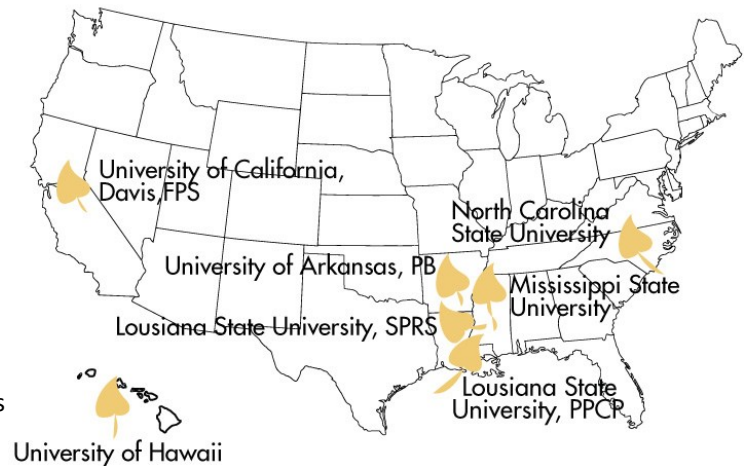




Sweetpotato Centers in NCPN

Our up-close look at the various Clean Plant Centers within the National Clean Plant Network continues in this issue of the *NCPN Network News*, as we take a look at sweetpotatoes, which formally joined the Network in 2015 and has a significant footprint across the US.

<https://www.nationalcleanplantnetwork.org/sweetpotatoes>



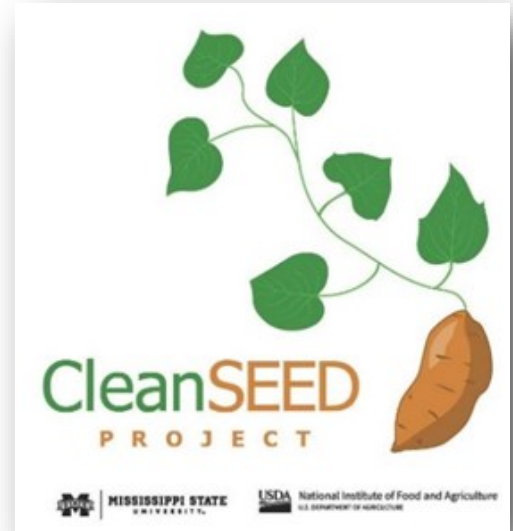
NCPN Instrumental in Transitioning Louisiana Sweetpotato Growers to Clean Plants

The Louisiana State University (LSU) AgCenter Sweet Potato Research Station was established in 1949. Dr. Julian C. Miller, the first successful sweetpotato breeder in the United States, saw a need for a dedicated unit that would service the needs of the sweetpotato industry in Louisiana. In 2024, the station, located in Chase, LA, commemorates 75 years and remains dedicated to advancing the sweetpotato industry through foundation seed production, research, and support. Traditionally, the foundation seed mission was achieved primarily by providing clean seed in the form of virus-tested root stock to producers as bedding material. The station joined NCPN-SP in 2015, as one of seven national Clean Plant Centers for sweetpotatoes nationwide. Affiliation with NCPN has allowed for significant improvements in greenhouse slip production and a transition of the foundation seed program to a more efficient plant-based model, thereby expanding its influence and reach. The station is currently led by Research Coordinator Dr. Tara Smith, and Cole Gregorie, Extension Sweetpotato Specialist and foundation seed coordinator.

Virus therapy, tissue culture propagation, and virus testing are conducted at the Sweetpotato Pathology Laboratory on the LSU campus in Baton Rouge, following a complete document management system. Sweetpotato accessions are maintained as virus-tested tissue cultures in routine maintenance collection and in a long-term maintenance collection in specialized growth chambers. In the winter, virus-tested plants are sent to the Sweetpotato Research Station in Chase, in north-central Louisiana, to be increased in protected greenhouses. Plant production is aided by the use of special LED grow lights that provide supplemental light. The targeted milestones for Louisiana are aimed at attaining the maximum foundation plant production that existing infrastructure currently supports. The Research Station at Chase produces more than 100,000 vine cuttings annually for sale to growers in the region and grows approximately 30 acres of foundation seed roots also for sale to stakeholders. The NCPN-SP activities are currently led by Dr. Imana Power, Catherine De-Robertis, and Elaisa Tubana.

