



## Organic Sweet Potato As a Commercial Crop In South Texas

[https://attra.ncat.org/downloads/TX\\_Organic\\_Farmers.pdf](https://attra.ncat.org/downloads/TX_Organic_Farmers.pdf)



The University of Texas  
Rio Grande Valley



What is the SOAR Project?

<http://www.southernsare.org/Grants/Apply-for-a-Grant>



### Organic Sweet Potatoes In South Texas?

Despite the increasing consumer demand for organic produce in Texas, there are still very few commercial organic growers in the state.

According to a report "Who Are the Organic Farmers of Texas" published by National Center for Appropriate Technology in August 2016, Texas consumers spend over a billion dollars per year on organic food, but only a tiny percentage of this is grown within the state.

PPC Farms, located in Mission, Texas, is one of the organic specialty crop grower in the State of Texas that has made its mission to lead the South Texas agricultural industry in organic production as a pioneer in sustainable practices and market development. As a member of Subtropical Organic Agricultural Research Partnership since its establishment in 2013, led by Dr. Alexis Racelis of the University of Texas Rio Grande Valley, PPC Farms has transitioned its production to organic, implemented integrated pest management, and adopted water and soil conservation practices.

In an attempt to develop additional commercial crop suitable for our region, PPC Farms conducted a trial of sweet potato production with the funding provided by USDA Southern SARE Producer Grant.

If sweet potatoes can be grown successfully in South Texas, this will add to the number of organically grown products in this region, adding to the crop diversity and income potential. We also wanted to demonstrate that organic sweet potato production could extend the growing season into the hot summer.

### Sweet Potato Production

Sweet potato originated in the tropical Americas and was grown extensively throughout the continent well before the arrival of the Europeans. It was then introduced to Europe, Africa, and Asia and is now

one of the major root crops in the developing world where over 90% of the production is found. In the tropics, sweet potato can be grown as a perennial while in temperate regions it is grown as an annual.

Mission, Texas, where the trial took place is in the USDA hardiness zone 9b. Average first frost happens between December 21st through 31st, and the average last frost happens between January 21 through 31st. The ecoregion is 34e, Lower Rio Grande Valley. Heat zone days are 181-210 days over 86 degrees.

Sweet potato needs between 90 and 150 days of a frost free period to produce harvestable roots. In theory, the crop can be grown in south Texas starting in February all the way until November.

### **Site Selection**

Sweet potatoes grow best in well-drained, loam soils which result in larger and well-shaped roots. Sweet potatoes grown in heavy clay soils, or in soils with high soil organic matter can result in rough, irregular roots.



We chose a sandy loam field that was organically certified as the location of our trial. Sweet potatoes do not require a lot of nitrogen fertility but do require significant potassium and phosphorus. The field of our choice had very high amount of the potassium and phosphorus, and extremely low levels of nitrate. The pH of the soil was 8.2, significantly higher than the recommended range of 6.0 to 6.8. 300 pounds per acre of sulfur was added to half of the plot as a soil amendment.

### **Site Preparation**

Two-row disks were used to form raised beds. 8" ridges were created to improve drainage and root quality. Soil was plowed and disked to prepare a fine planting bed. Beds were 40" wide. The slips were planted 12" apart.



### Slips

Sweet potatoes are grown from slips. Slips are shoots containing some roots which are pulled from growing plants. These slips had to be purchased from outside of Texas because there were not any organic sweet potato slip available. 2000 slips each of Beauregard, Georgia Jet and Covington varieties were purchased from Steele Plant Company in Tennessee.



Beauregard was chosen for its promised highest yield potential. In Kentucky yields have surpassed 500 boxes per acre. Beauregard matures in 90 to 95 days. It has copper-red skin with orange flesh, and is the most common variety grown.



Georgia Jet promised great taste, but may crack, negatively affecting its yield potential. It has bright orange flesh and red skin.

Covington is a variety developed by a scientist at North Carolina State University. It promised highest quality but with lower yield potential than Beauregard. Yield is estimated at 400 boxes per acre. It has rose colored skin with orange flesh. It reaches maturity in 100 days.

The slips arrived in ventilated cardboard boxes, bunched and roots wrapped in wax paper. The delivery from Tennessee to Mission, Texas took four days via UPS.







### **Spacing and Seeding**

Once the slips arrived, they were separated into different varieties.





Using a tomato transplanter, they were transplanted in a single row, 12" apart as recommended by the slip supplier.



