Saving Vegetable Seeds

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Seed Saving Benefits
- Accustom to climate and soil
- Adapted to pests
- Preserving interesting and unique varieties, heirlooms
- Potential cost savings

Open-Pollinated
- Stable, breed true to type
- AKA- Standard, Non-hybrid
- Set seed naturally
  - Aided by wind, rain, insects
  - Line continued by sowing seeds harvested from each generation

Open Pollinated vs. Hybrids

Open Pollinated

Hybrids
- Do not save seed from hybrids
- Deliberate crossing of two inbred lines
- 1st generation of hybrid (F1)
  - Contain exact same 2 sets of genes
  - Extremely uniform, better performance
- 2nd generation (F2)
  - Contain a random mix of genes
  - Variable characteristics

Cross Pollinated vs. Self Pollinated
Cross-Pollinated (Outcrossed)
- Pollen from:
  - Separate flowers (Corn, squash)
  - Separate plants (Asparagus)
- Two varied sets of genes
- Less predictable appearance—difficult to keep strain pure
- Beet, broccoli, corn, cabbage, carrot, cucumber, melon, onion, radish, spinach, turnip, pumpkin

Self Pollinated (Inbred)
- Easiest to save
- Pollen from same plant
- Two identical sets of genes
- Similar appearance to parent
- Beans, eggplant, lettuce, peas, peppers, tomatoes

Saving Seeds
- Usually collected from annuals and biennials
- Annuals
  - Beans, Cucumber, Eggplant, Lettuce, Melons, Peas, Peppers, Squash, Tomatoes
- Biennials
  - Work involved carrying over to next season
  - Beets, Brussels Sprouts, Cabbage, Carrots, Cauliflower, Celery, Onions, Turnips
- Perennials usually propagated by divisions or cuttings
- Collect from a high quality parent!

Mutant Fruit!
- Myth that 2 different vegetables can cross and produce a mutant
  - Potatoes will not cross with tomatoes
- The results of a cross are not apparent in the 1st year
  - Cross occurs in developed seeds not current fruit
  - Corn would be one exception

Botanical Nomenclature
- Vegetables identified by a Genus & species
  - Cucurbita pepo
    - Genus: Cucurbita
    - Species: pepo
    - Cultivar: Black Beauty Zucchini
    - Cultivar: Yellow Crookneck
    - Cultivar: Connecticut Field Pumpkin
    - Cultivar: Patty Pan Scallop
    - Cultivar: Spaghetti Squash
    - Cultivar: Warted Gourd
  - Cultivars with the same species will cross
  - No cross with:
    - Cucurbita maxima (Hubbard, turban, banana)
    - Cucumis melo (Muskmelon, honeydew, Armenian cucumber)

Maintaining Purity
- Isolation Distance
  - Spacing varieties at a specified distance large enough to prevent contamination from insect or wind pollination
- Time Isolation
  - Staggering planting times, so 1st crop blooms earlier
  - Works well if the crops have quite different maturation rates
- Hand Pollination
Maintaining Purity

- **Mechanical Isolation**
  - Construct a physical barrier to prevent undesired pollination
- **Bagging**
  - Cover the flowering portion to isolate
  - Used for self-pollinating crops
  - For smaller seed collections
- **Caging**
- **Alternate Day Caging**
- **Caging with introduced pollinators**

Population Size

- **Do want to maintain genetic diversity within a population**
  - Plants will adapt to a varying environment, continue to evolve
- **Important to save seeds from a number of plants within the variety**
  - Self-pollinated: from 20 plants
  - Cross pollinated: from 100 plants
  - As many as you can fit in a home garden
- **Lack of population leads to undesirable traits, lower yields, late maturity**

Beans, Peas & Other Legumes

- **Self pollinate**
  - Potential insect contamination
- **Selection**
  - Avoid collecting from plants with off foliage, unusual height, discolored/misshaped flowers, inferior pods
- **Harvesting**
  - Leave pods on plants on fully dry (seeds rattle)
  - Pick pods and allow them to dry on screen for ~ 2 weeks
- **Remove dry seeds (Hammer test)**
  - Sack method-winnower
  - Split by hand
- **Freeze for 3 days to kill bean weevil eggs**

Beans

- **Phaseolus vulgaris-Beans**
  - Will not cross with other beans species or peas
- **Isolation distance:**
  - Varies, don't plant varieties next to each other
- **Viability 50% at 4 years**
  - Fed Germ Standard 70%

Peas

- **Pisum sativum-Peas**
  - Will not cross with other pea species or beans
- **Isolation distance: 50’**
  - Many pollinate before the flower opens, so crossing is minimal
- **Viability 50% at 3 years**
  - Fed Germ Standard 80%

Solanaceae-Nightshade Family

- **Self pollinate**
  - Potential insect contamination
- **Selection**
  - Seeds collected from fully ripe fruits
- **Harvesting & Drying**
  - Crush, chop, squeeze to remove seeds
  - Mix with water, good seeds sink
  - **Ferment tomato seeds**
  - Avoid metal bowls
  - Avoid drying on paper
  - Stir twice a day
- **Dry seeds will break not bend**
**Eggplant**

- **Solanum melongena**
  - Will not cross with tomatoes, peppers, potatoes
  - Isolation distance: 50'
  - Solitary bees (bumblebees may work flower)
  - Cage or bag individual blooms
  - Use over mature fruit
  - Viability 50% at 7 years
    - Fed Germ Standard 60%

