



2021 Eastern Shore AREC Interactive Research Field Day

Authored by Mark Reiter, Professor and Extension Soils and Nutrient Management Specialist, Eastern Shore AREC, Virginia Tech; Lorena Lopez, Postdoctoral Associate of Entomology, Eastern Shore AREC, Virginia Tech; Emmanuel Torres, Assistant Professor and Extension Horticulture Specialist, Eastern Shore AREC, Virginia Tech; Tom Kuhar, Professor and Extension Entomology Specialist, Department of Entomology, Virginia Tech; Keren Brooks, Ph.D. Student of Soils and Nutrient Management, Eastern Shore AREC, Virginia Tech; Bo Zhang, Assistant Professor and Soybean Breeder, School of Plant and Environmental Sciences, Virginia Tech; John Mason, Research Specialist, Sr. of Soils and Nutrient Management, Eastern Shore AREC, Virginia Tech; Joy Zuchel, Research Specialist, Sr. of Horticulture, Eastern Shore AREC, Virginia Tech; Helene Doughty, Research Specialist, Sr. of Entomology, Eastern Shore AREC, Virginia Tech; Joseph Haymaker, Ph.D. Student of Soils and Nutrient Management, Eastern Shore AREC, Virginia Tech; Jenny Templeton, District Conservationist, Accomac Service Center, USDA-Natural Resources Conservation Services; Cris Lawrence, State Agronomist, USDA-Natural Resources Conservation Services; David Holshouser, Professor and Extension Soybean Specialist, Tidewater AREC, Virginia Tech; Billy Taylor, Research Specialist, Sr. of Soybean Management, Tidewater AREC, Virginia Tech; and Daniel Goerlich, Associate Director of Economy, Community, and Food, Virginia Cooperative Extension

Introduction

The Eastern Shore Agricultural Research and Extension Center (AREC) holds an annual research field day to showcase the latest applied research for Virginia growers. Faculty, staff, graduate students, and summer interns facilitate the field day by demonstrating ongoing research in field plots, presenting posters, and by utilizing handouts. Handouts are included in this publication to facilitate information dissemination for those that attended field day as well as for those that could not attend in person. Presentations with handouts are in blue and bold. Click on the title to find the handout. Depending on your computer, you may need to hold down the “control” key while selecting the title. Click on the handout to open as a PDF and see all information. Presenting author’s email address is in parenthesis behind the title.

Schedule of Interactive Events

8:30 am: Registration at new equipment shed

9:00 am: Welcome and introductory remarks – Mark Reiter (mreiter@vt.edu)

Virginia Tech update – Susan Duncan (duncans@vt.edu)

Demo for Unmanned Aerial Systems: Weed detection and herbicide applications – Vijay Singh, Dhiraj Srivastava & William Reynolds (v.singh@vt.edu)

[Precision agriculture tools for irrigation and mite management in tomato](#) – Lorena Lopez, Emmanuel Torres, Tom Kuhar & Mark Reiter (lorelopezq257@vt.edu)

9:45 am: Maroon Wagon Vegetable Track (plasticulture, tomato, potato, edamame)

[Edamame nitrogen and sulfur management](#) – Keren Brooks, Bo Zhang, John Mason & Mark Reiter (kerend@vt.edu)

Phosphorus and potassium fertility for edamame – Thomas Badon, Bo Zhang, John Mason & Mark Reiter (tbadon@vt.edu)

Corn earworm pyrethroid resistance and control options for crops such as edamame and snap beans – Kemper Sutton & Tom Kuhar (klsutton@vt.edu)

Introduction to anaerobic soil disinfestation - Jose Garcia-Gonzalez, Steve Rideout, Mark Reiter & Laura Strawn (josefg1@vt.edu)

Plant density selection for tomatoes under high tunnels – Emmanuel Torres & Joy Zuchel (etorres@vt.edu)

[Heat stress mitigation for open field tomatoes](#) – Emmanuel Torres & Joy Zuchel (etorres@vt.edu)