It is recommended that sweet potato slips are transplanted into rows at a depth of 3 inches with no less than 2 plant nodes in the ground and leaving at least 2 leaves or more above the ground.





### **Irrigation**

Once the slips were transplanted, the rows were irrigated through flood irrigation method.



Proper irrigation improves slip establishment.



(6/9/2017)





(6/23/2017)

Irrigation of sweet potatoes need not be as frequent as for other vegetable crops, but is helpful during bulking stages. Excessive irrigation will cause splitting and cracking. We applied one inch of water every ten days throughout the growing process.

### **Weed Management**

Sweet potatoes are an aggressive crop that can quickly form a canopy, shading out weeds.



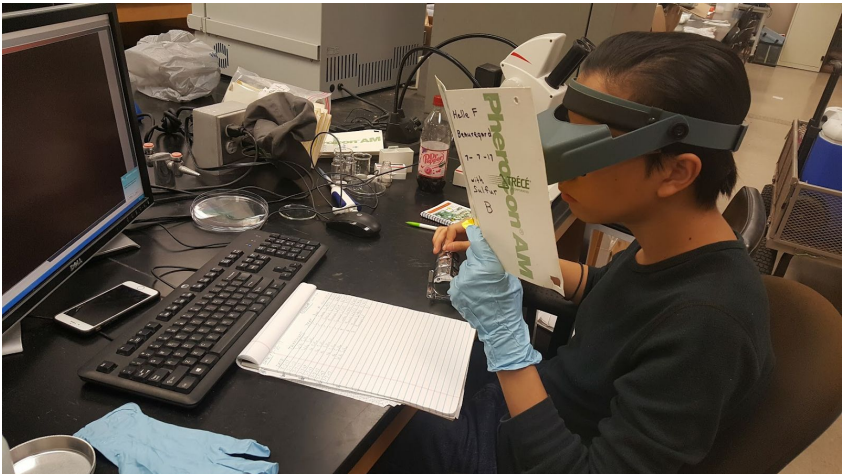
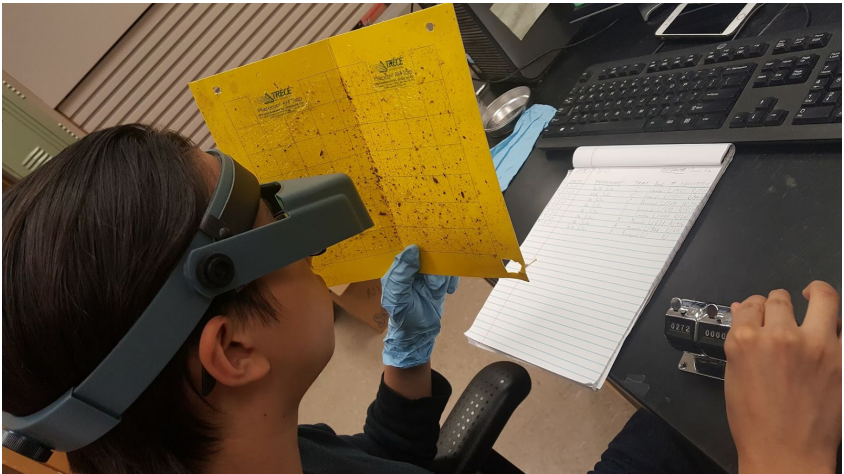
(6/29/2017)

Because our production was organic, we did not apply any herbicide but relied on manual cultivation.

Some of the weeds that infiltrated the fields are sunflowers and *solanum elaeagnifolium* commonly known as silverleaf nightshade.

### **Insect Management**

Pheromone insect traps were put out monthly to collect data on insects that are above ground.

