, and a combination of beneficial microbes plus fertilizer. Two applications of plant growth-promoting rhizobacteria were applied at the beginning of each stockpiling season in August and again 30 days later. A third of each plot was clipped in mid-November, December and January of each year to determine dry matter yield and nutritive value.

Research and Education Grants

LS22-386 Southern Farmer Leadership Fellowship for Farmer-led Racial Equity and Sustainability Projects in the South, $49,767, National Young Farmers Coalition

LS19-314 Regional Educational Campaign for High Tunnel Vegetable Producers, Limited-Resource, and Veteran Farms Via On-Farm Pest Exclusion and Natural Enemy Demonstrations, Publications, and Self-help Tools, $49,648, Auburn University

LS19-307 Biofertilization of Bermudagrass: A step toward sustainable forage production, $221,115, Auburn University

Graduate Student Grants

GS21-246 Supporting an Emerging Industry: Developing a broccoli model to guide growers with sustainable decision-making, $16,479, Auburn University

GS20-220 Novel Bio Sensor Derived from Cotton Biomass to Monitor Real-time Soil Moisture and Nitrate, $16,500, Tuskegee University

On-Farm Research Grants

OS22-154 Harvest Management and Genotype Effects on Sunn Hemp Forage as Cover Crop to Improve Sustainable Beef Cattle Production in Southeastern USA, $20,000, Tuskegee University

OS20-136 Validation of a Spotted Wing Drosophila Degree Day Model for the Southeast for Sustainable Blueberry Production, $16,581, Auburn University

Producer Grants

FS22-343 Project Urban Mushrooms on Mimosa Wood, $14,951, Fountain Heights Farms

FS21-333 Development of the East Alabama Black Belt Farmers' Market and the Black Belt Brand of Sustainable Agricultural Products, $13,060, East Alabama Black Belt Farmers' Cooperative

ARKANSAS

Developing Value-Added Products from Surplus Produce at Farmers Markets

Educational resources developed by University of Arkansas may aid farmers in developing value-added products from surplus produce at farmers markets.

Based on a graduate student study, researcher Renee Threlfall and graduate student Morgan Gramlich were interested in identifying the top most available produce items at a local Arkansas farmers market and then determine what types of value-added products could be developed that would be most profitable for farmers. Two fact sheets on creating value-added products from surplus produce were developed from the research.

Research results indicated that the top five items that were most highly available throughout the season included squash, cucumbers, zucchini, tomatoes and potatoes. High availability correlated with the lowest prices due to the surplus. As a result, researchers suggested that such produce available in large quantities could be used for developing value-added products. Tomato sauce, pickles and salsa were examples provided.

A fact sheet, "Producing Value-added Food Products from Surplus Farm Produce," was created, outlining the steps to create value-added products from farmers market surplus, and rules and regulations for production.

Additionally, researchers identified the economic potential of value-added products, specifically tomato sauce produced from surplus tomatoes. Researchers found that the top three costs for the tomato sauce production were labor, facility rental and jars/labels. A fact sheet, "Cost of Developing Value-added Food Products from Surplus Produce," presented a cost analysis for producing value-added food products from surplus produce at a food manufacturing facility to evaluate economic potential with the implementation of the value-added systems as part of a business model.

University of Arkansas

The purpose of the project was to strengthen local food systems through unexplored sustainable uses of surplus produce.

Research and Education Grants

LS22-363 Grazing with the Fun Guy (Fungi): Small ruminant worm control, $371,000, USDA-ARS

LS21-349 Regenerative Land and Livestock Management for Women, $49,972, NCAT

LS19-317 Innovative Nutrient Management Options for Sustainable Pasture Land Intensification, $296,352, University of Arkansas

LS19-316 Forage Establishment and Management in Arkansas' Silvopasture for Small Beef Producers, $251,321, University of Arkansas

Professional Development Program Grants

SPDP22-08 Sustainable Practices for Strawberry Production: Field demonstration and virtual training program for the Southeast, $71,481, University of Arkansas

ES20-154 Demystifying Regenerative Grazing and Soil Health, $79,866, NCAT

ES20-155 Utlizing Insect and Irrigation Monitoring to Enhance

ARKANSAS PROJECTS CONTINUED

Sustainable Vegetable Production: Extension Educator Training for Arkansas, $69,328, University of Arkansas

Graduate Student Grants

GS21-250 Utility of Native Floral Plantings Between Tree Rows for Conservation and Management of Wild Bees and Other Beneficial Insects of Tree Fruit Orchards, $14,817, University of Arkansas

GS19-207 The Impacts of Native Plant Diversity on Native Bee Development and Soil Health, $13,101, University of Arkansas

On-Farm Research Grants

OS19-124 The Impact of Estimated Breeding Values on Parasite Resistance and Reduced Parasitism in Sheep, $15,000, USDA-ARS

FLORIDA

High Tunnels Provide Pest and Disease Control Benefits in Tropical Climates

High tunnels in sub-tropical environments help decrease pest and disease pressures in organic vegetable production, based on the results of a farmer study.

Moses Kashem, founder of St. Simon's Farm in Indiantown, FL, used high tunnels to manage pests and diseases in cherry tomatoes, as well as determine if high tunnels can extend the growing season. St. Simon's Farm grows 100 acres of certified organic produce.

"For vegetable growers in sub-tropical climates like Florida, heat, humidity and high amounts of rainfall contribute to significant pest pressure and susceptibility for disease, which cause significant challenges for growers using organic, sustainable practices," said Kashem. "In addition, season extension runs into several challenges unique to the climate. Production is highest during the winter months, while production dwindles during the summer months."

Kashem said high tunnels may offer several potential benefits to south Florida growers, including protecting crops from heavy rainfall, which can precipitate pests and diseases, as well as lengthen the growing season to provide farmers with additional profits.

In the study, "Season Extension and Increased Economic Sustainability for South Florida Growers: Using high tunnels to extend tomato production," Kashem planted cherry tomatoes from September to July in both a high tunnel and an open field and compared the pest and disease pressures and yields between each one.

Results showed a 15 percent decrease in the occurrence of bacterial spot and a 20 percent decrease in the occurrence of pest damage in the high tunnel compared to the open field trial. However, Kashem did not see the growing season extended with the use of high tunnels; flower production decreased in the summer months leading to decreased fruit production. Yields were comparable between open field and high tunnel production.

