

## The Virtual Gardener—What’s in a Seed?

Some long-dead guy named Anonymous once said something about great minds thinking alike. He must have had Bill Schulze (see *Seed Starting—Get a Jump on Planting* later in this issue) and the Virtual Gardener in mind when he said that because we both independently decided to write about seeds this month.

Seeds don't really look like living things but they are. They are like little detached plant “wombs,” containing the embryo of an adult plant complete with a proto leaf (or leaves), stem, and root. Like any other living thing the embryo needs food and oxygen to survive, although its respiration rate is extremely slow until germination begins. The seed is enclosed in an outer shell to protect it and the embryo is packed in with a food supply to tide it over until it sprouts and can begin photosynthesizing to produce food on its own.

The hard coats of many seeds are highly adapted to the native environment in which the plant grows so that the seed will only germinate under specific conditions. For example, some seed coats are very hard and will only allow the seeds to germinate after they have been through the digestive system of a bird or other animal. Others will only allow seeds to germinate after the seed coat has been nicked and scratched as it

is carried along by wind or water. This promotes wide dispersion of the plants. Many seeds will only germinate after they have been exposed to low temperatures for a certain amount of time. In nature this delays sprouting until winter has passed and spring brings more favorable conditions for the new seedling to survive. Horticulturalists who gather seeds from plants in their gardens or in the wild spend a great deal of time figuring out what tricks Mother Nature uses to get the seeds to sprout. But gardeners who buy their seeds in packets don't have to worry about these problems.

Whether you plant seeds from a packet directly in the garden or start them indoors, you really only have to worry about three things to get them to sprout—planting depth, soil moisture, and soil warmth. Let's take a quick look at each of these.

Packed inside each seed is a supply of food for the embryo, as previously mentioned. This food has to last until the newly sprouted plant is capable of producing its own food. When the seed is dormant, respiration is very slow and the food will last a long time. Under proper storage conditions dormant seeds can remain viable for several years (for

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## Cochise County Cooperative Extension

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details, see the *Arizona Master Gardener Manual* at

[http://tiny.cc/MGM\\_seeds](http://tiny.cc/MGM_seeds)).

Once exposed to conditions favorable to germination, however, the rate of respiration accelerates and the food supply is rapidly consumed as the sprout pushes its seed leaves toward the surface and light. If a seed is planted too deeply, the food supply will run out before the sprout reaches the surface and the plant will die. So how deep is deep enough?

The answer to this question can be a little tricky if you are dealing with seeds you have harvested yourself, but if you are using vegetable or flower seeds from a packet, no guessing is required. Just read the instructions on the back of the packet. For many common vegetables, the rule of thumb is to plant four times as deep as the seed's diameter.

Once the seed has been planted, the other factors—moisture and warmth—come into play.

Seeds need moisture to sprout but embryos also need oxygen. Soils saturated with water can cut off the supply of oxygen and cause the embryo to die. If you are starting seeds in trays, follow the directions in Bill's article for maintaining moisture levels. If you are planting seeds directly in the garden, make sure the soil



drains quickly and apply only enough water to keep the soil moist but not saturated.

Even if the soil is moist, seeds won't germinate unless the soil is warm. Generally, warmer is better, but there is an optimum temperature for each plant. The effect of soil temperature is reflected in the percentage of seeds that germinate as you can see at this Web site:

[http://tiny.cc/optimal\\_temps](http://tiny.cc/optimal_temps)

Many people who start seeds indoors use a horticultural heat mat to warm the seed trays or place the trays in a warm (but not too hot!) environment such as on top of a hot water tank or refrigerator. A sunny window sill is usually not a good idea since the heat may become excessive inside a covered seed tray.

If you are starting seeds outside in the ground, you can check the temperature of the soil with an inexpensive cooking thermometer with a four or five inch probe. Alternatively, those folks lucky enough to be living in Cochise County can check the AZMET site at Bonita:

[http://tiny.cc/AZMET\\_Bonita](http://tiny.cc/AZMET_Bonita) to

see what they are measuring for soil temperatures. Just remember that soil temps at shallow depths go up and down during the day so you might want to look at the averages of day and night temps before deciding to plant your seeds.

