RESEARCH PROTOCOL: SEED PRODUCTION & BREEDING 2018
Sweet Pea Variety Trial

Farmer-researchers
Jessica Gale, Sweet Gale Gardens
Sas Long, Floralora Flowers
Janis Harris, Harris Family Flowers
Jen Feddema, Wendalane Farms
Joanne Feddes, La Primavera Farms

This document outlines the steps that Jessica, Sas, Janis, Joanne, and Jen will follow to execute their variety trial for *Sweet Peas*, including design, execution, data collection and data sharing. It also serves as a Memorandum of Understanding between the five growers and EFAO.

Background
Canada and Ontario specifically have very few locally grown flower seed companies. Much of the flower seed being produced and used by cut flower growers across Canada is grown internationally in place like the Netherlands, Israel, and various South American and African countries. Much of this seed is for large scale, corporate farms that use conventional methods of production and varieties are selected for the climates of the countries where the seed is grown. Because of this, there is a knowledge gap in the performance of varieties in other locations. Lastly, Canadian flower growers have a difficult time accessing seed, bulbs/tubers and other plant material and, therefore, are lagging behind flower trends and tend to pay higher prices due to currency exchange.

Luckily in terms of access, there is a revival of small scale Canadian seed houses catering to local cut flower farms. These seed houses import interesting varieties, but they are still being produced in the countries mentioned above. One crop of specific interest is sweet peas, which grow relatively well in Ontario climates. Many of these sweet peas come from breeders/seed producers in the UK and New Zealand. With an interest in identifying the most viable sweet pea varieties for Ontario growers, we decided to trial two of the most popular colours, white and blush, using seed purchased from two local Ontario seed houses, Unicorn Blooms and Stems, and compare them against an industry standard variety. The goal of this trial is to identify the best varieties for small-scale, ecological flower farms in Ontario. In turn, this knowledge may motivate local seed production to supply local seed houses.

Trial Design

Table 1. Participating Growers

Farmer	Farm name	Location	Email	Role
Jessica Gale	Sweet Gale Gardens	Hamilton	hello@sweetgalegardens.com	Mother site
Sas Long	Floralora Flowers	Prince Edward County	info@floraloraflowers.com	Satellite site
Janis Harris	Harris Family Flowers	London	janisandmarkharris@hotmail.com	Satellite site
Jen Feddema	Wendalane Farms	Niagara	jen@wendalane.com	Satellite site
Joanne Feddes	La Primavera Farms	Hamilton	joanne.laprimaverafarms@gmail.com	Satellite site

Table 2. Varieties Included and Grower Assignments. Seed pack sheets will list the varieties included for each farm, marked with letters A-J to ensure a blind trial.

Variety	Type	Source	Growers planting
Piggy Sue	Blush	Unicorn Blooms	Jessica + Janis
High Society	Blush	Unicorn Blooms	Jessica + Sas
Molly Rillstone	Blush	Stems	Jessica + Sas
Yvette Ann	Blush	Stems	Jessica + Janis
Spring Sunshine	Blush Check Standard	Gloeckner	Jessica + Janis + Sas
Wild Swan	White/cream	Unicorn Blooms	Jessica + Jen
Lunar Sea	White/cream	Unicorn Blooms	Jessica + Joanne
Jilly	White/cream	Stems	Jessica + Joanne
White Supreme	White/cream	Stems	Jessica + Jen
Spring Sunshine	White/cream Check Standard	Gloeckner	Jessica + Jen + Joanne

Trial Specifications

The trial will include one “Mother Site”, managed by Jessica Gale, and 4 “Satellite Sites”, managed by Sas, Joanne, Janis and Jen.

Mother Site

- **White/cream**: (4 varieties x 3 replicates per variety x 12 plants per replicate) + (1 check standard x 12 plants per)
    - TO SEED: 180 trial plants + 15 check standards - one seed per plug
    - TO TRANSPLANT: 144 trial plants + 12 check standards
- **Blush**: (4 varieties x 3 replicates per variety x 12 plants per replicate) + (1 check standard x 12 plants per)
    - TO SEED: 180 trial plants + 15 check standards
    - TO TRANSPLANT: 144 trial plants + 12 check standards

Satellite Sites

- 2 varieties per farm, either 2 **Blush** or 2 **White/cream**, plus check standard for that colour - refer to **Table 2** above for specific varieties.
- 3 replicates per variety x 12 plants per replicate for trial varieties
    - TO SEED: 90 trial plants (45-50 per variety) + 15 check standards - one seed per plug
    - TO PLANT: 72 trial plants (36 per variety) + 15 check standards

Table 3. Randomization for field planting with PLOT CODES for each section. Letters denote varieties, numbers denote replicate. Example: C-2 is the second replicate of variety C. Grey areas are gaps to avoid confusion between varieties. Growers can decide to plant grey areas with another variety of a distinct colour or leave unplanted.

