SEED SAVING INSTRUCTIONS

Native Seeds/SEARCH

At one time, seed saving was a necessity. Gardeners and farmers carefully selected and stored the best seeds from their harvests, ensuring they had seed for planting in subsequent years. The knowledge of pollination, purity, harvesting and storage of seeds was all part of survival and learned within the family and community.

The rise of commercially available seed resulted in a trend away from seed saving. Farmers and gardeners simply purchased new seed every year. Growing concern regarding the loss of commercially available seed offerings however, led to a grassroots movement in the late 70's and early 80's dedicated to seed saving.

Today, recognition of the importance of crop genetic diversity is exemplified by the many local, regional and national efforts devoted to conserving the heirloom, traditional varieties that were once so prevalent. For both home gardeners and seed bank operators, the fundamentals are the same in terms of saving seed and maintaining purity. What follows are some basics to get you started saving seeds.

POLLINATION

Pollination is necessary to produce seed. When pollen from the male flower part (stamen/anthers) comes in contact with the female part (pistil/stigma), pollination occurs. Successful pollination results in a zygote, or fertilized egg, within the ovary that matures into a seed.

Perfect flowers have both male and female parts. Beans and chiles both have perfect flowers. Self-pollination occurs when pollen (male) is transferred to the stigma (female) within the same flower. Technically, self-pollination also occurs when pollen from one flower is transferred to another flower on the same plant. Some plants have specific mechanisms for ensuring self-pollination. In beans, pollen transfer happens within a flower before it even opens. Thus, by the time a bean flower opens, it has already been self-pollinated!

Imperfect flowers are either only male (no pistil or stigma) or only female (no stamens or anthers). These flowers require cross-pollination. Cross-pollination occurs when pollen is transferred by wind or insects from a male flower to a female flower. The flowers may be on the same plant (monoecious) or different plants (dioecious). Cucurbits (squash, melons, gourds) have separate male and female flowers (imperfect flowers) on the same plant (monoecious). Pollen must be transferred by insects between male and female flowers in order for fruit to be produced.

ISOLATING DISTANCES USED FOR MAINTAINING GENETIC PURITY

Guidelines for maintaining seed purity between cross-pollinating crops help growers prevent unwanted crossing from occurring. The "one-quarter mile" rule is the standard isolation distance to prevent pollen from one variety contaminating another during the growing cycle.

Content developed and contributed by Native Seeds/SEARCH
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COMMUNITY SEED NETWORK

WHAT CROSSES WITH WHAT

All plants have a Latin name, known as their genus and species. The same plant can be known by different common, local, or regional names, so Latin names are used to make things universal and less confusing. Plants are given their Latin names based on their flower structure. Thus, plants of the same genus and species are very closely related and therefore cross pollinate. All corns, whether sweet, flour or popcorn, belong to the same species – *Zea mays* – and readily cross. Most of the peppers, or chiles, commonly grown in gardens are just one species, *Capsicum annuum*.

Generally, plants within the same genus, but different species, will not cross. Of the squashes, for example, *Cucurbita pepo* will not readily cross with *Curcurbita argyrosperma*, *Cucurbita moschata* or *Cucurbita maxima*. For this to be helpful, you have to know which species a particular variety belongs to.

For example, crookneck, zucchini, cushaw and hubbard represent 3 different species! It is rare, but not impossible, for plants from different genera (plural of genus) to cross. There are exceptions to the rules, and plant breeders have had some success with forced crossings.

Open-pollinated means that the variety is pollinated randomly, that is, pollination is not controlled in any way, such as that typically performed by plant breeders. Even self-pollinating crops, such as beans, are considered open-pollinated, though there is nothing particularly random about who pollinates whom. Technically, a plot of corn in your neighbor's backyard is open-pollinated, unless he/she goes out every morning and hand-pollinates individual ears. The interesting twist is that the corn could be the product of controlled pollinations between two or more different corn varieties, i.e., a hybrid. Yet, unless your neighbor actually conducts his/her own pollinations, the corn plot will be considered open-pollinated. Hybrids are produced by specifically cross-pollinating two varieties to produce a unique, third variety, and are common in modern agriculture and commercial garden seeds. Seeds from hybrids do not produce "true-to-type", that is, offspring of hybrids often do not maintain the characteristics of their hybrid parents.

MAINTAINING PURITY

Purity means preventing the mixing of more than one variety. Contamination of seed stocks can occur both as a result of cross-pollination between varieties of the same species or by mixing different varieties as a result of poor labeling after they've been harvested. The easiest method for maintaining seed purity is to grow only one variety of any one species at a time. Always be aware of what other gardeners near you have planted and what "weeds" may have volunteered in your compost or grow along the roadway.

Hand pollinating is commonly used on a small scale to maintain purity. It can be time consuming and labor intensive, but it's fun to play Mother Nature! When hand pollinating, you must physically act as the agent to transfer the pollen (male) to the stigma (female). You must also act to prevent any unwanted pollen from finding its way to the stigma.

Staggered planting times is another good practice to prevent crossing, especially for corn. Allow two, four or more weeks between planting of different varieties so that tasseling does not overlap. You must know how many days it takes each variety to mature for this to work; a second planting of an "early" corn that flowers while the first planting is still flowering will defeat the purpose.

