

The Seed Lending Library at Hampshire College's

❁ Guide to Saving Seeds ❁



SEED LENDING LIBRARY

— AT —
HAMPSHIRE COLLEGE

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Note to Readers

This particular guide is intended to aid in the saving of self-pollinating or heirloom crop varieties. These varieties don't require isolation techniques, because there is little risk of cross-pollination. This means that seeds produced by these plants should be true-to-type.

Plants that are open-pollinated have the risk of cross-pollination, and may not breed true-to-type. In order to save pure seeds from open-pollinated varieties you will need to carefully control the plants' environment to avoid crossing. If you are interested in learning more about how to save open-pollinated seeds, check the *Resources and Further Reading* section of this guide. It lists several great books and websites with lots of information about saving seeds of all kinds!

Section One

Seed Saving Basics

Harvesting Seeds

When it comes to harvesting seeds, there are two basic categories to keep in mind: wet seeds and dry seeds. Wet seeds are harvested from inside the moist flesh of fruits or berries. This includes plants such as tomatoes, melons, and peppers. Dry seeds are generally harvested from husks or pods that have been left to dry out on the plant. This category includes corn, beans, and lettuce.

Dry Harvesting

Threshing is the process of removing seeds from their coverings, or chaff. There are a variety of ways to do this. A common and simple method involves putting dry pods into a sack (often a pillowcase will work) and stomping or treading on it until the seeds break free (Ashworth, 2002). This works best with harder seeds, as too much force can cause cracking or breakage. A pedal thresher can also be used, and can be made by attaching a studded drum to a stationary bicycle (Hess, 2010). As one person pedals the bicycle, another holds the seed heads against the spinning drum, loosening the seeds which then fall into a collection container.

Wet Harvesting

Harvesting wet seeds has little variation from species to species, and essentially involves cutting the fruit open and scraping the seeds out of the flesh (Ashworth, 2002). For smaller fruit and berries, crushing and mashing works best.

Cleaning Seeds

Winnowing

Winnowing is a process used to separate dry seeds from the chaff and other debris left from harvesting. The simplest method of winnowing involves tossing the mixture into the air and letting the wind blow away the lighter particles, leaving the heavier seeds behind. This method was

developed by ancient cultures and is still practiced today. Modern winnowing techniques include the use of a fan instead of the wind, as the wind can be too variable and seeds can be lost (Ashworth, 2002).

Another method of winnowing called “screening” involves using a screen with holes that are just large enough for seeds to pass through, leaving the larger chaff behind. Often with this method a second screen with holes just smaller than the seeds is then used to separate the remaining small debris.

A method that works well with more rounded, spherical seeds is done by placing handfuls of seeds on one end of a flat board (such as a cutting board) and carefully tilting the board upwards until the seeds roll down the board into a container, leaving the chaff behind (Ashworth, 2002). This can also be done using a gentle fan at the bottom of the board which will simultaneously blow the chaff and lighter debris upward off the board as the seeds roll down.

Washing

After scraping out or mashing wet seeds, the seeds and pulp should be placed in a large bowl or bucket and covered with water (at least twice the volume of the seeds and pulp) (Ashworth, 2002). This mixture is then stirred vigorously. As they settle, viable seeds (which tend to be denser) will sink to the bottom of the container and the less viable seeds will float. They can then be poured or scooped off with any other floating debris. This process is repeated (adding more water as needed) until only clean, viable seeds remain. The seeds are then strained, rinsed under running water, and dried.

Disinfecting Seeds

Fermenting

The seeds, pulp, and juice of some species may need to be fermented before cleaning (Rowe, 1998). This natural process allows microorganisms to kill many seed-borne diseases that can affect the next generation of plants. Certain species, such as tomatoes, require fermentation to break down the seed coat in order for seeds to be able to germinate easily (Ray, 2012). While the process varies slightly species to species, generally it involves putting the wet, pulpy seeds and a little water into a clear container for several days until a layer of mold forms on the top

of the mixture (Ashworth, 2002). Make sure to keep the container in a warm place (75°F is ideal) out of direct sunlight. Once this mold has covered the surface, add water to the container and stir. The viable seeds will sink to the bottom and can be collected by gently pouring off the top layer. If left too long to ferment, seeds will begin to germinate, so watch them carefully!