**Peppers**

- **Capsicum annuum**: Sweet & chili peppers
  - Will not cross with tabasco or squash pepper
  - Isolation distance: 500'
  - Honeybees and sweat bees commonly visit
  - Cage or bag individual blooms
  - Use mature (red) fruit
  - Cut and scrape out seeds
  - Viability 50% at 3 years
    - Fed Germ Standard 55%

**Tomatoes**

- **Lycopersicon esculentum**
  - Will not cross with currant tomatoes, tomatillos or other Physalis fruits
  - Isolation distance:
    - Modern types have limited crossing
    - Cage if more than 1 variety of protruding style
  - Gelatinous coating removed through fermentation
    - Scoop seeds into container, add warm water
    - Let stand room temp for 3-5 days
    - Remove scum that forms, then add more water
    - Repeat until only clean seeds remain
  - Viability 50% at 4-10 years
    - Fed Germ Standard 75%

**Lettuce**

- Self pollinate
- **Lactuca sativa**: Lettuce & Celtuce
  - Will not cross with endive, escarole or chicory
  - Isolation distance: 12-25'
  - Some insect crossing possible
  - Cage or wrap heads with spun polyester will ensure purity
  - Viability 50% at 3 years
    - Fed Germ Standard 80%
  - Harvesting Seed
    - Allow stalk to bloom
    - Collect dry heads (12-24 days)
    - Hold stems and insert heads into bag, shake vigorously to catch seeds
    - Put seeds on screen & blow off feathers

**Cucurbits**

- Must control pollination of cucurbits
  - Male and female flowers
  - Determine which will open the next morning
    - Light yellow, distinct tip
  - In PM select flowers on same plant, use a paper chip/hands to hold flowers closed
  - In AM pick male flower and touch cluster of pollen to center of female flower
  - Reclose the female flowers so bees can’t get in
  - Tag so you can find it later

**Melons**

- **Cucumis melo**: Muskmelon, cantaloupe, honeydew, casaba, Armenian cucumber, pocket melon, vine peach
  - Will not cross with watermelon, cucumbers, squash
  - Isolation distance: ½ mile
  - Best with insect pollination
  - Harvest when melon is ready to eat
  - Viability 50% at 5 years
    - Fed Germ Standard 75%
Cucumber
- *Cucumis sativus*: Cucumber
- Will not cross with West Indian gherkin, Armenian, Burr, or African horned cucumbers
- Isolation distance: ½ mile
- Insects pollination
- Hand pollination effective
- Harvest
- Yellow color, softening
- Halve and scrape out seeds
- Remove gelatinous coat with fermentation method (1-3 days)
- Viability 50% at 10 years
- Fed Germ Standard 80%

Summer Squash & Other *C. pepo*
- *Cucurbita pepo*: Acorn, crookneck, scallops, small striped and warded gourds, pumpkins, spaghetti, zucchini
- Will not cross with cucumbers, melons, other winter squash
- Isolation distance: ½ mile
- Require insects for pollination
- Harvest
- Hardened fully/over mature fruit
- Sit for 3 weeks, then cut open, scoop seeds
- Wash, drain and dry
- Viability 50% at 6 years
- Fed Germ Standard 75%

Storing Seeds
- Short-lived seeds (1-2 yrs)
  - Corn, onions, parsley, parsnip, pepper
- Intermediate seeds (3-4 yrs)
  - Asparagus, bean, broccoli, carrot, celery, leek, pea, spinach
- Long-lived seeds (4-5 + yrs)
  - Beet, Brussels sprouts, cabbage, cauliflower, cucumber, eggplant, lettuce, muskmelon, pumpkin, radish, squash, tomato, turnip, watermelon
- Tightly sealed glass containers are ideal
- Within container store seeds in paper packets
- Keep in fridge (32-41°F)
- To help absorb moisture
  - Use silica gel desiccant
  - Place small cloth bag or tissue filled with 1-2 Tbsp of powdered milk (6 months)
- Dark location

Testing Germination
- To test seeds for germination before planting:
  - Moist 2-3 layers of paper towels.
  - Place a sampling of seeds on the towels and roll them loosely
  - Put in a plastic bag
  - Put in a warm location
  - Wait for germination. Check every other day
    - Radish: In 2-3 days
    - Peppers: 10-14 days

Sources
- Collecting and Storing Seeds from Your Garden, Oregon State University Extension
- Pollination Myths and Seed Saving, Colorado State Extension
- Saving Seeds for Next Year, SD State: [http://pubstorage.sdstate.edu/AgBio_Publications/articles/FS911.pdf](http://pubstorage.sdstate.edu/AgBio_Publications/articles/FS911.pdf)
- Saving Seeds from the Garden, University of Illinois Extension
- Saving Vegetable Seeds: Tomatoes, Peppers, Peas and Beans, University of Minnesota Extension
- Seed Saving Tips, West Virginia Extension
- Seed to Seed, Suzanne Ashworth (2002)
Seeds for Sale

- SD Dept of Ag - Ag Services
  - Kevin Fridley
    - 605-773-3724
    - Kevin.Fridley@state.sd.us
- South Dakota Seed Law
  - SDCL 38-12A
- South Dakota Seed Inspection Standards
  - ARSD 12-36
- http://sdda.sd.gov/Ag_Services/Agronomy_Services_Programs/Seed_Program/default.aspx