The Strawberry Store System for Germination of Gourmet Strawberry Seeds

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Version 1.0

Introduction

For over 25 years we have been collecting, growing and conducting research on gourmet strawberries. Our interest began with the alpine types (Fragaria vesca) and has continued with musk (F. moschata), Virginia (F. virginiana), beach (F. chiloensis), green (F. viridis) and heirloom hybrids. Germination of the seeds is said to be easy, but experienced growers have had difficulty with this task.

This document was written to help beginning gardeners and experienced commercial growers to better understand the strawberry germination process and offers tips that we hope are useful. By the use of videos we hope to make this a more pleasant experience that will allow the viewer to select the aspect of germination that is of particular interest without having to read a long boring document.

Background

Before we get into methods, let's talk briefly about strawberry seeds. What we call strawberry seeds are not actually seeds. They are called achenes and are the true fruit. We will call the achenes seeds for this discussion. The achenes can be imbedded in an indented area of the fleshy part of the berry or can be held on the surface.

The germination process for strawberries is really an effort to break the dormancy of the seeds. Dormancy is not usually discussed but it is at the core of the methods used to grow strawberry plants from seed.

You will see on our websites a statement that we precondition all seed before selling or shipping it. What we are actually doing is taking the first steps to a simple method of breaking dormancy. Freezing strawberry seeds for 3 or 4 weeks sends a "message" that winter is here. When the seeds are removed from the freezer they sense that "spring" has begun. The seeds will more readily germinate when exposed to moisture and acceptable temperatures. Temperatures above freezing to about 65^{o}F are ideal for germination. Temperatures higher than this can impede germination or even send seed further into dormancy. Viable

preconditioned seeds can germinate in the dark and will even germinate when lightly covered with media. As long as the media is moist and not buried these seeds will germinate.

Well, that sounds like it is very easy to germinate strawberry seeds. Yes, if you have fairly fresh viable seeds that have been preconditioned it is not that difficult. So, why do some growers find it to be a difficult if not impossible task? I have heard several times from commercial growers that germinating strawberry seeds is difficult.

As mentioned, the whole process depends on the level of dormancy. In my experience, freshly saved seed does not readily germinate. We are here assuming that the seed was allowed to fully mature before saving it. Immature seed may not be viable even with preconditioning and other dormancy breaking methods. We freeze freshly saved seed for at least 4 weeks before conducting germination tests or sowing. With some species or varieties this period may not be long enough and when we see poor germination from the new harvest we refreeze for several more weeks.

Other factors that affect germination are seed age and storage conditions. Strawberry seed stored properly in a refrigerator will remain viable for one to two years depending on its initial viability. If frozen, seed can remain viable for multiple years. We won't go into the actual numbers here because there is a lot of variability between species and varieties within species. F. chiloensis seed for example should not be frozen while F. vesca seed can be frozen for multiple years with excellent germination viability. The bottom line is that old seed or seed stored in extreme conditions can either die or go deeply into dormancy.

We have been testing various methods to break dormancy of strawberry seeds. We experience situations where we need to germinate very old seed or seed that was not properly stored. We are currently testing a number of methods and materials that have been suggested to aid strawberry germination. A subsequent version of this document will discuss the details of these studies when we are ready to release them.

If one spends the time to do online research, a couple of methods are mentioned that aid seed germination in general. The first method we use to improve germination is vermicompost. This has become part of our routine. We incorporate it into our soil mix and frequently apply vermicompost tea (vermitea). We have released some information on results obtained with vermicompost and will release more data in the future.

Another positive aid to germination specific to strawberries is light. The few studies available that involve light and strawberry seed germination mention the far-red spectrum and a few mention end of day far-red exposure. Our initial studies in this area have shown far-red light to improve germination even for seeds that have not been preconditioned and for old seeds that we thought were dead. Our research is ongoing in this area.

Another germination method for some types of seeds involves smoke. Observers have noticed that strawberries and other woodland plants come to life after a forest fire. Even seeds that have lied dormant for years can respond to the changes brought about by the fire. We can't simulate a forest fire but a clever enterprise has isolated the compounds that stimulate germination that are present after a fire. They have impregnated these compounds on a paper disc and sell them. We purchased some from Seedman.com and are trying this method on very rare, very old seeds that we could not germinate. We were able to germinate a few seedlings so far where no other method germinated even one seed. Again, we will update this document with more details when they are available.

An online search will result in a range of recommendations about germinating strawberry seeds. Some will suggest covering the seed lightly with media or sand. I have seen recommendations of a ¼" of media covering the seeds. Most will tell you not to cover the seed and I will tell you the same. If they actually get seeds to germinate under these conditions it is probably because seeds are fresh and preconditioned. I have my doubts whether they would get any emergence at this depth no matter how the seeds are treated.

When in doubt, precondition the strawberry seeds that you receive. And, use a broad spectrum light or filtered sunlight when germinating. For seed you receive from most sources these methods should ensure adequate germination. If you are receiving old seed or seed that was poorly stored you may need to try other methods. We hope you don't have to use the extreme "smoke" method.

