

# Seed Saving 101- Vegetables

## UME-MG Continuing Education

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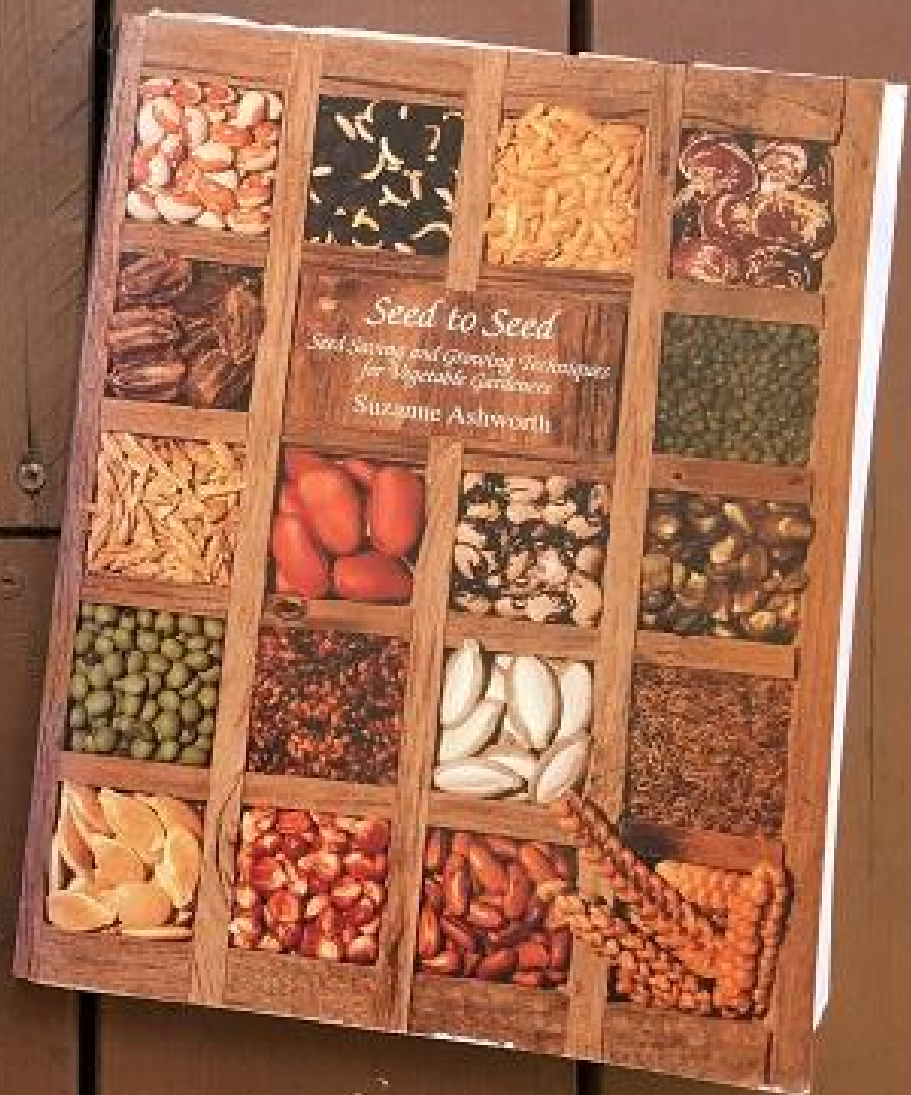
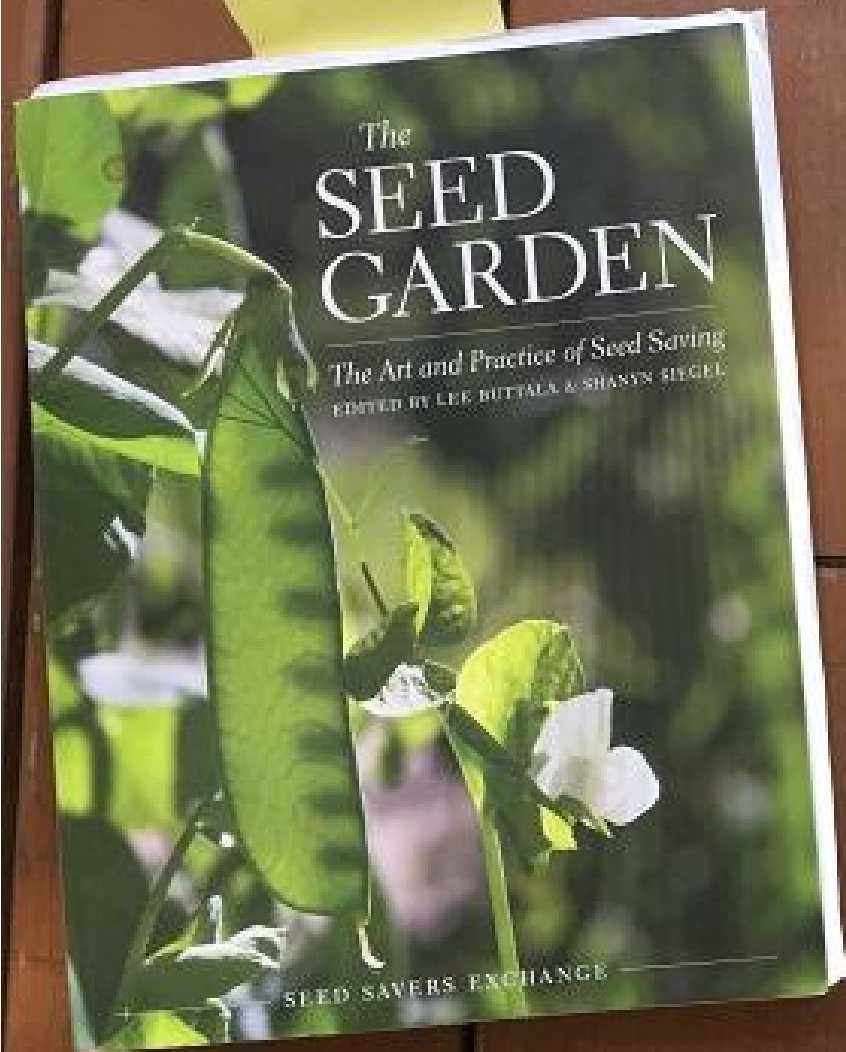