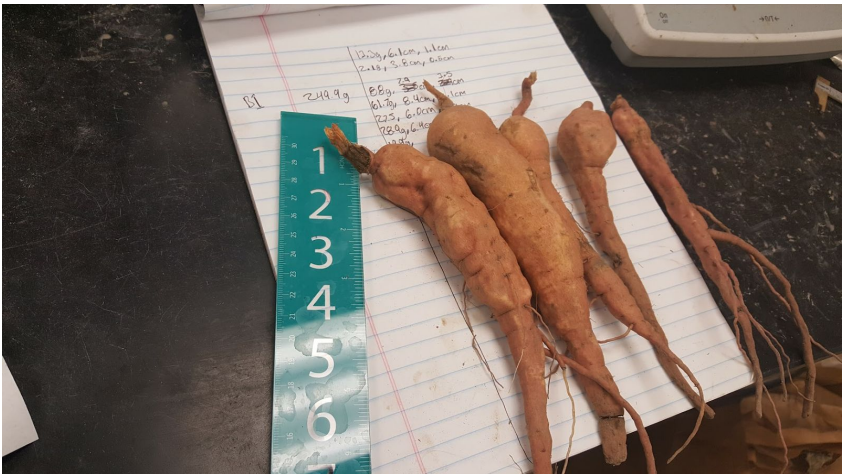


Common pests for sweet potatoes in other southern growing regions are Flea Beetles, Tortoise Beetles, Leafhoppers, and Sweetpotato Weevil.

Soil-borne insect pests are the most important insect pests. Main culprit are the wireworms and grubs. Samples of the roots were taken periodically to monitor for their presence.







Wireworms produce small holes in the roots.

White grubs, the larval stage of May and June beetles, attack the developing roots and damage areas of half an inch to more than an inch in diameter.

Wireworms usually are managed with soil insecticides such as Belay, Brigade and Lorsban, but in our organic production, we did not apply any chemicals.

### Harvesting

As we have never produced sweet potatoes at our farm and nor there were any commercial growers anywhere near us, it was difficult to get access to a mechanical harvester. After asking around, we finally located an old potato chain digger.