Hot Water Treatment

This process works well for both wet and dry seeds. Although it is not necessary for seeds to germinate, it is an effective method for killing seed-borne diseases such as black rot and bacterial canker (Ashworth, 2002). To do it properly, you will need a thermometer, an electric frypan, a large saucepan and a sieve. It is recommended to run through this process without the seeds first, as it is easy to lose track of the exact water temperature which could potentially damage the seeds.

First, heat some water in the saucepan to the appropriate temperature (see table, pg. 7). Warm the electric frypan, and then pour about a third of the hot water into it. Set the saucepan with the remaining water into the water in the frypan. Practice regulating the temperature by controlling the heat of the frypan, or by removing the saucepan from the water. Once the desired temperature can be steadily maintained, pour in the seeds, stirring them throughout the remaining time. After the treatment is complete, sieve the seeds and spread them out on a hard surface to dry.

Drying Seeds

Drying seeds is most important for wet varieties that have been harvested and cleaned, or for seeds that have undergone a hot water treatment. While seeds are still in the strainer after they have been washed, a clean towel should be used to soak up as much moisture from the bottom of the strainer as possible. Then the seeds are dumped onto a non-stick surface (glass, ceramic, wood - anything but paper or cloth, as they will be difficult to remove once they are dry).

Warm, wet seeds are likely to mold (or germinate prematurely), so drying them quickly and thoroughly is important. The easiest way to do this is to spread them out in a single layer and put them in a warm, dry place. Never expose them to temperatures exceeding 95° F (Ashworth, 2002). It is not advised to attempt to dry them in the oven or in direct sunlight. Using a

Hot Water Treatment Variations

Type of Seeds	Water Temperature	Exposure Time
Broccoli, Brussels sprouts, kale, Chinese cabbage, cucumber, carrot	122° F (50° C)	20 minutes
Eggplant, spinach, turnip	122° F (50° C)	25 minutes
Celery, pepper	122° F (50° C)	30 minutes
Cauliflower	126° F (52° C)	25 minutes
Cabbage	126° F (52° C)	30 minutes
Tomato	131° F (55° C)	25 minutes
Mustards, radish	122° F (50° C)	15 minutes
Lettuce	118° F (48° C)	30 minutes

(Ashworth, 2002 and Connolly, 2004)

fan to speed the process is possible, as long as it is placed far enough away that it does not blow the seeds around. A good non-stick surface to use for drying is a window screen, as it allows excellent air circulation. As they dry, stir seeds around, several times during the day if possible. The drying process should take a few days. Dry seeds should break, not bend (Ray, 2012). If you are unsure about the dryness, let them dry for another day to be safe.

Silica gel is sometimes used to absorb excess moisture from seeds. It can be purchased in bulk online or in most craft stores. Color-indicating silica gel makes it easy. The small beads are a deep blue when completely dry and as they absorb moisture they gradually turn pink. These beads can even be reused by drying them out again in an oven or microwave (Ashworth, 2002). When not in use, make sure the silica gel is stored in an airtight container.

To dry seeds using silica gel, first put seeds into paper packets and weigh them. Add them same weight of silica beads to a jar and place the packets inside, making sure to seal the jar as tightly as possible (Rowe, 1998). Leave the container alone for seven or eight days, after which time the seeds should have dried thoroughly.

Storing Seeds

Storing seeds properly is very important for long-term viability. Finding the right location for storing seeds can be tricky and may take some trial and error. When preparing to store saved seeds, it is important to keep two things in mind: heat and moisture. If heat or moisture levels are too high, seeds will mold or germinate. If the temperature or humidity often fluctuates, seeds will lose their viability (Ashworth, 2002). When choosing a place to store seeds, calculate the sum of the temperature (in degrees Fahrenheit) and the relative humidity. (Relative humidity can be calculated using a hygrometer, which can be purchased at most hardware stores.) The sum of the temperature and relative humidity should not exceed 100 (Ashworth, 2002). In most cases, high humidity is worse than high temperature, because it allows the growth of bacteria and fungus that will affect the seed's viability.

