

Cultivar Variation in Pollination Deficit in BC Cranberries

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Pollination in Cranberry

- Cranberry production relies on pollinators
 - typically honeybees
- Honeybees may be less attracted to cranberry flowers due to lack of nectar
- Cranberry flowers are buzz-pollinated – a behavior that honeybees do not do



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Pollination in Cranberry

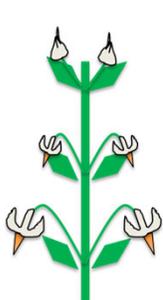
- Bumblebees buzz pollinate – potentially
- More efficient than honeybees in some crops
- i.e: In blueberry certain varieties benefit from the presence of wild bees



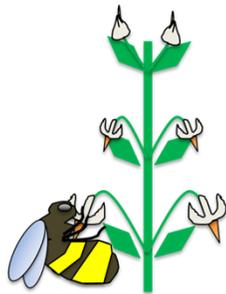
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Will increasing pollination matter?

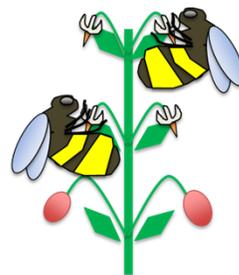
- Fruit set in cranberry is not known to be limited by pollination – extra fruit are aborted



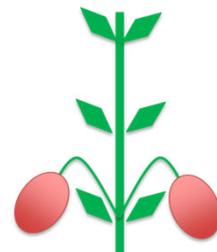
An upright might
make 6 flowers



If bees pollinate
the first two



And the rest...

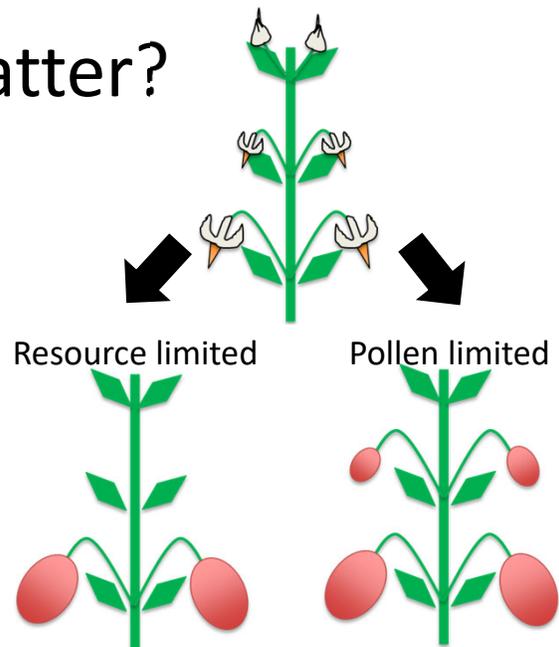


But plant only
invests resources in
the first two

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Will pollination matter?

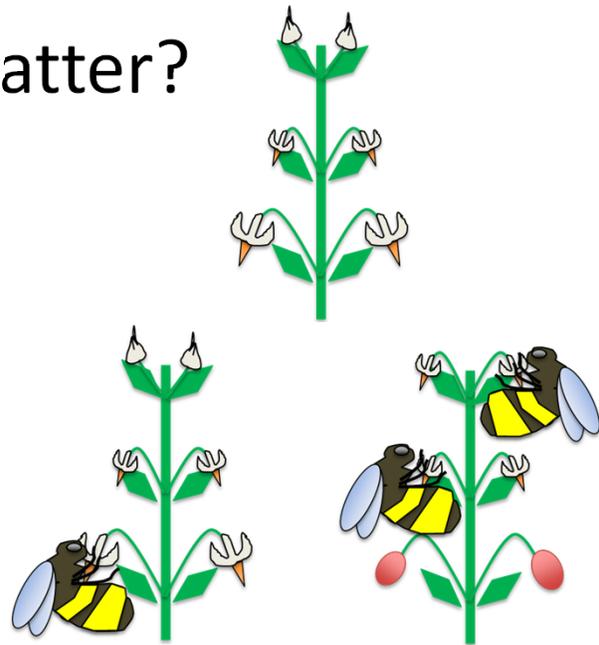
- However, studies of fruit abortion were done on one varietal – Stevens
- Varietals may vary in their respond to increased pollination



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Will pollination matter?