Capacity-building Efforts between NCPN-SP and the CleanSEED Program

The mission of NCPN-SP is to “conduct diagnostic and pathogen elimination services and to establish foundational planting stock of pathogen-tested plant materials to supply nurseries, growers, and state certification programs.” However, until now, there has been limited funding available to Clean Plant Centers to support research and Extension activities. A NIFA-Specialty Crop Research Initiative titled [CleanSEED](#) was awarded to address current and future challenges of providing clean foundation seed to the U.S. sweetpotato industry. This \$4.8 million grant provides funding for research and Extension activities to all NCPN-SP Centers in Arkansas, California, Hawaii, Louisiana, Mississippi, North Carolina, affiliates at USDA-ARS, crop protection associations, and the United States Sweetpotato Council. The CleanSEED Project, funded for 2022 to 2026, is directed by Dr. Mark Shankle and Dr. Lorin Harvey, Mississippi State University.



Scott Ellison, David Ellison, and John Ellison (left to right) with E3 Farms in Woodland, MS.

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Second-generation farmer David Ellison of Woodland partnered with the Mississippi NCPN-SP Center four years ago to begin using clean foundation seed after a bad year resulting in significant yield loss.

“In 2016 and 2017, we experienced up to a 70% loss for no reason other than viruses. Since we started with clean seed and growing our own foundation slips, we’ve had incredible yield, consistent data, and no problems whatsoever. Our yields of U.S. No. 1 grade sweetpotatoes have been above average or higher for the last four years,” Ellison said.

Helping more sweetpotato farmers adopt clean seed technology through increased awareness and education is one of the short-term goals identified by the multidisciplinary CleanSEED research team. The connection between NCPN-SP and the CleanSEED Project allows more engagement across the industry to standardize clean foundation seed terminology, improve best practices for efficient propagation strategies, reduce virus reinfection rate, manage pests and diseases, and develop efficient virus detection methods for use in the field (rapid tests). The CleanSEED Project will work closely with the NCPN Education and Outreach Committee to develop professional communication products based on the research results.

Ultimately, Shankle and the team aim to improve seed quality, yield, and generational longevity of seed stock.

“With each generation of saved storage roots for seed, the risk of virus levels in the seed increases,” Dr. Shankle explained. “Depending on the virus type and level of infection, sweetpotato yield can be reduced by more than 40%. That is why supplying growers with clean seed is so important.”



Mark W. Shankle

MPRU Supports NC State Breeding Program and Certified Growers

The Micropropagation and Repository Unit (MPRU) continues to provide cleanup services for five advance selections to the NC State breeding program and delivers about 90,000 nuclear plants to NC certified seed growers every year. They started the 2023-2024 sweetpotato greenhouse season in September 2023 and it is scheduled to end at the end of February 2024. Trays have been adopted by most NC certified seed growers. These certified growers are producing vine cuttings in protected greenhouses and will eventually produce the first generation of seed storage roots. Covington continues to be the dominant variety used in North Carolina, while a new cultivar with purple skin and deep purple flesh, named Purple Majesty, is gaining popularity. The MPRU finished the third year of data collection for the NCPN Economic Study and is also involved in the CleanSEED project, leading three greenhouse production goals.

Five-weeks-old Covington sweetpotato trays set at MPRU greenhouses ready to be delivered to NC certified seed growers.



Remembering Tammy Abernethy



Tammy Abernethy taking care of potted sweetpotato nuclear plants at HFL greenhouses. Picture taken in 2019 which was the first year of sweetpotato production at the newly inaugurated MPRU greenhouses.

MPRU colleagues are mourning the loss of Tamara Abernethy. Tammy retired from the MPRU in 2021 after 32 years of working in the Department of Plant Pathology at NC State. She spent time in multiple programs in the department and played a key role at the MPRU sweetpotato program running the production of clean seed for certified seed growers in the lab and the greenhouse. She passed away on December 22, 2023 in Colorado due to health complications. Tammy was a graduate of the Ohio State University, where she obtained her bachelor's and master's of science degrees in plant pathology and was an avid Buckeyes fan. She loved animals and enjoyed training her Labrador retrievers to compete in numerous obedience and agility trials over the years. She also loved the outdoors and planting flowers. Tammy, whose contributions impacted the NC sweetpotato community in many ways, will be dearly missed.