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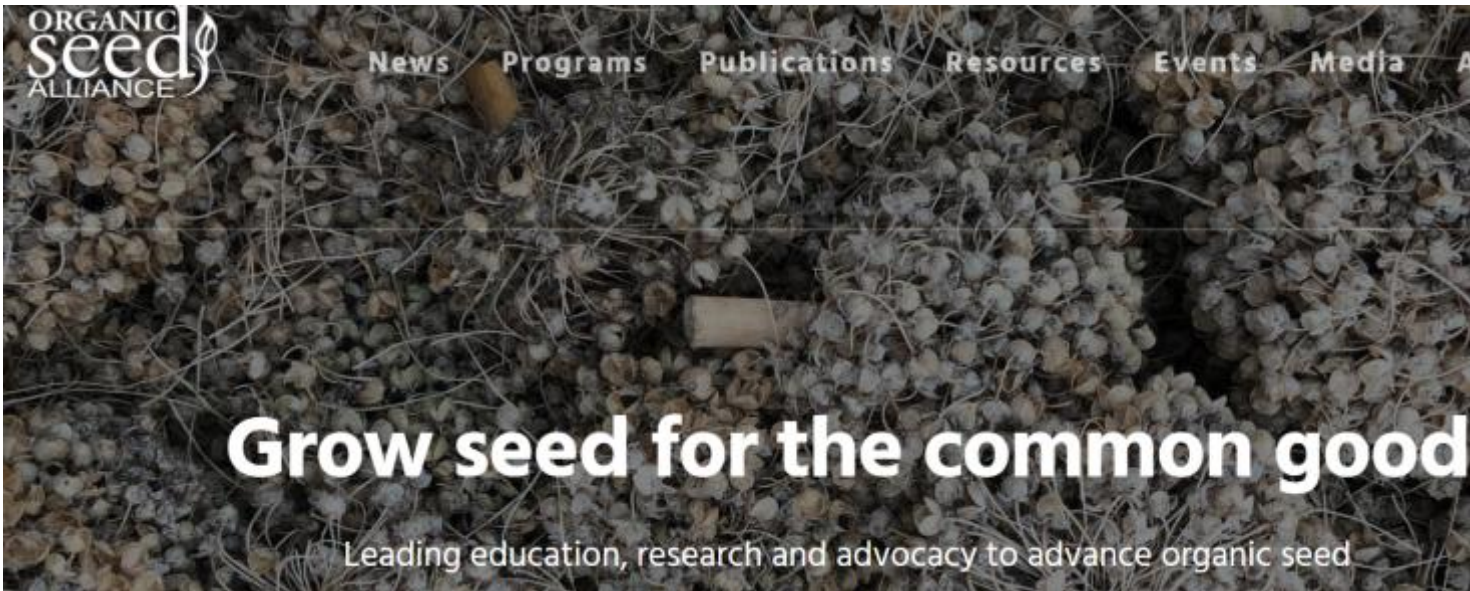
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# Reasons to save vegetable seeds