If you would like to explore this topic in more depth, check out the following sites:

[http://tiny.cc/physiology\\_seeds](http://tiny.cc/physiology_seeds)

<http://tiny.cc/sowing>

Until next time, happy surfing.

Gary A. Gruenhagen, Master Gardener  
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## In a Desert Garden

### The plant that ate my front yard: *Dalea greggii*—Trailing Indigo Bush

Little did I know what kind of monster I brought home when I bought this one-gallon plant. Trailing Indigo Bush is a very dainty and airy plant that does not resemble a bush as it only grows about one-foot tall. This plant is covered with tiny pearly, velvety gray leaves and has small clusters of tiny purple flowers that are pretty up close, but are not very showy at a distance. Despite its fragile appearance, this is a tough grower, very hardy, and enduring. This is the only ground cover I know that can survive on rainfall only.

I planted this one-gallon plant on a slight bank outside my house about ten years ago. I planted it during the rainy season and almost immediately forgot about it. Despite my neglect, it grew and grew. Now, it has covered the better part of this area. It grows under the juniper, around the spineless *Opuntia*, runs over the patch of *Agave regina*, and covers the dry creek bed.

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## April Reminders

- ◆ Stake new trees
- ◆ Plant fast growing cool season veggies
- ◆ Fertilize
- ◆ Prepare for pests
- ◆ Start plants from seed

## Seed Starting—Get a Jump On Planting

As this is being written in mid-March, it's seeming like spring ain't gonna get sprung this year. We've had just too many mornings with temperatures around freezing, too many days with cold winds. I'm aching for some sunshine and warmth. It's been so chilly this winter that global warming sounds like a sterling idea. Present frigidty aside, the heat of summer is, thankfully, inevitable and that means we really ought to be starting this year's crop of tomatoes and peppers indoors. These two vegetables really benefit from a good indoor head start since spring soil temperatures are often too cool for reliable germination. Melons, cucumbers, and winter squash can be started indoors in short summer areas, but are really best direct seeded outdoors in our area. Beans and corn should always be direct seeded outdoors.

There are a couple of schools of thought on when to actually plant outdoors in Cochise County. The "first tomato on the block" crowd wants to get things in the ground as early as possible, while other folks suggest waiting until early July to avoid the pitfalls of May and June—hot, dry days and withering winds. For a few things that require a long, hot summer, such as watermelons, peanuts, pumpkins, and winter squash, getting them in the ground in late April or May is the most reliable way to get a good, ripe crop. Of course, you'll need to worry about the occasional late freeze and protect the plants if one is imminent. Use whichever approach you prefer; however, it is a good idea to start your tomatoes and peppers indoors.



In the good old days, starting plants indoors just meant filling pots with soil and planting seeds in the pots. Somewhat surprisingly, it's not a good idea to use garden soil for starting seeds. Garden soil can harbor fungi and diseases that might destroy your young tomatoes and peppers. Last year, I used plain old soil (hey, it's cheap!) and my starts fell (quite literally) victim to damping off, a fungal disease that topples newly emerged seedlings. One day, all looked well. The little seedlings were a couple of inches high. The next morning, they were all lying on the ground. The scene looked for all the world like a miniature reenactment of the forest destruction around Mount St. Helens after its 1980 eruption.

The future for me is soil-less potting mixes! An easy, soil-less way to start seeds is to buy a "seed starting greenhouse" kit. Several companies make them, they're available at any nursery, and they're quite inexpensive. The one I used last year, following the Mount St. Helens fiasco, held 72 starts in its 10½-inch by 21-inch tray, and cost \$6 at a local mega-mart. Smaller versions are also sold. The kit consists of a plastic holding tray, a clear plastic lid that covers the tray, and a number of expandable peat

pellets (no soil!). You simply arrange the peat pellets in the tray, add an amount of warm water as prescribed in the kit instructions, and watch the pellets quickly swell to seven times their original height. Once swollen, drain off any excess water. Next, scrape the tops of the pellets a little to loosen the peat, sprinkle two or three seeds on each pellet, and cover the seeds with bits of the peat you loosened. Place the lid on the tray and put the whole shebang in a warm, dark spot. There's no need to water anymore as the lid keeps the moisture inside. Don't put the greenhouse in sunlight, though, as that can lead to moisture loss. Unsprouted seeds don't need light, just warmth.