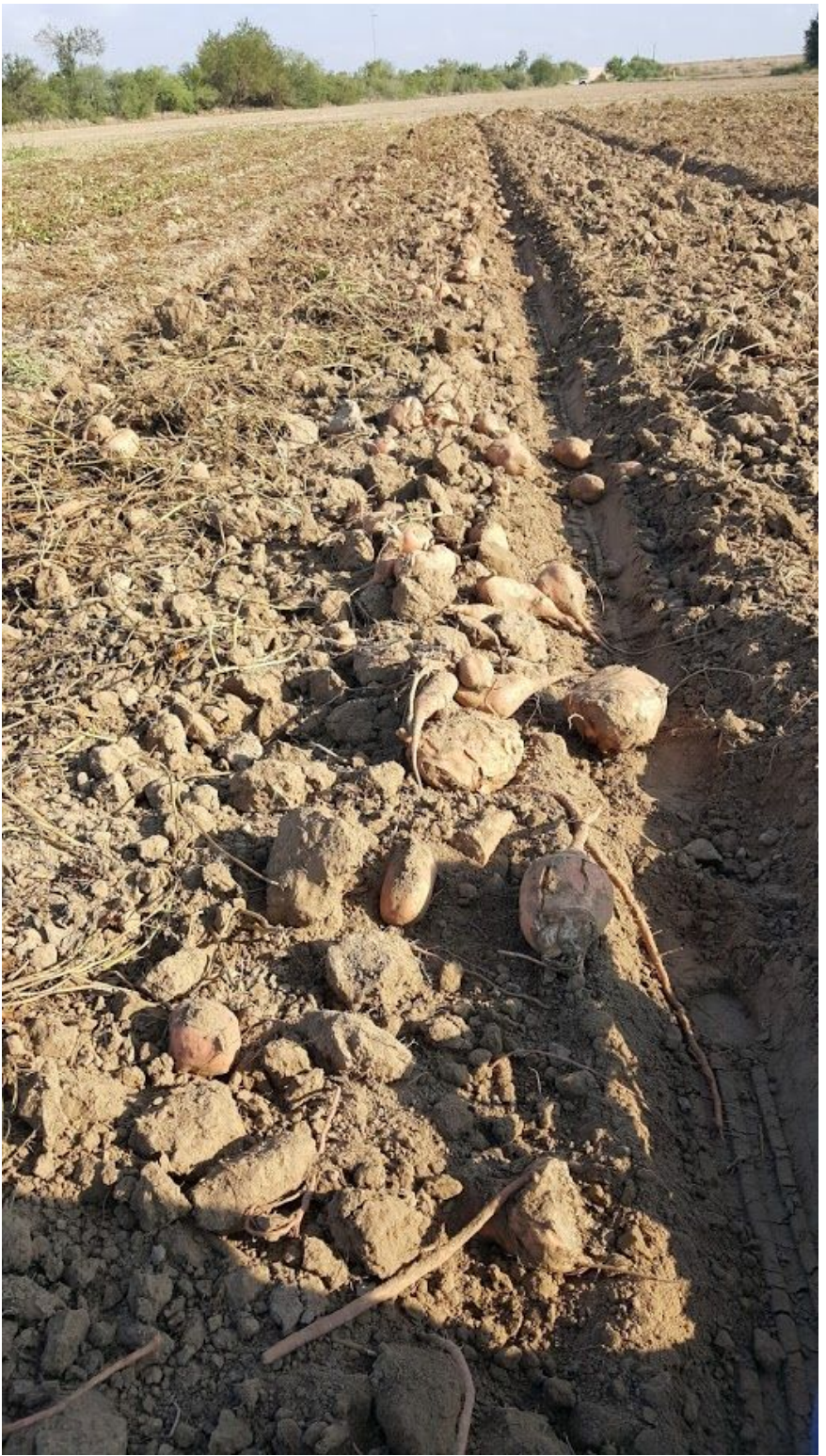


**The roots were tough, requiring two tractors to pull the harvester.**



**The chain digger was able to dig up the sweet potatoes, exposing them for manual gathering.**

















## Problem

We encountered unforeseen trouble during the harvest. The borrowed chain digger was old and inadequate to harvest the sweet potatoes. It required two tractors to pull, and when the roots were strong, the metal bars on the digger broke.



This problem was most noticeable with the rows where Murasaki variety were planted. The Murasak roots were rope like and very tough, not producing any edible sizes.

In the middle of harvesting, it started to pour rain, which continued for two weeks. The fields were too wet to enter.

When we returned after the field had dried, we discovered that a large group of feral hogs had attacked our partially harvested field. The hogs had completely destroyed our production, both the partially dug up as well as those still in the ground.





At this point, it was determined that proper harvesting was not possible, including calculation of yield. This unforeseen event of rain and feral hogs did not allow us to gather information regarding the following areas that we had intended.

**Curing**

**Storage**

**Grading**

**Marketing**

### **Is Sweet Potato a Perennial Crop in South Texas?**

After the hogs destroyed our fields, I did not disc the fields, hoping that the vines will continue to produce something.



11/3/2017

We saw that there were some secondary growth happening from the remaining vines. Having read that sweet potato was a



perennial crop in the tropics, we decided to leave the field to see if we could get a crop by leaving them alone in south Texas.





11/3/2017





11/07/2017



11/7/2017



11/22/2017



11/22/2017



1/9/2018



2/16/2018





2/16/2018

Continuous exposure to the hogs, combined with multiple freezing incidents, made the field overrun with weeds. It did produce some sweet potatoes here and there, but the size and shape were not of quality. Eventually the field browned completely. The field was terminated at the end of February.



US parks and wildlife placed hog traps right at the location of our trial in order to study the migratory patterns of the hogs. Apparently our field location was a hog hot spot.



## Results and Discussions

The study established that in the Lower Rio Grande Valley, No commercial slips are available nationwide for the first three months of south Texas growing season Feb, March and April. Dipping the shipped slips into water prior to transplanting is recommended.

Hot summer months between May and September are good for sweet potato growth.

Highly alkaline local soil still allowed for good production.

Furrow irrigation is a adequate method of irrigation.

One inch of water every 15 days is adequate.

No herbicide necessary for weed control as the vigorous plant growth quickly crowded out weeds.

Main weeds were sunflower and silverleaf nightshade.

Main insect pest present were whitefly.

Main insect damage was done by sweet potato weevil.

Major crop damage was due to feral hogs.

Special harvesting equipment is mandatory necessity.

The varieties tried did not follow the suggested maturity dates.

Yields were not able to be established due to prolonged wet weather which halted harvest mid process, and the subsequent feral hog invasion.

## Afterthought

Fortunately, the test production received quite a bit of attention from farmers and researchers since it was a rare attempt at commercial sized production of sweet potato in south Texas.

TDA approached me to discuss exporting organic sweet potato to Europe.

The slips were shared with other farmers at the transplant demonstration, which familiarized them with the slips. Some farmers planted the slips manually at their farms.

Several researchers approached me to collaborate with them for pest research, nutritional content, and sweet potato as cover crop.

The Key take-away for us was,

1. Local slip production is imperative to avoid rain during



harvest time.

2. March to April would be a better planting time for south Texas.
3. Must locate a mechanical harvester before jumping into production as manual harvest is not feasible for commercial production.
4. Summer time production of organic sweet potato is definitely possible in south Texas, allowing product availability for local growers meeting the local needs for fresh local produce.