

Seed Saving Basics

***Why Save Seed?**

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Why Save Seed?

- **Saving your own seed allows you to select plants that meet your needs. You can choose for size, color, taste or growth patterns.**
- **Save money! Seed prices seem to rise every year. While you will probably not save everything that you need, or want, you can save a few varieties every year to ensure that you'll always have seed.**
- **Some cultivars seem to disappear from the catalogs every year, to be replaced by hybrids or patented plants. As long as someone is growing a variety, and saving the seed, the genetics are somewhat safe.**
- **Many heirloom varieties are living history. Most have a story that goes along with the seed. Some have been passed along in a family, or to friends, for generations.**
- **Remain independent! If you save your seed properly, you'll never have to buy seed again (but, of course, once you start, you'll find that you "need" to buy more every year).**

TERMINOLOGY

Annual-Plants started from seed and produce seed within one growing season.

Biennial- Plants that require two growing seasons, normally producing seed during the second growing season.

Bolt-When a plant produces a seed stalk, usually brought on by weather changes.

Clone-A plant produced from the same genetic parent by vegetative propagation rather than by seed, i.e potatoes, garlic, sweet potatoes, etc.

Determinate (Indeterminate)-Usually used in reference to tomatoes. In determinate varieties, stem growth stops when the terminal bud becomes a flower bud, causing most of the fruit to ripen at nearly the same time. Indeterminate types continue to produce until plant dies.

Dioecious- A species that produces male and female flowers on separate plants.

Fertilization- The union of pollen with the ovule, eventually producing seed.

Genetic Diversity-A total range of genetic differences within a species.

Germination-The sprouting of a seed, marking the beginning of growth.

Heirloom/Heritage/Open-pollinated-Non-hybrid vegetable (or flower) usually passed from one generation to another, usually a long-time family favorite. The three terms are somewhat interchangeable: **Heirloom** is usually applied to vegetables/flowers with a history of some sort, **Heritage** is more often applied to fruits and roses, and **Open-Pollinated (OP)** is most often found in conjunction with corn varieties. The main thing to remember is that all of these terms refer to **non-hybrids** many of which are protected and some of which are sterile.

Hybrid-The offspring of a cross between two or more parent varieties that are genetically different.

Isolation-Separating one plant (or group of plants) to prevent cross-pollination.

Monoecious-A species of plant forming male and female flowers separately on the same plant.

Mutation-An unexpected inheritable genetic change.

Open-Pollination-Non-hybrid produced by two parents from the same variety, resulting in offspring just like the parents.

Perennial-Plants living more than two years. usually producing flowers and seed from the same root year after year.

Perfect Flower (Imperfect flower)-A perfect flower contains both a stamen (stamens) and a pistil. Imperfect flowers have a stamen or pistil, but not both.

Pollination-(Open, Self, or Cross)-Open-transfer of pollen by natural means from the flower of one plant to another of the same or different plant species. Self- the transfer of pollen from the male part of one flower to the female part of the same flower or another flower on the same plant. Cross- transfer of pollen from the anther on one plant to the stigma on a flower on another plant, also between varieties.

Rogue- A non-typical (usually inferior) plant within a varietal population.

Standard Variety- A non-hybrid variety usually the result of a breeding program, selected for generations until stabilized.

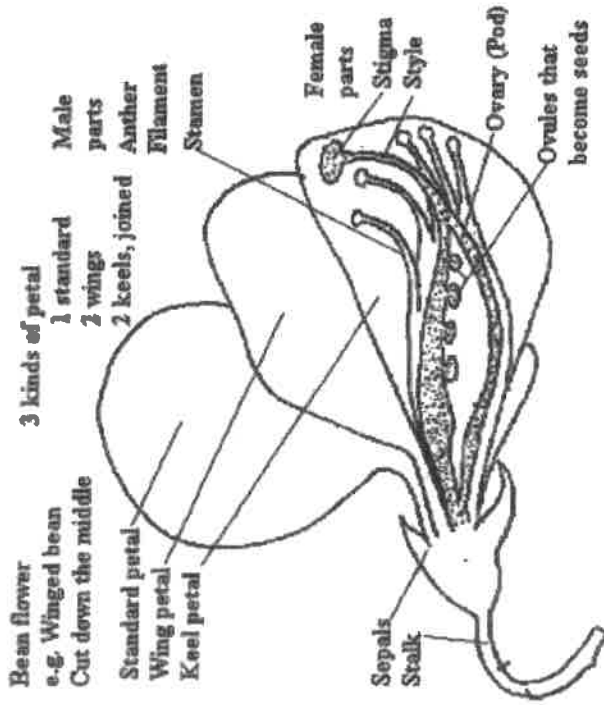
Threshing-Breaking the seed free from the hulls and other dry material.

