

**Linda Chalker-Scott, Ph.D., Extension Horticulturist and Associate Professor,  
Puyallup Research and Extension Center, Washington State University**

**The Myth of Soil Amendments Part II:  
*"If you have a clay soil, add sand to improve its texture"***

I was waffling on what myth to debunk this month when I received an August issue of *American Nurseryman*. One of the articles featured a high-end landscape renovation. The horticulturist on this job stated "...the soil was bad, too. We had to completely renovate the soil types with compost and sand."

As I've already dealt with the fallacy of incorporating organic amendments to permanent landscape installations (August 2000 B&B), I won't repeat it here. But the equally misguided practice of adding sand to improve a clay soil texture needs to be addressed.

### **Soil texture**

Soil texture is determined by particle size, which ranges from microscopic clay flakes to more rounded silt particles to sand grains. While undisturbed sandy soils are well aerated and well drained, they are nutrient poor since sand and silt cannot bind mineral nutrients. In contrast, clay soils do bind mineral nutrients but have poor drainage and aeration. Thus, a soil with both sandy and clay characteristics should be optimal for plant root health. So it's easy to see how the practice of adding sand to clay soils has evolved.

The problems occur when sand and clay are mixed in incorrect proportions. An ideal soil has 50% pore space (with the remainder consisting of minerals and organic matter). The pore spaces in a clay soil are all small, while those in a sandy soil are all large. When one mixes a sandy and a clay soil together, the large pore spaces of the sandy soil are filled with the smaller clay particles. This results in a heavier, denser soil with less total pore space than either the sandy or the clay soil alone. (A good analogy is the manufacture of concrete, which entails mixing sand with cement - a fine particle substance. The results are obvious.) ***A soil must consist of nearly 50% sand by total volume before it takes on the characteristics of a sandy soil.*** For most sites, it would be prohibitively expensive to remove half the existing soil and add an equal volume of sand and then till it to the necessary 18-24". Mineral amendments of large particle size, such as perlite, may provide some benefit but can also be costly depending on the size of the site. (Reducing this task to amending only the planting hole is a recipe for plant failure and perhaps will be addressed in a separate column.)

### **Soil structure**

Soil structure is the next level of organization for soil particles. Sandy and silty soils don't have much structure (and these soil qualities are primarily determined by particle size). Soils with more clay content, such as the various loams, aggregate into larger chunks called peds. Highly aggregated soils are optimal for root growth and aeration, but can be easily destroyed by any activity that results in soil compaction.

Soil structure can be improved through proper site preparation and management. One of the least invasive and most cost-effective ways to do this is by the use of organic mulches. This is especially effective for landscapes that receive high volume foot traffic. My landscape restoration classes now routinely have wood chips spread on site to allow soil recovery to begin as they prepare the site and install new plants. One particular site, a small lot near a bus stop, consisted of weeds, bare soil, and a few existing trees and shrubs. When we tried to take a soil core, the corer bent! We had 8-10" of wood chips spread over the whole site as we began our work. A month later, we moved aside part of the mulch and dug out a shovelful of rich, loamy soil. Had I not seen it for myself, I'm not sure I would have believed

these stunning results. The addition of the wood chips allowed the site to retain soil moisture and reduced the constant impact from foot traffic, thus enabling the soil to regain its structure.

**Bottom line:**

- Clay soils are not inherently bad, but can be problematic if they lack good structure.
- To significantly alter a clay soil, sand must be incorporated to about 50% of the total soil volume.
- Many problems associated with clay soils (poor aeration, drainage, etc.) can be alleviated through good management practices.

For more information, please visit Dr. Chalker-Scott's web page at <http://www.theinformedgardener.com>.