The easiest way to combat humidity is by storing seeds in airtight containers. Glass and metal containers are best, as they are moisture-proof. Canning jars with new lids are perfect and are very nearly airtight when the lid is screwed on very tightly. It is important to carefully label each container with the seed species and variety, and the date they were packaged. This will make things easier when you are choosing which seeds to plant in future seasons.

Once seeds are packaged and labeled, store them in a cool, dry, dark place with little or no temperature fluctuation. A root cellar or dry basement is ideal, but, for small operations, storing seeds in a refrigerator can work well, too (Ray, 2012). In the proper conditions, most seeds will stay viable in storage for several years (Rowe, 1998). Some species will only last for one year in storage, such as onions and chives, parsnips, parsley, and any seeds that have been hot water treated. The best way to test viability is by placing ten seeds between two moist paper towels, making sure there is some space between each seed. Put the towels and seeds into a Ziploc bag to keep them from drying out. Place the bag in a warm spot for a couple of days and then check the seeds, remoistening the towels if necessary. Keep

checking daily for another three or four days, by which time the seeds should have germinated (Hamir, 2002). You will get a rough estimate of the percentage of viable seeds by counting how many out of ten germinated (for example, if 7 out of 10 seeds sprout, the germination rate is roughly 70%).

Frozen Storage

Seeds that are stored in a freezer will last for many years - up to ten times longer than seeds that are kept unfrozen. However, when freezing seeds, it is even more important to ensure that they are as dry as possible. If seeds have more than an 8% moisture level the excess water will expand, rupturing cell walls and cracking the seed casing (Ashworth, 2002). If a seed breaks when it is bent, it is most likely dry enough to be frozen. Hard shelled seeds, such as corn or beans, will shatter when struck with a hammer if they are thoroughly dry, and will mash if they are still too moist (Ashworth, 2002).

Saving Seeds from Biennials

Biennial plants produce seeds during the second year of their two-year life cycle, so in order to save seeds from these plants you must be able to keep them alive through the cold season. Most biennials need to be exposed to a period of freezing weather to mature properly, so wintering them in a greenhouse is not usually recommended (Rowe, 1998). How you choose to overwinter your crops will depend on your climate and weather patterns, so some further research about your specific area is a good idea.

Generally, in warmer climates where the ground does not freeze or freezes only slightly, plants can be left in the ground and tended throughout the winter. If you are growing in a warm climate where there is a slight possibility of freezing, special mulching techniques can be used to cover plants and keep them warm enough to survive mildly cold weather (Ashworth, 2002). Unheated coldframes can provide adequate shelter in moderately cold climates. In very cold climates roots, bulbs, or plants will need to be dug up and stored through the winter, and then replanted in the spring.

Root cellars are designed to store crops through the cold months and are a great place to overwinter your biennial plants (Ashworth, 2002). The trick is not letting them freeze or dry out, so a moderately warm and moist environment is ideal. Temperatures between 32° and 40° F are best,

and containers that are regularly filled with water can provide sufficient humidity (Ashworth, 2002).

Roots and bulbs can also be “dug in” (or “heeled in”) to be stored over the winter. This process involves digging up the plants when extremely cold weather arrives and reburying them elsewhere in moist sand, peat moss, sawdust or another material that is moist and relatively inert (Rowe, 1998). Before reburying, remove all vegetation except the smallest leaves and shoots. This will prevent excess moisture loss. When buried these crowns (and only the crowns) should be left exposed, and can be covered with a tent of greenhouse plastic to keep them from drying out (Rowe, 1998). It is recommended to dig plants into a trench in the ground. Trenches are best dug near the foundation of your house, as it will let off enough radiant heat to keep them from freezing completely (Rhoades, 2013). These plants should be kept so that they avoid hard freezes *and* excessive warmth and dryness. Ideally they will remain at temperatures that hover around freezing until spring (Rowe, 1998).

Once outside temperatures begin to stabilize above 28° F or so, plants should be dug up again and planted in containers (Rowe, 1998). Place the containers in a spot where they can safely harden off for a few weeks before replanting them in the garden. You may decide that it works better for you to replant crops straight into the ground and skip the containers. If you do this, make sure you protect the plants from harsh wind and sun for a few weeks to let them establish new roots without stress.