- Fascinating and fun!
- Increase plant knowledge
- Save money
- Improve and preserve favorite cultivars
- Share seeds
  - Gardener-to-gardener; holiday gifts
  - Seed swaps and libraries
- Enhance Grow It Eat It programs







## Four phases of sexual reproduction:

Pollination

Fertilization of ovules

Fruit maturation

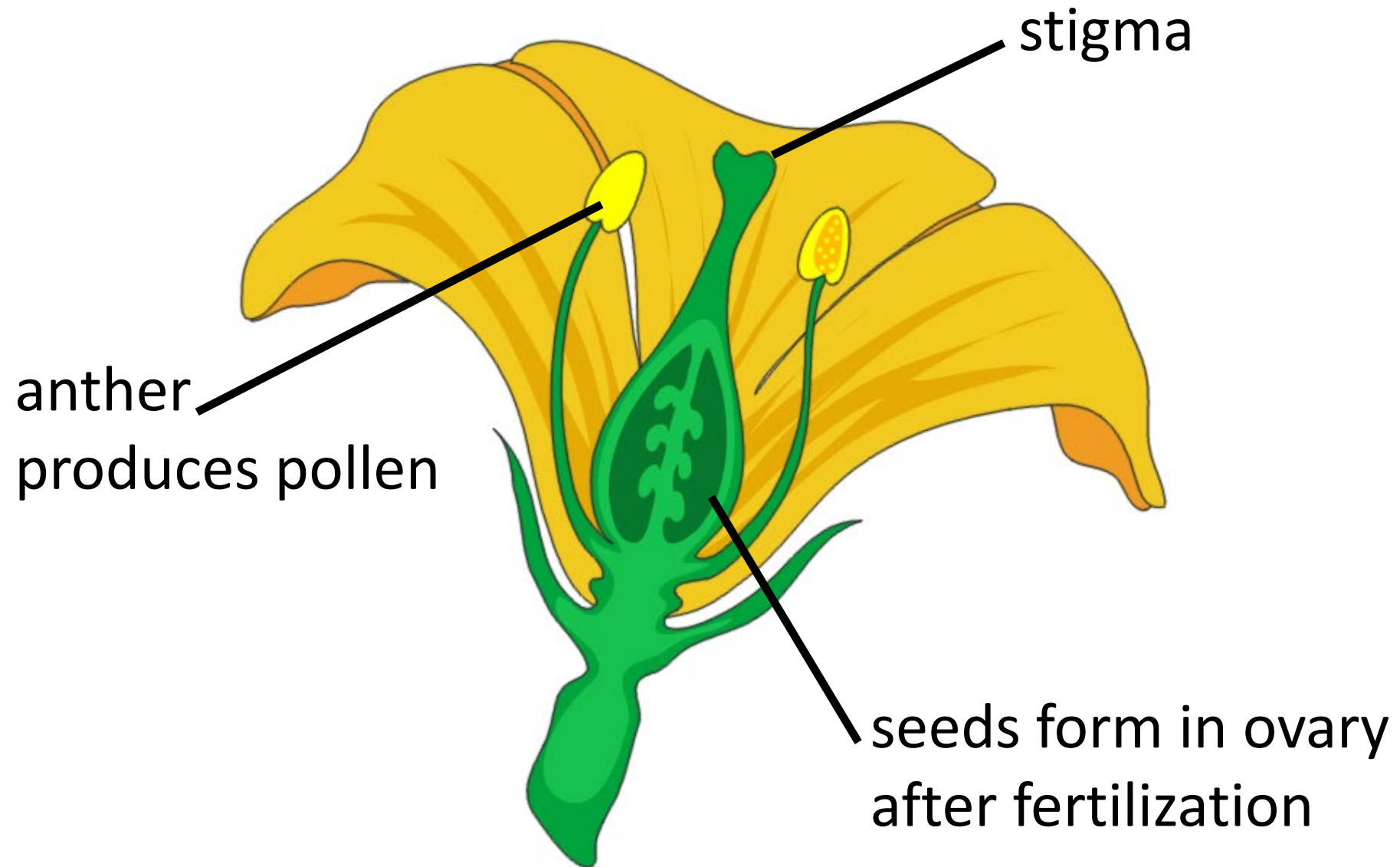
Seed maturation

**Flowers exist to produce seeds!**





Photo credit: Seed Savers Exchange; [seedsavers.org](http://seedsavers.org)



Pea & bean: self- pollinated



Photo credit: Seed Savers Exchange; [seedsavers.org](http://seedsavers.org)



Okra: self-pollinated and /insect pollinated



Photo credit: Seed Savers Exchange; [seedsavers.org](http://seedsavers.org)

Squash family: insect pollinated



Photo credit: Seed Savers Exchange; [seedsavers.org](http://seedsavers.org)





Corn: wind pollinated

Photo credit: Seed Savers Exchange; [seedsavers.org](http://seedsavers.org)



## Poll question 1

A monoecious species produces...

Correct answer is “b”



# Three levels of seed saving

## 1. Personal (for yourself, friends, and family)

possibly selecting for specific traits (earliest and largest fruits). Probably not able to follow population and isolation recommendations

## 2. Public sharing (for seed swaps, seed libraries, MG projects)

save seed from multiple plants and follow isolation recommendations

## 3. Cultivar maintenance (seed companies and serious seed savers)

requires seed from multiple fruits from all plants in the population to capture a range and balance of traits for genetic preservation

# Five elements of seed saving

- 1) crop selection
