

RESEARCH PROTOCOL: HORTICULTURE 2017

Foliar Sprays for Cucurbits

Farmer-researcher: Angie Koch, Fertile Ground CSA

This document outlines the steps that Angie will follow to execute her research trial, *Foliar Sprays for Cucurbits*, including design, execution, data collection and data sharing. It also serves as a Memorandum of Understanding between Angie and the EFAO.

Experimental Design

Research question:

How does a nutrient foliar spray compare to no spray with respect to plant health and production of summer squash and cucumbers?

Hypothesis: The nutrient foliar spray will improve production and quality of the cucurbits.

To test this hypothesis, Angie will plant summer squash and cucumbers in 15 rows, each 190'. Angie will divide each row into 4 x 45' sections with 2 blocks each, and she will take measurements within the middle 35' of each section for 10' no-spray buffer between sections. Angie will plant 3 plantings of summer squash and 2 of cucumbers, for a total of 6 replicate blocks for summer squash and 4 replicate blocks for cucumbers. Angie will assign spray treatment and no spray controls to full sections across planting, resulting in a semi-randomized block design.

Units of concentration of spray – per A, diluted in 50-55L water/A

1st 1-2 Weeks

- Holo Mac 1.5L
- Holo Mic 0.75L
- Micro 5000 25g
- Pepzyme Clear 100mL
- In 54L water

Beginning 1-2wks before flowering and continuing for 3 wks

- Holo Mac 0.5L
- Holo Mic 1.5L
- Accelerate 2L
- Micro 5000 25g
- Pepzyme Clear 100mL
- Once finger-sized fruit, add Holo K 0.5L
- In 54L water

At full production stage (may need to increase water ratio...still calculating the dilution!)

- Holo Mac 2.5L
- Holo Mic 2L
- Accelerate 0.5L
- Micro 5000 25g
- Pepzyme Clear 100mL
- Holo K 1L
- Ideally in 75-80L water if can figure out how to recalibrate sprayer!!

Spray Schedule

- Weekly beginning within 1 week of crop transplant

Summer squash

Cucumber

section	1				2				3				4				
	Measurement zone				Measurement zone				Measurement zone				Measurement zone				
row	5'	35'	5'	5'	35'	5'	5'	35'	5'	5'	35'	5'	5'	35'	5'		
1	spray				control				control				spray				1st planting
2																	
3																	
Empty bed																	
4	spray				control				spray				control				
5																	
6																	
7																	
Empty bed																	
8	spray				control				spray				control				2nd planting
9																	
10																	
11	control				spray				spray				control				
12																	
13																	
Empty bed																	
13	spray				control				spray				control				3rd

14					planting
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Measurements

- 1st fruits ready to harvest
- Ratio of female:male flowers on zucchini plants
- Size of flowers (female)
- Total # of weeks able to harvest healthy fruits
- Observations related to appearance of mosaic virus + cucumber beetle pressure on the plants + overall fruit quality
- Brix of leaf and fruit:
 - Measure Brix levels on fruit, at least once at maturity; try to have this be approximately same stage for each planting; record date
 - Take one representative fruit from each section and bed, for a total of 12 cucumbers and 16 summer squash from 1st planting, etc.
 - We can use difference (treatment vs control) to account for differences between plantings

Instructions for measurements; refer to <http://ohioline.osu.edu/factsheet/hyg-1653>

1. Equipment needed
 - a. method for labeling fruit as you harvest - prelabeld wine box?
 - b. cooler to keep cool
 - c. garlic press, plate and knife for juice collection
 - d. eyedropper for sample collection
 - e. refractometer
 - f. clean disposable wipes
 - g. distilled water
 - h. data collection sheet
2. Select fruit: keep track of the section, replicate, plot and keep cool until the measurements are taken
 - On each fruit, working with only one fruit out at a time and in a random order:
 - a. Pulp and collect juice from the fruit
 - b. Use an eyedropper to place on refractometer
 - c. Take measurement; clean eyedropper and refractometer with distilled water

Statistical test

ANOVA with treatment, planting and block

Research Expense Budget

- Spray
- Measurements - see above?
- Tape/flags?
- Additional research expenses pending approval

Memorandum of Understanding

Compensation for farmer-researcher

- Farmer-fee of \$500 per farm per experiment
 - \$250 receivable upon acceptance of this Research Protocol and Memorandum Of Understanding (MOU)
Acceptance form: <https://goo.gl/forms/0wMjDHmoLzRwLJIE3>
 - \$250 receivable upon remittance of the experimental data and photos, no later than October 31, 2017
- Reimbursement for approved research expenses
 - See budget above for approved research expenses
 - Fill out Reimbursement Form and send receipts (digital or hard copy)
Reimbursement form: <https://goo.gl/forms/6Rkj75dU7QGxBNDj2>
- Reimbursement for hotel stay, one per farm per experiment, for the Farmer-led Research Workshop, November 28, 2017 in conjunction with the EFAO Conference in Collingwood, Ontario.

In addition to the compensation above, the EFAO will

- Help set up Research Protocol, write and post Protocol in the Research Library
- Monitor progress of project, including check-ins and help with troubleshooting
- Deliver or mail a Farmer-Researcher farm gate sign
- Conduct training program related to on-farm research (training webinar link [here](#))
- Help analyze data, write and post a Research Report in the Research Library

Farmer-researcher will

- Maintain current membership in EFAO
- Establish and conduct experiment as outlined in Research Protocol above
- Record data outlined in Protocol and/or data collection sheet
- Take high quality photos throughout the project
- Keep in contact with EFAO with updates, problems, and questions
- Turn in data in a digital format and 3-10 best photos by October 31, 2017
- Complete feedback surveys related to the program

- Whole Circle Farm will host a Biennial Seed Production and Participatory Plant Breeding field day in August, as organized by Aabir Dey, EFAO, and Whole Circle Farm
- Provide upto 1 hour of mentoring, including reviewing related protocols in 2017 and/or 2018, and phone consultation with fellow farmer-researchers on related projects.

If possible, the farmer-researcher will

- Attend and present at the Farmer-led Research Workshop November 28, 2017 in conjunction with the EFAO Conference in Collingwood, Ontario

Contact

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Ontario
Trillium Foundation



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