



Healthy Food, Diverse Farms, Vibrant Communities

Cooperators

Nicholas Leete and Alice McGary
Mustard Seed Community Farm
Mark Quee, Scattergood Friends School

Project Timeline

Spring 2011 to Fall 2011

Staff Contact

Sally Worley, 515.232.5661
sally@practicalfarmers.org

Web Link

http://tinyurl.com/sweetpotatolifting

Funding

The Ceres Foundation

The prevention of ancillary roots for increased sweet potato production

Written by Sally Worley and Tomoko Ogawa

Abstract

Many PFI vegetable producers grow sweet potatoes. To increase the marketable yield of sweet potatoes, some have heard that it is effective to remove roots formed by sweet potato runners to help concentrate energy growth to the primary root crown. Two cooperators conducted research to compare the yields of sweet potatoes according to vine-lifted and not-lifted to examine if such practice indeed positively impacts the marketable yield of sweet potatoes and if the labor involved in such practice is economically justifiable.

About the Cooperators

Mustard Seed Community Farm (MSCF) is a collective group of farmers and gardeners located about 17 miles northwest of Ames. MSCF has a CSA and direct markets produce to Wheatsfield Co-op and local restaurants in the Ames area. MSCF also exchanges food for work and/or gives food on a sliding scale to anyone who wants to come to the farm. The farm is not certified-organic; however, they grow the food according to organic standards.

Scattergood Friends School (SFS) is a small Quaker boarding school about 15 miles east of Iowa City, with approximately 10 acres of IDALS-certified organic gardens and orchards and about 30 acres of pastures, upon which they grass-finish beef and lamb. SFS also raises a few heritage breed Guinea hogs and has a couple Berkshire sows, a small flocks of guinea fowl and turkeys, occasional broiler flocks and a laying flock of about 100 chickens. SFS primarily grows food for its school but also direct markets to New Pioneer Coop in Iowa City and Coralville, and supports the nascent West Branch farmer's market.



Nicholas Leete and Alice McGary, Mustard Seed Community Farm

had heard it would help concentrate energy growth to the primary root crown, thus increasing marketable yields. They wanted to find out if this is indeed true by conducting an on-farm research trial.

Background

Sweet potatoes are a popular crop for customers of PFI farmers. Since sweet potatoes are traditionally a tropical crop, Iowa farmers are limited in the varieties they can grow on a commercial scale. 'Beauregard' is a sweet potato variety with creeping vines that can be grown reliably in Iowa's climate on a commercial scale. It has nice plump roots and is one of the most popular cultivars in the U.S. (Lawson, V. and J. Hannan; Firon, N., D. LaBonte, A. Villordon, C. McGregor, Y. Kfir and E. Pressman, 2009). During project brainstorming at PFI cooperators' meeting, two farmers discussed how they remove roots formed by sweet potato runners because they

A literature review generated little research on the effect of vine lifting on yield. One publication had studied a particular creeping variety in Southern Asia but concluded that vine lifting effectiveness varied depending on the growth habit of the variety being grown (Villamayor, F. G. Jr., 1989).

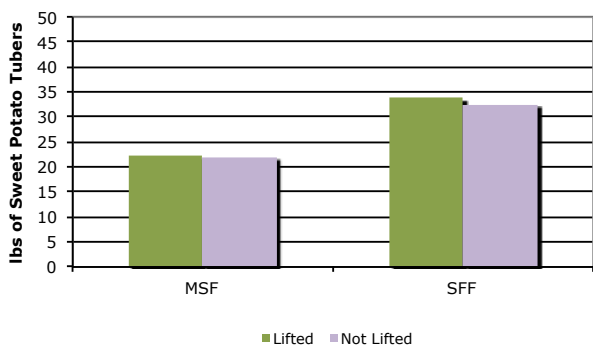
PFI farmers performed on-farm research to determine if lifting or not-lifting the vines of 'Beauregard' sweet potato increases yield. They also examined if the labor required is justified for potential yield increases.