- Different varietals may also interact with pollinators in different ways
- i.e. Variation in flower number or nectar production



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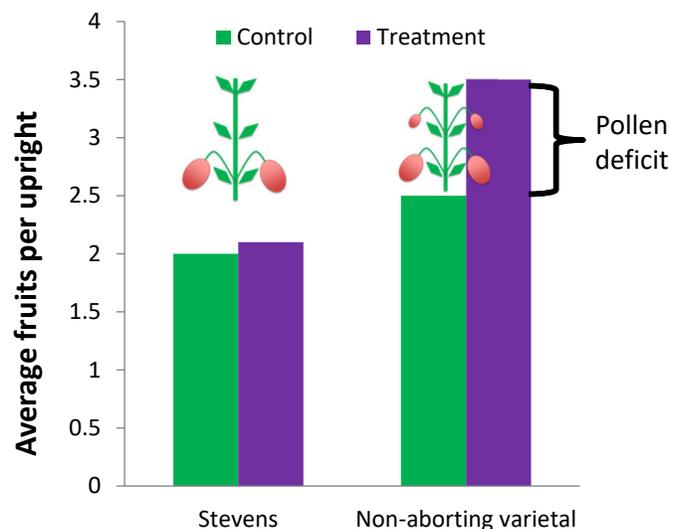
Study objectives

1. Determine cultivar variation in pollination deficit to determine which types might benefit from increased pollination.
2. Examine the role of honeybees vs. wild pollinators in mitigating this deficit across cultivars.

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What is pollen deficit?

- The difference in fruit set between open pollinated and supplemented flowers
- Represents additional potential yield that could be achieved with more pollination



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Methods: Field sites

- **Locations:**
- Cranberry research station in Delta
- Commercial farm in Richmond, B.C.
- **Cultivars:** Stevens, Demoranville, Mullica



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Methods: Quantifying pollinators

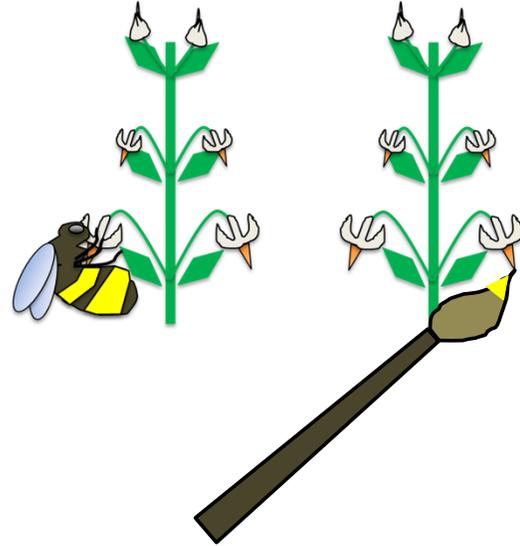
- Netted visiting pollinators for 2x 15 minutes per varietal at least 3 times during bloom.
- Honeybees were counted but not captured during collections.
- Estimated crop characteristics such as bloom density.



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Methods: measuring pollen deficit

- Selected 50 pairs of cranberry uprights per varietal per farm
- Assigned to one of two treatments:
 - Controls: receive ambient pollen
 - Treatment: supplemental pollination added by hand



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Methods: fruit data

- Treatment and control uprights were collected prior to harvest
- For each upright:
 1. Counted the number of fruits
 2. Weighed each fruit
 3. Cut open the fruit and counted the seeds



