

Farmer-Led Research 2019: In Search of Short Season Northern Sweet Potato Varieties: Selection and Evaluation of New Sweet Potato (*Ipomoea batatas*) Crosses



SEED PRODUCTION
& BREEDING

Farmer-Researcher:

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This document outlines the steps that Kate Garvie will follow to execute her research project, *In Search of Short Season Northern Sweet Potato Varieties: Selection and Evaluation of New Sweet Potato (*Ipomoea batatas*) Crosses*, including design, execution, data collection and data sharing. It also serves as a Memorandum of Understanding between Kate and EFAO.

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 a 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.

Experimental Design

Telsing created a large pool of new genetic resources that Kate would like to evaluate. With 57 unique F1 varieties, there is not enough space or capacity to do a replicated variety trial to select the best. In 2019, therefore, Kate will have only one replication of 57 blocks containing 3-4 plants for each new variety. She will plant slips from the 57 unique tubers with the goal of selecting 15 of the best to do a replicated variety trial in 2020.

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Sidenote: Kate will also plant out a block of sweet potatoes that Telsing identified as good crossers. This block, along with the 57 new crosses, will be planted in a block separate from the sweet potatoes that Kate will grow for Heartbeet Farm's CSA. Kate will collect seeds from good crossers in this block and any seeds that form in the evaluation grow-out. *However, this is a separate goal that is not officially part of this project.* This side project will continue Telsing's important work to gain knowledge of which varieties can be grown out in order to create seed (and thus brand new sweet potato varieties!)

Evaluation:

[Data Sheets](#) will be filled out when tubers are harvested in September. Taste testing will be a month later to maximize sugars.

Research Expense Budget

Prices are approximate; NA or in-kind for any materials that you already own or have access to. Please indicate if you intend to give any of the supplies to EFAO's Tool Library for others to use after you are finished with them.

Material	Quantity	Unit	Total Cost	EFAO's Tool Library (Y/N)
Plastic	300ft		In-Kind	N
Rental of Greenhouse space to grow out approximately 200 slips	20 square feet	0.87/square foot	\$17.40	N
Pots	200	0.14/pot	\$26.88	
Potting Trays	12	0.92/tray	\$11.04	N
Greenhouse heating propane		Cost/% of space used	TBD (approx \$100)	N
Field stakes (labels)	57		\$50	N
Total:			~\$200.32	

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Research Calendar

Time	Task	Action Item
March 12	Start slipping	
August	Check for flowers and podding	Rebecca text a weekly reminder in August and early September 613-315-2160
September?	Harvest and evaluation	Site visit by EFAO staff (perhaps Heather?) to help with recording data

Deadline for data, progress report and photo submission

Katie will send in the evaluation sheets (other than taste and keeping quality) by October 15, and, if possible, send taste data before mid-November. Keeping Quality will come in February 2020.

Memorandum of Understanding

Please refer to efao.ca/research-mou for Memorandum of Understanding.

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