[Monitoring wireworm adults with pheromone traps](#) – Hélène Doughty & Tom Kuhar (hdoughty@vt.edu)

Battling wireworms with killer fungi – Mika Pagani & Tom Kuhar (mika396@vt.edu)

9:45 am: Orange Wagon Grain and Oilseed Track (corn, soybean, cover crops)

Are neonicotinoid seed treatments needed on Bt corn in Virginia? – Kyle Bekelja & Tom Kuhar (kbekelja@vt.edu)

[Cover crop impacts on corn yield](#) – Joseph Haymaker, Mark Reiter, John Mason, Jenny Templeton & Cris Lawrence (jrhaymaker@vt.edu)

Cover crop management and volunteer plant control in corn – Vijay Singh, Vipin Kumar, Mark Reiter & Michael Flessner (v.singh@vt.edu)

Herbicide symptomology and efficacy – How to detect herbicide injury and control weeds – Vijay Singh & Vipin Kumar (v.singh@vt.edu)

[Soybean varieties for Eastern Shore growers](#) – David Holshouser (dholshou@vt.edu)

Poultry litter fertilizer for grain production on low soil test phosphorus fields – Mark Reiter, Amy Shober & John Mason (mreiter@vt.edu)

Soybean sulfur and nitrogen fertility and troubleshooting using plant tissue – Keren Brooks, John Mason & Mark Reiter (kerend@vt.edu)

11:30 am: Return to Shed (everyone together)

[Virginia Cooperative Extension update](#) – Dan Goerlich (dalego@vt.edu)

Virginia Cooperative Extension Eastern Shore update – Ursula Deitch & Theresa Pittman (utankard@vt.edu and tjmlong@vt.edu)

Find the Federal money: USDA-NRCS cost-share programs – Jenny Templeton (jennifer.templeton@usda.gov)

Find the State money: Eastern Shore Soil and Water Conservation District cost-share programs – Carmie Savage (carmie.savage@esswcd.org)

12:00 pm: Please Visit Our Sponsors. Thank you!

- Smith Agronomic
- Nichino
- AgBiTech
- MidAtlantic Farm Credit
- Delmarva Two-Way Radio
- Virginia Soybean Association
- Nutrien
- The Association of Virginia Potato and Vegetable Growers, Inc.
- A&N Electric Cooperative

Lunch – Enjoy a low contact and socially distanced lunch catered by Exmore Diner.

1:00 pm: Visit with speakers of other track if interested.



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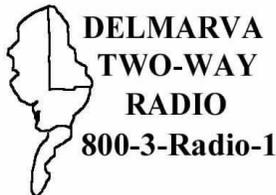
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The Stalk newsletter:

https://www.arec.vaes.vt.edu/arec/eastern-shore/articles_and_publications.html

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Dr. Susan Duncan	Associate Director, Virginia Agricultural Experiment Station
Dr. Edwin Jones	Associate Dean and Director, Virginia Cooperative Extension
Dr. Daniel Goerlich	Associate Director, Economy, Community, and Food, VA Cooperative Extension

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Leslie Anne Hinton	OMALS Student
Anne Mason	Summer Research Assistant
Ellie Mason	Summer Research Assistant
Gillian Travis	Summer Research Assistant

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Vipin Kumar	M.S. Student
Dhiraj Srivastava	M.S. Student
Milton Sturgis	Research Assistant

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Joyce Zuchel	Research Specialist Sr.
Darcie Badon	Summer Research Assistant

Entomology Program

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Dr. Lorena Lopez	Postdoctoral Associate
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Local County VCE Agriculture & Natural Resources Agents

Ursula Deitch	ANR Extension Agent, Northampton County
Theresa Pittman	ANR Extension Agent, Accomack County

Other Virginia Tech Cooperators

Michael Flessner	Associate Professor and Weed Scientist, SPES
David Holshouser	Professor and Soybean Agronomist, Tidewater AREC
Steve Rideout	Professor and Plant Pathologist, SPES
Laura Strawn	Associate Professor and Food Safety, FST
Bo Zhang	Assistant Professor and Soybean Breeder, SPES

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Irrigation and Mite Management

Lorena Lopez, Emmanuel Torres, Tom Kuhar, & Mark Reiter



Tomato Production

- Virginia's tomato industry averaged 10.5-tons/acre in 2018 with nearly 2,100 acres planted.
- Most of the tomato acreage is located on the Eastern Shore, followed by the Hampton Roads area.
- **Goal:** Increase the efficiency of irrigation practices and early detection of spider mites in open-field production systems.

