



Cucumber Breeding Project

Farmer-Researcher(s):

Nathan Klassen, Nith Valley Organics (West)

EFAO Contact

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This document outlines the steps that Nathan Klassen, will follow to execute his research project, *Open-Pollinated seedless English Cucumber Breeding Project*, including design, execution, data collection and data sharing. It also serves as a Memorandum of Understanding between Nathan and EFAO.

Background

Nathan at Nith Valley Organics enjoys growing English cucumbers in the greenhouse, but available varieties are either older varieties lacking modern fruit or production qualities, or modern varieties intended for high tech or soilless greenhouse production. He would like to combine the adaptability and season-long performance of the old standard that he has been saving seed from on farm, with the seedless fruit and flavour qualities of a modern hybrid dutch greenhouse type.

Breeding Goals

To produce an open pollinated seedless English cucumber with excellent flavour well adapted to growing in soil under organic greenhouse conditions.

Breeding Methods

Nathan has four heated greenhouses totaling roughly 10,000 square feet through which they rotate cucumbers, tomatoes, and peppers in the summer.

In 2019, Nathan will make an initial cross between the two parent varieties Tyria F1 (female) and Nith Valley Organics selected and saved variety, which has the working name Hofsteader (male). Tyria is a hybrid long european/dutch type of cucumber breed by Vitalis. It has no intellectual property restrictions. It is parthenocarpic (fruit is produced without fertilization of ovules, which makes the fruit seedless) and gynoeocious (the plant usually only produces female flowers). Hofsteader is a seeded english telegraph type we originally received from a friend around 2012. Since it wasn't given to us with a name we have named it in memory of the friend that gave us those first seeds. Since then, we have been selecting plants that seem to do well in our greenhouse conditions to save seeds from. It has been a reliable, if not prolific producer and has been much more robust against catastrophic failure due to insect and disease pressures. Overall



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yield per season has not differed greatly from Tyria, but the yield is spread over a longer time and only achieved in the end because of the higher livability of the plants. For this reason, and because of the different trellising requirements of seeded v.s. seedless cucumbers, it requires more labour to produce a given number of cucumbers than it would with Tyrea, or similar seedless dutch greenhouse types.

He will then select and hand self pollinate gynoeocious parthenocarpic offspring starting in the F2 generation using gibberellic acid to create staminate flowers (male) on plants that are otherwise only pistillate flowers (female) so that pollination can occur on selected plants.

Flavour, fruit appearance, yield and plant liveability will be other primary selection criteria.

Breeding Timeline

Nathan anticipates having a stabilized variety in 5 to 7 years based on previous experience with breeding cucumbers, unless he is able to compress the generation time and squeeze two generations into each year for initial years. This project would still require full season assessment in later generations for yield and liveability.

Measurements

For the first year, Nathan will be creating the crosses from which he can then select in later years. He expects to start formally assessing yield and liveability of promising lines in the F4 generation.

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)
Seed for parent populations				
Gibberellic acid			Only in 2020 and following years)	
Insect netting to screen greenhouse openings and wood to frame end door screens			Only in 2020 and following years	



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Twist ties to mark selected flowers.			in-kind	
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Research Calendar 2019

Time	Task	Action Item
Every two weeks!	Take pictures!	Rebecca will text

Deadline for data, progress report and photo submission

Will submit any data, a short Interim report, and some photos by October 1.

Memorandum of Understanding

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

Pledge for Breeders (this will be updated)

You have the freedom to use the seeds generated from your farmer-led research project in any way you choose. In return, you pledge not to restrict others' use of these seeds or their derivatives by patents or other means, and to include this pledge with any transfer of these seeds or their derivatives.

Acknowledgements

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Trillium Foundation



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