

Seed Saving

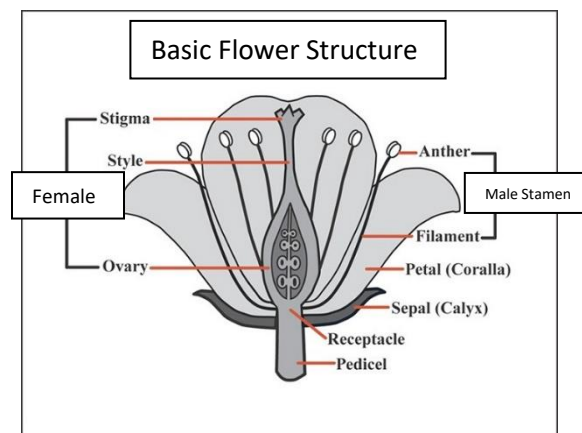
The saving of seeds has been very important to me as it is another facet of gardening that completes the growing season and is the means for the start of another. There is a list of references about the subject at the end of this article. I am going to take you through my methods for the saving of seed from members of three plant families.

Seed Saving Terminology

Open-pollinated: plants produced by crossing two plants from the same variety, which in turn produce offspring just like the parent plants.

Hybrid: The offspring of a cross between two different varieties of the same species that are genetically different, designated as an F1 in the seed catalogs.

Flower Structure Diagram:



Pole Rattlesnake Bean; family Fabaceae This is by far my favorite bean. I have been growing this variety for many years. A pole bean needs trellising and my preferred way of growing these is on a cattle panel arbor. Beans are easy to grow, are very low maintenance and produce a good yield over a longer harvest time than bush beans. I prefer the pole bean as I think the beany flavor in the snap bean stage is much more pronounced than in many of the bush varieties. Beans are relatively free of disease, do not readily cross, and for the home gardener a separation of 10' between varieties is sufficient to maintain a relatively "pure" stand. They are self-fertile and they self-pollinate.

Sowing bean seed the first two weeks of June when the soil adequately warms will produce snap beans about the first week of August.



Cattle panels (50" by 16") easily bent into an arch between tee stakes set 5' apart and secured with wire. Provides for a great arbor for growing pole beans.



Rattlesnake Bean seed and Snap Beans.

Throughout the growing season, if I miss a few pods and they swell beyond being palatable with growing seeds, I leave them to mature for next year's seed.

Most literature suggests to leave the pods on the vine until they are dry for saving seed. This method does work if your garden is located where there is good air circulation. Leaving the seed pods on the vine in a Wisconsin September, typically a month of rain and higher humidity, tends to discolor the seeds and promotes rotting. When the seed pods are fully expanded (mature) and the pod starts yellowing, are leathery and pliable, this is at this stage that they can be picked for seed. If a number of these pods are collected, do not pile them up in a bowl lest they mold. Be prompt at shelling them and place the seeds, single layer, on a cookie sheet with good air circulation. A fan blowing across the seed collection will assist in drying, which will take two to three weeks. The size of the bean seed will be reduced to less than half of the original plump shelled seed. I store the saved seed in canning jars placed into a cool dark room or placed into an ammo box. Germination tests are always good to verify seed viability. I typically do this for all saved seed during the months of December and January. This is accomplished by soaking the seeds in water for at least two hours and place them into moist paper toweling, fold and place into a Ziploc bag. Germinate these in 65 to 75 deg. F. On top of a fridge is a good place to germinate seed which should take place in five days or so. The germination percentage is easily calculated.

Squash, Family Cucurbitaceae

What squash is it?

The *Cucurbita* species typically grown in our area belong to one of the following;

C. pepo, includes summer squash (zucchini's), spaghetti squash, pumpkins, acorn squash, gourds.

C. maxima, hubbard types, buttercups, Dill's Atlantic Giant pumpkin

C. moschata, butternut, long island cheese

The three different species of '*Cucurbita*' will not cross. Squash of the same species readily cross and will produce hybrids.

Squash and pumpkin plants have separate male and female flowers. The female flower is distinguished from the male by an enlargement below the flower appearing as a miniature fruit. This is the ovary. See photos.



A female squash flower easily identified with an enlarged ovary underneath the sepals and petals.



A male squash flower.

Squash plants are self-fertile meaning that female and male flowers on the same vine are compatible. With the open flower single sex arrangement of the squash flowers, termed out-crossers, are readily visited by bees.



Bumble bee activity on a squash



This is the left photo enlarged to show the Bumble bee carrying several grains of pollen onto the next flower.