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Kashem said high heat was the main factor in the decreased flower production and fruit set in the high tunnel and suggested that the use of shade cloth might be a viable option to decrease the temperature.

"High tunnel use during the normal growing season (September to April) is still a great option," said Kashem. "Normally tomatoes are some of the most pest-ridden crops on organic farms. The pests and diseases they contract spread to a number of other crops such as eggplant, okra and peppers. Using high tunnels can turn tomatoes into a more reasonable crop to grow and also allow for other crops to be grown without the added pressure of further pests and diseases."

FLORIDA PROJECTS

Research and Education Grants

LS22-370 Using Rootstocks to Increase Blueberry Farming Sustainability in the Southeast, $371,000, University of Florida

LS22-378 Community Apiary: Providing experential education and access for novice beekeepers in an urban setting, $49,957, Clara White Mission

LS21-353 Evaluating the Dual-purpose of Chickpea: A cash and cover crop for agricultural production systems in the Southeast, $397,648, University of Florida

LS21-354 The Use of Cyanobacteria Biofertilizers to Increase Crop Productivity, Improve Soil Health, and Agricultural Sustainability in Florida, $242,000, Florida International University

LS21-360 Specialty Pumpkin: Laying the groundwork for an emerging crop and lucrative products, $399,999, University of Florida

LS20-334 Optimizing Nutrient and Water Management for Organic Mixed Vegetable Production Systems, $299,116, University of Florida

LS20-342 Enhancing Hedgerow Systems in Fruit Tree Production to Improve Beneficial Insect Diversity and Abundance, $311,118, University of Florida

LS19-315 Enhancing Seed Production of Regionally Adapted Crops in the Southeastern Farmer Seed System, $310,537, University of Florida

LS19-308 Harnessing Microbes for Sustainable Food Production, $44,468, University of Florida

Graduate Student Grants

GS21-235 Examining Field Crop Farmers' Climate Change Perceptions, Adaptation Strategies, and Resiliance in Florida: A spatial econometric approach, $15,775, University of Florida

GS21-238 Sustainable Management Practices for Vanilla Cultivation, $16,499, University of Florida

GS21-239 Quantifying and Understanding Factors Affecting Tissue Nitrate Accumulation in Organic Celery, $16,497, University of Florida

GS21-243 Arbuscular Mycorrhizal Fungal Associations in Tea Under Sustainable Production Systems in Florida, $16,444, University of Florida

GS21-244 What's the Buzz? Assessing Efficacy, Synergisms, and Sustainability of Pollinators in Southern Highbush Blueberry, $16,493, University of Florida

GS21-247 Small-scale Farmer Networks in Florida: Understanding and measuring their impacts and exploring the role of extension in their success, $15,930, University of Florida

GS21-249 Forecasting Pasture Productivity from Satellite Imagery for Use in Adaptive Grazing Management, $16,445, University of Florida

GS20-234 Development of Push-pull System for Ambrosia Beetles, Vectors of Laurel Wilt Disease in Florida Avocado, $11,564, University of Florida

GS20-225 Deploying Oak Mulch to Contain and Suppress HLB Disease in Citrus, $12,347, University of Florida

GS20-224 Determining How the Ubiquitous Fungi Mortierella Regulates Belowground N Dynamics Under Different Crop Rotation Systems, $16,144, University of Florida

FLORIDA PROJECTS CONTINUED

GS20-223 Intercropping for Pest Control in Organic Kale in Northern Florida, $16,279, Florida State University

GS20-222 Agroecological Intensification of Warm-season Pastures for Improved Productivity and Quality and Ecosystem Services, $16,173, University of Florida

GS20-221 Assessing Anaerobic Soil Disinfestation for Improving Weed and Soilborne Disease Management in High Tunnel and Open Field Salad Green Production, $16,499, University of Florida

GS19-203 Evaluation of Cladosporium cladosporioides and Its Extracts for the Management of Pathogenic Bipolaris Species, $14,332, University of Florida

On-Farm Research Grants

OS22-153 Enhancing Stink Bug Biological Control for Increased Sustainability of Rice Production in Florida, $19,982, University of Florida

OS21-142 Bridging the Fall Forage Gap with Stockpiled Limpograss Along the Southern Gulf Coast, $19,981, University of Florida

OS21-146 Evaluating Sorrel Varieties for Production in Florida, $19,708, University of Florida

OS21-147 Development of a Push-pull System in Avocado Groves in South Florida, $19,923, University of Florida

OS21-148 Plant Sap Analysis as a Tool to Optimize Fertlizer Application for Sustainable Citrus Production, $20,000, University of Florida

OS20-135 On-farm Evaluation of an Innovative Anaerobic Soil Disinfestation Practice for Improving Organic Carrot Production in North Florida, $19,995, University of Florida

OS20-137 Combining Non-crop Habitat and Semiochemical Lures to Increase Natural Enemy Recruitment and Retention in Florida Vegetable Crops, $18,164, University of Florida

Producer Grants

FS22-339 Methodology to Enhance Nutrition and Economics of Microalgae Use as Live Feeds in Marine Aquaculture, $14,985, Live Advantage Bait, LLC

GEORGIA

Sustainably Managing Pests in Pecan Orchards

Pecan growers may be able to rely on a host of integrated pest management tactics to better manage aphid pest populations in their orchards, according to the results of a Southern Sustainable Agriculture Research and Education (SSARE) Graduate Student Grant.

University of Georgia graduate student Eddie Slusher and major professor Jason Schmidt studied yellow and black aphid phenology and parasitism impacts in Georgia pecan orchards in an effort to help growers more sustainably manage pecan pests.

They found that aphids tend to follow a pattern of rising and crashing throughout the season with peaks usually occurring in May and June, followed by another peak in late September and early October. Knowing the season phenology of aphids may help growers in better targeting their insecticide application programs.

Researchers also studied aphid parasitism, specifically the parasitoid *Aphelinus perpallidus*. They found that the parasitoid followed similar population peaks and crash trends as the aphids, suggesting that parasitoid numbers rise and fall with that of their host.