True-to-Type-A plant (or group of plants) that conforms exactly to the known characteristics of that variety. The standard for comparison.

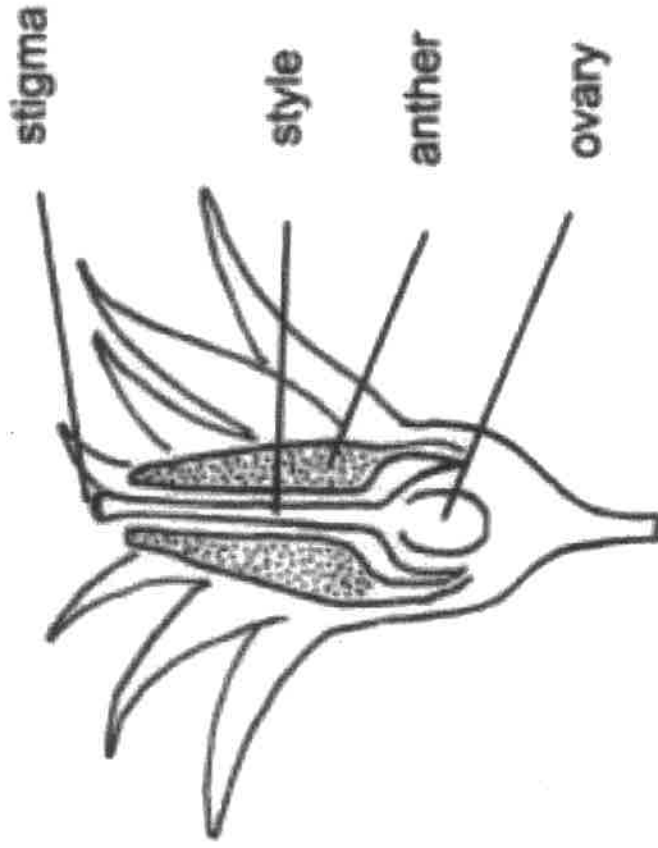
Viable-Alive, such as seed capable of germination.

Selfing Flower Structure

Bean / Pea Flowers

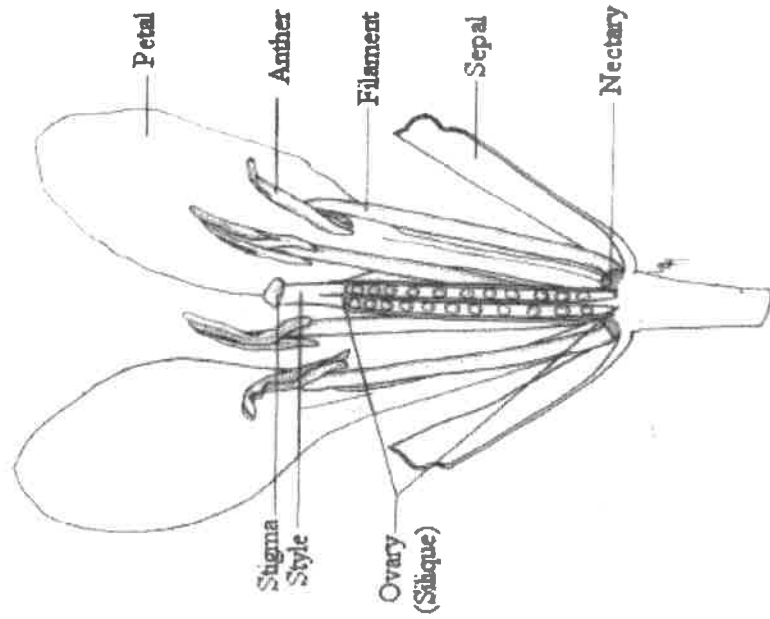


Nightshade Flowers (Tomatoes, Peppers, Eggplants)

