Class: Seed Saving

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The information contained in Growing Groceries presentations is based on WSU home gardening publications and other science and research-based materials. Resource lists are provided on the King County Growing Groceries website and at the end of some presentations.

To enliven the learning experience, speakers may use examples from their own garden experience and draw from their personal gardening successes and failures.

Resources

SEED SAVING
Saving Heritage
While
Saving Money

Seed Saving
Endangered Tradition

• Immigrants bringing seeds
• Ancestors were seed savers
• Family heirlooms passed 150+ years
• Urban migration: fewer family farms
• Land-grant universities: heirloom breeding decline
• Fewer students seeking careers in traditional plant breeding programs
**Endangered Tradition**

- Family seed company buyouts
- Multinational conglomerates replacing with hybrids (more profitable and patented varieties)
  - 1984–1987 54 of 230 mail order in the U.S. & Canada out of business (loss of 943 non-hybrid varieties 19%)

**Endangered Tradition**

- Hybrid production more expensive over “open-pollinated” (non-hybrid)
- Hybrid parentage can be kept secret (mother / father cross)
- Hybrid seed will be sterile or begin reverting

**Botanical Classifications**

Family, genus and species

In 1727, a two-word naming system was created (related morphology)

Genus is the first of its Latin name
Species is the second name

Different varieties of same species will cross
Crossing across different species is rare

**Parentage Makes the Difference**

Resulting Seeds

- Same variety parents = Pure
- Different variety parents = F1 Hybrid

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Pollination and Flower Structure

Most plants have male & female organs
Often on same flower

Male = stamen
filament & anther (pollen sac)

Female = pistil
stigma, style and ovary with one or more ovules (egg cells)

Pollination and Flower Structure

- Stigma can be receptive to pollen
  Stigma shape can vary (corn vs tomato)

- Pollen tubes grow down style to ovary fertilizing ovules
  ovary = fruit or seed pod
  ovules = next generation seed

Flower and Plant Structure

A plant with male flowers and female flowers is called monoecious (meaning one house)
If there are separate male and female plants, it is called dioecious (two houses)
Pollination and Flower Structure

Self-pollinated: male & female parts in same flower = perfect flower
Does not need insect or wind to be fertilized
(lettuce, tomatoes, peppers, eggplants, peas, beans, etc.)

Self-incompatible
Can not fertilize itself — needs insects or wind
(cabbage, cauliflower, etc.)

Insect-pollinated plants
Some plants have male & female flowers

Imperfect flowers
Need insects or wind to be fertilized (you?)
(i.e. Cucurbitaceae — Cucumber Family)
When flower opens it is receptive or shedding pollen

Insect-pollinated Plants

• Bees
  Collecting pollen on branching hairs

• Moths & butterflies
  Scales - pollen grains can not stick
  Wasps
  Course spines not adapted for transfer
  Flies
  Hairy legs can transfer pollen

Wind-pollinated
Pollen can be carried by wind for miles
(i.e. corn, spinach)
Maintaining Varietal Purity

- Isolation by distance
- Time isolation
- Mechanical Isolation
  - Bagging
  - Caging
  - Alternate day caging
  - Caging with introduced pollinators

- Hand-pollination
- Selecting desirable characteristics
- Population size
- Reacquiring genetic diversity
- Roguing for trueness-to-type

Isolation by Distance

Distances are site specific
Factors
- Plant population size and number of varieties
- Pollinator population density
- Alternative insect food source
- Geographical and or vegetation barriers
- Habitat

Time Isolation

Best with two different varieties that have very different maturity dates.

If equal or similar maturity date sow, at least four weeks apart.