Additionally, researchers found that both aphids and parasitoids tend to populate the lower tree canopy in greater numbers than in other areas of the tree. This may be helpful for growers for integrated pest management strategies. Previous research has shown that insecticide coverage decreases significantly as pecan

Pecan pest. SARE Outreach

canopy height increases. However, parasitoids still play a key role in pest management in areas of the canopy where insecticidal control may fail.

Research and Education Grants

LS22-368 Managing Markets: Assessing the Relationship Between Farmers Market Management and Farmers' Economic Viability and Quality of Life, $300,000, Emory University

LS22-380 Organic for All: Whole systems organic agriculture for farmers of color, IFOAM, $50,000

LS22-383 Tractor, Small Engine, and Hand Tool Selection, Use, Maintenance, and Repair for Small to Mid-scale Sustainable Farms, $45,320, Georgia Organics

LS21-362 How Technology Enhances or Impedes Sustainable Agriculture for Black Limited Resource Farmers in the Southeast Black Belt Region, $200,000, McIntosh SEED

LS21-361 Economic Benefits and Marketing Implications of Co-labeling Strategies for Small Organic Producers, $128,373, Universit of Georgia

LS21-358 Small Farms and Big Market Barriers, $400,000, Fort Valley State University

LS21-346 Empowering Southern Sustainable Farmers with Proactive, Community-centered Farm Law Education, Resources and Networks, $45,096, Farm Commons

GEORGIA PROJECTS CONTINUED

LS20-340 Pecan Hedge-pruning: A Sustainable Management Option for the Southeastern U.S., $299,894, University of Georgia

LS20-339 Exploring Agritourism to Increase Agricultural Sustainability and Resilience in the Municipality of Utuado, Puerto Rico, $300,000, Troy University

LS19-318 A Working Group to Address the Challenge of Food Deserts Through Urban Agriculture, $50,000, Savannah State University

LS19-309 Evaluating the Impact of Biostimulants on Blueberry Growth and Soil Biological Health, $297,119, University of Georgia

Graduate Student Grants

GS19-217 Evaluating Stakeholder Perceptions on Palmer Amaranth Management in Georgia, $14,797, University of Georgia

GS19-216 Assessing the Conditions Informing Direct-to-Consumer Access for Hispanic Immigrant Farmers in South Florida, $16,380, University of Georgia

GS21-236 Identifying the Roles of Predatory Natural Enemies in Pecan Systems: Molecular-based framework for sustainable pest management, $15,707, University of Georgia

GS20-233 Effect of Ground Cover Management on Predators and Predation of Halyomorpha halys in Georgia Peach Orchards

On-Farm Research Grants

OS22-150 Boosting Blueberry Patch Production and Native Bee Abundances Using Wildflower Patches, $20,000, Georgia Gwinnett College

Producer Grants

FS22-344 Enriching Vermicast Through the Use of Bokashi-Fermented Food Waste Inputs, $15,000, Trefoil Gardens

KENTUCKY

Extension Agents Receive High Tunnel Training to Better Assist Growers

Kentucky county extension agents are receiving high tunnel training to better assist growers with a variety of production challenges, including soil salinity, fertilizer use and season extension.

University of Kentucky Cooperative Extension specialists received funding through the Southern Sustainable Agriculture Research and Education (SSARE) Professional Development Program Grant to develop a series of trainings to provide accurate current information and equip county extension agents with useful skills to better assist high tunnel growers.

"High tunnel production has grown considerably in Kentucky since 2012," said University of Kentucky Extension vegetable specialist Rachel Rudolph. "However, many growers still struggle with production challenges that are more commonly observed in high tunnel systems. Because high tunnels are still relatively new, many agents do not have the experience or information to properly assist high tunnel growers." County agents from both University of Kentucky and Kentucky State University are eligible to participate in the training series.

To date, county agents have learned how to construct a high tunnel and offer guidance to growers with respect to proper site selection, construction details and design features; they've learned how to prepare the soil for crop production and manage the soil sustainably; they've learned how to prepare a high tunnel for summer production and transition to winter with frost protection, row cover use and winter cover crops; they've learned basic Integrated Pest Management strategies; and they've learned what it takes for a grower to prepare for the market.

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Participants have received both hands-on instruction and resources via virtual presentations.

Research and Education Grants

LS21-348 Principles of Soil Health in a Variety of Market Farming Frameworks: Best Practices from the Field with Experienced Regenerative Farmers, $48,000, No-Till Growers

LS19-319 Development of Local Small Grain Value Chains for Kentucky and the mid-South, $232,669, University of Kentucky

Professional Development Program Grants

ES20-158 Helping Agricultural Professionals and Mentoring Farmers to Train Previously Unreached Farmers about Sustainable Agriculture, $80,000, Kentucky State University

ES19-148 Experiential High Tunnel Training for Cooperative Extension Service Agents in Kentucky, $64,304, University of Kentucky

On-Farm Research Grants

OS22-157 Yaks Add Farm Diversification, $19,979, University of Kentucky

Producer Grants

FS21-335 Development of AI for Yak Semen and the Potential Economic Benefits to Southern Region Yak, Small Acreage Farmers and Beef Producers, $14,998, Zhi-ba Shing-ga Yaks

LOUISIANA

Biological Control Effective in Controlling Diseases in Sweetpotatoes

A biological control has been found to be an effective alternative to fungicide treatment to control Rhizopus soft rot in stored sweetpotatoes.

Based on the results of a Southern Sustainable Agriculture Research and Education (SSARE) Graduate Student Grant, the application of Bio-Save as a dip performed comparably to the fungicide dicloran, a common post-harvest product used to protect sweetpotatoes from disease. Bio-Save is a certified-organic, post-harvest biological disease preventative for potatoes. It's main ingredient is the bacterium, *Pseudomonas syringae*.

Researchers emphasized, however, that efficacy can vary based on such factors as the cultivar grown, soil type, weather conditions and how long the sweetpotatoes are in storage.

Louisiana State University graduate student Waana Kaluwasha and major professor Christopher Clark studied the application of Bio-Save as a dip and a spray, as well as the method of re-curing on five commercial sweetpotato cultivars: Beauregard, Bayou Belle, Bellevue, Orleans and Covington.

The re-curing treatment both alone and in combina

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tion with Bio-Save was not effective for all cultivars in both years, thus cannot be recommended at this point and needs further investigation. With Bio-Save, however, having another alternative comparable to dicloran would result in reduced fungicide use, improved environmental stewardship, and better quality of produce to meet the needs of various markets.