Caging individual plants with window screening, or bagging flowers with cheese cloth, muslin or paper sacks can prevent insects from visiting and crossing varieties. This will work well, as in chiles, if flowers are capable of self pollinating. Otherwise, hand pollination may be necessary. Other physical barriers include buildings and plants to disrupt or prevent movement of pollen or insects. Some crops and trees can act as deterrents to insect pollinators, but it takes a comprehensive understanding of which garden insects visit your garden.

SEED HARVESTING

WHAT TO SELECT

How plants are harvested depends somewhat on whether you're trying to maintain a variety 'as is' or are selecting for certain traits. If you're trying to maintain a variety 'as is', save seed from as many individual plants as possible, even if only 1 seed per plant. If seed matures over a period of time, save seed from multiple harvests so that seeds from early- and late-maturing plants are included in the sample. This helps ensure that genetic diversity will be maintained in your seed sample. On the other hand, if you're actually selecting for certain traits, only save seed from those plants that express the desired trait.

TIMING OF HARVEST

When to harvest depends slightly on whether the seeds are produced in 'dry' or 'wet' fruit. Examples of 'dry' fruit include chiles, beans, black-eyed peas, gourds, okra, amaranth, sunflowers, corn, peas, garbanzos, cotton, most greens and herbs, sorghum, tobacco, and wheat. These should be harvested when the fruit/seeds are dry. When the seeds rattle in their pods or have begun to fall from the plant, they are typically ready to harvest. They can be left in the field until completely dry or harvested and placed in a protected area to finish drying.

Examples of 'wet' fruit include melons, watermelons, squash, tomatillo and tomato. These should be harvested when the fruit are slightly over-ripe but are not rotten. For vining crops, the fruit are typically mature when the fruit are somewhat whitish on the bottom side and the tendrils on the fruit-bearing stem and two adjacent stems are dry. The fruit are typically split and the seeds are scooped out of the fruit, washed and allowed to dry on cloth towels or pillowcases out of the light and heat.

SEED CLEANING

Seeds must be cleaned before they can be stored. Different crops require different techniques for cleaning. Overall, seeds should be free of plant material (bits of leaf, stems, etc.) and bad seeds (non-viable, broken, split, etc.).

Some common techniques for cleaning seed include:

- Threshing – break up plant material (including fruits or pods) and expose the seeds by stomping, beating, crushing, etc.
- Winnowing – separate plant material from seed with a gentle fan or light wind, leaving only clean seed.
- Tarp/fan – slowly pour threshed seeds in front of a fan placed near a tarp, heavy seeds fall onto tarp while the light-weight plant debris is blown farther away.
- Hand-cleaning – remove plant debris by hand.

- Blending – some wet processed seeds can be cleaned by blending fruit in a blender; add water and 'float' debris off the top as water is poured off slowly; repeat filling and pouring water off until only clean seeds remain (bad seed and plant debris floats to the top and is poured off with water; good seed sinks). This works well for tomatillos, tomatoes, chiltepines, and small chiles.

CHOOSING SEED FOR SAVING

As with every step until now, it's important to keep an eye to quality. Below are some basic guidelines to consider when saving seeds:

- Choose healthy, undamaged seed to save
- Do NOT keep seed from diseased plants (some viruses are transmitted through seeds)
- Save seed from as many plants as possible
- Be sure seeds are clean of unwanted sticks, chaff, seed pods, etc. This will reduce the bulk that is stored as well as the threat of some possible pest and diseases.
- Keep enough seeds for next year's planting needs.

SEED DRYING

Allow seeds to fully dry. Wet processed seeds should be rinsed and placed on a cotton towel (pillowcases work perfect), screens or baskets. Do NOT use newspaper or paper towels as seeds will stick to the paper and the dyes commonly used in both products can transfer to the seeds. Make sure seeds are placed in an area with good air circulation and out of direct sunlight. Prolonged exposure to sunlight and high temperatures reduces seed viability. Do NOT try to hasten seed drying by placing them in an oven at low temperature! Seeds take up moisture from the air, equilibrating to relative humidity at the time. They can then be sealed in airtight jars or ziploc baggies. In other areas, silica gel can be used to dry seeds to low moisture content, a requirement for storing seeds under frozen conditions.

STORING SEEDS

Seeds can last for quite a long time when properly stored. Under frozen conditions, such as in any household freezer, many seeds will last 10 or more years, easily. While seed longevity under any storage condition is primarily dependent on the quality of the seed going in, there are certain conditions that lend themselves to longer seed storage time frames:

- Storage containers should not allow moisture to enter, nor to build up inside.
- Use glass jars with lids, metal trash cans, envelopes or bags, plastic ziploc bags (only if freezing).
- Store seed in a dark, cool, dry place such as a refrigerator or freezer (airtight containers); paper bags in a closet; do NOT store in outside sheds.
- Kill insects; freeze seed for 3 days; check for re-infestation periodically and repeat freezing if necessary; watch for bruchid beetles in beans (small white dots appear on outside of seeds, followed by holes; remove damaged seeds and refreeze)
- Optimal seed storage conditions – 45-55 degrees Fahrenheit (7-12 Celsius) with ~25% humidity.