

GROWERTALKS

Paul's Pointers

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Seeds of Success

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I became fascinated with the wonders of seed germination at an early age. I recall collecting tree seeds during recess and planting them in small pots or Styrofoam cups and being really excited as the seedlings emerged and grew. I didn't quite understand the science or biology allowing this magical event to happen, but the process of germination definitely sparked my interest in horticulture.

Left: Germination chambers can be used to obtain more uniform and consistent germination.

Millions and millions (perhaps billions) of seeds later, I'm still hooked on germination. Being older and relying on germination successes from a professional/business perspective is very different from

the lens I viewed the process of germination as an adolescent.

Perennials from seed can be more challenging than most of the seed annuals being commercially grown. This was especially true when I entered the industry more than three decades ago when perennial hybrids were absent and the seed technologies lagged when it came to perennials. That being said, perennials from seed can still be very challenging. It's impossible to walk you through all the ins and outs of starting perennials from seed in this article, but how about I share a few of the top areas that have helped improve my successes starting perennials from seed?

To germinate or not to germinate?

A large portion of germination successes comes down to the perennial variety you're trying to germinate. Seed quality and seed technology have come a long way over the past couple of decades, but that doesn't always ensure success. Some perennials are just easier to germinate than others. To improve your success, consider the varieties you're attempting to germinate and try to put yourself in situations where the odds are in your favor.

First rule: If you've been dabbling in perennial germination and have observed consistently poor germination (let's say less than 70%) over multiple occasions, I encourage you to stop trying and leave the germination to other propagators. This also applies after you've had two or more failed attempts with germinating perennials you've tried, but don't have previous experience with. Two strikes then move on. Buying in plugs of these difficult perennials is likely cheaper in the long run and allows you to hit your numbers when transplanting rather than being short all the time.

Second rule: Many perennials are available with various seed treatments to enhance or improve germination. This is usually an indication that germination using raw, untreated seed is problematic. When attempting to germinate these varieties, I recommend always using the pre-treated seed and not trying to start them with raw seed, which will likely have significantly lower germination rates.

Third rule: Consider multiple sowing or increasing the number of seeds being sown per cell to help you achieve better germination rates. Although there is some expensive perennial seed, most is reasonably priced. Multiple sowing is a viable, low-cost option for increasing germination successes. If you've been single sowing and have been getting 50% to 70% germination rates, increasing the seed count to two seeds per cell shifts the probabilities of having at least one viable seedling per cell. The increase in seed cost is easily offset by maximizing the yield and reducing the greenhouse space needed to consistently obtain the intended number of viable plugs. In other words, at a 50% germination rate, it would take two trays or twice the growing space to produce the intended number of viable plugs compared to double sowing and reaching 100% yield.



Seed storage

A large percentage of the crops with poor germination rates I've observed over the years was associated with either old seed or seed that's been improperly stored. Most growers don't have the ability to store perennial seeds for extended periods properly. The ideal conditions are 41F (5C) and 25% to 30% relative humidity.

Left: Multiple sowing can be used to greatly reduce the number of empty cells as seen in this Lavender Hidcote Blue. **Inset:** Determining moisture content in an objective way requires weighing trays. Each tray size will have its own optimal weight when watered appropriately.

Growers commonly use refrigerators; these can provide proper temperatures, but don't offer any ability to manage humidity. If you plan to store seed for long durations (three to six months), plan on obtaining a unit that can control both temperature and humidity. For short-term seed storage (one to three months), I suggest placing opened and unopened seed packets into airtight containers and placing them into a designated refrigerator set at 41F. The humidity levels inside normal refrigerators will still run higher than optimal for seed storage, which is why this method isn't suitable for long-term seed storage.

Germination chambers

Germinating perennials inside germination chambers increased my germination rates by up to 25% (more in some instances) compared to those previously obtained when germinating inside greenhouses. Germination chambers provide consistent temperatures and humidity, which are the main requirements for getting consistent and uniform germination. I also recommend chambers are equipped with lighting. Some perennials require light for germination, but the lights are most beneficial for reducing stretched seedlings.

Chambers may not be a possibility for all propagators, but I highly recommend them for growers doing a lot of perennials from seed. Some perennials have different requirements, namely warmer or cooler germination temperatures, but the majority of perennials will germinate well at 68 to 72F (20 to 22C) and >80% RH.

Tray moisture

One of the most significant factors I've learned in recent years is the importance of having the trays at a high enough moisture level after the seeds are sown. This has led to the most significant improvement I've ever made and has resulted in very consistent and uniform germination.

I previously went through the motion of running the trays through a water tunnel after sowing without fully understanding how important this step is. As it turns out, I wasn't adding enough water to the trays during this process, which was leading to faster drying out in the chambers and greenhouses, and reducing the germination rates as a result. Adequate moisture content of the trays after sowing allows the seed to imbibe and start germinating and reduces moisture variability within the trays in the days that follow.

A good rule of thumb for small tray sizes (such as 288-cell trays) is for the trays to weigh approximately 1,000 grams after the trays are run through the water tunnel. Each tray size will have its own optimal weight; you'll have to determine the targeted weights for each tray size you're using. It's important to avoid high-pressure and high-volume outputs out of any single nozzle in the water tunnel, otherwise small seeds can be washed away and/or buried too deeply.

Even with trays at the proper moisture level going into the chambers or greenhouses, it's still necessary to manage the humidity levels inside the chamber and moisture levels in the greenhouses with booms or mist to keep the moisture levels high enough during the germination process to optimize germination. Germination can be adversely affected when the moisture levels fluctuate largely and the surface where the seeds are located are allowed to dry down.

Carefully manage this stage until germination has occurred and the majority of the cells within the trays have seedlings with the cotyledons (seed leaves) present. Once the majority of the cells have germinated, the moisture content can be reduced to align more with your normal growing practices for plug trays.

Much, much more

There are a lot of other factors for growers to consider and focus on when starting perennials from seed, including using the proper type of substrate, achieving uniform tray filling, managing irrigation properly at the various plug stages—not to mention providing the right fertility, light intensity and fine tuning production using plant growth regulators, to name a few.

There's definitely more to starting perennials from seed than I could possibly cover in this article. The topics I focused on above are truly the areas that have helped me to improve my perennial germination successes the most and hopefully this information will prove valuable to you as well. **GT**

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