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Results: Data collected

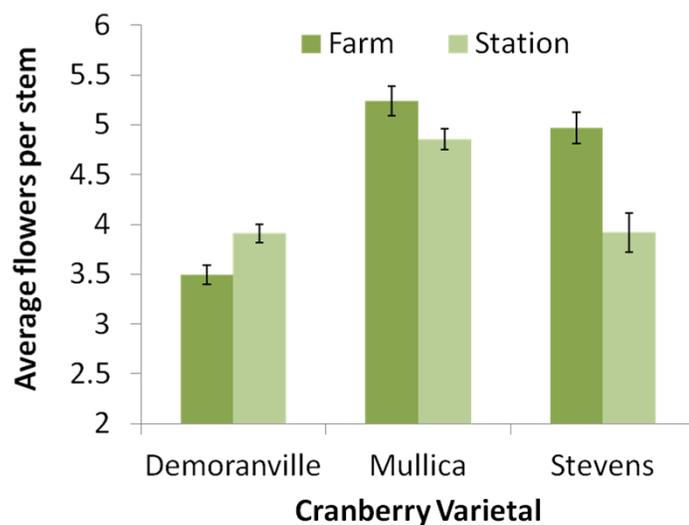
- Bees data collected 2-4 times per varietal:
 - Station: D x 2; M x 2; S x 3
 - Farm: D x 4; M x 4; S x 3
- Hand pollinations: Each varietal was pollinated at least six times
 - Station: D x 6; M x 12; S x 13
 - Farm: D x 7; M x 7; S x 7



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Results: Flowers per stem

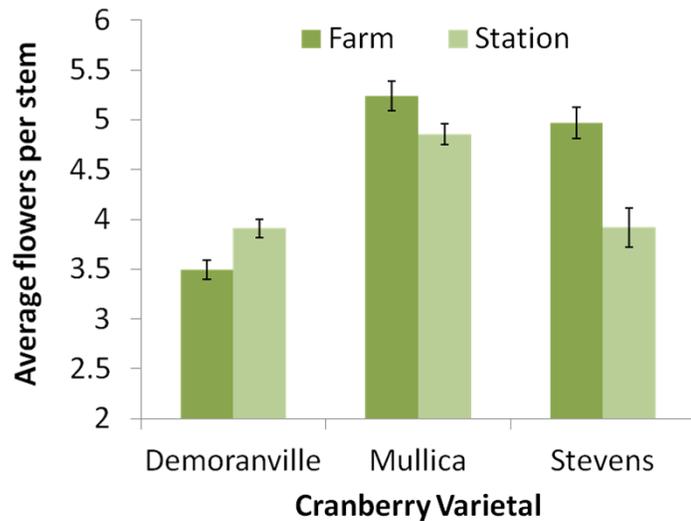
- Cultivars varied significantly in the number of flowers produced
- All varietals produced between 3 and 5 flowers per stem
 - Mullica produced the most
 - Demoranville the least



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Results: Flowers per stem

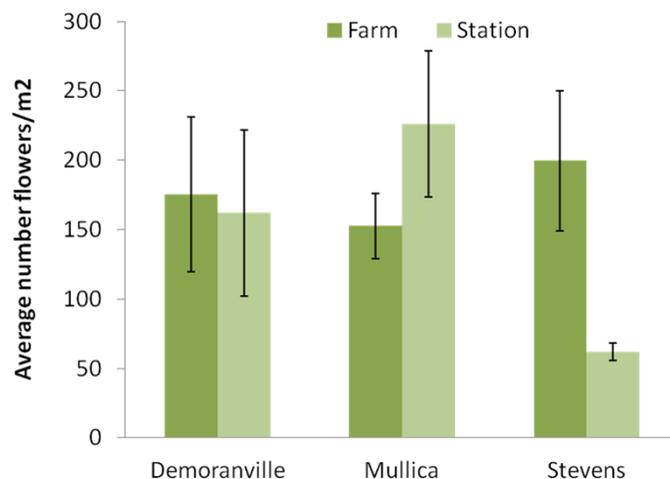
- Flowers further varied between our study sites.
 - Both Mullica and Stevens produced more flowers at the farm site than the station,
 - Demoranville was the reverse