Mechanical Isolation

Bagging
- Spun polyester cloth
- or paper bags
Mechanical Isolation
Caging
- Large frame (wood, wire, plastic, metal)
- (spun polyester cloth, window screen)
- Half circle in ground (wire)
- (spun polyester cloth)

Alternate Day i.e. cabbage & kale

Hand-Pollination
Self-incompatible or imperfect flowers

Imperfect flowers

Protect and Record
• Selecting desirable characteristics
• Population size
• Reacquiring genetic diversity
• Roguing for trueness-to-type

Seed Cleaning
• Wet processing, fermentation, and drying
• Dry processing and winnowing
• Hot-water treatment
• Seed cleaning equipment

Wet Processing, Fermentation, and Drying

Three-Step Process
• Removing seed from the fruit
  May need to crush or mash
• Washing
  May need fermentation first
  (occurs naturally in garden)
  Remove from pulp or fermenting mixture
• Drying the Seed
  Dry quickly to avoid mold and germination
  (avoid above 95°F if dark seeds 85°F)

Dry Processing and Winnowing

Usually seeds in pods or husks can dry in the garden
Can be pulled and hung because of weather

Threshing
  Rubbing, beating or flailing until seeds fall out

Winnowing
  Separating debris and chaff from seeds
  Wind? Blowers, fans
  Screening
  Gravity
Drying

Screening

Winnowing

Threshing
Hot-water Treatment
Maintaining a water bath:
(122° F)
Broccoli, Brussels sprouts, kale, Chinese cabbage for 20 minutes
Eggplant, spinach, turnips for 25 minutes
Celery, peppers for 30 minutes
(126° F)
Cauliflower for 25 minutes
Cabbage for 30 minutes
(131° F)
Tomatoes for 25 minutes
Sieve out the seeds and spread on hard surface to dry before storing.

Storage
Goal is to maintain maximum vigor
(rapid germination and good disease resistance)
Maximum vigor
thoroughly dried stored in moisture-proof container
Two greatest enemies are high temp and high moisture
(germination loss if fluctuating)
guide: Temp (° F) + relative humidity should be <100
Vigor is lost before germination rate
Drying before weight 50/50
(silica gel / seed & packet airtight glass jar 7-8 days)

Storage
Glass or metal are best for moisture
other storage containers can go inside them
How long will the seeds be stored?
Store in cool dry place (floor level best)

Long Term Frozen Storage
Strive for 70%+ germination rate
Almost no loss of germination and minimal vigor loss
when dried to 8% moisture, airtight, and frozen

Overwintering Biennial Plants
Germination Testing

Record Keeping
From source to saved seed
Who, what, when, where, why, how

Supplies for Seed Savers

Easiest to Save
(mostly self-pollinating)
- Jerusalem artichoke (tuber), cardoon, endive, artichoke, lettuce, salsify, shungiku, sunflower (flower, collect dry seed)
- Arugula, rutabaga (*)
- Bean, pea, lentil, soybean (dry in pod)
- Sorghum
- Tomato, pepper, eggplant, tomatillo, ground cherry (ripen fruit, separate from pulp; tomatoes ferment), potato (tuber) * limited varieties

Easy to Save
(self-sterile, cross-pollinating, outbreeding)
- Chive, garlic, leek, onion
  (let seeds dry, or replant bulbing varieties)
- Amaranth, beet /chard, orach, quinoa, spinach, lamb’s quarters
- Carrot*, celery, caraway, chervil, cilantro (coriander), Dill, fennel, parsley, parsnip

*crosses with Queen Anne’s Lace
Advanced Seed Saving

Asian greens, broccoli, Brussels sprouts, cabbage, cauliflower, collard, kale, kohlrabi, mustard, turnip

Cucumber, gourd*, luffa, melons, pumpkin, Summer* & winter squash*
(exceptions * uncommon varieties)

Barley, corn, kamut, millet, oat, wheat
(easy exception since uncommon is backyards)

Reference and Resource Materials

• Seed to Seed: Seed Saving and Growing Techniques for Vegetable Gardeners by Suzanne Ashworth
• Edible Heirlooms: Heritage Vegetables for the Maritime Garden by Bill Thorness
• Edible Heirlooms: Heritage Vegetables for the Maritime Garden by Steve Solomon
• The Organic Seed Grower: A Farmer’s Guide to Vegetable Seed Production by John Navazio
• Seed Saving at http://www.richmondgrowsseeds.org/seed-saving.html
• Seed Savers Exchange https://www.seedsavers.org

Q & A

Thank you to Master Gardener Foundation of King County, Growing Groceries, and all our speakers and volunteers.