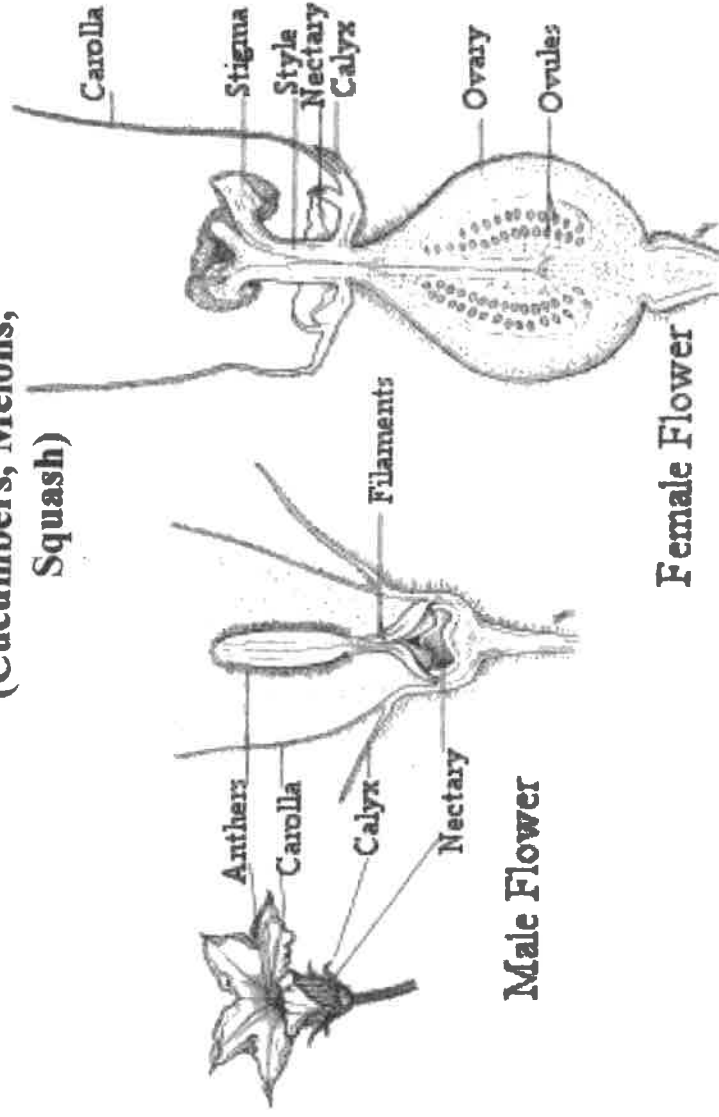


Out-crossing Flower Structure

Brassica Flowers
(Broccoli, Cabbage, Kale, Collards)



Cucurbit Flowers
(Cucumbers, Melons,
Squash)



Male Flower

Female Flower

Self-Pollinated Plants

Barley, flax, oats, wheat, common beans, fava beans, lima beans, peas, runner beans, sweet peas, chicory, eggplant, endive, lettuce, okra, pepper, tomato.

Note: Some of these plants may out-cross at 5-20% or more depending on humidity, temperature, stress, presence of pollinators, etc.-especially the fava, runner beans, eggplant, tomato and peppers. For absolute genetic control, treat these as out-crossers and either hand-pollinate, observe minimum isolation distances, or only grow one variety at a time.

Cross-Pollinated Plants

Amaranth, corn, rye, cilantro, fennel, mustard, parsley, alfalfa, red & white clover, asparagus, beet, broccoli, cabbage, cauliflower, celeriac, celery, Chinese cabbage, cucumber, kale, kohlrabi, leeks, melons, onion, parsnip, pumpkin, radish, rutabaga, spinach, squash, sunflower, Swiss chard, turnip, and watermelon.

Note: These plants require isolation, hand-pollination, caging, etc. for effective genetic control. Plants of the same species, and rarely, same genus, especially cabbage, squash and melons will readily cross, requiring careful pollination control to maintain seed purity.

Population Size

It is important to maintain enough genetic diversity to ensure good seed quality. If you are growing for your own use, it isn't as important as it would be if you are growing for a seed company, or selling your seed. Below are a few guidelines for minimum populations if growing for a seed company. I never plant all of my seed of a given variety; if you only have one or two seeds, you don't have much choice, but if you've got a handful of seed that you collected from some source, plant half and save half, in case of crop failure or pest damage.