Mark Quee, Scattergood Friends School

Graph 1

Lifted/Not Lifted Comparison Across Farms



Hypothesis

Plants shuttle photosynthates, or chemicals produced during photosynthesis, to different parts of their above-ground and below-ground parts. Since the tubers of sweet potatoes are the intended cash crop, increasing photosynthates to the tuber and away from leaf production is critical to increasing yield. Farmers tested whether lifting sweet potato secondary vines, to further shuttle energy to the crown roots and away from the secondary, ancillary roots, would increase yield of sweet potato tubers.

Method

Farmer cooperators planted ‘Beauregard’ sweet potato, on May 24, 2011, at SFS and June 4, 2012, at MSCF. Slips were planted at soil level, without any special hilling of beds with 18 inches between slips and 5 feet between rows. No straw or plastic mulch was applied for this research project. Treatments included, lifting or the control, not-lifting. Plots were 25 feet long and replicated three or four times depending on the farm. Two additional guard rows were planted on each side of the experiment to minimize edge effect.

Sweet potatoes were lifted approximately 45, 75 and 90 days after planting. At MSCF they were lifted on July 19, August 19, and September 2. At SFS, they were lifted on June 29, July 29, and August 26. Ancillary roots were completely removed from the soil. Lifting consisted of walking down each side of the row and pulling every secondary vine away from the soil, making sure the only roots connected to the soil were at the plant’s crown. Control beds were not lifted.

There was no lifting of side roots on the control sections. Weed cultivation, irrigation, and any fertility treatments were the same for both treatments, and each farm recorded all work in the plot as well as weekly observations on plant health. All sweet potatoes were harvested on the same day, but harvest dates varied between farms. Yield was measured from the center 10 plants of each plot

in each replication, omitting data from the three edge plants on each side, again to avoid edge effects.

Upon harvest, both the number of tubers and total weight from each crown was recorded. Data were reported as pounds and numbers of marketable tubers and “pounds and numbers cull tubers. Tuber health and other characteristics were also recorded.

Results and Discussion

No significant differences were measured between lifted and not-lifted marketable or cull sweet potatoes at MSCF and SFS. Lifted marketable tubers yielded 27.3 lbs/plot while not-lifted yielded 26.7 lbs/plot. Lifted cull tubers yielded 6.2 lbs/plot and not-lifted 7.4 lbs/plot. In addition, no significant differences were measured between numbers of lifted and not-lifted marketable and cull tubers (Graph 1).

No significant differences were measured between lifted and not-lifted marketable or cull sweet potatoes at SFS when the average tuber weight and average crown weight was used. There was a slightly higher yield per crown of lifted marketable sweet potatoes (0.62lbs/crown) but it was not statistically higher than the not-lifted control (Graph 2).

Conclusion

No significant differences were found between lifting and not lifting sweet potato crowns on marketable and cull yields or numbers of tubers. Nor were differences found on average yields of the individual tubers or crowns. “I am surprised by the results and would be tempted to gather more data,” says Mark Quee, Scattergood Friends School. Another year of data with more locations will help to determine if lifting sweet potato vines effects yield positively or not at all.

Data Analysis

Data were analyzed using a fit model one-way analysis of variance (ANOVA) to determine treatment effects. Comparisons of means were analyzed using the Student’s t-test. All data analyses were performed using the JMP9 software (SAS Institute Inc., Cary, NC).

References

Firon, N., D. LaBonte, A. Villordon, C. McGregor, Y. Kfir and E. Pressman. “Botany and Physiology: Storage Root Formation and Development.” In *The Sweetpotato*. Ed. Loebstein, G and G. Thottappilly. (2009) Springer.

Lawson, V. and J. Hannan. Sweet Potato Cultivar Trial. Iowa State University Muscatine Island Research and Demonstration Farm. RFR-A1001.<iowaproduce.org/pages/vegetable/files/sweet_potato/sweet_potato_cultivar_2010.pdf.>

Villamayor, F. G. Jr. (1989) “Indigenous Technologies in Sweet Potato Production and Utilization in the Philippines.” In *Sweet Potato Research and Development for Small Farmers*. Ed. Mackay, K.T., Palomar, M.T. , Sanico, R.T. <<http://idlbnc.idrc.ca/dspace/bitstream/10625/6946/1/52289.pdf#page=359>>

Graph 2

Marketable and Cull Sweet Potato Yield after Lifting/No-Lifting at Scattergood Friends School