Section Two

Saving Specific Species

VEGETABLES

Common name: Arugula

Family: Brassicaceae

Life cycle: Annual

Seeding: Arugula needs to be exposed to cold temperatures to trigger flowering. Overwinter your plants in the ground after the end of their leaf harvest. In the springtime, let the seeds dry completely on the plant, but be careful not to let the delicate seed pods shatter and disperse seeds.

Harvesting: Once the seeds are ready, the plants can be threshed by treading or flailing. Screen the seeds and winnow them to separate the chaff.

Storing: Arugula seeds should keep for up to 4 years in proper storage.

Common name: Bean

Family: Leguminosae (or Fabaceae)

Life cycle: Annual

Seeding: When harvesting for eating, leave no more than one or two pods per plant to mature. Allow the pods to dry completely on the plant if possible. If the weather will be wet, cut stalks at the base or pull up the whole plant and hang under cover until dry (wet pods will likely mildew or seeds inside will begin to sprout). Pods will crack and shatter when fully dry.

Harvesting: To shell small quantities of dried beans, place plants in a clean pillowcase, tie the end closed, and tread on it for a few minutes. This should break the pods, allowing the seeds to fall free. Once seeds are loose, remove the larger debris by hand. Remaining chaff can be screened and winnowed off. Remove any off-type or moldy seeds from the harvest.

Storing: Bean seeds will store for up to four years.

Common name: Beet

Family: Chenopodiaceae

Life cycle: Biennial

Seeding: Beets will need to be overwintered, but not in the ground. Dig them up and select the best-looking plants. Clip the leaves about an inch above the crown to prevent the roots from drying out. Store them in a cool, damp place, such as a root cellar until next season. After they are transplanted back in the garden, the plants should begin to bolt, producing many small flowers which will then go to seed. When seeds turn light brown they are ready to be harvested.

Harvesting: Beet seeds can be rubbed off the stems or plants can be bagged and tread upon. Screen and winnow the seeds to remove debris. Many beet seeds are clustered together and should be left intact.

Storing: Beet seeds will last for up to five years if properly stored.

Common name: Broccoli (also cauliflower)

Family: Brassicaceae

Life cycle: Biennial, but can be grown as an annual (see below)

Seeding: If growing broccoli as a biennial, transplant it into pots at the end of the season. In the Northeast, broccoli that is left in the ground to overwinter will usually freeze and die. Store potted plants in a root cellar or similar climate for the winter, making sure to not let them dry out. Replant broccoli in the garden in late March or April. Leave plants in the ground until summer when they should bolt and produce seed.

If growing broccoli as an annual, start plants indoors in late February or early March. Transplant them into the garden in April and they should bolt with the heat of the summer.

Harvesting: Cut the bolted stalks and thresh them by treading on them. Screen off larger chaff and winnow the smaller debris.

Storing: Broccoli seeds will store for up to five years.

Common name: Brussels's sprouts

Family: Brassicaceae

Life cycle: Biennial

Seeding: Leave a few sprout heads on each plant after harvesting for eating. Overwinter the plants inside by digging them up and potting them in containers. Replant them the following season and the remaining heads should flower and seed.

Harvesting: Allow seed pods to dry out on the plants before harvesting them. Once they are dry but before they open to disperse seeds, dig up the plants and thresh them by treading.

Storing: Brussels's sprouts seeds will keep for up to four years in storage.

Common name: Cabbage

Family: Brassicaceae

Life cycle: Biennial

Seeding: At the end of the first season, dig up several cabbage heads that you haven't eaten and overwinter them in pots in a root cellar. The following season, replant the heads and cut an "X" in the top of each to allow the seed stalks to come up through.

Harvesting: Once the shoots come up and flower, they will then go to seed. Allow seed pods to dry and become brittle, then pick them. Thresh them by treading on them or by hand.

Storing: Cabbage seeds will stay viable for up to 4 years in storage.

Common name: Carrot

Family: Umbelliferae

Life cycle: Biennial

Seeding: Carrots in the Northeast can be overwintered in the ground or in a root cellar. Pulling the plants to store them inside is recommended for seed saving purposes, as you can weed out the flawed or off-type roots to keep your seed harvest healthy.

