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Sweet Potato Crop Update

Tara Smith, Assistant Professor and Sweet Potato Specialist, LSU AgCenter

The 2011 production season is right around the corner and Louisiana producers are anxiously waiting for this year's field season. Producers have been busy in recent months, packing and marketing the 2010 crop and making plans for the 2011 crop year.

Unlike the disastrous 2008 and 2009 harvest seasons, the majority of Louisiana producers harvested an average to above average crop in 2010. State average yields approximated 380 bushels per acre which was a slight increase over the 2007 state average.

According to USDA: NASS statistics, approximately 14,000 acres of sweet potatoes were planted in the state in 2010. The current outlook is for acreage to increase slightly in 2011. With the recent opening of the ConAgra Lamb Weston Plant and a new crop insurance for Louisiana sweet potatoes, we expect to see a positive response in acreage over the next few years. This optimistic prediction, of course, is contingent on the weather cooperating and producers being able to realize the full potential of the planted crop in 2011 and beyond.

As of March 1, 2011, field activities were in full swing, as bedding operations have begun across the state.

Planting of the crop should begin in early May. Beauregard remains the predominate variety planted in Louisiana with the Evangeline variety comprising about 15% of Louisiana's acreage. As you prepare to start your bedding operations, please remember that plant bed management is critical, and proper fertilization and insect/disease/weed management are important initially. ***Transplant vigor, health and establishment at time of planting, set the stage for ultimate yields realized at harvest.***

Initially plant beds should be fertilized with a complete fertilizer, such as 13:13:13 or 8:24:24 at a rate of ca. 1 lb/100 sq. ft. of plant bed or 300-400 lb/A. Additional ammonium nitrate may be applied after the first cutting if needed. Zinc (9 % chelated) can also be applied at 1 qt/acre, one-two weeks before cutting plants. Research suggests that spacing roots further apart in plant beds may increase transplant girth and the number of nodes present on the transplants. The seed

roots can touch but should not be piled on top of one another.

Pay particular attention to aphids, whiteflies and early season cucumber beetles in plant beds. If cucumber beetles are present in plant beds before cutting, apply a labeled foliar insecticide along with the foliar zinc application. Producers in south Louisiana should manage sweet potato weevils in plant beds according to the mandatory spray program. Also keep in mind that plants should be cut and not pulled from plant beds. Seed potatoes should also be treated with Botran® fungicide according to label directions. A new formulation of Botran is available as Botran 5F, so be aware of that as you are purchasing your chemicals this year.

A few specific things to consider in Evangeline seed beds:
1. Do not bed too deep, 2-3 inches of soil is sufficient.
2. Pre-sprout this variety at 75-80ºF and approximately 70% humidity under well ventilated conditions if possible, to promote earliness and uniformity in sprouting.
3. Apply Botran fungicide to seed roots according to label directions.

Please contact the LSU AgCenter with questions or for additional information on managing sweet potato plant beds.

LSU AgCenter Sweet Potato Research Station Foundation Seed Program Update

Tara Smith

2010 was a good year for the LSU AgCenter Foundation Seed Program. Approximately 40 acres of popular commercial cultivars were produced at the LSU AgCenter Sweet Potato Research Station in 2010.

All orders with the exception of Beauregard (B-63) and some of the older "home garden" varieties were allocated as requested. Our supply of B-63 was a little short to meet requests this year; however we intend to address this shortfall in 2011. If they have not already done so, producers should contact the station to make arrangements to collect their seed at their earliest convenience, preferably during March.

The majority of the LSU AgCenter foundation seed crop in 2010 consisted of the Beauregard and Evangeline varieties. The Sweet Potato Research Station also produced several acres of LA 05-111 which will be evaluated under material transfer agreements in 2011. Limited quantities of several heirloom varieties such as Jewel, Porto Rico and Heart of Gold were also produced.

Virus-tested planting material is now available for ***LA 07-146*** for research and evaluation purposes and the the LSU AgCenter breeding program intends to extensively evaluate this variety on-farm in 2011.

Thank you for supporting the LSU AgCenter Foundation Seed Program in 2010. We look forward to working with you during the coming year.

Bacterial Soft Rot

Dr. Chris Clark

Bacterial soft rot re-emerged as a problem in some plant beds and production fields in 2010 after several years when the disease was not a problem. Older varieties such as Centennial and Porto Rico are resistant to this disease. It was not until after the releases of Georgia Jet and then Beauregard, both of which are very susceptible, that the disease was even recognized on sweetpotato. In inoculation tests, Evangeline is similar to Beauregard in its susceptibility to this disease.

It is likely that a number of events combined to lead to the problem in 2010: two successive years in which most of the crop was flooded in the field provided an excellent opportunity for the bacterium to build up in seed roots; Evangeline withstood the flooding better than Beauregard and everyone was anxious to increase their Evangeline seed, thus more infected roots were saved for seed; and more Evangeline seed was presprouted, which can activate latent populations of the bacteria and allow it to spread from rotting seed to healthy seed during bedding.