Graduate Student Grants

GS21-240 Evaluating the Impacts of Conservation Stewardship Plantings on Arthropod Communities in Louisiana Agroecosystems, $16,008, Louisiana State University

MISSISSIPPI

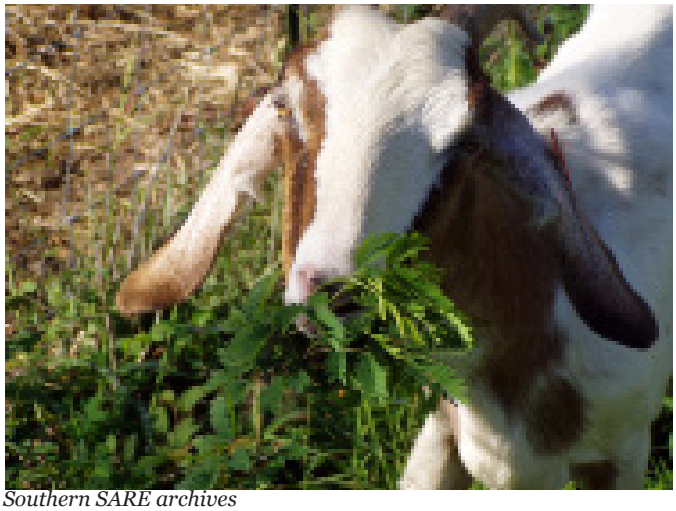
Farm-to-Fork Strategies Being Developed to Better Market Meat Products

Animal science specialists from Mississippi State University, Alcorn State University and Tuskegee University (in Alabama) are developing farm-to-fork training tools to provide small-scale livestock producers the means to more efficiently harvest, process and market their product. The information is specifically targeted to the meat goat industry.

Through a Southern Sustainable Agriculture Research and Education (SSARE) Professional Development Program Grant, the researchers are designing and building a mobile meat processing unit capable of cold storage, fabrication, processing, marketing, and cookery. Mobile training workshops will be held that focus on four key concepts of value-added processing, safety, marketing and cookery.

"By equipping our agents and existing processors with this valuable training, they can help small producers implement more sustainable management strategies that are driven by an improved understanding of the end products that satisfy their specific markets," said MSU animal science specialist Derris Burnett.

The approach used in this project is to use the basic components of anatomy, biology, and chemistry to



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teach producers, processors, and other frontline meat industry personnel about novel strategies to process, market, and cook meat products. Each lesson generally begins with identifying a specific cut of meat from a selected species and then explaining the anatomical, biological, and chemical components of the muscles that make up the cut. This approach is especially useful in the small ruminant arena where these products are less mainstream and producers/consumers may lack the confidence and/or competence to prepare and market these products.

Research and Education Grants

LS22-379 Small Farm IPM Training Workshop for Underserved Communities, $22,898, Alcorn State University

LS21-352 Training MS Farmers and Producers with Alternative Farming Practices Including Intercropping, $50,000, Mileston Cooperative Association

LS20-325 Scaling Up Production and Local Marketing for Minority and Limited Resource Farmers, $49,777, NCAT

Professional Development Program Grants

SPDP22-016 Training Agriculture Professionals and Educators to Support Diversified Vegetable Farmers with Cost Analysis, $75,000, Oregon Tilth

SPDP21-07 Profitability, Viability, and Sustainability of Pasture-Based Dairy Farms: The Southern Dairy Sustainability Network, $79,737, Mississippi State University

ES20-156 Meat Chemistry and Cuisine: Using a proven method to train extension agents and other professionals serving small-scale and limited-resource producers, $80,805, Mississippi State University

ES20-153 Improving Conservation Practices and Soil Health in Sweet Potato through Cover-It-Up, $65,220, Mississippi State University

On-Farm Research Grants

OS22-155 Enhancing Soil Organic Carbon Storage Using Cover Crops in the Mississippi Delta, $19,779, Mississippi State University

NORTH CAROLINA

Better Weed Control Through Mechanical and Electrical Means

A combination of electrical and mechanical means to control weeds in vegetable production may be an economical and sustainable part of a weed management program, according to the results of a North Carolina State University graduate student study.

NCSU researcher Katherine Jennings and graduate student Levi Moore focused on palmer amaranth weed control in cucumbers, peanuts and sweet potatoes using mechanical means (weed puller) and an agricultural implement that sends electricity to the roots of the weed plant. The electricity ruptures the plant cells killing the plant. The methods were applied to the palmer amaranth at various heights above the cash crop canopy, and effects of treatments on palmer amaranth control were evaluated using a scale of 0% (no treatment effect) to 100% (plant death). The methods were compared to hand control and post-emergent herbicide treatments.

Results found that hand weed removal consistently resulted in optimal weed control. However, mechanical and electrical applications controlled palmer amaranth by up to 87 percent when applied at the 0.9m and 1.2m heights. Mechanical control was less effective when weeds were a smaller height. Electrical control was less effective once weeds grew larger than the height of the cash crop.

Results also found that palmer amaranth was most effectively controlled in peanuts and sweet potatoes using mechanical and electrical means. Though hand removal often resulted in the greatest peanut pod count and total sweetpotato yield, the weed puller and electrical treatments resulted in similar yields to the hand treatments. Weed control in cucumbers was less effective due to plant tendrils grabbing onto the palmer amaranth and making it difficult to remove weeds.

Palmer amaranth. Photo courtesy of USDA-ARS

Through this project the researchers were able to learn to use advancing technology for weed management, provide graduate student training, and provide technology demonstration to growers.

