



**MEMORANDUM**

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**TO:** North Mississippi Research and Extension Center  
Mississippi Agricultural Crop Improvement Association  
Mississippi Farm Bureau  
MSU Extension  
Mississippi Sweetpotato Council

**FROM:** George M. Hopper   
Dean/Director, CALS/MAFES/CFR/FWRC

**DATE:** September 28, 2018

**SUBJECT:** Mississippi Sweetpotato Foundation Seed Program

Attached is a three-year plan for the MAFES sweetpotato foundation seed program. This plan has been developed for the following purposes:

- to expand the in-state production of certified sweetpotato seed,
- to better meet the needs of Mississippi growers, and
- to address emerging threats to the industry.

Once implemented, the expected outcomes will be an increase in the availability of certified seed to the industry and in the proportion of Mississippi's sweetpotato crop that is produced from certified seed. We hope this will ensure within state production of certified seed to meet Mississippi production needs and reduction on the dependence of out-of-state plant materials; thereby, mitigating the risks associated with transportation of the Guava nematode and other harmful pathogens. We also expect to see an increase in the number of Mississippi certified seed producers and an increase in the number of varieties offered.

These changes will be phased in over three years from 2019 – 2021.

MAFES remains committed to the sustainability and continued growth of the sweetpotato industry in Mississippi. Implementation of this plan will benefit the Mississippi sweetpotato industry by making Mississippi-grown certified seed more abundant and available to our growers.



## Mississippi State University

### Mississippi Virus-Tested Sweetpotato Foundation Seed Program

#### Transition Plan

*Prepared September 19, 2018*

#### I. VISION

To help ensure the vitality of the Mississippi sweetpotato industry by providing virus-tested and true-to-type sweetpotato plant material to sweetpotato producers in a manner that is sustainable, equitable, and transparent.

#### II. MISSION

To serve the Mississippi sweetpotato industry by maintaining, propagating, and making available for purchase virus-tested and true-to-type sweetpotato lines of commercial and research significance; to educate stakeholders on the benefits of using foundational plant material and how to properly maintain and propagate foundational sweetpotato material in a manner consistent with current regulations; and to collaborate with peer sweetpotato clean plant centers to mitigate risk and exchange knowledge.

#### III. HISTORY OF SWEETPOTATO FOUNDATION SEED PROGRAM IN MS

The Mississippi foundation seed program was initiated at the Mississippi Agriculture and Forestry Experiment Station (MAFES) Pontotoc Ridge-Flatwoods Branch Experiment Station (PBES) in the 1960s with an emphasis on eliminating storage roots with altered flesh color and using hill selection techniques in an effort to minimize mutations in sweetpotato. However, research results provided evidence of yield decline in traditional plants compared to meristem plants due to viral infections. Therefore, in 1999 the program advanced to a tissue culture-derived, virus-tested propagation system. This was done to develop management practices that would ensure the success of a commercial virus-tested foundation seed program in Mississippi. All foundation seed operations were conducted by PBES until a transition plan was initiated in 2008 to spin-off apportioned “seed increase” and “commercial sales” operations to a private sector business partner. This permitted PBES to focus more on science-based aspects of the program by developing a platform of clean plant material for several sweetpotato varieties and manage the program based on input from the public sector.

The cumulative strategic changes in this program have increased foundation seed production in Mississippi from 14 to 70 acres per year. In addition, the USDA-APHIS-National Clean Plant Network (NCPN) recognized the MAFES-PBES as one of six certified sweetpotato clean plant centers. The NCPN is a service-oriented network that is committed to ensuring vegetatively propagated member-crops “Start Clean-Stay Clean” by supporting diagnoses of systemic plant pathogens (primarily viruses), developing and utilizing unified therapeutic methods to generate plant material free of known problematic viruses, and establishing foundational plant material. This has increased the scientific responsibilities at MAFES-PBES, and required that more emphasis be placed on laboratory techniques and education about production of certified seed to develop a more sustainable foundation seed program.