Bacterial soft rot is caused by *Dickeya didantii*, which used to be called *Erwinia chrysanthemi*. It causes soft rot of storage roots and stem rot on vines in the field. The soft rot can be distinguished

from Rhizopus soft rot by the fact that bacterial soft rot does not produce whiskers or any other fungal growth on the surface of the root.

Fig. 1 Active bacterial soft rot on a storage root.

Under normal circumstances, this bacterium does not survive long in soil. However, when the soil is flooded, it can survive long enough to spread from an infected hill to nearby hills. In flooded soils, lenticels become susceptible to infection and the bacteria enter the sweetpotatoes through these natural openings. Sometimes they may cause soft rot right away, or they may only cause a small lesion around the lenticel, but most times they become latent inside the sweetpotato. Latent bacteria may be carried in seed roots, slips, and vines throughout the growing season without causing soft rot until the environmental conditions are favorable.

Low oxygen and warm temperatures favor development of soft rot. Episodes of soft rot have occurred in the past when growers have wetted down roots going into curing (the film of water on the roots reduces their ability to take up oxygen); if there is inadequate ventilation in storage or during presprouting, or in plant beds if there is not enough aeration (poking holes in the plastic mulch helps). Bacteria are not controlled by most fungicides, so using Botran has no effect on this disease.

Sanitation is always important in sweetpotato production and is even more crucial whenever there has been an outbreak of bacterial soft rot. Sanitizing packinglines, pallet boxes, or anything else is necessary to prevent healthy roots from becoming contaminated during handling. For more information on sanitation methods, please consult our web site, www.lsuagcenter.com/sweetpotato to reference the postharvest bulletin and publications on sanitation. You may also request copies of these by contacting the Sweet Potato Research Station, 318-435-2155.

The incidence of bacterial soft rot has been lower since the implementation of the virus-tested seed program. The tissue culture process used to generate virus-tested seed also eliminates *Dickeya*. Thus, the closer seed is to foundation, the less likely it is to have latent populations of the pathogen.

We have developed a crude test to determine if seed has latent populations of *Dickeya*: seed roots are coated with mineral oil and held at warm temperatures (85-90^{o}F) for a week. Seed with latent bacteria generally develop soft rot within 3-5 days. We tested samples of 50 roots from each of 33 different seed lots during February 2011. We did not detect latent soft rot in 12 lots of Beauregard, detected 2% infection in one of four lots of Covington tested, but found bacteria in 7 of 13 Evangeline seed lots with infection levels of 2-10% *(we did not detect bacteria in foundation Evangeline).*

It thus appears that some effort will be necessary to get our Evangeline seed cleaned up. Some steps that may help to accomplish this include: avoid using seed that has a history of bacterial soft rot or flooding; watch seed very carefully during presprouting and make sure there is adequate air exchange; bed foundation seed before bedding older seed that could contaminate the clean foundation seed; if possible, isolate foundation seed away from older generations or at least put it in beds that will not be exposed to runoff water from older beds; poke holes in plastic mulch immediately to provide some aeration; periodically sanitize knives or plant cutters when slips are cut in the beds; and if you see bacterial soft rot during harvest, it may help to sanitize the diggers at least before moving from one field to another.

Unfortunately, we do not have research on how effective adding antibacterial chemicals like bleach to sprays applied to seed might be in reducing infection during bedding, but the key to controlling bacterial soft rot in the long term is keeping the bacteria out of seed and slips.

Soil Moisture Management for Optimum Storage Root initiation and Yield Potential

Dr. Arthur Villordon
Sweet Potato Research Station

Just like other crop plants, sweet potato plant growth is dependent on photosynthesis. Sucrose, a major product of photosynthesis, is required for storage root initiation and sizing. Water is an important requirement of photosynthesis. This water is taken up from the soil by the sweet potato root system. Some water is lost from plant surfaces, primarily from leaves. This mode of water loss from plants is called *transpiration*. Water is also lost via *evaporation* from the soil surface. The combination of transpiration and evaporation is called *evapotranspiration* (ET) and generally represents crop water use (Fig. 1). Water taken out of the soil must be made up with either rainfall or irrigation or the soil reservoir will become dry. When water becomes limiting, plant growth slows down due to reduced photosynthetic activity.

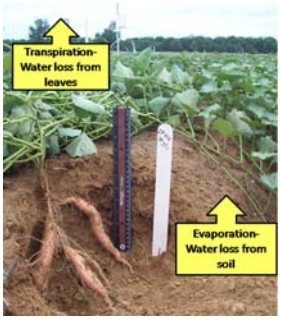

Figure 1. Water loss from transpiration and evaporation generally represents crop water use.