NORTH CAROLINA PROJECTS

Research and Education Grants

LS22-365 Regional Evaluation of Cucumber High Tunnel Trellising Systems, $158,000, Carolina Farm Stewardship Association

LS22-376 North Carolina Small Ruminant Improvement Program, $49,999, NCSU

LS22-384 Advancing Conservation Through Educating and Empowering Women Farmers and Landowners in the Southeast, $50,000, American Farmland Trust

LS21-357 Southern Pasture-raised Beef: From Farm to Table to Us, $380,203, Duke University

LS21-356 Securing Land Tenure Rights for Heirs Property Owners, $399,965, Land Loss Prevention Project

LS21-351 Saving Seed for Resilient Local Systems: An online, video-based course on saving seed from Utopian Seed Project, $49,775, Utopian Seed Project

LS21-347 Farmer Direct Sales During and After COVID-19, $49,950, Appalachian Sustainable Agriculture Project

LS20-336 Navigating Financial and Mental Health Crises, $299,959, Rural Advancement Foundation International

LS20-333 Development of a Sustainable Cropping System for Industrial Hemp Production by Limited Resource Farmers, $229,933, North Carolina Agricultural and Technical State University

LS20-326 Promoting Southeastern Agriculture Resilience with Carbon Farm Planning, $50,000, NC Foundation for Soil and Water Conservation

LS20-321 Small Ruminant Producers Program: A pilot program for small ruminant producers and county agents, $31,895, North Carolina Agricultural and Technical State University

LS19-311 Application of a Banker Trap Plant (BTraP) Concept of Trap Cropping for the Management of the Harlequin Bug, a Pest of Brassicaeae: A new paradigm in small farm IPM, $257,987, NC A&T University

LS19-310 Cool Season Annual Grass, Grass-Forb, and Grass-Legume Forage Systems for Southeastern Beef Cattle Production, $270,708, North Carolina State University

Professional Development Program Grants

SPDP22-12 Grant-writing Training for Extension Agents and Service Providers to Support Underserved Farmers, $79,996, North Carolina A&T University

SPDP22-13 Land Summit Professional Development, $59,206, NCSU

ES19-146 Effectively Using Permanent and Temporary Electric Fence Technology: Adviser training to support producers implementing adaptive grazing management, $79,954, North Carolina State University

Graduate Student Grants

GS21-253 Combining Roller Crimpers and Electrical Methods for Termination of Cover Crops in Herbicide-free Reduced-tillage Vegetable Crop Production Systems, $16,326, North Carolina State University

GS21-252 Improving Nutsedge and Grass Control in Organic Production Systems Using Sequential Mowing and Organic Herbicide Application, $15,654, North Carolina State University

GS21-242 Equity and Environment in Scaled-up Sustainable Food Systems Development, $16,500, University of North Carolina at Chapel Hill

GS20-230 Investigating Social Networks for Cooperative Management Potential in Agriculture, $8,984, North Carolina State University

On-Farm Research Grants

OS22-159 Researching Colocasia esculenta (aka Taro) in the Southeast as a Sustainable and Alternatie Crop, $20,000, The Utopian Seed Project

OS21-145 Southern Pea Production Under Conservation Tillage Systems in North Carolina, $18,730, University of Mount Olive

OS21-141 On-farm Trials to Evaluate New Tomato Breeding Lines with Verticillium Wilt Race 2 Tolerance, $20,000, North Carolina State University

Producer Grants

FS21-337 Establishing and Grazing Native Warm Season Grass: How average daily gain and internal parasite burden are affected in weaned lambs, $2,723, LeeDer Farm

FS19-313 Bee Pollen Identification for Increased Sustainability, $9,938, Hudson, NC

OKLAHOMA

Understanding Production Under Native American Cropping Systems

Langston University and a co-hort of Native American-serving institutions are studying the "sisters" model of crop production to educate and enhance the capacity of tribal and other socially disadvantaged farmers to produce culturally relevant crops within a systems approach.

SARE Outreach

Through a $300,000 Southern Sustainable Agriculture Research and Education (SSARE) grant, the three-year project is testing and validating soil moisture, and weed and pest management within the three and four sisters Native American production system. The "sisters" system includes planting a perimeter trap crop, along with corn, a legume (generally beans), and a cucurbit (generally squash).

The objectives of this project are to assess production characteristics, nutritional profile, and marketability of traditional Native American crops. The results of this work will provide a clearer understanding of the potential crops that have usefulness in traditional polycultures.

Research and Education Grants

LS20-344 Developing a Sustainable Meat Goat Production and Marketing System for the Southeastern United States Through an 1890 Universities Consortium, $600,000, Langston University

LS20-338 Researching and Networking Native American and Socially Disadvantaged Farmers Traditional Market Gardening Production System Resiliency, $298,066, Langston University

PUERTO RICO

Ag Professionals Receiving Training in Soil Management Practices

Soil resource specialists with the University of Puerto Rico and the USDA Natural Resources Conservation Service are training extension agents across the island on soil nutrient management practices to help fill educational and resource gaps between ag professionals and farmers.

The training, funded through a Southern Sustainable Agriculture Research and Education Professional Development Program Grant, is taking place across five regions in Puerto Rico: Arecibo, Gurabo, Mayaguez, Ponce and San Juan. The regions support 67 extension agents who serve over 1,100 farmers.

Workshops, which will take place over the course of a year, cover such topics as soil sampling, soil analysis interpretation, nutrient recommendation, soil nutrient management, and soil quality/health.

Resource tools are also being developed, including instructional videos on soil management pertinent to tropical agriculture, a website on soil management practices, and an online fertilizer calculator. Extension agents will also have access to soil sampling and field analysis instruments.

Southern SARE archives

Research and Education Grants

LS22-385 An Agro-ecological Incubator and Educational Programs for Beginning Farmers in Western Puerto Rico, $50,000, Plentitud PR

LS21-350 Puerto Rico Goat and Sheep Educational Program Initiative, $48,036, University of Puerto Rico

Professional Development Program Grants

SPDP22-14 Learning to Teach Farmers About Agricultural Interpretation to Foster Sustainability and Food Security, $59,999, VISITRICO

ES20-152 Soil Nutrient Management in Tropical Soils, $69,335, University of Puerto Rico

Producer Grants

FS21-334 Case Study for American Heritage Hogs in Puerto Rico, $14,885, Finca Brutal

FS20-324 Building Soil and Plant Health with Compost and Compost Teas, $12,443, Finca La Jiba

SOUTH CAROLINA

Summer Cover Crops Benefit Row Crop Production

Clemson University researchers have found that with careful selection of species and appropriate planting time, inter-seeded summer cover crops can enhance soil health, boost cash crop yields and save water in the soil profile.

Through a Southern Sustainable Agriculture Research and Education (SSARE) On-Farm Research Grant project, researchers inter-seeded a mix of white clover, buckwheat, and pigeon pea with corn during the V4, V7, and V10 growth stages of the corn crop over two growing seasons. The effects on soil moisture, soil health and cash crop biomass were evaluated against a no cover crop control.