#### IV. JUSTIFICATION FOR FURTHER PROGRAM TRANSITION

There is *an emerging threat to the sweetpotato industry that may limit the transfer of certified seed from other states* to Mississippi. The guava root-knot nematode (*Meloidogyne enterolobii*) was introduced to North Carolina sweetpotato production systems in 2011, and this pest of sweetpotato, cotton, and soybean is now a potential threat to other production areas around the United States. In fact, it was transferred from North Carolina to Louisiana on a shipment of foundation sweetpotato seed roots in the spring of 2018. Currently, there are no efficacious or cost-effective management options once it has entered into a production system. Several farms in Mississippi purchase foundation sweetpotato seed roots from North Carolina growers, which invokes the risk of transferring this pest to Mississippi crop production systems. Therefore, the Mississippi foundation seed program will become the primary source of certified seed if new guidelines are imposed to minimize the threat of introducing infectious diseases from outside sources. To meet current and anticipated future demand for foundational material the Mississippi foundation seed program must increase production capacity.

*Improved risk management* is needed to make the Mississippi sweetpotato foundation seed program more robust and sustainable. The current program model is susceptible to catastrophic events because it is dependent on a sole source of greenhouse plants and a single location for the field-increase of seed roots. Plant material in a greenhouse is subject to a power-outage, disease out-break, and weather events that could damage the greenhouse structure. Similarly, dependence on a seed production field at one location does not mitigate the risk associated with the occurrence of crop injury or damage by herbicide drift, insect pests, disease, wildlife, or adverse growing conditions. The incorporation of private sector greenhouses and multiple locations for the field-increase of certified seed would mitigate risks associated with the potential failure of the Mississippi sweetpotato foundation seed program.

There is an opportunity to *provide more varieties of sweetpotato foundation seed* to Mississippi growers. In the future, PBES will continue to supply 2 or 3 virus-tested sweetpotato varieties that will service the commercial production area. As a clean plant center, PBES will

begin to build a tissue culture library of additional heirloom and specialty crop varieties as requested by industry stakeholders. This expansion will provide the opportunity to serve the high-value niche markets such as Community Supported Agriculture (CSA) operations and regional truck crop farming. The clean plant center at PBES currently maintains the three commercially important lines in tissue culture, as well as other varieties such as Evangeline, O'Henry, Vardaman, Travis, Jewel, Centennial, and Heart of Gold for on-demand production.

Therefore, in an effort to 1) increase availability of foundational material, 2) reduce dependence on interstate transport of certified seed, 3) mitigate risk, and 4) increase varietal selection; a transition plan is being implemented to advance the Mississippi Virus-Tested Sweetpotato Foundation Seed Program through a collaborative effort between the university and the private sector. This plan is designed to promote an increase in the number of certified seed producers and the amount of certified seed that is commercially available to Mississippi growers, minimize loss of foundation seed due to a catastrophic event, service the high-value niche markets, and create a more sustainable foundation seed program for the state of Mississippi. This plan will provide transparency and service to all Mississippi growers that have an interest in producing or purchasing certified seed. All growers are encouraged to participate as the plan evolves so that the transition is efficient and successful. To facilitate the transition to a more robust foundation seed program, PBES will partner with Mississippi State University Extension (MSU-ES), Mississippi Farm Bureau Federation, Mississippi Crop Improvement Association (MCIA), and the Mississippi Sweetpotato Council to provide education and information about the seed program as this plan is put into action over the next several years.

## **V. PROPOSED TRANSITION PLAN**

YEAR 1 (Fall 2018/Spring 2019) – First cutting certified seed production will continue as in the past. Second cutting foundation material will be made publically available.

1. No later than October 1, 2018, Mr. Jessie Chrestman will communicate to PBES the varieties and quantity needed to satisfy certified seed production goals for the 2019 growing season.
2. Certified, virus-tested tissue culture plants (referred to as G0) will be maintained in a secured, inspected, and environmentally controlled lab at PBES and hardened off to establish “mother plants”. Mother plants of desired varieties will be increased to capacity of the PBES greenhouses in preparation for an April-May harvest of vine cuttings.
3. An initial harvest of vine cuttings will be conducted by Mr. Jessie Chrestman’s labor force from plants in PBES greenhouses no later than May 15, 2019. This 1<sup>st</sup> cutting will be provided to Mr. Jessie Chrestman with the understanding that he will supply certified first and/or second field generation (G1 and G2, respectively) seed roots to Mississippi producers.