- 2) population size
- 3) isolation
- 4) selection/rouging
- 5) storage







# Crop selection

- Only save seed from open-pollinated cultivars. Seed collected from hybrid cultivars will not “come true”
- Learn the crop: family, genus, and species; annual or biennial; pollination, isolation, and population requirements
- Easiest to save seed from annuals that are mostly self-pollinating (genetically more uniform), such as bean, pea, tomato, and lettuce
- Harder to save seed from species that are mostly insect or wind pollinated, such as spinach, broccoli, and corn. They are genetically more variable and likely to cross-pollinate

# Isolation distance

## Population Size

- Isolation distance is the distance between the plants that seeds will be saved from and potential source of cross-pollination contamination
  - You can reduce distances based on topography and structures, pollinator forage, and bee populations
- Population size is the number of individual plants from which seeds will be saved to achieve a particular seed saving goal



# Three levels of seed saving- tomato

## 1. Personal (for yourself, friends, and family)

Population size- **1 plant for viable seed**

Isolation distance- 10 ft., except for potato-leaf cultivars (50 ft.)

## 2. Public sharing (for seed swaps, seed libraries, MG projects)

Population size- **5-10 plants for variety maintenance**

Isolation distance- 10 ft., except for potato-leaf cultivars (50 ft.)

## 3. Cultivar maintenance (seed companies and serious seed savers)

Population size- **20 plants for genetic preservation**

Isolation distance- 10 ft., except for potato-leaf cultivars (50 ft.)