***Corn- requires at least 500-2000 plants**

***Brassicas- require at least 75-250 plants**

***Beans and Peas – should have at least 20-60 plants, but some cultivars need fewer. This can be determined by observing variability from plant to plant.**

***Tomatoes, Peppers, Eggplants, Squash, Cucumbers, Melons, and Gourds- require at least 20-50 plants.**

Quality Control-Roguing vs. Selection

***Roguing is the removal of plants from the seed production population before the plants flower. This may be due to growth habits, color, etc. If a plant doesn't look like all the others in a population, it should be removed.**

***Selection is the choice to save seed from the best performing plants/fruits after flowering has occurred. Again, if a plant has superior fruit, leaf growth, size, taste, color, etc. it should be marked for seed collection.**

*** Roguing is usually preferred for seed saving, but it is not always possible.**

***Occasionally, a plant that should be rogued may be superior to the population, but is different in a good way. It should be isolated, and seed saved-but marked as such.**

Wet Seed Processing

I ferment the seed of tomatoes, peppers, eggplant, cukes, melons, and (briefly) squash. This removes germination-inhibiting chemicals, especially in the gelatinous covering on tomato seed. Fermentation is necessary for consistently high germination in tomatoes, and is recommended for the others.

*Peppers, cukes, melons and squash require shorter fermentation.

*Eggplants require the shortest fermentation (or none at all). Southern Exposure Seed Exchange suggests that fully ripened eggplant seed can be removed by cross-hatching the skin and smashing the fruit with the blunt end of a 2" x 4". Some varieties begin sprouting with even a short ferment, so check your seed often. With eggplant, you may be able to just wash the seed clean, and skip the ferment.

Dry Seed Processing

Dry seed processing is easy. Allow the seed to dry on the plant, harvest when fully mature, and remove the chaff. Humid conditions or the promise of rain sometimes make this impossible. Learn to identify when a crop is fully mature, harvest as soon as possible, and finish processing indoors.

- Harvest Southern (Crowder or Cow) peas, beans, and pea pods when yellow and leathery.
- Allow brassica plants to over-winter and harvest the seed in the spring when the seed pods have turned brown. Allow the seed to cure in the pods indoors for at least two weeks before threshing.

Fermenting Tomatoes

- Wait until the fruits are fully mature, then harvest and let sit inside, or outside in the shade, for 1 to 3 days.
- Mash the tomatoes. This can be done by hand for small batches. A Victorio Strainer works for slightly larger batches, the grinder from a cider press works for small-scale growers, and there are larger machines that handle hundreds of pounds.
- Add up to 1/3 the total volume in water, if necessary to cover.
- Try to stir at least every eight hours. Continue until bubbles no longer rise when you stir, normally 36 to 96 hours.
- Add water and let sit 30 seconds while the good seeds settle to the bottom. Scoop off the bad seeds and pulp, which will float on top.
- Add more water slowly and repeat the process of scooping off the pulp and floating seeds. Repeat until you've removed all the pulp and the water is clear.
- You should have nice, clean seed at the bottom of your bucket!
- Dry the seed. One good way is to tie them into Reemay bags and hang in front of a fan. Fully drying may take 1-4 weeks depending on temperature and humidity.

Pumpkins & Squash

- Summer squash needs to ripen like winter squash, until the skin toughens and can't be dented with a fingernail.
- Allow to cure for 3 weeks at 30°-70° F, out of the sun and protected from squirrels.
- Cut the squash open with a box cutter or short blade to avoid damaging the seeds.
- Scoop out the seeds and wash with a high-pressure hose to remove the stringy pulp. Alternatively, let the seed ferment in water overnight. This will loosen the pulp, which will float to the surface. Don't leave them in water too long or they'll sprout.
- Finish drying as with tomatoes.

Seed Storage

LABEL EVERYTHING! Label the outside of your seed storage containers, and put a label inside as well. If the container gets wet, outside labels can fade or fall off. While many bean seeds are readily identifiable, tomato seeds all look alike, only varying in size.

Control temperature and humidity. The sum of the temperature and humidity should not exceed 100. I recommend storing seed in glass containers with tight fitting lids. Bean seeds especially should be frozen for two weeks after threshing to kill any bean beetle larva that may be in the seed. After that, you can store your seed in a dark, cool spot. Many ardent seed savers store all their seed in a freezer.

Seed longevity increases as the temperature drops. To freeze seed, the moisture should be below 14%. Below 5% moisture may induce a difficult to break dormancy.

A Seed Processing and Storage Guide can be found at SavingOurSeed.org for more detailed information, as well as plans for winnowers, etc.

RECOMMENDED ISOLATION DISTANCES

Solanaceae- Capsicum- Sweet, Chili and Hot Peppers- 500 feet.

Lycopersicon- Tomatoes- Debatable; Most are self-pollinated, but cross pollination can result from insect visitation.

Lycopersicon Pimpinellifolium- Currant tomato- Same as above.

Physalis Ixocarpa- Tomatilla- Same as above.

