Seed Saving Methods

A general guide made by CSUN's Sustainability students

Introduction

This guide is intended to provide a foundation of knowledge that will set you on your way to becoming a proficient seed saver. It is necessary to understand how plants reproduce in order to understand how to preserve them. This pamphlet in conjunction with the sustainability presentation and the Spotlight Plants booklet will provide a holistic view on how to save seeds and why seed saving matters.

Life Cycle Types

There are three life cycle types. It is important to know which type of plant you are growing so that you will know when your plant will produce seeds.

Annuals:

Annuals have an entire life cycle in one growing season. Meaning they germinate, reproduce and die all in that same season.

Ex. peas, corn, watermelon, tomatoes, peppers, etc.

Biennials:

These plants usually experience two seasons. The first season is usually characterized by slower growth rates. In the second season plants reproduce (which may require vernalization), then they die.

Ex. carrots, cauliflower, onions, fennel, etc.

Perennials:

These plants can live for many years and can reproduce many times throughout its lifetime. However, it may not produce seeds for the first few years.

Ex. golden currant, strawberry, potato, garlic, asparagus, etc.

Annuals tend to be the easiest plants to grow followed by biennials and perennials. Each plant type has its trade-offs. Annuals and biennials can be planted each year relatively easily. While perennials require more of an investment upfront via time and energy, a single perennial plant may produce more seeds than an annual or biennial plant over its lifetime.

Reproduction

Plants have a sex life, for the purpose of this pamphlet we'll discuss flowering plants. Each plant contains male and female gametes. Pollination methods depend on where these gametes are located on the plant but, more on that later. Sexual organs are usually located in flowers. Perfect flowers are described as having both the male and female sex organs in the same flower, imperfect flowers are when they are in different flowers. Some plants are monoecious species,

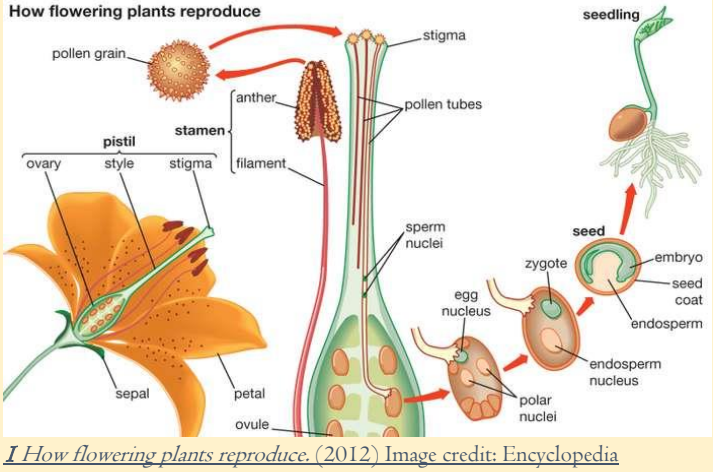
which describes a plant with male and female flowers. Dioecious species describes plants in which there are only male or female reproductive organs.

Male reproductive organs & gametes:

Stamen (anthers & filament) → pollen

Female reproductive organs & gametes:

Pistil (stigma, style & ovary)→ ovules



1 How flowering plants reproduce. (2012) Image credit: Encyclopedia Britannica, Inc.

Seeds form when the pollen comes into contact with a receptive stigma. A pollen tube then begins to form and travels down the style until it reaches the ovules in the ovaries.

Seed saving is essentially selecting the genetic makeup of future plant generations. Seeds will have the same characteristics as its parent plant. Because of this it is important to keep in mind the characteristics of the plants you've selected for seed.

Characteristics such as: height, hardiness, color, productivity, flesh thickness, etc.

Pollination

There are a couple of things that need to be kept in mind when it comes to pollination. The first is your plant taxonomic classification and the second is method of pollination. These two together determine how closely you should plant certain species.

This is the scientific name for radish

BRASSICACEAE Raphanus sativus

Family Genus Species

If different plants from the same species are planted too closely to one another then there is a chance of cross pollination and the creation of hybrid species. This is not necessarily always a good thing. Seeds saved from crossbred species will have different characteristics than the parent plant, they may even be sterile.

How a plant reproduces also determines the pollination methods it will employ. Perfect flowers are self-pollinators and generally do not need any assistance. Imperfect flowers (monoecious and dioecious species) may rely on insects or wind in order to reproduce.

The pollination method in use determines the isolation distance which is how far apart plants need to be planted in order to avoid cross pollination. Isolation distances preserve the genetic makeup of the next generation by ensuring the production of pure seeds (seeds that most genetically resemble their parents). Isolation distances can be quite specific and vary from species to species. It is very important to keep this mind when you are planning a garden.

Isolation Techniques:

Time Isolation | Mechanical Isolation | Bagging Techniques | Caging Techniques | Hand-Pollination

Dry Process

Seeds that are produced in pods and husks are usually reserved for this method. The pods and husks must completely dry before starting the process. They can be allowed to dry on the plant outside, however if weather does not permit this then the whole plant may be harvested and dried indoors.

Threshing and winnowing are the main practices used. Threshing is the act of removing the seed from their coverings. This can be done by beating or flailing the seed pods. It is important to note that different threshing techniques must be used depending on the plant. If too much pressure is applied during this part of the process the seeds may be damaged.

