Farmer-Led Research 2019: **Broccoli Landrace Breeding**

Project Year 1

SEED PRODUCTION & BREEDING

Farmer-Researcher(s):

Greta Kryger, Greta's Organic Gardens (East)

EFAO Contact

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This document outlines the steps that Greta Kryger will follow to execute her research project, *Broccoli Landrace Breeding Project Year 1*, including design, execution, data collection and data sharing. It also serves as a Memorandum of Understanding between Greta Kryger and EFAO.

Background

Inspired by the work of Raoul Robinson and Joseph Lofthouse, the newly formed SeedWorks Plant Breeding Club is interested in breeding a heat tolerant heading broccoli that has broad genetics and is bred for organic systems, criteria which seem to be missing from the commercial vegetable grower market. For example the Breeding, Research, and Education Needs Assessment for Organic Vegetable Growers in the Northeast showed that stress tolerance in broccoli was the number one priority for growers in the Northeast, and new varieties that are certified organic need to be developed.

In planning for this project, they have made connections with brassicas breeders such as Hannah Swegarden, Adrienne Shelton, and Heron Breen, as well as other plant breeders such as Michael Mazourek who have agreed to be consultants on this project.

Breeding Goals

The goal is to breed a heat tolerant heading broccoli that has broad genetics to be adaptable to climate variability and is bred for organic systems.

Methods and Materials or Breeding Methods

To start this project, Greta will allow crosses to occur from a large population of both hybrid (those without cms) and open pollinated varieties. A list of germplasm that Greta will use can be found here.

In year two or three, multiple farms that are part of SeedWorks, will grow out large populations of these crosses, and they will use the mass selection method to select from this highly variable population. The mass selection method acts like a sieve, collecting the seed of only those plants with desirable traits. These seeds are then bulked and planted the next year and the process

repeats. After multiple cycles of selection, they can release one broccoli variety (or a broccoli grex) and they will have improved several regional populations.

Breeding Timeline

We anticipate this project will take at least 5 years to complete. The first two years we will not have any treatments and controls as we are just working to mix up the genetics of a huge amount of germplasm. Mass selection starting in year 3 will be used. Progeny selection may be used in subsequent years to stabilize any desirable lines.

Measurements

Recording data like planting dates, and flowering dates, harvest dates (and harvest window), temperature recordings, will be taken.

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
Protect Netting			in-kind	N
Commercial seed varieties			Approx $30	
Varieties from GRIN			n/c	
Seeds from Heron Breen			n/c	
Trays, soil, greenhouse space, etc			in-kind	

Deadline for data, progress report and photo submission

October 1, 2019

Research Calendar

Time	Task	Action Item
	Seeding	Rebecca will text
	Take photos of the broccoli plot	Rebecca will text

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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LONDON COMMUNITY FOUNDATION

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