Sensor-Based Irrigation

- Reduce plant stress with minimal water and nutrient losses due to deep percolation.
- The Normalized Difference Vegetation (NDVI) and Photochemical Reflectance (PRI) Indexes are indicators of water stress.
- NDVI and PRI measured by Unmanned Aerial Vehicles (UAV) remote sensing using a multispectral and infra-red camera.

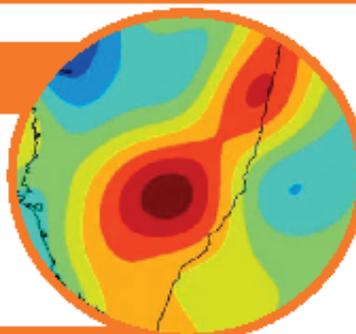


Two-Spotted Spider Mites (TSSM)

- Key pest of fruiting vegetables: Water-stressed plants are more suitable for TSSM infestations.
- Hot and dry conditions during late summer and early fall are optimal for TSSM resulting in increased infestations and damage.
- Geostatistical Analysis (kriging) performed to identify spatial and temporal distribution patterns in open-field systems.

Model-Based Decision Making

- Understanding potential correlations among reflectance indexes, soil water content, and TSSM distribution will allow growers to:
- Irrigate based on root depth, soil texture, and water holding capacity.
- Manage TSSM based on early detection, distribution, and optimization of irrigation and pest management practices.





Edamame Nitrogen Management

The rise in edamame consumption in the United States has caused a new market for local fresh edamame (vegetable soybean). As farmers seek to fill these new markets, management strategies should be in place to ensure production thrives. Soil fertility is essential to ensure the crop grows and develops to its full potential in a timely manner. Arguably the most necessary nutrient: nitrogen must be carefully considered. As a legume, edamame is able to fix its own nitrogen, but fertilizer may prove to boost yields. In a study done on the Eastern Shore Agricultural Research and Extension Center, researchers are examining different rates and timings of nitrogen fertility to determine the optimal application.



Fig. 1 Mature edamame ready for harvest.

To determine optimum nitrogen fertility, the research looks to already established management plans of oilseed soybean and snapbean. Oilseed soybean is typically left unfertilized relying solely on soil nitrogen and nitrogen fixation to supply the necessary nutrients while snapbeans are typically fertilized to ensure proper nutrition in the shortened growing season. A 0-fertilizer treatment simulated oilseed soybean management while 4 rates (20, 40, 60, 80) of nitrogen applied at-planting and the same 4 rates applied in a split application (half at planting and half at R1) to simulate snapbean management. A treatment of sulfur with nitrogen (20 lb S/ac and 40 lbs N/ac) was added to see if sulfur was limiting in this system.

Maturity

Edamame is sold in the pod which means the appearance of plants must be flawless to ensure a high-quality crop. Throughout the growing season leaf

