HOW GROWING MEDIA HANDLING IMPACTS CROP PERFORMANCE

Whether you purchase a premade growing medium or make your own, certain chemical and physical properties are necessary for optimal plant performance. However, once in use, the physical properties of a growing medium can be altered depending on how it is prepared before planting, processed during planting and handled after transplanting. Physical properties also change within a planted container over time, often because of compaction resulting in lower air space. From the time you receive a growing medium or make your own, to when the crop is sold, the physical properties of the growing medium can change due to several factors.

Fluffing or Mixing Growing Media

Using a bale fluffer with compressed peat moss or your own mix of components, the growing medium can be damaged by the machine if it is mixed for too long. Turning blades can eventually crush perlite and vermiculite while breaking peat moss and coir fibers. Damage is minimal if the components or growing medium is processed by the machine for as little time as possible. Mixing equipment that quickly conveys the loosened or mixed product out into another hopper or directly to a pot filler minimizes damage to the growing medium.

If a growing medium is processed too long, large components can be broken down into smaller particle sizes. The problem is that small particles settle between large growing media particles that would normally create larger voids that contribute to air space. With fine particles in these voids, the pores are much smaller and retain water to reduce air porosity and oxygen within the growing medium. Plant roots then have less access to oxygen, hence root development is slowed along with plant growth. Poor plant growth equates to low water usage, so the growing medium dries out slower creating issues with overwatering, algae growth on the growing medium surface, root diseases and uneven drying of containers.

Another consideration is how long it takes to empty hoppers of soil mixers and fluffers. The first product out from the soil mixer or fluffer will suffer minimal damage, while the last product out from the same batch can have a greater percentage of fine particles from the grinding action of the equipment. This can create a watering challenge if these containers are intermixed on the same bench. Containers with fine particles will dry out slower than the same growing medium that is less processed, leading to uneven drying within the crop.

Adding Components to Premade Growing Media

Perlite is often added to a growing medium to reduce water retention and encourage faster dry down between irrigations. Perlite will deliver the desired effect without introducing any negative impact on the growing medium. However, adding sand to a growing medium to prevent pots from tipping over from wind or to create a growing medium for bulbs can work, but the weight of the sand will compact peat and other organic components, reducing air porosity. Again, plant roots may struggle to find sufficient oxygen, compromising plant growth as discussed above. Field soil may be added to improve cation exchange capacity and minimize pH fluctuations with the growing medium. This can work, but like sand it is heavy and has fine particles that plug up air space within the growing medium. Keep in mind that both sand and soil can also introduce unwanted weed seeds, plant pathogens and herbicides.

Before adding a different component to a premade growing medium or your own blend, consider how it will impact the final product both chemically and physically, and determine if it could introduce unwanted contaminants. It is best to do a small trial with a new component first so any adjustments that need to be made to growing practices have already been determined prior to adding a new component to all your growing medium. If the component did not work, then only a small percentage of a crop is negatively impacted.

Adding Water While Fluffing or Mixing Growing Media

When loosening peat moss or a premade growing medium, dust can often be created. To minimize dust, water is added to the growing medium during the fluffing or mixing process. Depending on the amount of added water, it can provide additional benefits or be detrimental.

Blending components together or fluffing a premade growing medium that has low moisture (less than 40% moisture content by weight) will often settle too much within a container upon initial watering in. The weight of the water and slow absorption into the dry growing medium causes compaction and significant settling within the container. By increasing the moisture content of the growing medium up to 50-60% by weight, peat moss, coir and other fibers gain elasticity from water and there is minimal settling within the container upon initial watering in.

Moisture content (by weight)	Comment when filling containers	Result when squeezing growing medium in your fist
<40%	Too dry	Mix is dry to the touch. When squeezed in your fist, the mix falls apart when opening your hand
50-60%	Ideal moisture	Mix is moist, but not wet. Squeezing a handful of growing medium will hold together loosely after opening your hand
60-80%	A little too wet	Mix feels very moist. When squeezed in your fist it holds together well when opening your hand. There may also be a few drops of water that squeezes out of the growing medium.
>80%	Too wet	Mix feels wet. When squeezed, water runs out and the growing medium and holds together when hand is opened.

Adding too much water to the growing medium prior to filling containers, can create compaction in the pot from the water weight within the growing medium.

Filling Containers

When filling containers the goal is to fill uniformly and avoid compaction. Compacting growing media within a container causes large air-filled pores to collapse, reducing air porosity and oxygen within the growing medium. This can slow plant growth and affect crop quality as outlined above. When filling containers with growing media, do not pile them up on one another as it causes compaction. Avoid nesting filled containers within one another while stacking as this compacts the growing medium in the lower containers. Do not press growing medium into containers after they are filled. When transplanting plugs or liners, dibble a hole, place the plug into the hole and allow the growing medium to settle around the root ball by watering in; do not press the growing medium around the root ball.

The trays holding containers in this picture have indentations on the bottom so that when stacked on other flats of filled containers they nest inside each other causing compaction. Notice the space between the flats is narrower on the bottom row vs the tops row. Source: Premier Tech

Plant Movement

Once plants are watered in and placed on carts, they are transferred to another location where they are placed to grow. However, if the carts bounce around from traveling on uneven or rough surfaces, the vibration causes wet growing medium within the containers to settle and compact. If possible, transport filled containers over smooth surfaces. If this is not possible, water in the crop after it has been transported and placed on a bench or floor.

The Water Pressure

If the pressure of the water coming out the end of the hose is high it can “churn up” the upper layer of growing media causing perlite and bark to come to the surface while the peat and finer particles settles below. This can create uneven drying problems. High water pressure can cause compaction of the growing medium within the

containers. If so, angle the water stream at 45° to the growing medium surface so some pressure is lost before the water hits the growing medium surface.

High water pressure can “churn up” the upper layer of growing medium causing perlite to float to the surface. This reduces air porosity within the growing medium. Source: Premier Tech

How a growing medium is handled and processed can have a negative impact on its physical properties. Whether you mix your own or buy a premade growing medium, remember that it is crucial to handle it gently not to adversely affect its physical properties. Remember that minimum and proper handling maximizes crop quality and uniformity.

Authors:

PREMIER TECH

Ed Bloodnick
Director of Grower Services

Troy Buechel
Horticulture Specialist – Mid Atlantic US

2020.01.27