

Searching For the Right Seed Starting Mix



Now that winter is here (which also means that the world didn't end on December 21st) and you are cozied up with your seed catalogs planning your 2013 garden, the next important question is: "For those seeds that you are going to grow and transplant next spring, what will you use for a seed-starting media?" As Master Gardeners, you already know that you aren't supposed to use your garden soil. You also know that you want to start your seeds early and indoors so that come spring when the air and soil temperatures have warmed up and your garden planting bed is prepared, you can transplant the already flourishing seedlings.

So what do you use for a seed-starting media to start your seeds early and indoors? I was reminded of this "dilemma" as I listened to a recent [Farmer Fred show](#) several Sundays ago. Fred and his guest, Debbie Flower—what a great name for a horticulture instructor at American River College—both had similar but different recipes for their homemade seed-starting mixes. Fred's recipe was equal parts peat moss (or [coir](#)), compost, and perlite. Debbie's recipe was slightly different and more complex, using equal parts peat moss (or coir), perlite and vermiculite, and adjusting pH by adding lime. Both agreed that warm or hot water and/or a wetting agent was desirable to get the peat moss to absorb water and be workable. Fred uses a small amount of liquid detergent in a hose-end sprayer while mixing a bag on the driveway; Debbie used a commercial wetting agent (Aqua-Flow) while mixing. Also, in Debbie's case, she added some time-release fertilizer. But even Debbie admitted that this is a debatable point, since seedlings usually don't need fertilizer until the first set of "true" leaves is present. Another seed-starting mix from a source I've mentioned before, [Don Shor at Red Barn Nursery in Davis](#), contains two parts peat moss to one part each of perlite and pumice. In comparison to these mixes, one commercial seed-starting mix I looked at (Jiffy) contained a mix of 50/50 peat moss and vermiculite along with lime to adjust the pH.

I found it interesting that even while these recognized experts agreed in the basic formulation, they disagreed in the details of a seed-starting mix. After considerable further review, it seems that almost everybody who propagates from seed has their own "mix" that they are comfortable with. I wondered what some of the recognized propagators among our Master Gardeners (MG) use, so I asked Dianne Martinelli who propagates many, many plants for both the Pleasant Hill Garden Study Club and the Our Garden weekly plant sales. She said that she and Janet Miller (2012 Great Tomato Plant Sale... 3,000 tomato plants from seed) both use commercial [Potting Soil](#) from Navlet's and Orchard Nursery, which contains fir bark, "forest humus", peat and many other often recommended seed starting ingredients. Sara Hoyer, who propagates hundreds of veggies raised from seed for PHGSC plant sale, replied that "...I've been happy with Navlet's [planting mix](#)-- not [potting mix](#),--mostly because it's handy to go there and I have the discount card from PHGSC. I add my own perlite to the mix and I just eyeball the amount, maybe 15 - 20% or so." She also reminded me that "I have found that, even more than the starting mix, bottom heat, appropriate moisture levels, and air circulation are key in successfully starting seeds. Using an oscillating fan has been a huge factor. (*Both Dianne and Janet do essentially the same to grow their seeds.*) It keeps the damping off to a minimum, and makes the starts sturdier." All three are obviously quite successful using these several mixes. This does run somewhat counter to the majority of high volume amateur propagators in the various web forums I perused who mix their own seed-starting mix because they believe it is less expensive. By using high quality commercial mixes, that cost difference can be reduced or maybe eliminated.

Even with the recommendations of these local experts, I was still dissatisfied with what I would give as my MG recommendation if someone asked about seed-starting mixes. When I research these types of questions, I'm pretty much a web-surfer, e.g., putting in a search term such as "seed starting mix UC Davis" and doing a Google search to see what comes up. I did quite a few of these searches and was somewhat surprised to not find a nice one-size-fits-all response. Most of Google's UC results were from other County MG websites and were almost all word-for-word the same and similar to the mix recipes above, or they defaulted to commercial seed-starting mixes. But most surprising to me, what with all the other "how-to" vegetable gardening information UC Davis provides, was the comment that home vegetable gardening seed-starting mixes were limited to "[a commercial potting mix suited to starting seeds will work well.](#)" The UC recommendation is probably the easiest for a moderate-sized home garden.

But what if a gardener wanted to make his own mix? What would be the best recipe? To find the answer, I consulted the stand-by compendium of everything MG – the **California Master Gardener Handbook**. (Note to self—maybe I should have consulted the Handbook first?) You do remember that bigger-than-telephone-directory-sized book that you might have last looked at when you took your initial MG training? Right there on page 96 is an almost half-page in 9-point, eye-straining type, explaining "**Seed Germinating Media**":

“Starting Plants from Seed Germinating Media. Many materials can be used to start seed, ranging from straight vermiculite to mixtures of soilless, artificial media to the various amended soil mixes. With experience, you can determine what works best under local conditions. Always keep in mind the ideal characteristics of a germinating medium: fine and uniform in texture, yet well aerated and loose; free of insects, disease organisms, and weed seed; low in total soluble salts; and able to hold moisture yet also drain well. One mixture that possesses these characteristics is a combination of one-third sterilized sand, one-third vermiculite or perlite, and one-third peat moss. Do not use garden soil by itself to start seedlings as it is too heavy, not sterile, does not drain well, and shrinks from the sides of containers if allowed to dry out.

