

# SOILS FOR SUCCULENTS: A NURSERYMAN'S VIEW

By Dan Bach

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(The Jan.--Feb. 1998 issue of the Cactus and Succulent Journal contains several articles on growing media. This one, by longtime Tucson nurseryman Dan Bach, elucidates what he has learned on this subject.)

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A successful medium should provide good physical support for the plant, a reservoir for nutrients and water, plus sufficient drainage and aeration. It must also be consistently reproducible. Commercial growers in particular must consider these things, but they also have additional requirements. It is my intention in this article to explain how, and why, we have evolved our own present medium in the hope that amateur growers may be able to glean some new insights for their own experiments with growing media, for, make no mistake about it, ongoing experimentation is essential in obtaining optimum growth from your plants.

We use a soilless medium because our native soil (the loam constituent of the traditional soil mix) may contain pathogens and is variable from source to source.

Following are the points we consider when selecting components for our medium:

- The ingredients must be inexpensive;
- The mix must be reproducible and consistent. Ingredients must be readily available and of the same quality every time;
- It must hold sufficient water and nutrients. Our summer weather is very hot and dry, irrigation frequency is a significant cost consideration;
- The roots need to be able to penetrate the medium easily;
- The medium should rewet easily, it should not shrink away from the walls of the container as it dries;
- Finally the medium must be lightweight, so that potted plants are easy to lift and transport.

With the above considerations in mind, we have chosen the following ingredients for our medium:

- Pumice: A naturally occurring, lightweight, volcanic rock. It is light in color, and weight, and although it resembles perlite it doesn't float on the soil surface during watering. After a California grower reported that pumice from a local source was high in boron content and caused problems, we had a chemical analysis performed on the pumice we use. We recommend this procedure for first-time use, and whenever the source

changes to avoid problems. Pumice evidently varies chemically, depending on the source. This ingredient has proven to be very important for us and has allowed us to eliminate sand and perlite from our medium. Our supplier claims a cation exchange capacity (CEC) for his pumice - this is a fancy term for the ability of a medium or soil to hold nutrients. It has been reported that pumice may indeed have a small CEC potential but that it definitely has micro - pores that do hold moisture and dissolved nutrients.

- Peat: We use a high quality Canadian sphagnum peat and it comprises about 20% of our mix. We consider it essential for water and nutrient solution retention. I think of the medium as a battery that stores ingredients for plant growth, and we want to properly and efficiently recharge it every time we irrigate. In addition, we believe that peat may enhance the thermal capacity of the medium and buffers the roots from air temperature extremes.
- Mulch: The material we use is a sawmill byproduct and is described by the supplier as a composted forest mulch. We think this means it has simply been allowed to sit long enough for the aromatic compounds to dissipate. Our experience shows it is not good to use mulch which smells like freshly cut pine trees. There has been some interesting research which indicates that mulch of this nature has natural fungicidal properties.

#### Amendments:

1. Osmocote. This is a slow-release encapsulated fertilizer. We use NPK 18-6-12 which is designed to release over a 8-9 month period. In our heat it may not last that long, but it does make nutrient-dense areas that are available to root-hairs as they expand through the medium. We transplant very large numbers of small seedlings with limited root systems and believe this type of fertilization is important for re-establishment. Our experience indicates that liquid feeding immediately after transplant is inefficient due to the lack of root-hairs. Using Osmocote allows us to go a month or more before we have to liquid feed.
2. Lime. This is agricultural lime ( $\text{CaCO}_3$ ), not the lime used to make mortar. The product we use is ground-up dolomite limestone rock pelletized to make it dissolve slowly. Without lime the pH of our medium is 5.5. Adding lime adjusts pH to 7.0 which reduces the virility of the pathogen *Fusarium oxysporum*. Plant growth for us is excellent within the range 5.5 to 7.0, and I do not recommend adjusting the pH unless there is a *Fusarium* problem. Lime is also a rich source of calcium, which has been shown to increase disease resistance.
3. Phosphorus. The solubility of this nutrient is a concern, especially above pH 7.0. We incorporate granular NPK 0-45-0 (triple super phosphate) into the medium so that it is readily available for root absorption. We don't want the medium to become deficient in this nutrient, because it is responsible for strong root systems. It also significantly increases flowering.

4. Potassium. We add granular potassium which has been repeatedly associated with disease resistance.

This, then, represented our current growing medium. It is the result of much experimentation and is producing excellent results for us. Even though we have been growing cacti and succulents for many years, we feel that we are still at the low end of the learning curve, and we know that further experimentation will lead to better growing media. If you are a beginning grower, don't be afraid to experiment also. There is much to be learned from reading, use of the Internet and drawing on the experiences of others. Just remember: if you are going to find the medium that best meets your needs, there is no substitute for investigation and experimentation.