University of Arkansas Continues to Meet Expansion of Sweetpotato Industry

In Arkansas, sweetpotato production has been growing steadily, increasing in production from 3,000 acres in 2009 to 5,200 acres in 2023. This growth is seen primarily in the Mississippi Delta in the eastern region of the state. Sweetpotato is an economically important crop for small-scale and limited-resource farmers in Arkansas. Production in Arkansas is primarily for fresh market and processing. The University of Arkansas at Pine Bluff (UAPB) initiated the Sweet Potato Foundation Seed Program with financial assistance from the state and USDA in 2010. This gave the program the necessary startup funding needed to meet the needs for clean plants in Arkansas. UAPB is one of the six National Clean Plant Centers for sweetpotatoes and is involved in testing and producing virus-tested clean plants.



Dr. Ponniah with virus-indexed clean sweetpotato plants in the insect-free greenhouse at UAPB farm.

Predominant cultivars grown in Arkansas are Orleans and Beauregard-B14. These varieties, obtained from Louisiana State University, are maintained as virus-indexed tissue culture plants. At UAPB, sweetpotato virus-tested clean plants are multiplied in the Biotechnology Lab. The clean plants are further multiplied in an insect-free greenhouse on campus. The greenhouse plants are further tested to preclude reinfection before they are transferred to a hoop house, where they are multiplied further. UAPB follows the recommended sweetpotato virus-testing protocols developed at the 2015 Beltsville, Maryland workshop. They thoroughly test and ensure that all entries subjected to therapy are free from known viruses. Additionally, UAPB shares data with other Centers on virus detection from direct tests on sweetpotatoes using the biological indicator, *Ipomoea setosa*. This data is used to continually reassess the virus testing protocols. UAPB's annual target is to produce 50,000 to 100,000 virus-tested clean plants for sweetpotato producers in Arkansas, which are used by approximately 20 small-scale producers annually. Since the start of the program in 2010, the impact on the industry has been substantial: about 90% of the sweetpotato production area in Arkansas uses virus-indexed planting slips developed through UAPB's Sweet Potato Foundation Seed Program.



The NCPN-SP Tier 2 meeting was conducted at UAPB in 2023. NCPN Center directors and staff are pictured here with Dr. Njue, Assistant Dean for extension, and a graduate student, Shermaine Critchlow (far left).



Multiplication of virus-indexed clean plants in the hoop house. UAPB's undergraduate students are helping with multiplication.

NCPN Economic Studies Show Positive Potential of Clean Plants

Foundation Plant Services has teamed with UC Cooperative Extension advisor Scott Stoddard to conduct virus testing as part of an NCPN-SP supported economic study. The study aims to identify the impact of specific virus diseases on sweetpotato production in California. Field trials began in 2021, comparing old to new (G1) seed for virus infection and yield. In 2021 and 2022, no special measures were done in the field after trans-



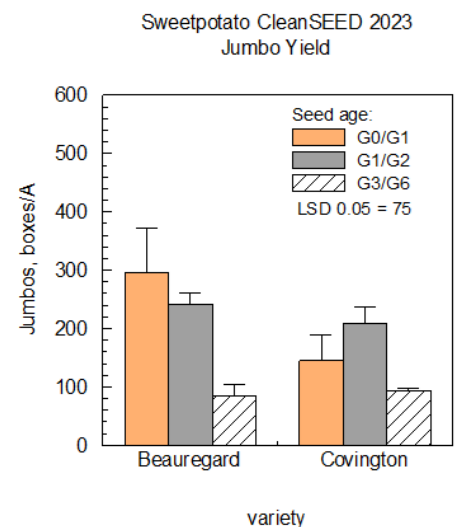
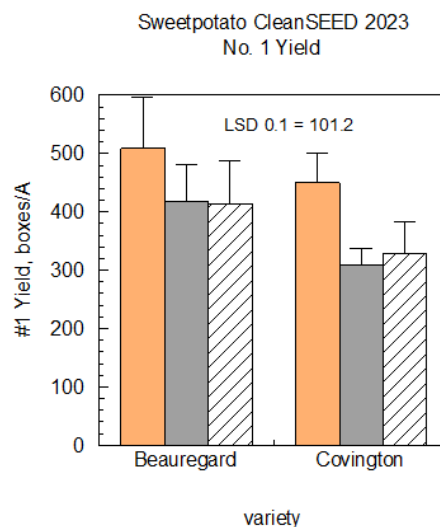
planting to keep the plants free of aphids, the primary vector for the four viruses that infect sweetpotatoes (SPFMV, SPV2, SPVC, SPVG). In 2021, there was a 50% to 92% increase in total marketable yield with G1 compared to old seed. In 2022, yields increased 0 - 20%. Just as importantly, skin color and overall appearance of the harvested roots were superior in G0 and G2 plants.