Southern SARE archives

"We found that cover crops when inter-seeded at V7 or V10 saved more water in the 20 cm soil profile than when they inter-seeded at V4 or compared to no cover crop control. Cover crops when inter-seeded at V10 or V7 growth stages of corn increased the biomass production of corn compared to the no-cover crop control. However, this benefit was not realized when cover crops were inter-seeded at V4 growth stage of corn," said Sruthi Narayanan, assistant professor of crop ecophysiology and project principal investigator. "Soil health score was higher when cover crops were planted at V7 and V10 corn growth stages compared to V4 and no-cover crop control in both seasons. Corn growth stages V7-V10 appear to be the ideal planting time for cover crop inter-seeding based on soil water conservation, soil health, and corn biomass production."

The field trials were conducted at Mull Meadows Farm in Anderson County. Farmer Robert Mulliken, Anderson County Agronomy Agent Christopher Talley, and Agricultural Economics Assistant Professor Lisha Zhang participated in the study.

The purpose of the research was to satisfy the growing interest of incorporating cover crops in row crop production in the Southeast, but find solutions to challenges of successfully establishing cover crops during long crop growing seasons, while providing benefits to the soil and the cash crop.

A forage corn variety, pioneer 2089VYHR, was planted at a rate of 36,000 plants/acre in 2020 and 32,000 plants/acre in 2021. The cover crop treatments were sown manually using a push spreader at V4, V7, and V10 corn growth stages. Seeding rates were 3 lb/acre for white clover, 48 lb/acre for buckwheat, and 10 lb/acre for pigeon pea as single species and 1, 16, and 3.3 lb/acre for white clover, buckwheat, and pigeon pea, respectively in the mixture. The control treatment was forage corn planted without any inter-seeded cover crops. All plots were 18 feet x 18 feet size. Plots were maintained as rain-fed.

Lack of diversity in the production system that makes it less adaptable to extreme climatic events and deterioration of soil health that affects long-term sustainability of the system are major challenges for organic and conventional farmers, said Narayanan.

"In order to address the above challenges, crop production needs methods that make the system more diverse, protect the environment, and are sustainable in the long run, which makes cover cropping a suitable approach to address those challenges. However, farmers may be reluctant to adopt the system without seeing it in action," she said. "This project is the first step in determining the feasibility of inter-seeded cover crops in corn production systems and may help increase the adoption of this technique by row crop producers."

SOUTH CAROLINA PROJECTS

Research and Education Grants

LS22-366 Development of Sustainable Strategies for Managing Bacterial Diseases and Improving Tree Health in the Peach Production System, $371,000, Clemson University

LS22-369 Establishing an Organic Watermelon Industry in South Carolina, $370,000, Clemson University

LS22-374 Cover Crop Interseeding in Organic Corn Production to Reduce Resource Inputs and Soil Disturbance and Enhance Pest Control and Farm Profitability, $371,000, Clemson University

LS22-387 Wholesale Market Success for Limited Resource Gullah Farmers, $49,500, Gullah Farmers Cooperative Association

LS21-359 Strengthening Farmer-consumer Connections for Sustainble Agricultural Systems, $213,954, Furman University

LS21-355 Gullah/Geechee Agro-Culture: Sustaining culture to sustain agriculture in the Lowcountry, $341,346, University of South Carolina

LS19-306 Utility of Anaerobic Soil Disinfestation and Organic Herbicides for Weed and Disease Management in Organic Solanaceous Vegetable Systems, $293,470, Clemson University

LS19-305 Incorporating Natural, Non-toxic Arthropod Resistant Tomato Varieties into Southern Production Systems, $299,963, Clemson University

Professional Development Program Grants

SPDP22-15 Training Educators in the Southern Region Using Aquaponics as a Sustainable Agriculture Solution, $71,980, Clemson University

ES19-150 Advance Soil Health Training for South Carolina Agriculture Professionals, $79,847, Clemson University

Producer Grants

FS22-341 Does Reduction of Nitrate Inputs in Pasture Land Treated with Chlorella vulgaris Result in Cost Savings and Healthier Soil and Grass? $10,975, Sweetgrass Garden

TENNESSEE

Increasing Cropping Systems Resilience With Cover Crops

Preliminary data from a three-year Southern Sustainable Agriculture Research and Education Grant has found that cover crops may help buffer against extreme soil temperature changes, in addition to providing a myriad of other benefits, such as improved soil health, reduced soil erosion and increased water-holding capacity. The findings may help to increase cropping systems resilience in the face of extreme weather changes.

Southern SARE archives

Researchers with Middle Tennessee State University, Auburn University and University of Kentucky are evaluating the influence of cover crops on soil thermal properties and heat capacity and how these may influence crop productivity. Other soil health indicators were also analyzed, including water retention, bulk density, pore size distribution, organic carbon, soil pH, and microbial biomass.

"Rising temperatures may affect the soil ecosystem services, crop productivity and agricultural and environmental sustainability," said Samuel Haruna, Middle Tennessee State University assistant professor in soil science and the project's principal investigator. "Therefore, it is important to identify soil and crop management practices that are more adaptive to a changing climate."

Two farmer fields, located in Tennessee, contained two treatments (cover crops vs. no cover crops) with three replicates of each treatment. Thermal sensors and heat flux plates were installed in both treatment plots. In addition, soil temperature and water content sensors were installed after cover crops were planted. Soil samples were taken before and after cover crop planting, and after cover crop termination.

Results showed that while soil properties were similar between cover crop and no cover crop management just before cover crops were planted, these properties were significantly different prior to cover crop termination.

For example, bulk density was 18 percent higher under no cover crop management compared to the cover crop treatments prior to termination. Haruna said that was attributed to the roots of cover crops opening up soil pores and also due to the higher soil organic carbon under cover crop management (organic carbon was 14% higher under cover crop compared with no cover crop management).

"No cover crop management significantly increases thermal conductivity and thermal diffusivity. Further, as a result of higher soil organic carbon and water content, volumetric heat capacity was 21% and 14% higher at saturation and field capacity under cover crop compared with no cover crop management," said Haruna. "This demonstrates that cover crop management can buffer against significant heat transfer within the soil, helping to keep the soil temperature stable for longer periods."