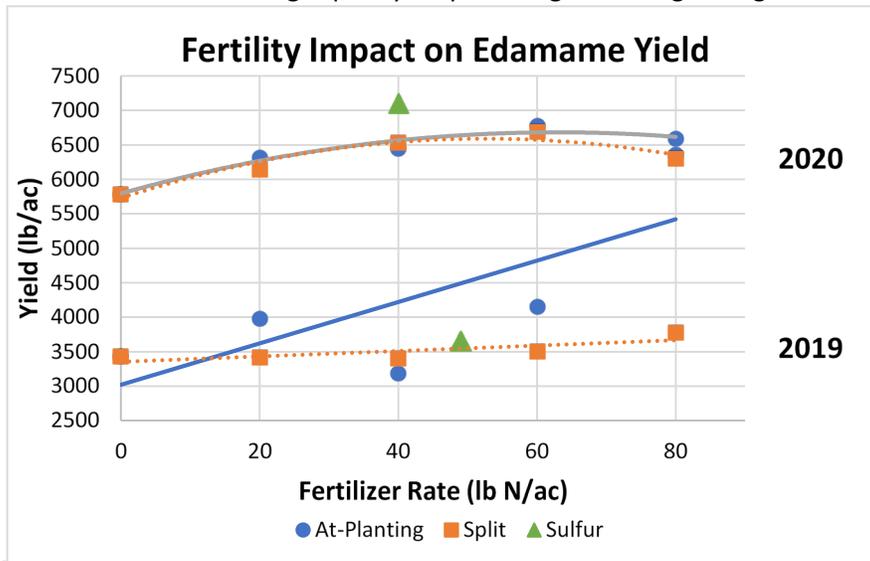


Fig. 2 Yield results from 2019 and 2020 on the ESAREC.

Sustainable strategies for heat stress mitigation and yield enhancement for tomato production in the Eastern Shore

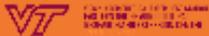
The use of plastic mulch in commercial tomato production is almost universal in the USA. Tomatoes in Virginia are produced in a traditional annual hill plasticulture system. Plastic mulches promote earliness, reduce weed pressure, and preserve moisture and fertilizer. The plastic captures heat in late spring, which increases soil temperatures and accelerates growth. It also prevents the establishment of many weeds, while reducing fertilizer leaching from the beds and soil water surface evaporation. Black plastic mulch is the cheapest and most often used for spring tomatoes. However, summer planted tomatoes in the south-east are negatively affected by excessively high soil temperatures. Hence, current recommendations suggest that tomatoes be planted on white or metalized plastic, which reflects some surface heat and does not warm the soil as much.

Different color mulches will also have different price points, with the traditional black mulch being the least expensive, followed by white plastic and metalized. These two latter can cost almost twice as much as the traditional black mulch. An alternative to white and metallic mulches could be the foliar application of kaolin clay (Figure 1). The white coating of kaolin clay could serve as a reflective layer on the black mulch and plant canopy to minimized temperatures changes.



Figure 1. Kaolin clay applied on top of black much at a rate of 30 lb/A in June 2021 at Painter, VA.

Preliminary results at the Eastern Shore Agricultural Research and Extension Center suggest that soil temperatures can be maintained 10°F cooler with 20 to 40 lb/A of kaolin clay, compared to black mulch (Figure 2).



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 Dept of Entomology,
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 Helene Doughty
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MONITORING WIREWORM ADULTS WITH PHEROMONE TRAPS

2020

Preliminary studies evaluating efficacy of pheromone traps for click beetles and potential for use for integrated pest management of wireworms

Objectives:

- Correlating trap catch to following year damage in potatoes
- Using traps as an indicator for fields with high wireworm populations
- Determining peak catch timing for management of adult click beetles prior to oviposition

2021

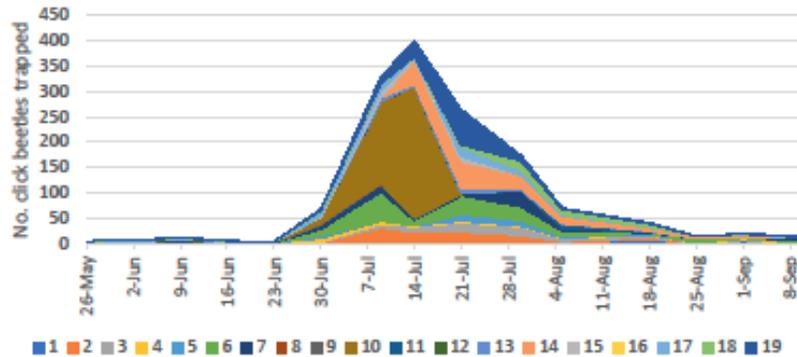
Continued evaluation of traps as integrated pest management of wireworms and trap style comparison