Solanum Melongena- Eggplant- Self-pollinated- recommend 50 feet.

Solanum tuberosum- Potato- Usually grown from tubers, seed pods are sometimes formed and can be collected.

Umbelliferae- Apium graveolens- Celery/Celeriac- Biennial-All will cross with each other- isolate, bag or cage.

Anethum graveolens- Dill- Time plantings of different varieties so that only one is blooming at a time.

Coriandrum sativium- Coriander/Cilantro- If different strains are grown, ½ mile isolation, or timed plantings.

Daucus Carota- Carrot- ½ mile is recommended; will cross with wild carrot (Queen Anne's Lace). Biennial, will require winter storage and replanting to produce seed. Can be hand-pollinated, or caged for purity.

Foeniculum vulgare- Fennel- ½ mile isolation, hand-pollination, or caging.

Petroselinum crispum- Parsley- 1 mile isolation, hand-pollination or caging.

Zea Mays-Corn- 2 miles, or hand pollination

Ocimum Basilicum- Basil- 150 feet from other varieties, or caging.

Abelmoschus esculentus-Okra- Self-pollinated, 1 mile isolation recommended.

Allium Family-Onions, multiplying onions- i mile.

Brassicas-Oleracea- Kale, Cabbage, Broccoli, Cauliflower, Collards, Brussels Sprouts, Kohlrabi-1 mile, most will cross-pollinate and are biennial. Caging is recommended.

Rapa- Chinese Cabbage, Mustards, Broccoli Raab, Turnips- 1 mile, caging recommended.

Sativus- Radish- ½ mile between varieties, or caging.

Beets-5 miles, Swiss Chard- 2-5 miles, Lamb's Quarters-5 miles, Spinach- 5-10 miles.

Sunflower- 1/2 -3 miles

Lettuce-12 to 25 feet minimum (will cross with wild lettuce).

Cucurbitaceae-Cucumis melo- Muskmelon, cantaloupe, honeydew, plum granny- ½ mile.

Citrullus vulgaris- Watermelon- ½ mile.

Cucumis sativus- Cucumber (except Armenian, burr and African horned)
½ mile.

Curcubita maxima, mixta, moschata, and pepo- ½ mile by variety. *
Some sources state that species will not cross, others state that some will on occasion.
Hand-pollination, or isolation is highly recommended when growing different species.

Leguminosae- Peanut-1 mile

Garden Pea- (includes shell, Snow and Sugar) normally self-pollinating,
European standards require 100 meter isolation.

Soybean, Lentil, Runner Beans, Cowpea/Crowder/Field Pea, and
Common Bean (Wax, Green, Pole, ½ Runner, bush, etc.) are all considered to be self-
pollinating. Opinions vary as to isolation distances; some plant them in the same rows,
some isolate by a paths width, some more. I usually give them as much distance as I can
in my garden, planting them in different beds throughout the garden. Bumblebees
sometime chew through the blossoms, causing cross-pollination. Distance helps to
prevent this somewhat.

Lima/Butterbean- While these are also considered to be self-pollinating,
they produce sweet smelling flowers in abundance, drawing insects which can cause
cross-pollination. John Coykendall, a specialist who grows many limas in association
with Clemson University, recommended to me a few years back that limas/butterbeans be
isolated by at least 5 miles. For this reason (since my garden is not that big) I only grow
one variety per year.

The distances recommended here are from the book, SEED TO SEED, by Suzanne
Ashworth, and reflect isolation distances for commercial growers. Hand pollination,
caging, timed plantings and selected plantings can all be used to reduce these distances.

Resources on Seed Saving

www.SaveOurSeeds.com

www.seedalliance.com

Books:

Seed to Seed by Suzanne Ashworth

Seed Saving by Marc Rogers

Breed Your Own Vegetables by Carol Deppe

Organic Seed Production and Saving by Bryan Connolly

Seed Sowing and Saving by Carole B. Turner

Seeds: the Definitive Guide to Growing, History and Lore
by Peter Loewer

Sources for Heirloom Seed

Southern Exposure Seed Exchange-

www.southernexposure.com

Baker Creek Seeds-www.rareseeds.com

FEDCO Seeds-PO Box 520, Waterville, Me. 04903-0520

Heritage Harvest Seeds-www.heritageharvestseed.com

www.amishlandseeds.com

www.growitalian.com

Territorial Seed Co.- www.territorialseed.com

Pinetree Garden Seeds-www.superseeds.com

Totally Tomatoes-www.totallytomato.com

Seed Savers Exchange-www.seedsavers.org