Other results found that water infiltration was 52 percent higher prior to cover crop termination and 68 percent higher two months after termination compared with the no cover crop treatments. This suggests that cover crops can increase soil water infiltration and persist after cover crop termination.

Further, measured saturated hydraulic conductivity was numerically higher under cover crops compared with no cover crop management, demonstrating that cover crops can reduce surface runoff and soil loss while increasing water infiltration and storage, and, thus, potentially improving crop productivity.

TENNESSEE PROJECTS

Research and Education Grants

LS20-335 Cover Crops and Cropping System Sustainability in a Changing Global Climate, $299,995, Middle Tennessee State University

Graduate Student Grants

GS20-228 Sustainable Management of Phytophthora Cinnamomi and Ambroia Beetles Under Stress Conditions, $16,335, Tennessee State University

On-Farm Research Grants

OS22-160 Development of Novel Directed Optical Energy Weed Management Robotics Platform for Sustainable Soybean Farming, $20,000, Middle Tennessee State University

OS21-149 Predicting Corn N Response Using Alkaline Mineralizable Nitrogen and Haney Soil Health Tool-Nitrogen in TN, $20,000, University of Tennessee

Producer Grants

FS22-342 Improving the Cost Efficacy of Improving Silvopasture Establishment in the Southeast, $12,771, Lick Skillet Farm

FS21-331 Successional Mushroom Production: Farming Multiple Species of Mushrooms on One Substrate to Lower Input Cost, and Increase Revenue and Products Sold, $10,780, Henosis

TEXAS

Strengthening the Beekeeping Industry in Texas

A consortium of beekeeping experts, with assistance from an agricultural consulting firm, have developed resources to better equip those who are in a position to teach, train and mentor new Texas beekeepers and youth interested in apiculture.

The objective of the project, funded through a Sustainable Agriculture Research and Education Professional Development Program Grant, is to strengthen the beekeeping industry in Texas. Beekeeping resources, while abundant, lack applicability to Texas because of various factors such as climate challenges and confusing management practices.

Researchers from AgriLogic Consulting, LLC, Texas AgrifLife Extension Service, Texas Beekeeper Association, and Texas Apiary Inspection Services have developed a website that streamlines and organizes electronic curriculum that can be used to guide agricultural extension personnel and mentor the next generation of beekeepers.

Texas Beekeeping 101: Your Resource for Raising Honey Bees in Texas provides basic information on beekeeping, an event calendar, and youth education and resources. A big portion of the website offers Texas beekeeping curriculum centered around honey bee biology, equipment, bee yard setup and safety, hive management, pests and diseases and marketing.

Photo courtesy of USDA-ARS

The website design is user friendly and organized in such a manner that new beekeepers can pick and choose which topics they wish to learn about without wading through unrelated information first. It is also set up to appeal to those who are visual learners and prefer photos, videos, and diagrams to long passages of text.

Extension agents, existing beekeepers, new beekeepers and youth interested in apiculture are all intended to benefit from the information available.

Research and Education Grants

LS22-364 Development of Sustainable Organic Rice Ratoon Production Systems in the Southern U.S., $340,000, Texas A&M University

LS22-371 Evaluating Cover Crops for Weed Reduction Throughout the Southern States, $360,000, NCAT

LS22-372 Sustainable Soil Resource Management and Produce Marketing on Resource-Limited Urban Farms, $371,000, Texas Christian University

LS22-373 Converting to Alternative Annual and Perennial Forage-based Systems for Sustainable Grazing in Semi-arid Environments, $371,000, Texas A&M University

LS22-375 Sheep Integration for Diverse and Resilient Organic Cotton Systems, $371,000, Texas A&M University

LS22-382 Development and Implementation of the Agriculture Community Education (ACE) Online Learning Modules for Northeast Texas Limited Resource Producers, $35,667, Northeast Texas Community College

LS21-345 Soil for Water, $1,000,000, NCAT

LS19-313 Organic and Conventional Agriculture: Learning from Each Other to Promote Soil Health and Economic Viability in West Texas, $299,667, Texas A&M University

LS20-343 Toward Culturally Responsive Disaster Management for Limited-resource Producers: The role of person, place and professional agencies, $300,000, Prairieview A&M University

TEXAS PROJECTS CONTINUED

LS20-341 Assessing Water Use Efficiency, Soil Health, and Pollinators within a Transition from Irrigation to Dryland Management in the Texas High Plains, $299,208, Texas Tech University

LS19-312 Regional Food Transportation for Texas Farmers, $299,311, The University of Texas at Arlington

Professional Development Program Grants

SPDP22-09 Carbon Farm Planning to Promote Sustainable Agriculture in Texas, $79,529, NCAT

SPDP22-10 Certificate Program for Sustainable Cotton Production for County Agents, $31,034, Texas A&M University

Graduate Student Grants

GS21-251 Effectiveness of Tarping and Tillage as Weed Management Strategies in South Texas, $16,499, University of Texas-Rio Grande Valley

GS21-248 African American Absentee Landowners in Houston and Their Knowledge of Rural Land Ownership Conservation Practices: A needs assessment, $14,532, Texas A&M University

GS21-241 Harnessing the Wild Relatives of Rice Novel Adaptive Phenotypes: Genetics and breeding for agricultural sustainability beyond the Green Revolution, $16,500, Texas Tech University

GS20-226 Comparing the Effects of Forage Mix and Nutrient Management on Soil Greenhouse Gas Flux in Semi-arid Improved Pastures, $16,450, Texas Tech University

GS19-211 Roadblocks to Success: Needs assessment of small producers in Texas, $10,132, Texas State University

GS19-209 Improving Resilience, Sustainability and Nutritional Properties of Specialty Crops Using Composted Spent Coffee Grounds, $16,044, Texas A&M University

GS19-198 The Success of Organic and Other Sustainable Dual-Purpose Wheat Systems Depend on Access to Adapted Varieties, $16,500, Texas A&M University

On-Farm Research Grants

OS22-156 Promoting Water Sustainable Agriculture by Combining In-situ Soil Moisture and Remote Sensing Data for Irrigation Scheduling, $19,987, Texas A&M University

OS21-140 Introducing Beneficial Entomopathogenic Nematodes for Biological Control and Enhanced Plant Resistance to Improve Pest Management in Cucurbit Crops, $20,000, Texas A&M University

OS20-139 Incorporating Native Plants in Insectary Strips to Promote Insect Diversity and Belowground Beneficial Microbes, $20,000, University of Texas-Rio Grande Valley

OS20-138 Strategic Management of Legume Cover-forage Crops to Optimize Utility in a Challenging Environment, $20,000, Texas A&M University

Producer Grants

FS22-338 New Design of Two Queen Horizontal Honey Bee Hive Bases for Commercial and Small-scale Beekeeping Operations, $14,662, Texas Honey Company

U.S. VIRGIN ISLANDS

Exploring Alternative Grazing Grasses for Livestock Farmers

Agronomists with the University of Virgin Islands are exploring higher-quality and more drought-tolerant forage options as an alternative to current grazing grasses for livestock farmers on the island.