Objectives:

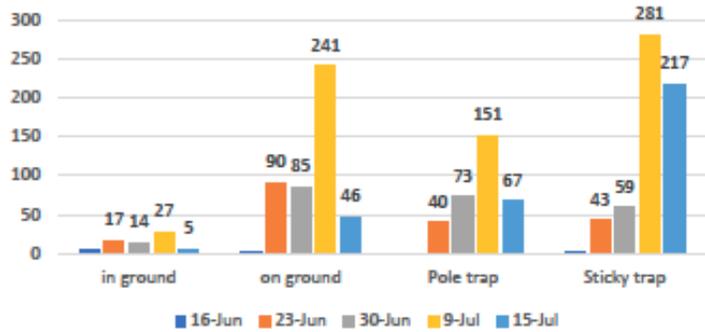
- Determining a better trap style for monitoring of click beetles



Click Beetle Trap Catch by Field 26 May through 10 Sep 2020
 (all traps averaged by field)



Catch by Field 9 Jun through 15 Jul 2021
 (by trap type)



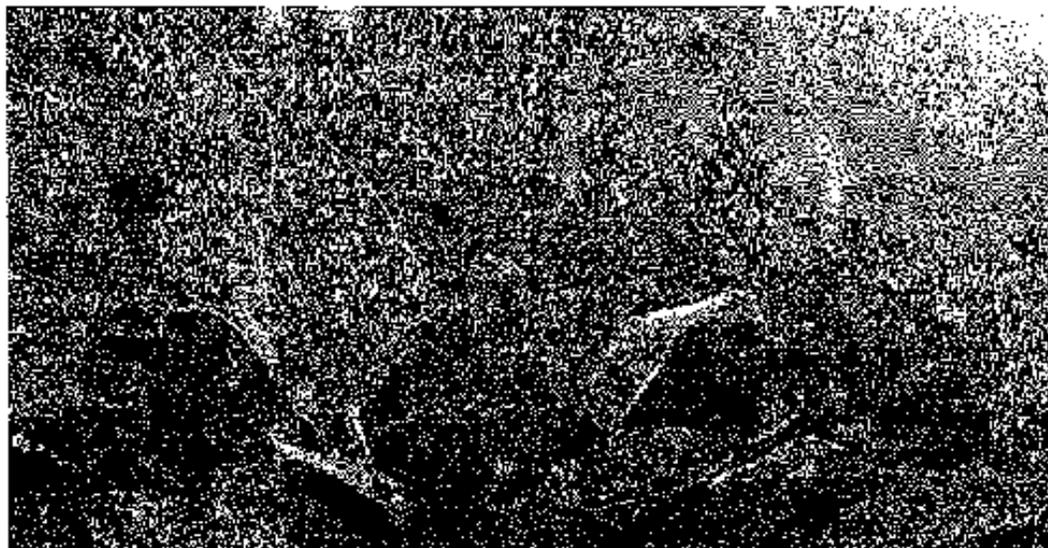
ESAREC Rotational Cover Crop Study

Treatment	1	2	3	4	5	6	7	8	9	10	11	12
Description	Baseline A: All corn, conventional tillage, no CC	Baseline A2: All corn, no-till, no CC	All corn, grass CC, High C:N	All corn, legume CC, Low C:N	All corn, diverse CC, Mid-C:N	Baseline B: Corn/FSSB, no CC	Corn/FSSB, Rotating grass/legume CC	Baseline C: Corn/W/DSCB, no CC	Corn/W, 1 summer off, rotating CC	Corn/FSSB, 1 summer off, rotating CC	Corn in long rotation w annual CC	Corn in long rotation w perennial CC
Investigation/Demonstration Objectives	Control	Control	Simple cover (Rye)	Simple cover (Vetch)	"Kitchen Sink" CC Diversity	Control	Simple cover (Vetch/Rye)	Control	Purposeful diversity (mixes with a purpose)			
Winter1	Fallow	Fallow	Rye	Vetch	9sp Mix	Fallow	Vetch	Fallow	Residue Maker (3spRMix)	N Fixer (3spN1Mix)	Wheat	(3sp P Mix) Alfalfa, Red Clover, Orchardgrass Permanent CC to break rotation cycle.
Summer 1 (2015/2018/2021)	Corn (tilled)	Corn	Corn	Corn	Corn	Corn	Corn	Corn	Soybean	Short Summer (May 1)	Tall Summer (June 15)	
Winter2	Fallow	Fallow	Rye	Vetch	9sp Mix	Fallow	Rye	Wheat	Wheat	Residue Maker (3spRMix) (Aug. 15)	N Fixer (3spN1Mix) (Aug. 15)	
Summer 2 (2016/2019/2022)	Corn (tilled)	Corn	Corn	Corn	Corn	Soybean	Soybean	Soybean	Tall Summer (June 15)	Soybean	Short Summer (May 1)	
Winter3	Fallow	Fallow	Rye	Vetch	9sp Mix	Fallow	Vetch	Fallow	High N Fixer (4spNMix) (Aug. 15)	Late Bloomers Mix (3spLMix)	N Cycler (3spN2Mix) (Aug. 15)	
Summer 3 (2017/2020/2023)	Corn	Corn	Corn	Corn	Corn	Corn	Corn	Corn	Corn	Corn	Corn	

VIRGINIA SOYBEAN PERFORMANCE TESTS 2021

David Holshouser & Billy Taylor

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VCE Administrative Update for the ESAREC Field Day

If you don't remember anything else from this administrative update, remember this: for every dollar invested by the state, Agency 229—the budgetary term for Virginia Cooperative Extension and the agricultural research and Extension centers—returns \$1.30 to \$1.80.

