GROWERTALKS

Columns

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# Let’s Get Physical

*Paul Pilon*


Before I get into the article, first I’d like to welcome you to the inaugural edition of my new column, Paul Talks Perennials.

In case you don’t know me, I’m also the editor-at-large for the *Perennial Pulse* e-newsletter. Beyond that, I’m a horticultural consultant for my real job. Essentially, I’m a cultural crop consultant who specializes in perennials. I visit greenhouses and nurseries throughout the U.S. and internationally, and help them to improve various aspects of their perennial programs.

As you can imagine, I get the opportunity to see a lot of good, as well as not-so-good, things in my travels. If you don’t mind, I’d like to share some of them with you here every other month. In addition to that, I’m open to receiving article ideas or questions from you. Don’t be shy—let me know what challenges you’re facing.

Now let’s move into this issue’s topic, “Let's get Physical.” I’m not talking about the Olivia Newton John song, the next fitness craze or whatever thought came to your mind; I’m talking about the physical properties of growing mixes.

Physical properties are the characteristics desirable for plant growth and include the particle sizes, the distribution of particles and porosity (air and water retention). Of these, I’d like to focus on particle sizes.

Many growers assume that because they’re using a bark-based growing mix that there’ll be adequate drainage and air in the root zone. Unfortunately, this is often not the case. I’m not making any universal declarations, but the fact of the matter is most bark sources also contain a reasonable quantity of fine or small particle sizes (some of them contain an excessive amount).

I’ve recently reviewed the particle size distribution of a mix containing one-half inch and smaller bark, which only had 3% of the particles larger than 3/8-in. and over 40% of the particles were less than 1 mm in size. Does this bark source contain a uniform distribution of particle sizes? Hint: The answer is no.

Before I discuss what the particle distribution should be, check out these images.

These pictures were taken at two growers in the Northeast who were located about an hour apart. Each grower was using a different growing mix, the plants were grown in similar structures and the images were taken one day apart. You can easily see that the heuchera on the right, which is two to three weeks younger, has significantly more roots than the one shown on the left, which has been in production longer. The delayed rooting and reduced root mass are excellent examples of the effects poor physical properties resulting from too many fine particle sizes in the bark can have on crop development.

Rooting is a great indicator that the physical properties are good or need to be modified. Although all perennials will root differently, for most plants, I generally look to obtain roots to the edge of the pot within seven to 10 days of potting, roots to the bottom of the pot within three weeks, and to appear fully rooted in about one month after potting. When I don't consistently observe rooting within these targets, I start asking questions about the growing mix.

In my opinion, the distribution of particle sizes is one of the most important, yet overlooked, attributes of growing mixes. Here's what I look for.

**Example Sieve Results of a Bark Growing Mix**

| Size Group | Sieve | Percent | Size Group % | Size Group Targets |
|---|---|---|---|---|
| > 4 mm | 3/8" (9.5 mm) | 6% | 25% | 20-30% |
| | 1/4" (6.3 mm) | 19% | | |
| 2 to 4 mm | #6 (3.35 mm) | 10% | 24% | 20-25% |
| | #8 (2.4 mm | 14% | | |
| 1 to 2 mm | #12 (1.7 mm) | 13% | 23% | 20-25% |
| | #18 (1.0 mm) | 10% | | |
| < 1 mm | #20 (0.85 mm) | 9% | 28% | 25-30% |
| | #40 (0.42 mm) | 10% | | |
| | #100 (0.15 mm) | 8% | | |
| | Pan | 1% | | |

All particle sizes are important and necessary; however, to optimize air and water in the root zone and to allow for optimal rooting, it's best to have relatively equal proportions of each of the particle sizes.

Using a sieve analysis, I typically break bark mixes into four particle size categories: <1 mm, 1 to 2 mm, 2 to 4 mm and >4 mm. I'm not looking to obtain exact results, but aim to achieve a relatively equal amount of

particles in each of these size groupings.

When there are large discrepancies between any of the particle size groups, the optimal physical properties for rooting and growth are compromised and the plant will not root or develop as well as they would if the distribution of particles were more equivalent between these groupings. For example, when 40% of the particles are in the <1 mm group, the mix would have reduced air space and drainage and will hold onto water for a long time and rooting will be reduced/delayed as a result.

The majority of the growers I come across don't know the distribution of particle sizes in their growing mixes. If you suspect you've fallen victim to delayed plant establishment, consider looking at the distribution of the particles sizes in the growing mixes you're growing in. **GT**

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