Harvesting: Carrots produce white umbel flowers. When the flowers turn brown, it is time to harvest the seeds. Seeds can be harvested easily by threshing or treading. Clean the remaining debris by screening and winnowing.

Storing: Carrot seeds will last up to 3 years in proper storage.

For information about cauliflower, see broccoli.

Common name: Chard

Family: Chenopodiaceae

Life cycle: Biennial

Seeding: Chard may be able to overwinter in the ground with proper mulching to keep it from freezing. Otherwise replant it in late April and

wait for it to bolt. It should produce many small flowers, and when their dry seeds turn light brown they are ready to be harvested.

Harvesting: Chard seeds are best threshed by treading on them in a pillowcase or in a large bin. Screen and winnow off the chaff.

Storing: Seeds should last up to five years in storage.

Common name: Corn

Family: Poaceae

Life cycle: Annual

Seeding: Leave ears on the stalks to mature and dry, making sure to not let the kernels rot or sprout in the rain. Once they are dry, harvest the ears and take them indoors. Shuck them and hang them to continue the drying process.

Harvesting: Once the ears are fully dry, the kernels should rub off the cobs easily. Winnow off the chaff with a fan or simply by blowing it away with your breath.

Storing: Corn kernels will remain viable in storage for up to five years.

Common name: Cucumber

Family: Cucurbitaceae

Life cycle: Annual

Seeding: Leave a few cucumbers on the vine well past when you would pick them for eating. These fruits will continue to grow and will turn dark yellow in color. In the Northeast they should last for a long time in the garden without rotting, so don't hesitate to leave them until just before the first frost (early October) if you don't think they are ready to harvest.

Harvesting: Cut the fruit open down the middle and scrape out the seeds and surrounding pulp. Like tomato seeds, cucumber seeds have a gel sac that contains chemicals that keep the seeds from germinating in the wet fruit. To break down this covering you will need to ferment the seeds (see Fermenting, pg. 5). Once they are fermented, clean and dry them for storage.

Storing: Cucumber seeds can last up to ten years in proper storage conditions!

Common name: Eggplant

Family: Solanaceae

Life cycle: Annual

Seeding: Leave eggplants in the garden long after you would harvest them for eating to allow them to mature. When ready, purple-colored varieties will turn brownish, and lighter varieties will turn yellowish.

Harvesting: Cut the fruit into sections and put them in a blender with some water. Blend on the lowest setting until the viable seeds begin to sink to the bottom of the mixture. Pour off the pulp and immature seeds that float. Clean and dry the remaining seeds.

Storing: Eggplant seeds will store for 5-7 years.

Common name: Kale

Family: Brassicaceae

Life cycle: Biennial

Seeding: Kale is generally quite cold-hardy so can potentially overwinter in the ground, depending on the variety. In the second season, allow the plants to bolt and flower. Kale seeds need to mature and dry in their pods while still on the plant.

Harvesting: When you see dried pods with very dark or black seeds inside, they are ready. Be careful not to leave the pods too long or they will shatter and spread the seeds, especially in hot, dry weather. Pick off the pods or pull whole plants and thresh them by treading on them. Screen and winnow away the chaff and other debris.

Storing: Kale seeds should last 4-5 years in storage.

Common name: Kohlrabi

Family: Brassicaceae

Life cycle: Biennial

Seeding: Bring kohlrabi plants indoors to overwinter. After they are replanted the following year, they will flower and produce seeds.

Harvesting: Let seeds mature on the plants in their pods. Pods will become brittle when ready. Cut the seed stalks and harvest seeds by treading. Winnow and screen off any debris.

Storing: Kohlrabi seeds will last for 4-5 years in storage.

Common name: Leek

Family: Amaryllidaceae

Life cycle: Biennial

Seeding: Leek are quite cold hardy and can potentially be overwintered in the ground. If unsure, bring them inside to overwinter in a root cellar.

Replant the leeks the following season and allow them to flower and then go to seed. Staking may be needed as heavy seed heads begin to form.

Harvesting: Harvest seed heads and bring them inside when about half the pods have opened, showing black seeds. Hang them over a tarp or container to continue to dry, which will catch falling seeds as pods begin to shatter. Thresh any remaining pods by shaking seeds out, then winnow and screen off chaff and debris.