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Flower density during bloom

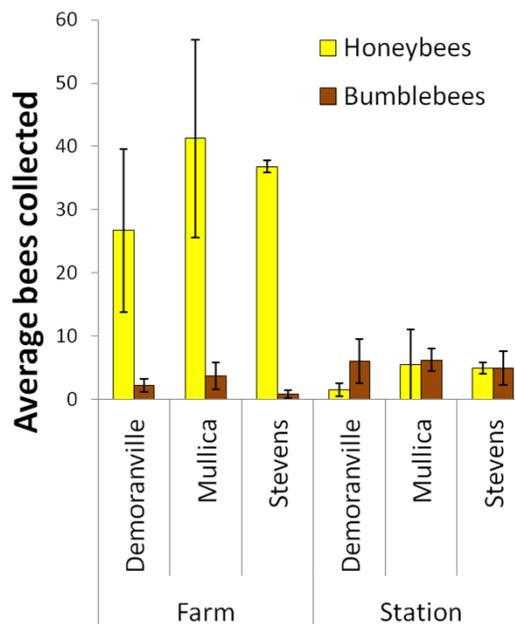
- The number of flowers/m² varied as well
 - Demoranville and Mullica are high and similar
 - Stevens at station is very low



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Results: Bees

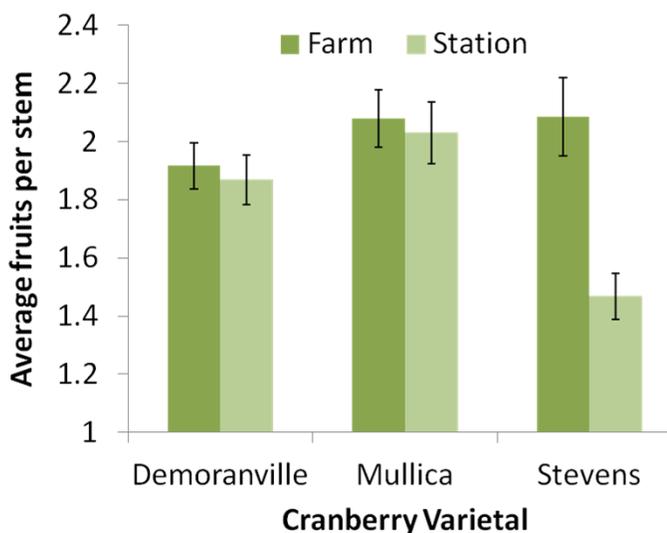
- The farm site had many more honeybees
- The field station had relative more bumblebees
- Varietals did not differ significantly in visits by honeybees or bumblebees



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Results: Fruits per stem

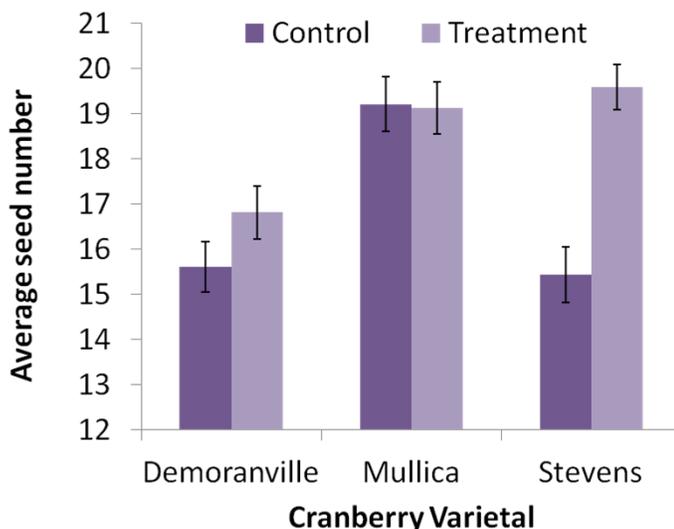
- All varietals produced on average about 2 fruits per stem
- Exception: Stevens at the research station, which produced on average 1.5 fruits per upright
- No effect of pollination treatments