Skin color improved with G2 and G0 Beauregard seed as compared to old seed (photo by Scott Stoddard).

In 2021, pre- and post-harvest testing of the seed roots (assessed by RT-PCR and RT-qPCR) showed an increase in virus accumulation with age: 57% of the G1 roots were found to have only one of the four viruses, while G2 seed was found to be nearly 100% infected with all four. G0 plants, which were virus tested and only grown in the FPS screened greenhouse, were also found to be nearly 100% infected, which suggests that even the cleanest plants can become infected with viruses in one growing season.

As part of the USDA-SCRI CleanSEED project, this trial was conducted again in 2023 using G0 greenhouse plants, and G1 and G6 seed for the variety Beauregard, and G1, G2, and G3 seed for the variety Covington. For this project, the field plots were separated by clean cultivated borders and by growing peanuts on adjacent beds to act as a trap crop to suppress plant-to-plant transmission of viruses by aphids. Total marketable yield was improved 16 – 22% depending on variety, with the largest impacts on jumbo root production. Virus results are pending.

Sweetpotato No. 1 and Jumbo grade sweetpotato yield as affected by variety and seed age, Merced CA.



In Memorium: Dr. Deborah Golino



This last December the National Clean Plant Network lost one of its founding leaders and stalwart supporters. Deborah Golino played a key role in the establishment of NCPN and continued to advocate for the Network and its mission until her retirement in 2021. As the Director of Foundation Plant Services, Dr. Golino and her teams were responsible for building and maintaining Clean Plant programs for a number of specialty crops recognized by the network. But her influence extended far beyond grapes, fruit trees, roses, and sweetpotatoes. Deborah advocated equally for all crops within the NCPN family and was tireless in her efforts to ensure continued funding and protection of the national program.

Below is an excerpt from the January 8, 2024 article by Dr. Maher Al Rwahnih. To read more: <https://fps.ucdavis.edu/newsarticle.cfm?newsid=91>

Deborah Golino remembered for guiding evolution of Foundation Plant Services and advocating for the use of clean plants

Deborah Golino, former director of Foundation Plant Services (FPS) in UC Davis's College of Agricultural and Environmental Sciences, passed away on December 23, 2023. Deborah worked as director of FPS from 1994 until retirement in 2021. She was a kind and supportive administrator, who will be deeply missed by all those who knew her. Deborah was a prominent advocate for clean plant use and the advancement of technologies used for clean plant production.

From 1994 to 2010, FPS's programs more than tripled under Deborah's management. Deborah was a great fundraiser and made sure that FPS had the financial resources to ensure its long-term stability.

Foundation Plant Services and the UC Davis Department of Plant Pathology are working together to hold a celebration of Deborah's life on April 27, 2024 at 2:00 pm at the UC Davis Conference Center. A Zoom feed will also be available. Please use [this form to RSVP](#).

UC Davis has also established the [Deborah Golino Fund to Support FPS](#) for those who want to support the FPS program in her memory.

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It is an honor to have worked with Deborah, and her impact cannot be overstated. Deborah was one of the top grape research and extension administrators in the country. She will be remembered as a firm believer in the importance of clean and certified planting stock, and for working closely with industry to ensure that their concerns were heard and needs were met.

—Dr. Maher Al Rwahnih, FPS Director



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