Virginia Cooperative Extension is rooted in a history of helping our communities thrive, no matter what the challenge. This means not only adapting our programs to meet needs but also doing whatever else in our communities needs to be done. Our agents continued to work and serve clients throughout the pandemic, delivering educational information in creative ways. For example, during early 2020 we had agents sewing medical masks, helping in food pantries, setting up online reading rooms for kids, and helping farmers markets transition to e-commerce platforms, among many other efforts. We rapidly adjusted our programming to an online format so we could continue to reach our clients, and in many cases experienced unprecedented program attendance, such as an audience of 1,500 at the State Master Gardener College and 500 participants in a Farm to eCommerce webinar.

One of the earliest successes I recall is that, within a two-week timeframe in early April 2020, Extension worked with the Beef Cattle Improvement Association to move the 41st annual SW Virginia Performance Tested Bull Sale from a traditional in barn sale to a combination of on-line and telo-auction. Realizing that many producers lacked access or comfort in using these tools, Extension agents set up 11 remote sites across Southwest Virginia. Following physical distancing guidelines, agents quickly spread the word among producers and helped reassure them that the new format would work. On sale day, agents assisted producers at each of the sites and 115 bulls were sold for an average of \$3,230, resulting in over \$370,000 in revenue.

Recognizing that on-line programming is not accessible or preferred by everyone, however, at the same time that these efforts were taking place VCE continued traditional efforts—such as farm visits made by our Agriculture and Natural Resources agents—to the best of our ability and with appropriate health and safety protocols.

More recently, Virginia Cooperative Extension agents served as a bridge at the local level to facilitate sharing of information about COVID-19 vaccines with eligible citizens from the very early stages of vaccine availability in order to help clients make the best decision for themselves using science-based information. Agents also worked with the Virginia Department of Health, local government, and/or partner organizations to develop lists of essential workers that desired to be vaccinated. And, agents worked with VDH to identify centralized locations used by farmers where shots could then be administered. In recognition of the value provided by VCE, Madison County provided 100% local funding to place an additional employee in the local VCE office specifically to field calls about the COVID-19 vaccine. As of April 27, 2021 10,550 calls had been received at the office, which helped facilitate 42% of eligible Madison County residents becoming fully vaccinated by that time.