

Workshop Title: Achieving quality vegetable seed through pollination control
11:30-12:30pm, 24 November 2015

Speaker: Will Bonsall

Executive Summary:

The distance between plants must be considered in order to mitigate cross pollination and ensure that varieties run true to type. Will discusses the distances that plants require to decrease cross pollination, and gives tips on how these vegetables can be grown successfully for seed saving. Harvesting the best and most desirable seed and the subsequent storage is the key to a genetically diverse, strong, and long-lasting seed collection.

Moving away from basic seed saving there are two things that must be considered...

1. Cross pollination
2. Biennials

But why should seed savers care about purity within seed?

- The population should be relative uniform and predictable
 - For example, if popcorn cannot pop then people will not want to buy that variety any longer

F1 hybrids and saving seed

- Yes, saving this seed can happen but it will not be very good
- All varieties begin as hybrids but they are stabilized after many generations
- Inbreeding is negative because it decreases genetic diversity
- For example, if butternut and blue hubbard squash are crossed - the F1 hybrid will have a new vigour and be very consistent
 - However, the generation after that (F2) is very different
- To save an F1, save the seed that exhibits the traits that yourself, as a grower, wants to exhibit for multiple generations
 - This will then create an OP variety (Open pollinated)
 - Rename the plant because it is not the same as the original

Vegetable seed saving

Cross pollination

• **Peas and beans**

- Take away the sexual parts to ensure that the type runs true - Consistency and uniformity happen through incest
- Bees cannot get into the flowers so growers do not have to worry about cross-pollination

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- **Lettuce, leek, cabbage, etc. will all cross pollinate**
- **Swiss chard and beets**
 - They are the same species - isolation is necessary
 - Year 1 this does not matter - both beets and chard do not produce their seeds at this time
 - However, during Year 2 the plants need significant distance between them
 - Keep in mind that recommended distance depends on what pollinator prefers the plant - i.e. Honey bees can travel much further than bumblebees

- **Carrot**
 - If multiple varieties are planted, give a huge distance between the types
 - The best way to ensure that no crossing happens is by planting just one type
- **Brassica oleracea**
 - Cabbage or kale family
 - Cole wort is what modern-day kale originated from
 - *Brassica rapa* is not common in the Maritimes (turnip)
 - Rutabaga was bred from *Brassica oleracea* and *Brassica rapa*
 - If growing true turnip then true turnip will continue to be bred

Pumpkins/Squash

- 4 different species but all are *Curcubitas*
- Know what species are being grown

Cucumbers

- Must be grown in isolation
- To save seed, allow the vegetable to be brown and mushy
- Mash up all of the seeds and goo and let it sit
- Slosh the gunk around - if some seeds begin falling to the bottom, the seeds are ready
- Scrape the gunk off the top, leaving the seeds at the bottom
- Add water, and keep doing this until all of the gunk is separated
- Dry the seed and save
 - The dried goo is habitable by fungi so it is necessary to get this all off to ensure that the seed doesn't deteriorate

Curcubit pollination

- The sexes are combined in this plant, but not in the same blossom
- There are male blossoms and female blossoms on the same plant
- Blossoms happen for a single day - they are ephemeral
- Males grow first

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- To determine the gender of the flower:
 - Females have a small version of the plant that is being grown (i.e. a zucchini, or patty pan) at the base of the flower
 - Males have nothing - they only have a flower and then the stem of the plant
 - Attach a tiny paper bag to the female flower and fasten it on with a paper clip so that no bees can go in and pollinate it
 - Take this off the next day - rub the pollinated bit over the female parts by tearing the petals off of the male plant and rubbing the pollen over the female parts
 - Put the bag back on to ensure that purity is kept, then take the bag off the next day
 - The plant is now pregnant and we can ensure that the plant is the type that we wanted
 - Make a scratch on the female part of the plant so that is known to be true to type
 - This is like branding a cow
 - Once the fruit matures, take the 'branded' ones to save seeds, and all other are left to eat or sell

Cabbage

- How to save enough seed to ensure that there is significant genetic diversity?
 - Do it over multiple years - grow 100, save 50, and eat 50
 - Sometimes a sacrifice has to be made (i.e. grow 100, save 80, eat 20)
 - The seeds can be stored in freezers and will save for 15+ years

Selecting the types of seed to be saved

- The largest, and fattest vegetable may not be the traits that are desirable to the grower
- Does the grower want an early variety? If so, do not save the fat plants that have taken all year to grow

Storing seed

- The drier the location, the better
- The most ideal place is to store seeds in the freezer
 - As long as the seeds are dry enough, it will never be too cold
- The University of Colorado stores seed at -300degC in cryo-chambers and it looks like they will be saved for several hundred years

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- For the longest and best preservation, put them in a glass jar in the freezer with tape around the lid
- When retrieving seed from the freezer each year, allow the jar to come to ambient room temperature before the lid is uncapped - this ensures that no unnecessary humidity will get into the jar
 - Changing temperature is fine for the seed, it just needs to be brought to room temperature so that no humidity enters the jar due to the temperature change

Methods for isolation

- Distance
 - Will has many isolated plots throughout his acreage
 - This is where he plants things that need isolation to grow such as chard, carrots or beets

Q & A

Q: When we buy seeds of peas we cannot get them to run true - should we save our own seeds?

A: Determine if they're cross pollinating - by saving the seed yourself you can select the plants that do run true to type. Pull the plants out if none are looking good!