4. Approximately 4 weeks after the initial cutting the vines will have grown out sufficient to support a second cutting which will be made available to the public. Growers can place orders for a 2<sup>nd</sup> cutting of the greenhouse-grown plants during the month of October 2018. If orders for 2<sup>nd</sup> cutting slips exceed PBES production capacity, available stock will be proportionately allocated among those growers placing orders.
5. Grower(s) purchasing plants from the 2<sup>nd</sup> greenhouse cutting will make arrangements with PBES to cut plants with the growers' labor force(s) or PBES for smaller orders and take receipt of plants no later than June 15, 2019.
6. PBES, MSU-ES, and MCIA will provide training to ensure certification standards are met and to maintain seed quality. This training will also include strategies for plant propagation and greenhouse management for production of G0, virus-tested plants.
7. MSU Agricultural Economists will assist PBES in the development an enterprise budget for the greenhouse phase of foundation seed production. Educational efforts to share this information with the Mississippi sweetpotato industry will be led by MSU-ES.

YEAR 2 (Fall 2019/Spring 2020) – First cutting foundation material will be made publically available to certified growers willing to comply with MS state seed law and supply certified G1 and/or G2 seed roots to Mississippi growers. Second cuttings will be made publically available.

1. Orders for cultivars available at PBES will be accepted for the 1<sup>st</sup> and 2<sup>nd</sup> greenhouse cuttings during the month of August 2019. The unit price will be established by MAFES based on estimated operational costs. Orders for the 1<sup>st</sup> cutting will be limited to certified seed growers who intend to supply certified G1 and/or G2 seed roots to Mississippi producers. Orders for the 2<sup>nd</sup> cutting will be available to any Mississippi sweetpotato producer. If orders for 1<sup>st</sup> and 2<sup>nd</sup> cutting slips exceed PBES production capacity, available stock will be proportionately allocated among those growers placing orders.
2. Certified G0 tissue culture plants will be maintain in a secured, inspected, and environmentally controlled lab at PBES and hardened off to establish "mother plants". Mother plants of desired varieties will be increased to capacity of the PBES greenhouses in preparation for an April-May harvest of vine cuttings.
3. The 1<sup>st</sup> cutting will be conducted by the certified seed growers' labor force(s) from plants in PBES greenhouses no later than May 15, 2020.
4. The 2<sup>nd</sup> cutting will be made by the growers' labor force(s) or PBES for smaller orders no later than June 15, 2020.
5. PBES, MSU-ES and MCIA will provide training to ensure certification standards are met and to maintain seed quality. This training will also include strategies for plant propagation and greenhouse management for production of G0, virus-tested plants.
6. Producers will be encouraged to partner-up and build a greenhouse(s). Education will be provided to assist growers with the technical expertise to successfully launch greenhouse operations.

YEAR 3 (Fall 2020/Spring 2021) – PBES will no longer provide vine cutting or slips, instead will focus on allocating all greenhouse capacity to producing potted daughter plants or rooted plugs for public sale to certified growers who have greenhouse capacity and are willing to comply with MS state seed law and supply certified G1 and/or G2 seed roots to Mississippi growers.

1. Orders for cultivars available at PBES will be accepted for potted daughter plants or rooted sweetpotato plugs during the month of July 2020 for producers with greenhouse facilities who are willing to comply with MS state seed law and supply certified G1 and/or G2 seed roots to Mississippi growers.
2. Certified G0 tissue culture plants will be maintained in a secured, environmentally controlled lab at PBES and hardened off to establish “mother plants”. Potted daughter plants of desired varieties will be produced to capacity of the PBES greenhouses in preparation for January/February pickup.
3. Potted plant material orders must be picked up during the winter months of January and February 2021. The unit price will be determined by MAFES based on production costs. If orders for potted daughter plants/plugs exceed PBES production capacity, available stock will be proportionately allocated among those growers placing orders.
4. Potted daughter plants/rooted plugs will be grown out in certified seed producers greenhouses for harvest of vine cuttings to be transplanted to certified seed production fields.
5. PBES, MSU-ES, and MCIA will provide training to ensure certification standards are met and to maintain seed quality. This training will also include strategies for plant propagation and greenhouse management for production of G0, virus-tested plants.
6. Producers will be encouraged to partner-up and build a greenhouse(s). Education will be provided to assist growers with the technical expertise to successfully launch greenhouse operations.