Storing: Leek seeds will only store for 2 years.

Common name: Lettuce

Family: Compositae (or Asteraceae)

Life cycle: Annual

Seeding: If you are growing a variety of head lettuce, cut a slit across the top to allow seed stalks to emerge. Non-heading varieties will bolt and flower on their own at the end of the season.

Harvesting: Lettuce seeds mature 12-24 days after flowering. Harvest them in the garden by gently shaking seed heads over a container. Mature seeds will fall off, leaving the rest on the plant to continue to mature. Continue to harvest them daily. An alternate method is to pull the plants up when most of the seeds are mature, harvest those that are ready, and hang the plants upside-down over a container until the remaining seeds dry and fall off.

Storing: Lettuce seeds will last up to three years in proper storage.

Common name: Melon

Family: Cucurbitaceae

Life cycle: Annual

Seeding: Melon seeds develop inside the fruit while on the vine, and are mature at the time of regular harvesting.

Harvesting: Harvest melons as you would to eat them. Separate the seeds from most of the pulp. Harvested this way, melon seeds will need to be fermented (see Fermentation, pg. 5) before they are cleaned and dried (as they would normally go through this process while rotting in the garden).

Storing: Most melon seeds will keep for up to five years in proper storage.

Common name: Okra

Family: Malvaceae

Life cycle: Annual

Seeding: Leave some pods on the plant to mature and dry.

Harvesting: Once the pods begin to crack open, harvest them and remove the seeds by hand and continue to dry them indoors (see Drying Seeds, pg. 6).

Storing: Okra seeds will store for up to four years if kept properly.

Common name: Pea

Family: Leguminosae (or Fabaceae)

Life cycle: Annual

Seeding: Leave some pea pods on the vine to dry, which usually begins around mid-July. Make sure that after rain or damp weather that they don't begin to mold. The pods and peas inside should grow to full, plump size before they dry out completely.

Harvesting: Pick dry pods off the vine or pull up the whole plants. Shell them by hand or thresh them by flailing or treading. Screen and winnow away the crumbled pods and other debris.

Storage: Peas last for up to three years in storage.

Common name: Pepper

Family: Solanaceae

Life cycle: Annual

Seeding: Depending on the variety of pepper you are growing, it will turn a specific color once the fruit is ripe. The most common varieties will turn red, yellow, or orange, while others will turn purple, brown, or black.

Harvesting: Once the fruit is ripe, cut it in half and scrape out the seeds. Rinse them in a sieve and dry them on a plate in a warm, dry place out of direct sunlight. Don't dry them on paper or cloth because they tend to stick to those surfaces. Be very careful when harvesting the seeds from hot peppers! Wearing extra-thick gloves is advised to avoid exposure to the residue which will stay on your skin for some time and will burn and sting your eyes and lips!

Smaller-fruited varieties of pepper can be put into a blender with some water and mixed at a low speed until the pulp has broken down. When seeds start to sink to the bottom, pour off the pulpy mixture at the top. Add more water and repeat this process until only clean seeds remain.

Storage: Pepper seeds will keep for 2-3 years in storage.

Common name: Pumpkin

Family: Cucurbitaceae

Life cycle: Annual

Seeding: Harvest pumpkins when they are fully ripe, and store them in a cool, damp place, such as a root cellar, for sixty days or so. The seeds will begin to go through an after-ripening process which will help break down seed coats for better germination rates.

Harvesting: Cut the pumpkin open and scrape the seeds out. Rinse away any pulp, and dry them in a warm, dry place. Some sources recommend fermenting pumpkin seeds by hand (see Fermenting, pg. 5). If you choose to ferment them this way, harvest the seeds after 3-6 weeks instead of sixty days.

Storage: Pumpkin seeds will last 5-6 years in storage.

Common name: Radish

Family: Brassicaceae

Life cycle: Biennial

Seeding: Radish plants should be pulled after roots develop and before bolting. Inspect the roots for quality, disposing of any unhealthy-looking plants. Then put the roots in a refrigerator for 2-3 days as a cold treatment. Replant them in the garden and they will bolt and go to seed. Staking may be required to keep seed pods off the ground.

