

Seed Saving 101- Vegetables

UME-MG Continuing Education

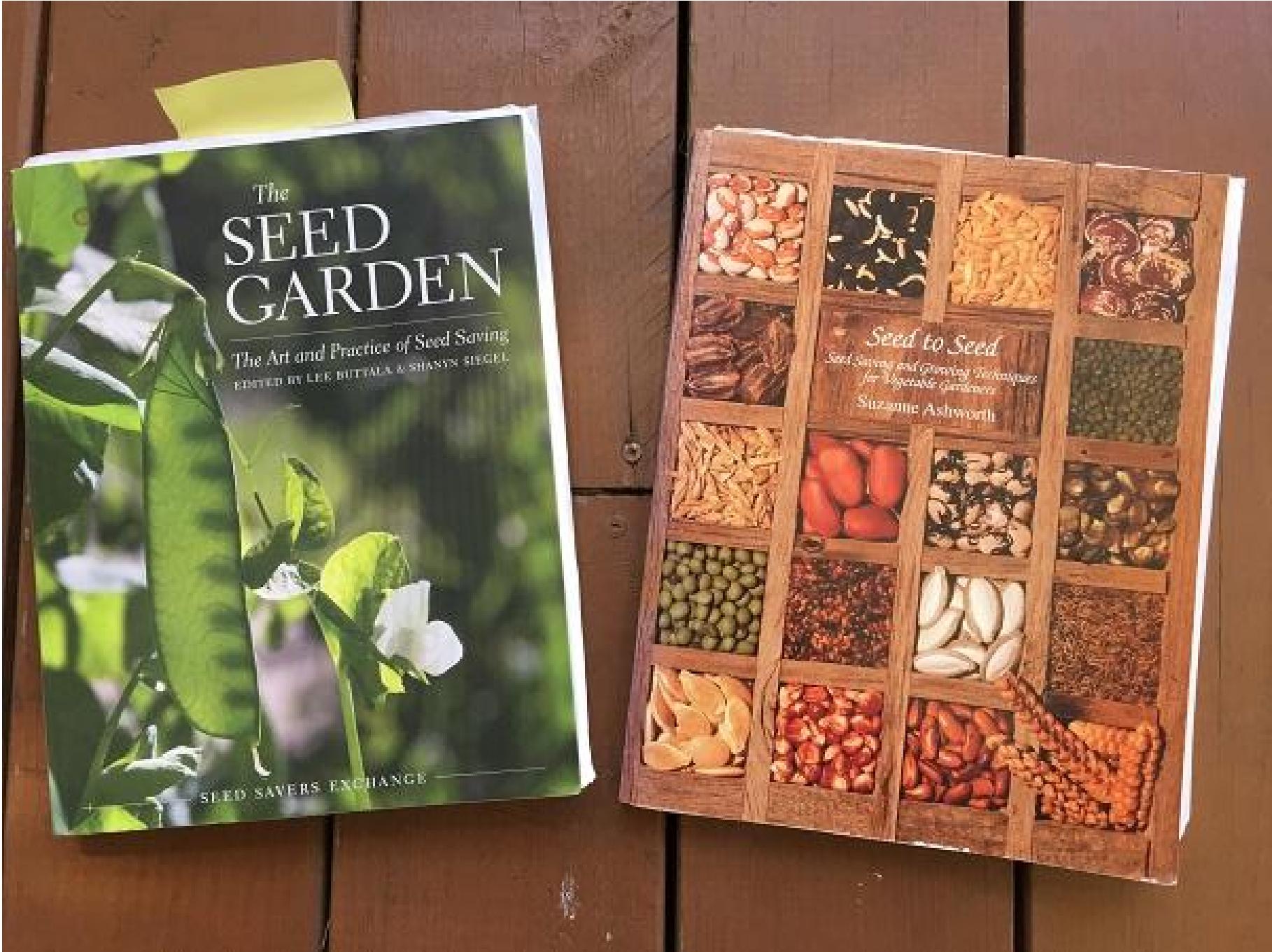
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Grow seed for the common good

Leading education, research and advocacy to advance organic seed



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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