Once the seeds have sprouted, remove the plastic lid and move the tray under a light. An ordinary fluorescent shop light works very well. Get the plants as close to the light as you can; there's no harm even in having the plant leaves touching fluorescent bulbs. With the greenhouse lid off, you'll also need to remember to water occasionally.

Since the expandable pellets are peat, they have little nutritional value, so, once your plants have their first true leaves, lightly fertilize with the product of your choice. Once your plants have a few sets of leaves, and the chill of winter is history, you can transplant the pelleted starts directly into the garden or into larger pots if you prefer to wait a while before going outdoors.

Good luck and happy gardening!

*Bill Schulze, Master Gardener*



## Cuttings 'N' Clippings

✧ The next CCMGA meeting is 5:00 p.m. Thursday, **April 1**, at the University of Arizona South Campus Public Meeting Room. The meeting will feature a terrific talk on the ethnobotany of Coronado National Memorial. The speaker will be Katie Hooper, a Ranger - Park Guide for the National Park Service.

✧ **April 3**, 9:00—10:30 a.m. “**Q & A Water Panel**” - April is Water Awareness Month. To kick it off the free Water Wise presentation will be local water experts speaking about our water and it will be held at the University of Arizona South, 1140 N. Colombo Ave, Sierra Vista in the Public Meeting room. Representatives from the City of Sierra Vista, Cochise County, the Upper San Pedro Partnership, the Bureau of Land Management, Ft Huachuca, and the Upper San Pedro Water District Organizing Board will be panelists answering your questions.

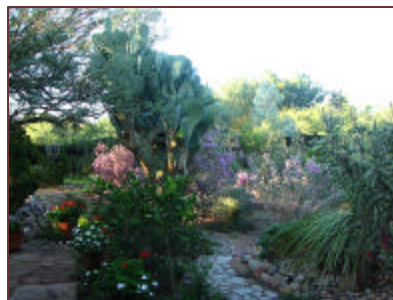
Each panelist will get ten minutes to talk about their organization’s work meeting our water challenges and then will take questions from the audience. With so many water organizations it is confusing to know who is doing what and why. Take advantage of this special opportunity to learn more about our water. For information, contact the University of Arizona Water Wise program at 458-8278 x 2139.

✧ On Saturday, **April 17** the Cochise Master Gardeners will be participating in Sierra Vista’s Earth Day celebration at the Farmers Market located on the NW corner of Carmichael and Wilcox. The event runs from 9:00 a.m. to 3:00 p.m. Stop by with a question, for information, or just to say “Hi!”



✧ On **May 2** the Spring Xeriscape Tour will take place. Watch for details on the Master Gardener Web Site

[www.ag.arizona.edu/cochise/mg/](http://www.ag.arizona.edu/cochise/mg/)



*Robert E. Call*

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## The Vegetable Garden

When planning your garden, it is important to ask a few basic questions:

Who will be doing the work? Will the garden be a group project with family members or friends who will work willingly through the season to a fall harvest, or will you be handling the hoe alone, in between camping and swimming? Remember, a small weed-free garden will produce more than a large weedy mess.

What do you and your family like to eat? Although the pictures in the garden catalog look delicious, there is no value in taking up gardening space with vegetables that no one eats. Make a list of your family's favorite vegetables, ranked in order of preference. This will make a useful guide in deciding how much to plant of each. Successive plantings of certain crops, such as beans, will give a longer harvest period and increase your yield. List recommended varieties and planting dates.

How do you plan to use the produce from your garden? If you plan to can, freeze, dry, or store part of the produce, this will be a factor not only in planning the size of the garden but also in selecting the varieties grown. Some varieties have much better keeping quality than others. Care should be used in choosing the seeds, making sure the varieties you select are adapted to your area and intended use.

How much space is available? That is, how much area can be converted into usable garden space, not simply how much empty ground is available.

**Source:** *Arizona Master Gardener Manual*, Chapter 10, [http://tiny.cc/MGM\\_veggies](http://tiny.cc/MGM_veggies)

## The Agent's Observations

**Q** Is there an easy way to kill grass? We live on two acres. We do not water any of the grass to maintain a lawn, but get enough rain that the grass grows anyway. I'm trying to dig up the grass and plant native shrubs to attract birds & butterflies. The previous owners had horses, so we have several types of grass and lots of weeds, and during the summer we have to spend a lot of time mowing. I'm trying not to use any herbicides, but the grass keeps coming back. Do you have any suggestions?