Harvesting: When seed pods are papery and dry, they are mature. Unlike other plants in the same family, these seeds pods won't readily break open to disperse seeds. Pull up whole plants and thresh by treading. Winnow and screen away chaff.

Storing: Radish seeds will remain viable for up to five years in proper storage.

Common name: Squash (summer and winter)

Family: Cucurbitaceae

Life cycle: Annual

Seeding: Allow squashes to grow to full maturity, which in most cases is past the point of harvesting them for eating. Soft-skinned varieties, such as summer squash, will become firm and leathery. Once they reach this stage, pick them and store them in a cool place for 3-6 weeks.

Harvesting: Squash seeds may need to be fermented by hand if they have not already gone through the natural after-ripening fermentation

process (see Fermenting, pg. 5). It is easy to tell if the seeds have fermented inside the fruit by the smell of the pulp. If you ferment by hand, the process shouldn't last longer than 24-48 hours. Left too long to ferment and squash seeds will lose viability.

Clean squash seeds under running water in a sieve. Once strings and pulp have washed away, dry the seeds and store them.

Storage: Squash seeds should stay viable for up to six years.

Common name: Tomato

Family: Solanaceae

Life cycle: Annual

Seeding: Tomato seeds are mature when you pick the fruit for eating.

Harvesting: Tomato seeds have a gel coating that contains chemicals which prevent the seeds from germinating inside the wet fruit. Fermentation is required to break down this seed coat. Cut tomatoes in half and scoop out the seeds and pulp into a glass container. Smaller varieties such as cherry tomatoes can be mashed instead. Continue the fermentation process (see Fermenting, pg. 5). Once they have been fermented, clean and dry the seeds for storage.

Storage: Tomato seeds should last for 4-10 years in storage.

For information about zucchini, see squash.

HERBS

Common name: Basil

Family: Lamiaceae (or Labiatae)

Life cycle: Annual

Seeding: Basil plants will begin to bolt at the end of the season, after harvest. Allow them to flower and produce seed heads, then collect the heads when they begin to dry.

Harvesting: Continue drying the seed heads somewhere warm and dry. When seeds are fully mature the heads will easily crumble in your hands. Blow away the chaff and screen if necessary.

Storage: Basil seeds will store for up to five years.

Common name: Chives

Family: Amaryllidaceae

Life cycle: Perennial

Seeding: Leave some chive clusters alone and they will flower and produce seeds in the spring.

Harvesting: Let seed heads dry thoroughly on the plants. Once dry, seeds will easily crumble out of the flowers. Winnow and screen any chaff if necessary.

Storage: Chive seeds will only last a year or two in storage.

Common name: Cilantro (or Coriander)

Family: Umbelliferae

Life cycle: Annual

Seeding: Cilantro plants are quick to bolt. Allow them to flower and go to seed.

Harvesting: Harvest cilantro seeds when they are fully dry on the plant. Bring seed heads indoors and thresh them by treading on them. Winnow and screen off any debris.

Storage: Cilantro seeds will store for up to three years.

Common name: Fennel

Family: Umbelliferae

Life cycle: Perennial

Seeding: Fennel plants that are left in the garden will produce flower heads and eventually go to seed.

Harvesting: Harvest the seeds after they have dried completely on the plants. As with most other Umbels, seed heads can be threshed by treading or by crumbling by hand. Winnow off any remaining chaff and screen if necessary.

Storage: Fennel seeds will keep for three or more years in proper storage.

Common name: Mustard

Family: Brassicaceae

Life cycle: Annual

Seeding: Leave several plants alone in the garden and they will flower abundantly and produce seeds. Larger plants can be contained by bending stalks into each other, creating hoops, between rows or individual plants, that simultaneously keep seeds off the ground and allow airflow for drying.

Harvesting: Seed are mature when the bottom pods begin to crack open. Cut the stalks and bring them inside to finish drying. Once dry, thresh the seeds by treading on them, then winnow and screen off any debris.

Storage: Mustard seeds will last for four or more years in proper storage.

Common name: Parsley

Family: Umbelliferae

Life cycle: Biennial

Seeding: Parsley can be overwintered in the ground (except in the coldest parts of the Northeast) if properly mulched. In the second season plants will flower and go to seed.