Crosses will not be evident in the fruits produced the first year but would show up in the next generation if seed from these crosses are saved and grown out. This is not necessarily a bad thing as there may be some interesting fruits produced, and some that are not so desirable.

If fruit set is all that is needed then let the bees have full access to the planting. If you want to save seed from a specific open-pollinated squash then there are some options that can be employed to maintain seeds for a true to type variety.

- 1) Grow only one variety of each of the three species. Another consideration is isolation distance. Looking at the chart from Seed Savers Exchange, it lists 1000 ft distance or more from other plantings of the same squash or pumpkin species you are saving seed. So, if your neighbor is growing a variety of *C. maxima* and the garden is less than the listed minimum distance one will have to employ a pollinator exclusion method.
- 2) Pollinator exclusion. This technique requires that the gardener is observant and watches for flowers, both male and female, that will open the following morning. These are taped or tied shut to keep insect pollinators from entering the flowers. Note: Place a stake near the designated flowers for easy location. The next morning the male flower is removed from the vine and dismembered to expose the anther to be used as a pollen 'brush'. The female, left intact is opened and the male pollen "brush" is used to transfer the pollen to the female stigma. The female flower then is closed back up and identified with surveyor's ribbon or yarn tied around the flower peduncle (the stem structure below the ovary) for identification.

Note: Hand pollination techniques can be employed on growing squash and pumpkins in the absence of active insect pollinators. In the Namekagon river valley it is typical not to have bees when the female and male flowers first develop on the vines.



A female flower that will open in the morning. To be secured with ribbon or tape at the tip to exclude insects.



The male flower dismembered to expose the pollen "brush".



The male anther used as a "brush" to transfer pollen to the stigma of the female flower.

Saving Squash Seed

For winter squash, that includes varieties from all of the three listed species, it is best to leave the squash on the vine as long as possible to be removed before the first killing frost. After removing them from the vines make sure to identify those designated for seed saving with an indelible marker or other. Allow the squash to sun cure for an additional 2-3 weeks before storage. Squash will continue to mature off the vine. Seed saving can take place when the fruit is selected for the table. Cut or chop open the squash and remove the seeds. The seeds should be separated from the pulp and cleaned under running water working the seeds against the screen of a strainer. Dry the seeds on a dinner plate separating them with a tooth pick or other implement. Allow to dry for 2-3 weeks.

Store dried seeds in a sealed container placed into a dark area. If saving seeds from a summer squash type, allow the fruit to reach full maturity ("boats" as I refer to them) and perhaps a little past being ripe. Scoop out the seeds and process as the winter squash types.

Checking seed viability, a germination test can be performed. I like to file the side edges of the seeds in two places just enough to break the seed coat. Place them into water to rehydrate and then into a labeled moistened paper toweling. Fold up and place them into a sealable plastic bag and move to the top of the fridge or other 65-75-degree area for germination. Performing this test in the winter months will establish seed viability, if 80 percent or more you should feel

good about your achievement, it will save money by precluding any thoughts about procuring new seed from the catalogs that are filling your mailbox.

This germination method can also be used to start next year's squash plants. Start the germination process about 3-4 weeks before setting out. When the radical appears (the initial root) during germination, the seeds should be placed into pots (radical down) using soilless mix or other to be grown out under good light.

Depending on your timing, the germinated seeds can be planted directly into the garden in prepared hills the first or second week of June in northern Wisconsin.

Family Solanaceae, tomatoes and peppers

Tomatoes are self-fertile. They pollinate themselves with the aid of mechanical action from wind vibration or buzz pollination from bees.

There are several considerations when saving tomato seed;

- 1) Is your tomato an open-pollinated variety or is it a hybrid?
- 2) What is the flower structure of the tomato? Older varieties of tomatoes can cross, especially those that have potato type leaves.
- 3) Tomato plants also have a propensity for disease.

Hybrid vs open-pollinated. If you are going to save tomatoes it is advisable to save seed from the open-pollinated varieties which means that the seed will produce plants that come true from seed. Hybrid seed on the other hand, typically labeled F1, is from the first generation cross. You can save seed from hybrids but don't expect the fruit to resemble that which you grew the previous year.

How do tomatoes cross? We have to take a close look at the flower structure. The more modern tomatoes, those that have regular leaves typically have an anther cone that surrounds



This is a Prudens Purple flower. A potato leaf variety tomato with the female style and stigma exposed from the loose anther cone. Active bees can readily cross pollinate this flower type.