# Strategies to prevent out-crossing (unwanted cross-pollination)

- Plant only one cultivar of a species
- Separate cultivars by time
- Cage or cover plants
- Bag flowers and hand-pollinate
- Learn what's growing in neighbor gardens



# Plant and fruit selection

- Rogue out off-type plants
- Don't save seed from badly stressed, diseased, or infested plants or from off-type fruits
- Save seed from best fruits (maternal selection)
- Seeds within a fruit ripen concurrently. Seeds between fruits ripen differentially





# Seed saving techniques

- Harvest fruits when seeds are mature; doesn't always match market (eating) maturity.
- Seeds almost always need further drying after extraction from dry or wet fruits. Moisture content should be 4-12%
- Wet/fleshy fruits- either use water to separate/wash seed (e.g., tomato) or scrape seeds from fruit cavity (e.g., pepper)
- Dry fruits- thresh by hand; walk on or flail dried fruits; hang seed heads upside down in paper bag or pillowcase



Photo credit: Seed Savers Exchange; [seedsavers.org](http://seedsavers.org)



## Vegetable seed storage:

- Keep them cool, dry, and in the dark
- Rule of thumb- air temperature + relative humidity  $\leq 100$
- Freezer good for long-term storage
- 2- 6 year life depending on species





# Scenario #1- Tomato

- Solanaceae family; *Solanum lycopersicum*
- Perennial treated as a tender annual
- Perfect, self-fertile flowers
- Very self-pollinating but varies by cultivar; also insect pollinated
- One fruit from one plant gives for viable seed



‘Carmen’ tomato- pistil is “inserted” – stigma is positioned below anther cone





‘Pruden’s Purple’- a potato-  
leaf heirloom with protruding  
(exserted) pistils



Photo credit: Seed Savers Exchange; seedsavers.org

Exserted pistil

Inserted pistil





Photo credit: seedsavers.org



Photo credit: seedsavers.org

### Wet processing and seed fermentation process:

- Cut fruits and scoop or squeeze out seeds and pulp into a container
- Place container outside in a protected location
- Fermentation occurs naturally in 2-4 days (breaks down germination inhibitor and helps prevent seed-borne diseases); seeds will sink to bottom
- Remove and discard fungal mat, rinse seeds well