Through a Southern Sustainable Agriculture Research and Education On-Farm Research Grant, agronomist Worku Burayu and his colleages are studying the feasibility of teff and Rhodes grass as an alternative to such common grazing grasses as buffel grass, hurricane grass, and guinea grass. In a two-year study, they are comparing establishment, height, yields, and nutritional value of teff and Rhodes grass against Mombasa grass.

Additionally, the researchers are incorporating leguminous cover crops into the field trials to evaluate protein quality of the grasses.

The researchers hypothesize that the introduction of drought tolerant, low input alternative grass crops in conjunction with leguminous cover crops can lead to a range of soil health benefits: improved agricultural productivity, greater drought resilience, sustainable grazing systems, and better environmental outcomes.

Teff is a warm-season annual grass that has become more popular as a summer forage, fodder and grain crop due to its fast-growing characteristics, low input

Cattle grazing on teff. Texas A&M University

costs, drought tolerance and high forage quality.

Rhodes grass is found throughout the tropics and is a prolific hay crop that is easily established, and is drought tolerant, salt tolerant and tolerates heavy grazing.

Research and Education Grants

LS22-377 Launching Virtual and Live Youth Sustainable Educational Agriculture Program, $50,000, The Center for Educational Growth

Professional Development Program Grants

ES20-157 Advancing Professional Development in the U.S. Virgin Islands About the Cooperative Business Model: A training and mentorship program, $87,833, University of the Virgin Islands

On-Farm Research Grants

OS22-151 Potential Grasses as Alternative Forage Crops for the Virgin Islands, $19,236, University of Virgin Islands

Producer Grants

FS20-327 Testing Vegetable Varieties in Tropical Conditions on St. Croix, USVI for Farm to School Crop Production, $12,480, Virgin Islands Farmers Alliance

VIRGINIA

Silvopasture Systems Help Reduce Heat Stress in Livestock

Silvopasture systems (the integration of trees and livestock) can improve animal welfare by lowering stress from prolonged exposure to high temperatures, according to the results of a Southern Sustainable Agriculture Research and Education Graduate Student Grant.

Virgnia Tech University graduate student Sanjok Poudel and agroforesty specialist John Fike used cortisol biomarkers as an indicator of stress on Katahdin sheep in black walnut and honey locust silvopasture systems and open-range pastures.

They found that ewes on open pasture had higher body temperatures (0.9 to 1.8 degrees Fahrenheit hotter) than those animals in the silvopasture systems. Additionally the ewes on open pasture spent more time standing or loafing and less time eating and lying down than ewes in the silvopasture systems, a sign that the animals were trying to lower their heat stress. Prolonged heat stress can impact an animal's behavior, health and productivity.

Southern SARE archives

The researchers also found that measuring cortisol levels through hair samples rather than blood samples was a more reliable measure of stress in the animals. Collecting hair samples is less invasive than taking blood samples, which require animal restraint and a subsequent increase in animal stress. Hair cortisol reflects long-term chronic stress levels in animals as it is not influenced by the handling and restraining of animals during the sampling procedure.

Research and Education Grants

LS22-367 Biological Recycling of Agricultural Residues with Mushroom for Multidimensional Use, $371,000, Virginia State University

LS22-381 Empowering Farmers, Farmers Market Managers, and Gleaners to Safely Address Local Hunger and Food Insecurity, $49,999, Virginia Tech

LS20-337 Development and Evaluation of IPM Systems Components for Insect Pests and Pathogens of Cucurbit Crops in the Southeastern U.S., $299,935, Virginia Tech

LS20-332 Silvopasture for Poultry Production with Outdoor Access: Impact on animal welfare, economic, and environmental parameters, $279,078, Virginia Tech

LS20-327 A Modular Curriculum for Growing Food Grain for the Local Market, $50,004, Common Grain Alliance

LS20-324 Organic Soil Health Education Online Course and Resources for the Southern SARE Region Farmers and Ranchers, $49,882, Organic Farming Research Foundation

Professional Development Program Grants

SPDP22-11 Advancing Comprehensive, Peer-to-Peer Soil Health Training Across Virginia, $74,952, Virginia Tech

ES18-144 Sharing the Wealth of Cover Crops: Improved cover crop and soil health knowledge sharing and networking, $79,091, Virginia Tech

Graduate Student Grants

GS21-245 Spraying Too Much: Understanding the biology of the red headed flea beetle to inform IPM in nursery crops, $16,480, Virginia Tech

VIRGINIA PROJECTS CONTINUED

On-Farm Research Grants

OS22-152 Adjustable Farrier Stocks for Draft Power, $19,000, A.V.S.

OS22-158 Evaluation of Current Virginia Peanut Cultivars and Advanced Breeding Lines for Southern Corn Rootworm Resistance, $20,000, Virginia Tech

OS21-144 Cluster Protection Shelter to Reduce Fungicide Usage in Conventional and Organic Vineyards, $20,000, Virginia Tech

OS21-143 Tapping New Forest Farming Opportunities in Central Appalachia Through Black Walnut Syrup Production, $19,546, Virginia Tech

Producer Grants

FS22-340 Small Grains on Very Small Farms, $13,987, Great Day Gardens

FS22-345 Effects of Using a Native Legume as a Cover Crop in Small Scale Vegetable Production, $15,000, NANIH Farm and Garden, Inc.

FS20-325 Breeding and Evaluation of Butternut Squash Varieties for Southeast Organic Farms, $19,846, Common Wealth Seed Growers/Twin Oaks Seed Farm

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