

EFAO 2021: Research Protocol

Does intercropping with onions improve overall yield for cauliflower?

Farmer-researcher(s): Kristine Hammel, Persephone Market Garden - West

Project type: Research trial

Research priorities: Disease and pest management; Nutritional quality; Soil health; Weed control

EFAO Contact: Dillon Muldoon, dillon@efao.ca

Objective

To test the efficacy of interplanting cauliflower with onions.

Background

In spring 2020, Kristine had cauliflower in two side-by-side beds. One was just cauliflower. The other was cauliflower interplanted with artichoke and onions. The artichoke was the main crop and the others were left over transplants. The interplanted cauliflower did much better, despite very similar, though not exactly the same, treatment for weeding/mulch. This left Kristine curious about whether it was the intercropping that made the difference?!

Experimental Design

Field layout

100 feet long, on 5' centres, with 2 rows of cauliflower per bed with 1.5' spacing. For spring, Kristine randomly assigned 2 beds to have 1 bed of green stem and 1 bed of white stem. For fall, Kristine randomly assigned 3 beds to have 1 bed of green stem, 1 bed of white stem and 1 bed of romanesco.

In each row, Kristine will divide the bed into 4 x 20' increments and randomly assign each pair of increments to either cauliflower with no onions (control) or cauliflower interplanted with onions (+ onions). This layout will allow ~ 8' of wiggle room for Kristine to avoid the ends/edge of the beds for the trial.

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Bed layout

Bed	Season	Cauliflower type	20' row 1	20'	20'	20' row 4
1	Spring	Green stem	1-1-C no onions	1-2-O + ONIONS	1-3-C no onions	1-4-O + ONIONS
2	Spring	White stem	2-1-O + ONIONS	2-2-C no onions	2-3-C no onions	2-4-O + ONIONS
3	Fall	White stem	3-1-O + ONIONS	3-2-C no onions	3-3-C no onions	3-4-O + ONIONS
4	Fall	Romanesco	4-1-C no onions	4-2-O + ONIONS	4-3-O + ONIONS	4-4-C no onions
5	Fall	Green stem	5-1-O + ONIONS	5-2-C no onions	5-3-C no onions	5-4-O + ONIONS

Plot ID: bed#-plot#-C or O for control or interplanted with onions

Varieties

Cauliflower

Green stem = Song TJS-65 (JSS)

Regular = Goodman (High Mowing)

Romanesco = Veronica (JSS and HM)

Negi

Nabechan (JSS) Negi onions, which are scallions grown singly, deep like leeks and left to get bigger than regular scallions. The timing of growing Negi fits well with cauliflower and is flexible, meaning Kristine can harvest the onions at a range of sizes.

Statistical Model

We will use a split plot model to analyze Kristine's trial. This means that the design was randomized on two levels, where cauliflower variety in each season is the factor randomized at whole-plot level (i.e. whole-plot factor) and interplanting with onions or no onions is the factor randomized at the plot level (i.e. split-plot factor).

Note that we randomized the bed location for two cauliflower varieties in the spring and for three cauliflower varieties in the fall, but were not able to fully randomize across the two seasons (i.e. we couldn't have two green stemmed plantings in the spring, etc.).

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Measurements

Plant health

If possible, Kristine will measure plant health using a rating of very healthy, moderately healthy, unhealthy. She will take example photos of each rating and rate each head accordingly. If this is too much work throughout the season, Kristine will take general notes about plant health.

Yield & Quality

Total weight

For each harvest, Kriwill count the weight of **total harvestable and % marketable** cauliflower in each plot.

- For each harvest, this is 4 weights per bed
- Kristine will pre-label bins with the plot ID and use tared weights

Head per plot

For each harvest, Kristine will count the number of **total harvestable and % marketable** heads from each plot.

Average head weight

Using the data above

Photos

Kristine will take photos of each variety throughout the season.

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Research Plan

Time	Task	Methods & Measurements or Action Item
March 31	Seed spring cauliflower	Soil blocks, germination chamber
March 25	Seed spring onions	Soil blocks, germination chamber
Late april/early may	Bed preparation and layout	Remove cover (if any --note if it was covered?). Remove any remaining crop residue, add compost, rake, dibble
	Transplanting	By hand and cover with row cover
	Observations	Weekly pictures?
Mid/late june/early july	Harvest	
July	Submit spring data and photos	Submit data and photos to Sarah
June	Seed fall cauliflower	Record specific dates
June	Seed fall onions	Record specific dates
	Bed preparation and layout	Remove cover (if any --note if it was covered?). Remove any remaining crop residue, add compost, rake, dibble
	Transplanting	By hand, soak in, and cover with row cover
	Observations	Weekly pictures?
Sept/Oct	Harvest	
October	Submit data and photos	Submit data and photos to Dillon
December 31	Invoice	Send Sarah invoice for farmer-fee

*Please note that if data is submitted after the submission deadline, EFAO staff cannot guarantee that your data will be analyzed and written up before the Research Symposium and/or the next growing season.

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Staff check-ins

Monthly

Materials

Please list all materials, supplies and equipment that will be reimbursed for this project. If possible, please also indicate a short-list of any in-kind materials, supplies and equipment that you will use.

Material	Unit	Quantity Required	Total Cost*	Note
Flats				No additional needed
Seed				No additional needed
Extra tubs or scale?				No additional needed
Wood stakes for labelling the field plots				No additional needed
Total			~0	

Farmer-fee

\$500 in 2021, invoiced to EFAO after farmer-researcher submits data.

Invoices for Farmer-Fees & Reimbursements

Research expenses

- Email an invoice along with copies of receipts for all qualified expenses to **research@efao.ca**.
- Expenses can be claimed anytime throughout the year.
- Deadline: December 31, 2021

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Farmer-fee

- Email an invoice for your farmer-fee to **research@efao.ca**.
- Farmer-fees can be claimed after your data is submitted
- Deadline: December 31, 2021
- If you collect HST for your farm business, you can choose to add HST to your fee.

Memorandum of Understanding

You agree to keep an active membership with EFAO throughout the duration of your trial.

<https://form.jotform.com/210625202854246>

To check the status of your membership, log in here:

<https://efao.z2systems.com/np/clients/efao/login.jsp> or contact Martina, martina@efao.ca.