	Janis	**Sas**	**Jen**	**Joanne**		**Jessica**	
Min 3’							
4'	D	B	F	G		B	G
Min 3’							
4'	A	C	I	H		D	F
Min 3’							
4'	E - check	B	F	H		A	H
Min 3’							
4'	D	C	I	G		C	I
Min 3’							
4'	A	E - check	J - check	J - check		E - check	J - check
Min 3’							
4'	D	B	I	H		D	G
Min 3’							
4'	A	C	F	G		A	H
Min 3’							
4'						B	F

Min 3’							
4'						C	I
Min 3’							
4'						E - check	J - check
Min 3’							
4'						B	F
Min 3’							
4'						C	H
Min 3’							
4'						A	G
Min 3’							
4'						D	I
Min 3’							
4'						E - check	J - check
Min 3’							

If, for some reason, planting order in the field differs from Table 3, please record the planting order.

Please observe these best practices to the extent possible:

- Choose best plants to transplant but save any other plants in case transplants are lost in the field.
- Plant a total of 4 row-feet per replicate = **8” spacing for 6 plants on both sides of the net**, 12 plants total.
- In total, Satellite sites will need 24 row ft for 2 trial varieties, 24-32 row ft for separation gaps, and 4 row feet for the industry standard, totaling 52-60 row ft.
- To avoid confusion, either plant another Sweet Pea (distinct colour!) (min. 3’) OR leave the space empty (min. 3’).
- All Mother and Satellite sites will be **field grown plots**
- Avoid the edge of the field and the end of the bed when finding a place for the trial, as well as any areas with known soil, shade or irrigation differences that would affect some plots more than others.
- If possible, plant the trial in a spot where it has the same crop on either side of it.
- Use stakes to label the plots **and** draw a field map showing the order and location of varieties. This serves as a backup in case the stakes get lost!
- **Please use the randomized map for planting** (above)
- **Please record all data in the Data Collection Sheet** (print, fill out, and scan or mail to Jessica when complete) (link below):

- https://docs.google.com/spreadsheets/d/1NjCcYJ_2aOtIMTEbbW5kQgUaRXVgTRaWI2YKWhKjp0w/edit?usp=drive_web&ouid=106114368976798482985

Table 4. Planting & Cultivation Recommendations. Suggestions based on practices at Sweet Gale Gardens. Use it if these suggestions make sense for your farm. Use the Data Collection Sheet to record information.

Approximate seeding dates and recommendations in greenhouse	Week 14, or April 1; Pre-soak sweet peas for overnight before seeding into final trays or pots. 50 cell or small pots recommended.
Approximate transplanting dates	Week 18, or April 29
Plot size per variety replicate	4 ft
Row and bed spacing	8” between plants, 2 rows per bed with netting down the middle, beds 3-4 ft wide
Seeding rate	45 seeds per variety, 15 for industry variety
Weeding, irrigation, and pest management	Please make note of techniques and applications used for soil amending, weeding, pinching, mulching, pest management, and irrigation. Farmers can do their regular methods. SGG will: apply compost to beds, retain bare soil (no mulch), interplant with alyssum for aphid control, hoe and hand weed, use drip irrigation, pinch according to Florets directions, and when transplanting, soak trays in a seaweed/ molasses infused water.

Methods and Analysis

Cuts for stem length and bloom size should be made in the morning and at **four times throughout the bloom period** on a schedule of 5-7 days after 1st bloom, 5-7 days after 1st measurement, 5-7 days after 2nd measurement and 5-7 days after 4th measurement.

Sampling Method

- Cut in the morning
- For each plot, harvest everything that is ready in each block and bunch together with a rubber band **and a label with plot code** (e.g. D-4)
- Store chilled in water until you have time to measure (same day, preferably)
- In good light, measure each stem to the nearest mm using a well marked ruler!
- Record data and notes on the Data Collection Sheet
    - Stem length (measured)
    - Bloom size (measured)
    - General notes about: vase life, petal drop, insect/disease pressure
    - Bloom period

Statistical test
Mother sites: ANOVA for each measurement; Satellite sites: T-test between control vs treatment for each measurement.

Materials and 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	45-50 seeds per variety (100 in total)		$160, $100 additional donated	N
Netting/posts	1 roll, 50-75', 10 posts, estim	Netting: $25 Posts: $50	$75	N
Tagging tape	4 rolls		$20	N
Postage and supplies for mailing seeds?			$10	N
			$265	

Grower References

Farmer-researchers are asked to consult the following references:

Organic Seed Production Six Webinar Series 2017 Part 2: Trials and Selection and webinar: https://www.youtube.com/watch?v=cme2t0361hg&feature=youtu.be

The Grower's Guide to Conducting On-farm Variety Trials, Colley et al. https://seedalliance.org/wp-content/uploads/2018/02/Growers-guide-on-farm-variety-trials_FINAL_Digital.pdf

Deadline for data and and photo submission:

Satellite growers to Jessica: October 1, 2018, the earlier the better
All data to Sarah: October 31, 2018

Acknowledgements

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Memorandum of Understanding

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

Contact

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