Drying- 1-2 weeks indoors; spread seeds out

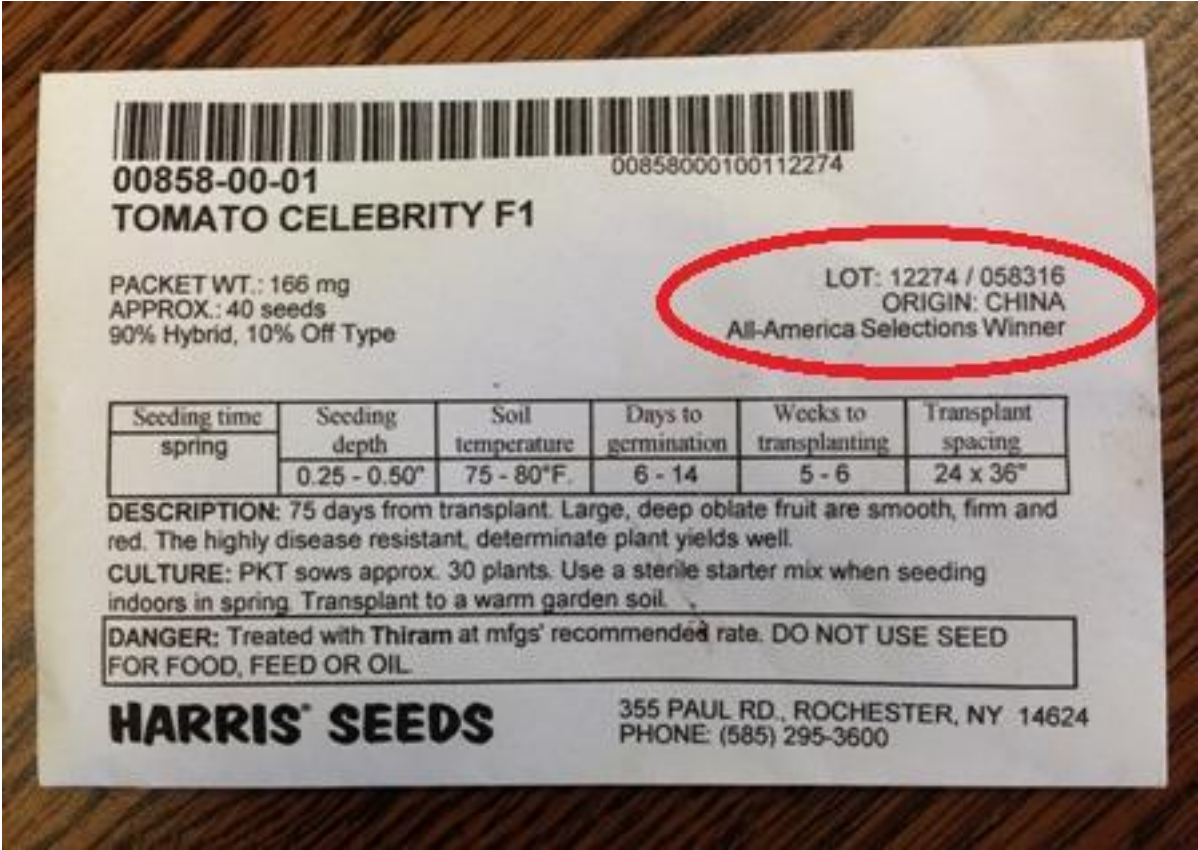


Photo credit: Seed Savers Exchange; seedsavers.org





Result from planting seeds of a store-bought grape tomato



Vegetable seed productions occurs world-wide



# Inter-species crossing in pepper



- Perfect, self-fertile flowers; also out-crosses via insect-pollination, especially chile peppers
- *Capsicum annum* (most garden peppers), *Capsicum frutescens* (e.g., Tabasco), and *Capsicum chinense* (e.g., Habanero) all cross-pollinate
- *Capsicum baccatum* (e.g., Aji' Amarillo) may cross with these three.
- *Capsicum pubescens* (e.g., Rocoto) will not cross with other *Capsicum* spp.

(In your garden, hot chiles do not make adjacent sweet peppers hot)

## Scenario #2- Summer squash

- Cucurbitaceae; *Cucurbita pepo*
- Annual
- Monoecious; separate male and female flowers on same plant; self-compatible
- Mostly outcrossing; insect-pollinated
- One fruit from one plant for viable seed





Photo: Gerald Holmes, Bugwood.org

Immature ovary (baby fruit) is always  
below female flower



Male flowers are on straight flower  
stems (pedicels)





Squash anther cone- three  
anthers fused together

Can be used as a paint brush to  
pollinate female flowers



# ‘Costata Romanesco’

- Harvest fruits that are beyond “market maturity”- large with hardened rind and dry fruit stem
- Let fruits sit indoors for 30 days; seeds mature inside fruits







Remove, wash, and dry seed



To maintain wide range of cultivar traits: mix in seed from other sources if saving seeds from just a few fruits from 1-2 plants





## Poll Question 2

Can a zucchini plant (*Cucurbita pepo*) cross with a pumpkin plant (*Cucurbita pepo*)?

Correct answer is “d”



X



Photo credit: UNH Extension

## Scenario #3- Bean and Pea Family

- Fabaceae family
- Annuals
- Perfect, self-fertile flowers
- Very self-pollinating (varies by cultivar); cross-pollination via insects
- Dry fruits/dry seed processing
- One fruit from one plant for viable seed



# Pollination differences within bean family

- Common garden bean- very self-pollinating
- Cowpea- mostly self-pollinating
- Lima bean- self-pollinated and commonly insect pollinated
- Scarlet runner- mostly insect pollinated





Hairy vetch fruits threshed in box lid



Anise hyssop

Basil





Photo credit: Seed Savers Exchange; [seedsavers.org](http://seedsavers.org)





Threshing

Photo credit: Seed Savers Exchange; [seedsavers.org](http://seedsavers.org)



# Winnowing



Photo credit: Seed Savers Exchange; [seedsavers.org](http://seedsavers.org)



Thanks for  
participating!

Questions?



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