Winnowing is the act of separating debris and chaff from the seeds using wind. There are several ways to winnow your threshed product. You can use the naturally occurring wind however, you may lose large amounts of seed in a huge gust of wind or if the wind changes direction. Good alternatives include old hair dryers with the heating mechanisms removed, small fans and vacuums.

Screening can also be employed in place of or in conjunction with winnowing. This requires passing the threshed product through a screen or a basket. The initial screening allows the seeds to pass through. The second screening involves using a screen in which the seeds are too large to pass through and removes the remaining chaff.

2 *Winnowing and threshing harvested rice, Korea. Liebig educational card.* Image credit: European School (19th century) via Look and Learn

Gravity separation may also be employed. This is when threshed product is placed on a slightly tilted surface (board or a pan) in which the gentle breeze from a fan is concentrated on. The heavier seeds will fall and the lighter chaff will be blown away.

Wet Process

This process includes three steps: removal, washing and drying.

Seeds may be removed by cutting open the fruit and scraping them out. Smaller fruits may be crushed or mashed in order to remove the seeds. Some plant species may require an extra step called fermentation; it is needed to break down the gelatinous coverings of some seeds. The fermentation process naturally occurs in the natural environment when plants fall to the ground and rot. During this process microorganisms like bacteria and yeast destroy a lot of seed borne diseases. Water should not be added to the fermentation mixture as it can dilute it and slow the process, it can also cause sprouting near the end.

The next step is washing. Run the seeds under gentle running water to separate them from the surrounding pulp or the fermentation mixture. Seeds or fermentation mixtures can be placed in a bowl with twice as much water. Nonviable/bad seeds will float to the top along with any extra debris. All of the viable/good seeds will sink to the bottom. The water can be poured off along with the nonviable seeds and debris. The process should be repeated until only clean seeds remain. The final step is to

run the seeds under water in a strainer for the final separation and cleaning.

The final step is drying. Clean seeds should be spread out as thinly as possible on a nonstick surface (ceramic dish, cookie sheet, plywood or screen). It is important to dry the seeds quickly because moisture can cause germination or mold. Seeds should not be set outside to dry because temperatures hotter than 95°F will damage the seeds. It is important to keep in mind that the seed temperature may exceed the air temperature depending on the color of the seed or the temperature of the surface it is lying on. The best option is to dry seeds inside with the assist of a fan, preferably a ceiling fan to avoid blowing the seeds away.

3-7 Wet Process on tomato seeds. Image credit: Marie Iannotti via The Spruce

Seeds are vulnerable to foodborne pathogens and many types of disease: black rot, black leg, black leaf, bacterial canker, target spot, downy mildew, Septoria, fungi and some viruses as well. It is important to sanitize the seeds with a hot water treatment or a chlorine bleach treatment. Seeds should be allowed to dry completely before storing.

Labeling & Storage

After your seeds are completely dried, they are ready for labeling and storage.

Labeling is very important as it contains valuable information about the seeds. They should include their scientific name, characteristics, where they grew, germination percentages and date obtained/stored. Even more detailed descriptor data and photographs may be kept on file on computers. However, collecting this much data about the plant is generally not needed for home gardens.

There are a couple of storage methods with different results. Airtight storage is probably the most accessible. A glass or metal vessel with a rubber seal is moisture proof and airtight. Seeds can be placed in plastic baggies or envelopes before being stored inside an airtight vessel. However, plastic baggies and envelopes should not be used as storage containers on their own. Seeds should be stored in a cool and dark place, preferably in a room where the sum of the temperature and the relative humidity do not exceed 100.

Storage spaces near the ground are generally better than those near the ceiling.

For longer term storage, seeds may be stored in a refrigerator. However, seeds must have a moisture level of 8% or less before being frozen otherwise, the excess water will freeze and expand and damage the seed. Color indicating silica gel can be an effective tool for reducing the moisture levels in seeds to the optimal percentage. Place the seeds in an airtight container with the silica gel, most seeds reach those moisture levels in 7- 8 days. The final storage container must be moisture proof and airtight, the best place to store seeds is in the freezer, followed by the refrigerator.

Additional Resources

Websites:

This is a list of websites that has a plethora of information and links to even more resources.

Seed Saver's Exchange | seedsavers.org

Food Print | foodprint.org

Seed Savers Alliance | seedsaversalliance.org

Life Lab | lifelab.org

Community Seed Network | communityseednetwork.org

Books:

This is small list of suggested reading, there are many other books on the topic.

Seed to Seed | Suzanne Ashworth

The Complete Guide to Saving Seeds | Cheryl Moore Gough & Robert E. Gough

How to Save Your Own Seeds | Seeds of Diversity Canada

Documents:

These documents are available at seedsavers.org.

Seed Saving Chart | Seed Savers Exchange

Seed Saving Terms | Seed Savers Exchange

Bibliography

Ashworth, S. (2002). Seed to Seed: Seed Saving and Growing Techniques for Vegetable Gardeners. Decorah: Seed Savers Exhange, Inc.

Lewis Ivey, M. L., Adhikari, A., Graham, C., Malekian, F., & Fontenot, K. (2015, September). Horticulture Crops Pathology Laboratory. Retrieved from Louisiana State University College of Agriculture: https://www.lsu.edu/agriculture/plant/extension/hcpl-publications/7_Pub.3447-VegetableSeedSanitation.pdf

Contact Us

Institute for Sustainability

Phone: (818) 677 -7710

Email: sustainability@csun.edu

Web: https://www.csun.edu/sustainability/institute