



In Search of Short Season Northern Sweet Potato Varieties: Variety Trials of New Sweet Potato (*Ipomoea batatas*) Crosses

Farmer-Researchers:

Kate Garvie, Heartbeet Farm- East

Erin Richan, Highland Gem - East

Lise-Anne Léveillé, BeetBox Cooperative Farm - East

Research Priorities: Variety Trials, Seed Production, and Seed Breeding

EFAO Contact: Rebecca Ivanoff, rebecca@efao.ca

Objective

To identify the best performing varieties of sweet potato crosses of organic farming systems in the Ottawa area.

Background

Most sweet potatoes are grown from slips, which are clones of the tuber. This means that no new genetic diversity is created each year, with no progress towards regional adaptation. As a hexaploid (six homologous sets of chromosomes), however, sweet potatoes are very genetically diverse. To get new genetic diversity, plants need to be grown out, produce flowers and also produce viable seeds. This is difficult because most varieties of sweet potato show self- and cross-incompatibility, low natural flowering ability, and low seed fertility.

In 2016, Telsing Andrews at Aster Lane Edibles planted Georgia Jet and Purple sweet potato plants and they produced flowers and some open pollinated seeds.

In 2017, Telsing planted these seeds, as well as seeds from a cross from Sweden between Nordic White X Purple (though orange sweet potatoes had been in the same field), and also some tropical sweet potato seeds that she acquired from an enthusiast in Britain. Kate also grew out slips from Telsing and was able to collect seed. In these diverse populations, some plants produced flowers and also seeds. In 2018, these seeds were planted out. Tubers and plants were evaluated but, due to the weather, no seed was produced.

In 2019, Kate Garvie took on this project and was able to grow slips from the wide diversity of tubers produced in 2018 with the hopes of evaluating the nearly 60 unique crosses and finding something that is well suited to her farm. There was not enough space or capacity to do a replicated variety trial to select the best and, therefore, Kate planted out one replication of 59 blocks containing 3-4 plants of each variety, with the goal of selecting about 10 of the best to do a replicated variety trial in 2020. The report from 2019 can be read here:

<https://efao.ca/wp-content/uploads/EFAO-Garvie-2019.pdf>



Research Plan

Time	Task	Methods & Measurements or Action Item
Mid March	Grow Slips	Kate will grow slips for all three farms for the top 9 new varieties as well as Covington.. Kate will aim to give 10-12 slips of each variety to all three farms (30-36 slips of each cross). Rebecca will text Kate as a reminder.
Spring	Purchase Stakes	Kate will source 20 stakes each for all participating farms. Rebecca will text Kate as a reminder.
Mid May	Deliver Slips and Stakes	Kate will get the slips to the other farmers and will also bring them stakes to make the field. Rebecca will text Kate as a reminder.
Late May	Plant in the Field	All farmers will plant out in a randomized and replicated design (see below) the slips that Kate has started. SEE EXPERIMENTAL DESIGN BELOW. Rebecca will text Kate, Lise-Anne, and Erin as a reminder.
September	Harvest and Observe Sweet Potatoes	All farmers will use THIS FORM to record data from each plot, as well as take a photo of each variety as it is harvested.. Five of the best tubers from each plot will be set aside for both using as slips for next year and for tasting in the winter. Rebecca will text Kate, Lise-Anne, and Erin as a reminder.
August	Invoice	All farmers will send Sarah an invoice for all approved research expenses with copies of the original receipts.
October 15	Submit data and photos	All farmers will submit data and photos to Sarah
November 15	Invoice	Send Sarah invoice for farmer-fee and receipts for pre-approved research expenses
February 2021	Taste Sweet Potatoes and assess storage quality	All farmers will do a taste test of the different varieties, take photos, and fill out THIS FORM .
March 1, 2021	Submit data and photos	Submit data and photos to Rebecca for taste and storage quality

Experimental Design

Using all of the data from 2019 and Winter 2020, Kate selected the 9 best yielding, marketable, and tasting sweet potato crosses, which she will use to create slips in spring 2020. She will also create slips from Covington sweet potatoes to be used as our check variety.

Growing Recommendations

- One compost application before planting



- 18 inch spacing in line
- Kate strongly recommends planting into clear plastic
- Plant two randomized replications of the 10 sweet potato varieties.
 - Each plot will have 5-6 sweet potato slips planted, so Kate will aim to provide 12 slips of each variety to each farmer. Kate will provide the slips with codes from SP1 to SP10 (SP=Sweet Potato).

2-3 Slips of other sweet potatoes as Buffer	2-3 Slips of other sweet potatoes as Buffer
SP8	SP5
SP2	SP7
SP3	SP4
SP9	SP2
SP6	SP10
SP5	SP8
SP4	SP1
SP7	SP3
SP1	SP6
SP10	SP9
2-3 Slips of other sweet potatoes as Buffer	2-3 Slips of other sweet potatoes as Buffer

Due to the fact that these are brand new crosses for which Kate does not have a lot of tubers, there is a possibility she may not get as many slips as she hopes. If she is able to give farmers 6+ slips, do 2 replicates (if 7, do 3 for one rep and 4 for another, if 6 then do 3 plants for each rep), However, if she is able to give less than 6 slips of each cross, farmers will do one replicate on each farm.

The Check variety slips were from Covington sweet potatoes i got from Jambican studio gardens who had ordered slips the year before from the states



Materials

Please list all the equipment that you need for this project. Indicate “in-kind” under Total Cost for any materials that you already own or have access to. For pre-approved research expenses, for which you will be reimbursed, please indicate cost.

Material	Unit	Quantity Required	Total Cost*	Note
400 slips at cost	\$1/slip	Max 400	\$400	
Covington sweets for slipping from Jambican Garden	\$10/bag of slipping potatoes	1	\$10	
Purchase of check varieties (Covington)	\$75/100 slips	1	\$75	Backup only if Covington doesn't work/slip properly
Field stakes (labels)		60	\$50	
Clear plastic	Up to \$70	2	\$140	
Total			\$675	

* For approved research expenses

Farmer-fees

Each farm will invoice for \$250 for the variety trail once the data has been sent in for analysis to Rebecca.

Memorandum of Understanding

Farmer-researchers agree to keep an active membership with EFAO throughout the duration of their trial. Reimbursement for research expenses and farmer-fees will be paid to current members only.

Please also refer to efao.ca/farmer-led-research for a **Memorandum of Understanding** of other responsibilities. Specifically refer to sections:

- *What is expected of me as a farmer-researcher?*
- *What support will I receive from EFAO as a farmer-researcher?*



SEED PRODUCTION
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To check the status of your membership, log in here:

<https://efao.z2systems.com/np/clients/efao/login.jsp> or contact Martina, martina@efao.ca.