It is very important to use sterile media and containers. To sterilize a small quantity of soil mixture in an oven, place slightly moistened soil in a covered, heat-resistant container or pan and then place the container in an oven set at about 250°F (121 °C). Use a candy or meat thermometer to ensure that the mix reaches a temperature of 180°F (82°C) for at least 30 minutes. Avoid overheating as this can damage the soil. The process may produce an unpleasant odor. This treatment should kill damping-off fungi and prevent many other plant diseases, eliminate potential insect pests, and kill many weed seeds. Containers and implements should be washed to remove any debris, then rinsed in a solution of 1 part chlorine bleach to 9 parts water. Avoid recontamination of the medium and tools.

An artificial soilless mix may also provide the desired qualities of a good germination medium. The basic ingredients of lightweight mix are sphagnum peat moss and vermiculite, both of which are generally free of weed seeds and insects.

Ready-made "peat-lite" mixes or similar products are commercially available. To make them at home, combine 4 quarts (3.8 l) of shredded sphagnum peat moss, 4 quarts (3.8 l) of a fine grade vermiculite, 1 tablespoon (15 ml) of superphosphate, and 2 tablespoons (30 ml) of ground limestone. Another combination is 50 percent vermiculate or perlite and 50 percent milled sphagnum peat moss with fertilizer. Mix thoroughly. Because these mixes have little fertility, seedlings must be watered with a diluted fertilizer solution soon after they emerge.”

The Handbook gave no recent references for its recommendations and guidance, and although I couldn't disagree with its recommendations because of my somewhat limited knowledge, much of it does seem complicated and more of a summary of all the possible recommendations drawn from conditions other than California, and maybe even from British gardening sources. Unfortunately, I found that the Handbook recommendations didn't quite resolve my question fully, let alone endorsing them to a home gardener to use outright.

So I looked for one more expert to add to the “mix”. I called upon the advice of Kathy Echols, the now retired but previously long-time horticulture instructor at Diablo Valley College. For many MGs, Kathy was their instructor on propagation during their initial MG training. Her gracious and timely response was:

“A good seed mix needs to have peat moss as its main base. Then, if it is for small seeds, it needs fine perlite. Some of the mixes of the old days were part sand as well. I always felt that this made it too heavy, but straight peat is too light. Adding the perlite and sometimes fine vermiculite makes for a good mix. Peat is an important element as it prevents damping off. The research was done at UC Davis years ago. They haven't found that same quality with coir, but I don't know if it has been studied in such detail. As for mixes on the market, Black Magic made a seed mix that was pretty good ([author note: I couldn't find that product under current Black Magic line](#)), and Premier is now making a commercial size for homeowners too, at least according to their advertising. [Premier BX](#) is what I like. They are now making one with mycorrhizal inoculants in it which should make it even better. One of the problems with a lot of them is that they don't have a surfactant in them. Peat is hard to wet and if you try to sow seeds in a dry peat, the seeds end up washing around the tray and transplanting can be a nightmare. At school we used a commercial surfactant until we switched to the Premier BX which already had it. At

home, with peat, a drop of dishwashing soap can be used to get the peat damp. Also use warm water to wet rather than cold. The warm or hot water will allow the peat to grow much faster than cold. If I am doing bigger seeds or seeds that need good drainage, I will usually add more perlite to the mix. If I am doing cactus seeds, I do add sand. If I am doing native seeds, I sow on the top and then top dress with sand or perlite, depending on the size of the seed...so there are lots of alternatives.”

The conclusion to my review is that while almost all seed-starting mixes have some elements in common (usually a peat or coir base and fine and fluffy texture), almost everybody seems to have their own “recipe” for a slightly different finish to a seed-starting mix. For a small quantity, unless you have the ingredients on hand, the simplest solution seems to be a commercial seed-starting mix. If you are going to be growing a considerable number of seeds, it would appear that the use of commercial potting soil (or planting mix with some additional perlite) from a reputable supplier may fill your needs. If you still want to make your own seed-starting mix, I’ve given you several recommended mixes that you could readily use or tweak to the particular seed you are planting. Probably the most common recommendation is something close to equal parts peat moss, perlite, and vermiculite. Finally, the seed-starting mix is only the first step in seed propagation. Growing seeds to transplant isn’t just a “put the seed into your starting mix and stand back” activity. Just like the babies they are, you must care for your seeds, almost several times daily at first, by providing moisture, light, appropriate temperatures, and other critical elements to ensure success, often for six to eight weeks. However, given a good seed-starting mix with appropriate care, you should be rewarded with healthy transplants come spring.

Question: What seed starting mix do you use?

Note: If your interest is further piqued on this subject and you want more information, the web provides a wealth of information if you follow the various links from a Google search. Like all things on the web, consider the source of the web information before you implement it. A rule of thumb for MGs is to look for information from “.edu” sites or from other trusted sources (e.g., crfg.org). One book I’ve long had that I would also recommend is *The New Seed Starters Handbook* by Nancy Bubel (Rodale 1988).

Steve Morse (2010)