On the other hand, it has also been shown that prolonged exposure to saturated conditions reduces storage root initiation and results in breakdown in mature storage roots. Under conditions of poor drainage, oxygen becomes limiting and the root system experiences flooding conditions. Therefore, it is critical to supply what is required (ET) and to remove excess water through a proper drainage plan. The relationship between among plant available water, deficit conditions, and saturated conditions are shown in Fig. 2.

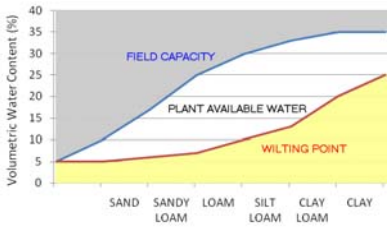

Figure. 2. Available soil water vs. soil texture. This diagram is intended as a general guide.

It is important to note that plant available water varies according to soil texture and field-specific calibration is needed to facilitate the development of an irrigation plan.

<u>Soil moisture is needed for uniform root development</u>

Unlike crops that are direct seeded, sweet potatoes are set as cuttings or transplants. It has been shown that the soil moisture requirements for establishment of vegetables that are set by cuttings or transplants are generally higher than direct seeded crops. Field and greenhouse research has consistently shown that slips or cuttings become established within 3-7 days when set under conditions that match or exceed ET. Slips or cuttings are considered established when adventitious roots are initiated and the plants begin to extract water from the soil (Fig. 3).

Figure 3. Slips or cuttings become established when adventitious roots are initiated as early as 3-7 days.

It has also been shown that up to 90% of these roots have the potential to become storage roots. Under conditions of limiting soil moisture conditions (below wilting point) during the first 20 days, storage root initiation is reduced. Some adventitious roots are initiated later and contribute to non-uniformity in storage root development ("late set"). In conditions of optimum soil moisture, sweet potato adventitious root architecture becomes fully developed between 15 to 20 days (Fig. 4).

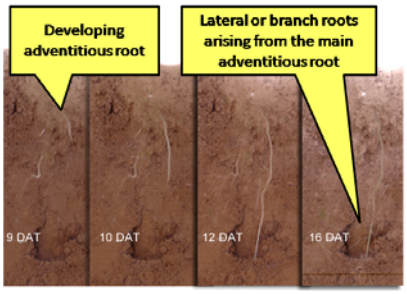

Figure 4. Series of images that show a developing adventitious root that show progression of lateral root formation between 12 and 16 days.

Root architecture refers to the three-dimensional deployment of root axes, including the lateral or branch roots. It has also been shown for Beauregard that storage root initiation starts as early as 13 days. Recent data for Evangeline also shows a similar time frame for storage root initiation. A fully developed adventitious root

system allows the plant to fully exploit available soil moisture and nutrients needed for growth and development. This also allows the sweet potato to withstand periods of limited soil moisture. Any supplemental irrigation that is performed at this period should be accompanied with a drainage plan. Prolonged soil saturation (3 days or more) or improper drainage during this period reduces oxygen availability in the soil, impairs root growth, and leads to suppression of storage root initiation.

Soil moisture is essential for further storage root growth and bulking

Further storage root growth or bulking is a direct result of cell division, primarily around the periphery of primary and secondary xylem in storage roots. Xylem is the main water conducting tissue in plants. After the first 30 days, limited soil moisture has been associated with suppression of storage root growth and bulking. Thus, it is important to maintain optimum soil moisture throughout the growing season in order to ensure uniform storage root initiation and bulking. Fig. 5 shows 60-day old storage roots sampled from irrigated and non-irrigated plots. The non-irrigated plots only received less than 1 inch of rainfall within 10 days of transplanting. There was limited adventitious root development and some storage root initiation in non-irrigated plots, but further storage root growth was minimal. While the irrigated plots were harvested at 115 days, the non-irrigated plots were harvested past 150 days, and only after late-season rainfall events.

Irrigation scheduling is used to apply the proper amount of water to a crop at the proper time. Various irrigation scheduling methods are available including "feel and see" method and systematic or regular application methods (e.g., every week). The most efficient method involves adjusting irrigation according to plant water use, and using an adaptive water balance approach based on a budgeting procedure that recognizes plant stage of growth, together with a soil moisture measuring tool.

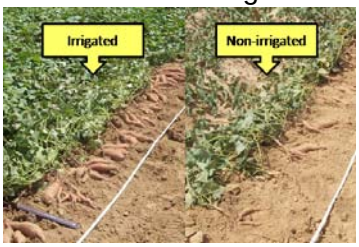

Fig 5. Storage root development in irrigated and non-irrigated plots sampled at 60 days.