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Results: seed number

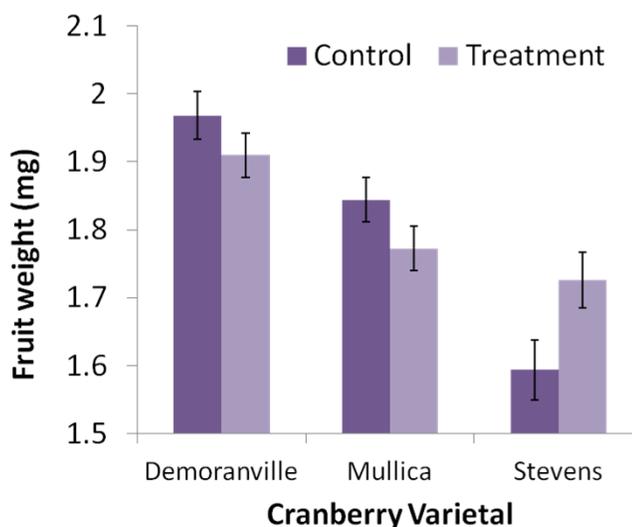
- Treatment Stevens and Demoranville produced more seeds per fruit
- Suggests some level of pollen limitation



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Results: fruit weight

- Treatment Stevens had higher fruit weight
- But not Demoranville
- Strong site-level impacts on both fruit weight and seed number that need to be further investigated.

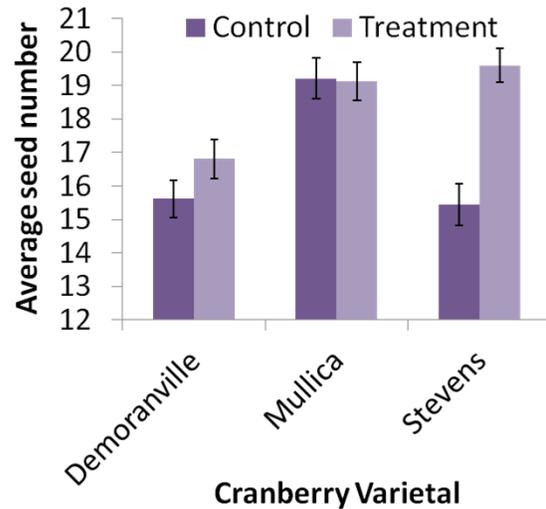


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Study objectives

1. Determine cultivar variation in pollination deficit

- No evidence of a pollen deficit impacting fruit number
- Some evidence in fruit seeds and weight for Stevens and possibly Demoranville

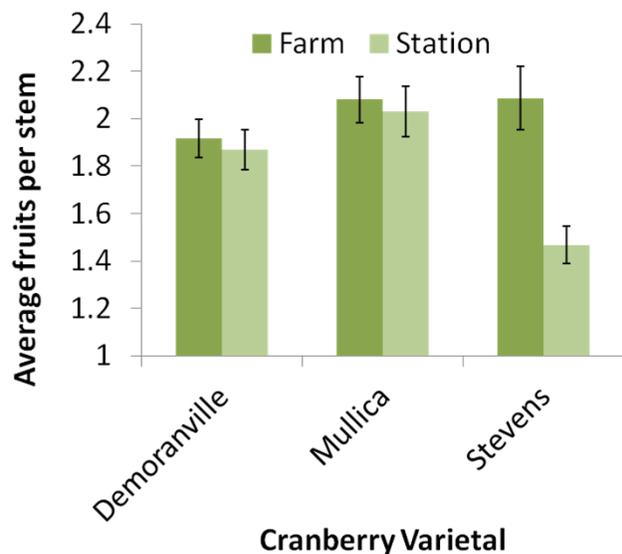


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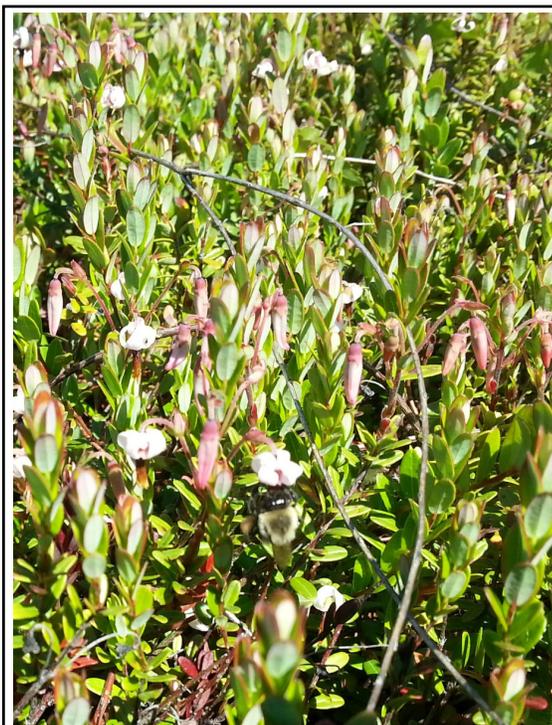
Study objectives