**A** I assume that the grass was a pasture for the horses. Depending on the type of grass that is growing you could spend a lot of time trying to pull it all up by hand, especially if the grass is a perennial like Bermudagrass. Glyphosate (RoundUp®) herbicide is very safe to use, even though you do not want to use an herbicide. It will kill the roots of green growing plants and does not discriminate between grass and broadleaf plants. If you are going to use glyphosate I would recommend using the concentrate (18%) and mixing your own. The ready mixed material has less than one percent active ingredient. If you have some tough grass you might need a 2 to 3% mixture.

**Always follow the label.** It is a legal document. If you truly do not what to use an herbicide then tilling, hoeing, burning, or pulling the grass are really your only options other than having an animal like a horse, goat, or sheep eat it!

**Q** We would like to transplant some Eldarica pines that have been in pots for a couple of years. The roots are coming out of the pot drainage holes and are growing into the ground. Should we cut the top shoots back to balance out with the tops with the roots? Can we successfully rip the roots out of the ground without hurting the trees? How should we proceed to plant these evergreen trees?

**A** DO NOT CUT THE TOPS OF THE PINE TREES BACK! Pines do not produce lateral or adventitious buds. Pine tree buds grow on the tips of branches. They start to grow and form "candles," which are long shoots, where the needles (leaves) are produced. When the needles are still small and have not expanded but are still laying flat against the candle, the candle shoots can be pinched back to deter growth. Where the pinching takes place is where the new buds will form. Planting Eldarica pine trees can be done in early spring or better yet in the fall. Many times spring planted potted plants struggle with the heat and wind of latter May and all of June.

When pulling a pot up off the ground if the roots are ripped out of the ground it will not matter. Remove the tree from the pot. Tease out or cut the roots in the root ball ¼ to ½ inch deep using a knife (I like to use my thumb as a depth gauge). Run the knife blade from the top to bottom of the root ball. Do this in four to eight places around the root ball. This damage will cause new roots to grow. If this is not done the plants can become "root-bound" and will not grow well. Severely root-bound trees can strangle themselves, causing "plant suicide" and that is not good! Plant the pine trees in a hole large enough to accommodate the root ball, but not any deeper, so it rests on firm ground. Backfill around the root ball with the same soil that came from the planting hole. Numerous university studies have shown that adding soil amendments, root stimulators, or anything else other than the soil that came from the hole has no beneficial effects. Loosen the native soil three to five times wider and as deep as the root ball. I do this by driving a pick into the soil and then leaning the pick backwards. This loosened soil will allow the roots to grow more readily in the surrounding soil. Water the newly planted tree to settle the soil. Then water daily for the first week, every other day the second week and every third day the third

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*Dalea greggii*

*(Dalea greggii continued from page 2)*

This *Dalea* is a very efficient ground cover and forms a little mound and it trails. New roots form from the trailing stems as it spreads. This is a true xeric plant and once it is established can make it on its own. Keep in mind in a drought situation it would look better with some occasional irrigation. This plant is a good choice if an area further away from the house needs to be covered. It is also rabbit and deer proof. It doesn't take foot traffic very well, especially in the dry season as the stems get very brittle when it is stressed. It is tolerant of most soils but needs good drainage

when it gets irrigated. We had a good moist winter and for the first time it has self-seeded into other parts of my front yard. *Daleas* are in the pea family, Leguminosae—they fix their own nitrogen. The pea-shaped flowers are attractive to bees and attract a variety of nectaring insects.

*Angel Rutherford, Master Gardener*



*(Agent's Observations continued from page 5)*

week. Gradually decrease watering as the plant becomes established. After the initial watering place up to four inches of mulch over the soil area that has been loosened to aid in water conservation, weed control, and to cool the soil. The mulch can be organic material or rock material—it really does not matter. For further information please see the publication, *Planting Guidelines: Container Trees and Shrubs* at: <http://ag.arizona.edu/pubs/garden/az1022.pdf>

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