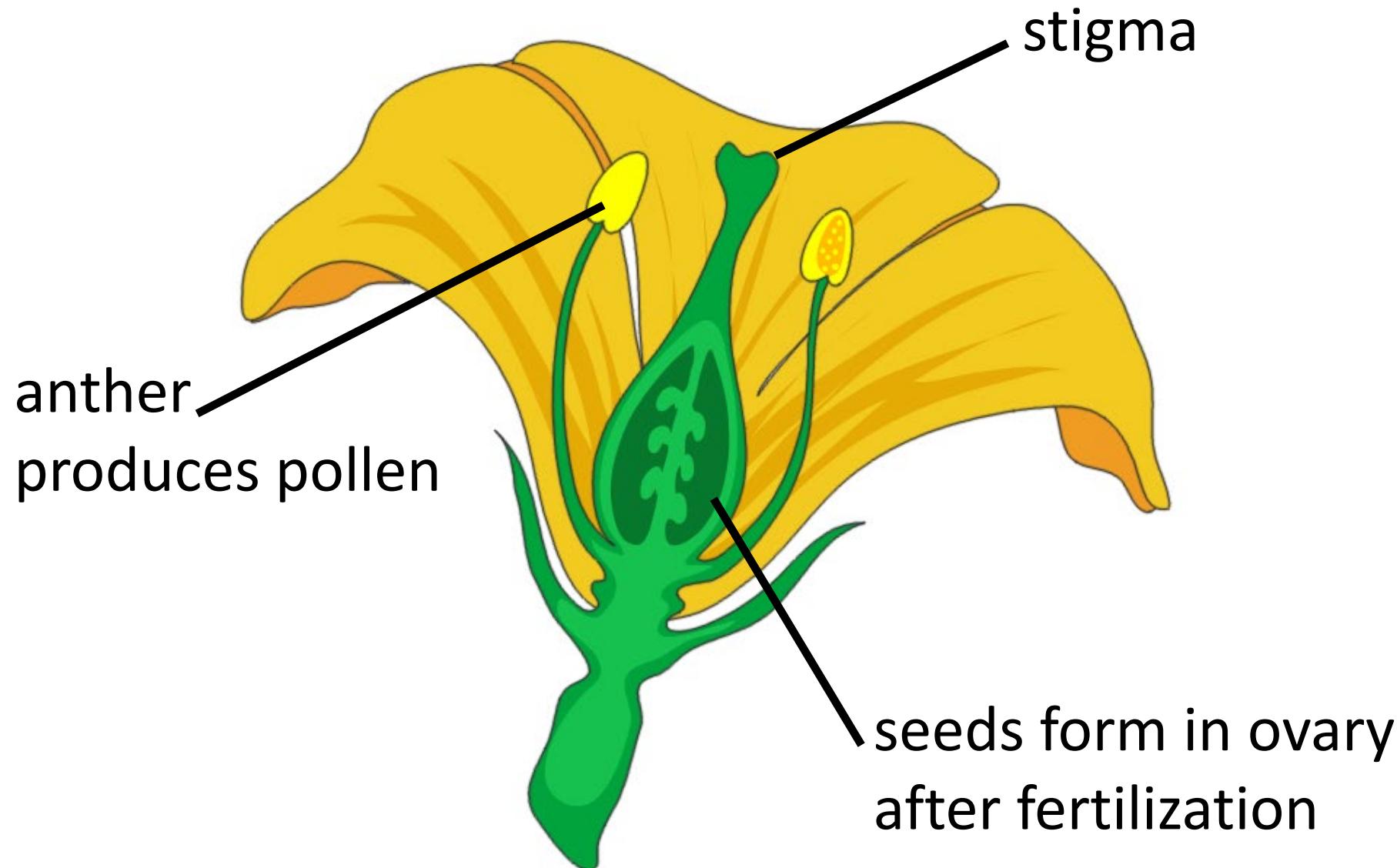
Fruit maturation

Seed maturation

Flowers exist to produce seeds!



Photo credit: Seed Savers Exchange; seedsavers.org



Pea & bean: self- pollinated



Photo credit: Seed Savers Exchange; seedsavers.org

Okra: self-pollinated and /insect pollinated



Photo credit: Seed Savers Exchange; seed savers.org

Squash family: insect pollinated



Photo credit: Seed Savers Exchange; seed savers.org



Photo credit: Seed Savers Exchange; seed savers.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 contact 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



Vegetable seed storage:

- Keep them cool, dry, and in the dark
- Rule of thumb- air temperature + relative humidity ≤ 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



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



Photo credit: seedsavers.org

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 production 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



Photo credit: Seed Savers Exchange; seed savers.org

Winnowing



Photo credit: Seed Savers Exchange; seed savers.org

Thanks for
participating!

Questions?



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