2. Examine the role of honeybees vs. wild pollinators in mitigating this deficit across cultivars.

- Our two sites had vastly different rates of visits, particularly from honeybees
- Yet, the research station had similar fruit set to the farm site



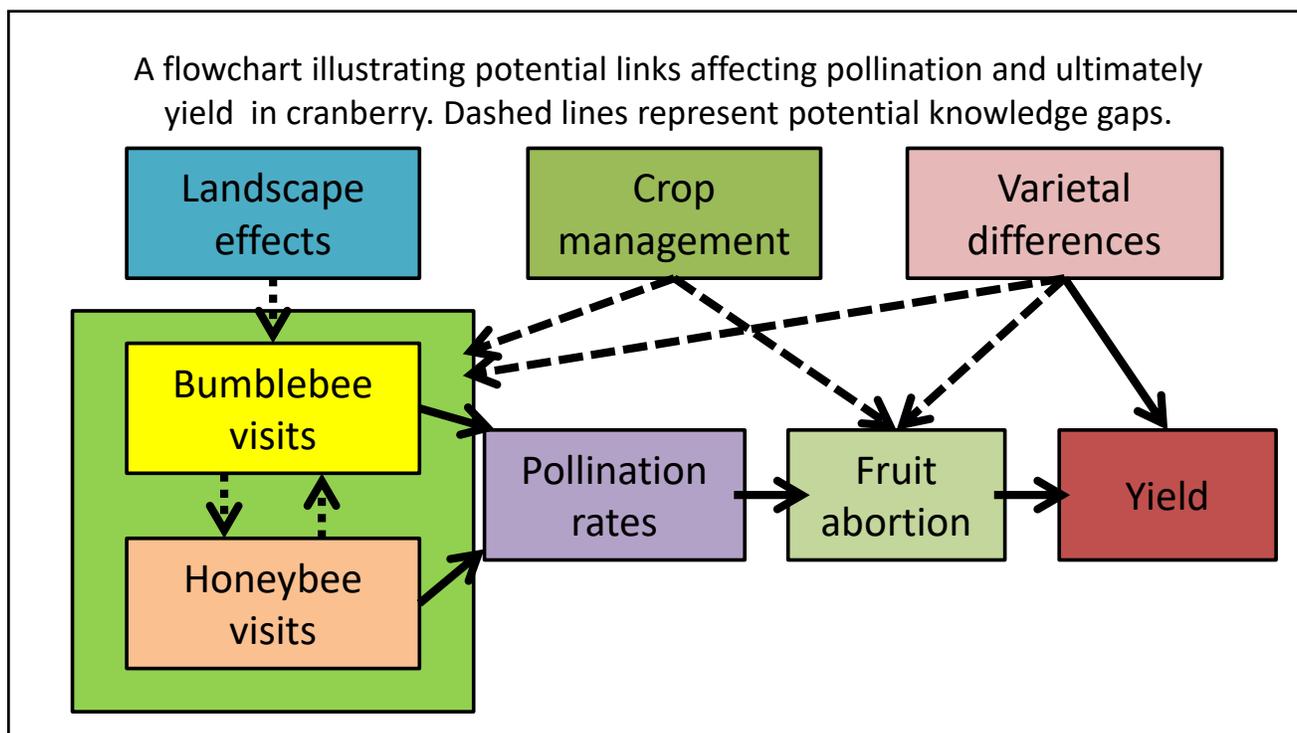
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Next steps

- Pollen deficits can vary vastly between seasons
 - Weather during bloom and other factors
- Examine other varieties that are becoming more popular
 - Crimson?
- Because of strong site-impacts research at a third location would be ideal
 - Particularly for Stevens

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Acknowledgements

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