Harvesting: Allow seeds to dry out on their plants. When flowers begin to easily crumble, bring the heads indoors and thresh them by treading or by hand. Screen and winnow off any chaff.

Storage: Parsley seeds will store for up to three years.

For more information on saving herb seeds, check out the titles in the Resources and Further Reading section.

FLOWERS

Methods for saving flower and grass seeds are fairly consistent from species to species. Most flowers and grasses produce seeds in seed heads or seed pods. These will need to be left on their plants to dry until they are mature, but just before they open and disperse the seeds inside. If you are unsure about whether they are mature, it is better to leave them alone until the plants begin to naturally disperse their seeds. You will lose some seeds this way, but you'll know that the others inside are ready to be harvested.

It is important that you never harvest seeds of any kind, especially flower seeds, when they are wet. Wait until the weather is dry so that your seeds do not mold. Once you are ready to harvest them, pull up the plants or cut off the seed heads and bring them indoors. Hang them upside down over a tarp or other container that will catch falling seeds. If you are processing several varieties at once, make sure to keep track of which seeds came from which plant! Once most of the seeds

have fallen from the plants, thresh the rest by hand by rubbing seed heads or pods between gloved hands. Winnow away the chaff and put the seeds somewhere warm (between 70°F and 95°F) and well-ventilated to continue drying (Linsley, 2008). Be sure to keep them out of direct sunlight! Flower seeds should dry for 2-6 weeks, depending mostly on the size of the seeds, but also the temperature and humidity of their drying space.

Once dry, store seeds in a cool, dry place. Flower and grass seeds will last anywhere between 2-10 years in proper storage.

Glossary

Annual - any plant that completes its life cycle in one growing season.

Biennial - any plant that completes its life cycle over two growing seasons, with initial growth in the first season and reproduction in the second season.

Bolt - the upward growth of flowers from a plant that has basal vegetation, e.g., lettuce. To go to seed.

Chaff - the dry seed coverings, flowers, or other particles found with seeds after threshing.

Coat (seed coat) - the protective layer on the outside of a seed.

Debris - any unwanted particles in a collection of harvested seeds. See also: "chaff".

Flailing - the process of beating dry plants against a hard surface to loosen seeds for gathering.

Germinate - the sprouting of a seed.

Heirloom - any variety of open-pollinated crop that had bred true-to-type for generations, usually predating 1945.

Hybrid - a crop variety created by crossing two different varieties. These plants will not breed true-to-type.

Mulching - covering the ground with certain types of organic matter (hay, leaves, compost) to enrich and insulate soil.

Open-pollinated - any variety of plant which breeds true even when randomly mated within its own variety.

Overwinter - to keep a biennial plant alive through the cold season.

Perennial - any plant that returns each growing season, usually producing flowers and seeds from the same roots year after year.

Pod (seed pod) - the shell that covers and contains seeds on certain varieties of plants, e.g., peas or beans.

Root cellar - an underground storage room or rooms used to keep plants for overwintering due to its characteristically cool, damp environment.

Screening - to separate seeds from chaff and other debris by using particularly gauged screens that allow either seeds or chaff to fall through while holding the other back.

Seed coat - see "coat"

Seed pod - see "pod"

Thresh - any process used to separate seeds from their parent plants.

Treading - a process of threshing by putting seed pods in or under cloth and stomping or treading on them.

True-to-type - any plant that displays characteristics and qualities that are expected of its variety.

Variety - a group of plants that are genetically related and have uniform traits and characteristics.

Winnow - separating seeds from chaff, usually by pouring them into another container in such a way that the wind or a fan can blow the light-weight chaff away, leaving seeds behind.

Resources and Further Reading

In Print:

Seed to Seed: Seed Saving and Growing Techniques for Vegetable Gardeners by Suzanne Ashworth

The Wisdom of Plant Heritage: Organic Seed Production and Saving by Bryan Connolly, as part of the Northeast Organic Farmers' Association's Organic Principles and Practices Handbook Series

The Seed Underground: A Growing Revolution to Save Food by Janisse Ray

Online:

Vegetable Seed Saving Handbook: howtosaveseeds.com

High Mowing Organic Seeds - Growing and Seed Saving Information: highmowingseeds.com/cultural-disease-and-seed-saving-information.html

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