I will mention one other aspect of using preconditioning or other methods to improve germinate. Unconditioned seeds can take 30 days or more to germinate. We have found that preconditioned seed germinates quicker, in as little as 4 - 14 days depending on the variety. Even preconditioned seed will germinate over an extended time period. If you are sowing a few seeds for your home garden you won't need any specialized methods. If, however, you are a commercial grower using tiny cells in plug trays and are trying to time your crop, seeds that germinate consistently and uniformly will be preferred. This is where one needs to employ as many methods as possible to get the best germination and also consistent uniform germination.

Preparation

When your seeds arrive, determine if they need to be preconditioned if possible. Here at The Strawberry Store (aka Strawberry Seed Store) we precondition all seeds. Be assured that seed that you receive from us has been frozen for at least a month before you receive it. If you purchase seeds from other sources ask them if they have been preconditioned. One other tip: All seed that we ship has been tested for germination and the results are on the seed packet.

Some seed sellers do not test or report germination results so ask them for that information as well.

If there are delays in transit (such as for International orders) or if the seed warms up to room temperature or higher for several weeks, it needs to be reconditioned before sowing by freezing. If you received the seed within a week or two of shipment and plan to sow within a couple of days, refrigerate the seeds until you use them. For longer term storage place them in the freezer. Make sure they are sealed to prevent moisture getting into the package.

When you are ready to sow, check the germination on the package. The minimum standard for strawberries is 60% germination. We do sell seed with germs this low on occasion, but most times germ is in the 70 – 90% range. Knowing this will help you during the process to determine the number of seeds to sow per cell.

Media

The most important things to remember about germinating strawberry seeds:

- Do not let the media dry out during this process
- Do not cover the seed, light aids germination
- Use a well drained mix. We do not recommend using garden soil unless it is sterilized. Add sand or perlite to aid in drainage.
- A mix with peat or coir is preferred to other media due to the pH requirements of strawberries. Strawberries need a pH of 6.5 to 6.8. We exclusively use coir in our mixes. Be aware though that coir from some sources have excessively high amounts of salt. Don't switch all of your germination to coir until you have some experience with this media.

Here are reasons to consider using vermicompost in your germination mix, for strawberry seeds or for any garden seed.

Vermicompost:

- Adds nutrition and many minerals to the mix
- Has been shown to increase germination of seeds
- Has been shown to protect seedlings from several diseases and insect pests.
- Adds beneficial microorganisms to the media

Click the video link to learn about the media mix and system used by TSS .

Media Video on YouTube

Before we move on, here are a couple of other tips. First, we do not recommend using peat pellets for germinating strawberry seeds. There is too high a risk that the surface will dry out and the seeds will die. Even if you are an experienced gardener it is a risk.

A second precaution involves using compost in your seedling mix. If the compost is stable and is no longer heating you are part of the way there. Compost takes a lot of time to decompose and to be consistent. If the compost has been turned frequently and thoroughly you should be ok. I have seen a number of cases of erratic germination results, or even slow death of seedlings due to the unknown composition of compost. To be safe, have it analyzed before using it in germination mixes. Seedlings can be particularly sensitive to excess salts, improper pH and other characteristics of compost that has not completely decomposed.

Sowing

There are many ways to sow seeds. Strawberry seeds are very small. A sneeze can send many seeds into the air. We use an electric vibrating seeder that we have used for many years. We have used vacuum seeders but I have to admit not being patient enough to use them long term.

We will mention a couple of options for those who do not want to spend money on sowing seeds, especially if sowing is done infrequently. Simple mechanisms are available for a few dollars that can be tapped with a finger or a wheel can be rotated that causes vibration. It's even possible to sow seeds with a folded piece of paper and tapping it to get a steady flow of seeds. Here are a couple of pictures of inexpensive simple equipment that can be used to sow a range of seed sizes including strawberries:

Pro Seeder

Click this link for a video on the sowing process here at TSS

Germination System

Not all systems have to be complicated. Over a number of years we have tested many systems to germinate strawberry seeds. This is the one that seems to work best for us and it's the simplest one we use to date.

Click this link to view the germination process we use

Post Germination

If you continue to soak the cells in a tray of water you run the risk of some pretty serious pest problems including Pythium and fungus gnats. As soon as the first seeds start to sprout the tray needs to be taken out of the water and placed in a well lit area. Under no circumstances do we recommend that the tray should be in water for more than 7 or 8 days. An even better practice is to soak the tray until the soil is wet and then take it out of the water. If you have the time, doing this daily will help to avoid pest issues.

Click This Link for a Video on the Post Germination Process

Wrap Up

Should you have questions about this process please contact us. We want you to be successful and to enjoy the growing process as much as you will enjoy the fruit that you harvest.

We intend to update this document with new information and/or videos as time goes on. Check back from time to time to see if the version has changed. The version is just below the title and author on page 1.

Please visit our seed site at www.strawberryseedstore.com/buyseeds.

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