Market Outlook

Movement of the 2010 crop has slacked off during the last few weeks. James Deshotel of James Deshotel Farms in Avoyelles Parish indicated that "We are meeting the demands of our regular customers." Wayne Garber of Garber Farms in Iota, La. indicated that movement was picking up again and should remain solid through the Easter packing season. Both brokers commented on the amount of competition in the market place. Mr. Deshotel commented that "buyers were demanding medium to large U.S. No. 1 packs and our packers have to be consistent and grade tightly to deliver a product that consumers are demanding." Mr. Garber added, "If we are expected to compete with other states, we have to be able to produce specialty sized packs." The FOB price currently stands at16.50 to 17.00 for a 40 lb box of U.S. No. 1's. The increased cost of freight, in light of rising fuel prices will put additional pressure on the price over the coming weeks. The overall outlook is that demand is expected to increase as Easter approaches and based on previous years, is likely to slack off during the summer months.

Industry News

Board Meetings of the Louisiana Sweet Potato Association and Louisiana Sweet Potato Commission to be held April 6, 2011

The spring board meetings of the Louisiana Sweet Potato Association and Louisiana Sweet Potato Commission will be held, Wednesday, April 6, 2011 in Winnsboro, La. at the LSU AgCenter Scott Center. The meetings will begin at 10 a.m. Please plan to attend these meetings as your schedules permit.

Mr. Mark Fields Recognized by the National Sweet Potato Council and the Louisiana Sweet Potato Association in 2011

Mr. Mark Fields was presented the Distinguished Service

Award from the Louisiana Sweet Potato Association during their annual meeting held January 19, 2011. In addition, Mr. Fields also received the Distinguished Service Award from the National Sweet Potato Council. This award was presented January 25, 2011 in Orange Beach, Al., during the annual meeting of the National Sweet Potato Council. Mark was born and raised on his family's sweet potato farm in Gibsland, La. In 1979 he returned to the family farm as a business partner with his father (JP Fields), mother (Nan Fields) and brother (David Fields) in a commercial operation as growers, packers, shippers of fresh market sweet potatoes and certified seed.

Mr. Mark Fields, far left with his father John Paul and brother David, during the 2009 National Sweet Potato Council Covention in Baton Rouge, LA.

In 1995 he joined Southern Produce Distributors of Faison, North Carolina as General Manager of Operations. This operation covered multi-states and a wide variety of vegetable production such as cucumbers, bell pepper, egg plant, squash, sweet corn, sweet potatoes as well as cotton, soybeans and tobacco. In 2000, he joined Allens, Inc. of Siloam Springs, Arkansas as Raw Product Buyer for their Belle d'Eau, LA facility. In 2008 he became Plant manager of the facility. Today, he is Plant Manager of the Allens, Inc. Fort Worth, Texas plant. Mr. Fields is a Past President of the United States Sweet Potato Council, Past President of the Louisiana Sweet Potato Association, Past Chairman of the Louisiana Sweet Potato Commission, and Past Vice-President of the Avoyelles Parish Sweet Potato Association. He was a Trustee for the Louisiana 4-H Foundation and a Member of Farm Bureau. In 2008, he was selected as Mr. Yam for the Yambilee Festival in Opelousas, La.

Congratulations Mark!

LSU AgCenter Publications *On Packing Line Impacts and Sanitation Available*

Two recently completed LSU AgCenter publications titled ***"Reducing Damage to Sweet Potatoes on the Sweet Potato Packing Line" and "Sanitation in the Sweet Potato Packinghouse"*** are now available on the LSU AgCenter Web site (www.lsuagcenter.com). These publications are also available in hard copy by contacting the Sweet Potato Research Station at 318-435-2155.

Featured Recipe

Pork and Sweet Potato Kabobs

"Colorful" and "delicious" are what your family and friends will say when you serve these great Mediterranean-influenced kabobs!

Ingredients:

1 cup Lawry's Herb & Garlic Marinade with Lemon Juice, divided
1 tsp. dried basil

1/2 tsp. crumbled dried rosemary
3/4 lb. boneless pork loin, cut into 1 1/2-inch cubes
1/2 small sweet potato, peeled and very thinly sliced (1/8-inch thick)
1 medium onion, cut into wedges
1/2 EACH: red and green bell pepper, cut into 1-inch chunks
Wooden skewers

Instructions:

In a small bowl, mix together Herb & Garlic Marinade with basil and rosemary; reserve 1/4 cup. Place remaining Marinade in large resealable plastic bag with remaining ingredients, except skewers; seal bag. Marinate in refrigerator for 30 minutes. Thread pork and vegetables onto skewers; discard used marinade. Grill or broil, turning and basting with reserved marinade until vegetables are slightly charred and pork is browned, about 15 to 18 minutes. Makes 4 servings.

www.sweetpotato.org

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LSU AgCenter Extension personnel are available to assist you with all of your crop needs. Please call on us if we can be of assistance.

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