This flower has a style that extends beyond a tight anther cone. This is a Paul Robeson tomato which is a regular leaf variety.

and encloses the style and stigma of the female part of the flower. This arrangement is less likely to cross than that found in the flower of the potato leaf varieties. A serious seed saver really has to study the flower type of the tomato he or she wants to save seed from to know what approach to take. The pictures show the differences in flower structure of the potential out-crossers with exerted style and stigma and a modern flower in which the anther cone encloses the female flower structure.



A typical modern tomato flower with the anther cone enclosed around the style and stigma. Cross pollination is not very likely.

The best approach to insuring that the tomato seed remains pure is to grow one variety of tomatoes or employ blossom bagging to exclude insects from cross pollinating varieties. Please review information at Seed Savers Exchange for equipment and bagging techniques. Blossom bags can be made from nylon mesh. They are placed over a flower cluster that has not yet opened and secured with a draw string or twist tie. These are left in place until the fruit has set then can be removed and the tomato group designated for seed saving with surveyor's ribbon tied around the stalk.



Tomato Blossom bag. A means of excluding pollinators.

Peppers are notorious for crossing because of their open flower structure. The male and female structures are easily accessed by pollinators. Pepper flowers can be blossom bagged or caged with nylon netting to exclude the bees.



A Pepper flower with exposed male anthers and female style/ stigma. Peppers readily cross with this open type of flower structure.



Caged peppers plants. A method for pollinator exclusion.

Disease is another concern for the saver of tomato seeds. Collect the best disease-free fruits for seeds. With tomatoes especially having a propensity for disease, there is a method employing a hot water treatment to eliminate some fungal and bacterial seed borne diseases. Refer to Extension Fact Sheet #XHT1261 for an overview of this process. I have made my own apparatus to perform this on saved seed prior to sowing and will be implementing this into our procedure for seed starting for our annual plant sale. I am yet in the midst of testing and refining this apparatus.

Saving Tomato Seeds

1) Select a high-quality ripe tomato.

Note: It is standard practice amongst seed savers to ferment the seeds and juice which helps to break down the gel surrounding the seeds.

2) Scoop or squeeze out the gel and seeds into a small jar. I typically use small canning jars.

Note: I have seen some instructions that add water to this mix. The addition of water dilutes the sugars and interferes with the fermentation process, so don't add any. You can eat the rest of the tomato.

3) Label the container with the variety of tomato.

4) Cover (with cap lightly screwed on or with cheese cloth) and allow to ferment 3-4 days at room temperature. Swish or stir daily. A scum and mold will likely form on the surface of the liquid.

- 5) Add cold water. Pour off pulp and any floating seeds that rise to the surface. Several rinses will help clean the seeds.
- 7) Transfer the seeds and any residual pulp into a fine mesh tea strainer or equivalent.
- 8) Work seeds against the screen (gently) under cold running water.
- 9) Drain and dump seeds onto a piece of window glass or a glass dinner plate.
- 10) Separate the seeds with a toothpick. This makes it easier for handling individual seed at starting time.
- 11) Allow seeds to dry 1-2 weeks at room temp. (Don't place in the sun)
- 12) Scrape off the seeds, gently with a plastic card or other and place them into a vial or medicine bottle and cap.
- 13) Label with variety name and the year.
- 14) Store in a cool, dark place. I store all of my seed containers in ammo boxes.

Germination Test

Place 10 seeds or more onto moistened paper toweling. Fold up and place into a small plastic bag and seal.

Place on top of the fridge. Germination should take place in 5-8 days. Germination percentages are easily determined.

References

Seed Savers Exchange, <https://www.seedsavers.org/> has several articles on seed saving, isolation distance charts, etc.

Breed your own Vegetable Varieties, The Gardener's and Farmer's Guide to Plant Breeding and Seed Saving, Carol Deppe

Seed to Seed, Suzanne Ashworth, seed saving guide

The Organic Seed Grower, John Navazio, A Farmer's Guide to Vegetable Seed Production

Hot-Water Seed Treatment for Disease Management, University of Wisconsin Garden Facts #XHT1261

Open Source Seed Initiative, <http://osseeds.org>, OSSI was created by a group of plant breeders, farmers, seed companies, and sustainability advocates who want to **Free the Seed**.

Seed Sources for Open-Pollinated Varieties

Seed Savers Exchange

Baker Creek

Southern Exposure

Sand Hill Farm

Tomato Fest

Seeds of Change

High Mowing

Territorial Seeds

Pine Tree Gardens

Johnny's Selected Seeds

Victory Seed Company