

PROPAGATION GROWING MEDIA: MOISTURE & GAS EXCHANGE

Factors to keep in mind that impact substrate moisture and gas exchange in propagation growing mixes.



Young plants have different soil moisture requirements than finished crops, and some plant groups prefer higher or lower substrate moisture throughout their production cycles. While this may seem like a no-brainer, my conversations with growers suggest that finding the “sweet spot” for soil moisture in young plant production based on what works best for their environment and greenhouse infrastructure is tougher than one might think. Finished mixes, on the other hand, can include optional amendments that are typically not offered in propagation media, but can have a tremendous effect on moisture management and rootzone gas exchange.

On the young-plant side of the equation, if you struggle with seed germination, plug or cutting rooting speed, uniformity and establishment of wet-to-dry cycles, examine your propagation media from the following angles:

Plug Media Particle Size. Those of you who use too-coarse mixes for plug production, particularly in smaller-cell trays (like 288's or smaller), often encounter rapid dry-down and

poor- or non-uniform seed germination. This then leads to non-uniform plug growth and development, which makes irrigation and fertilizer application very difficult as they mature. The result is plants at various stages of maturity in the same tray, and this non-uniformity follows the crop through finished production.

To avoid this, select a plug mix with finer particle size and good water-holding capacity that will not dry down rapidly. This is especially important if you bench-germinate lots of seeds and do not have a germination chamber with tight control over relative humidity and moisture loss after you sow seeds.

Liner Media Particle Size. If you struggle to root cuttings rapidly and uniformly, you might use mixes that are too fine and/or heavy for this type of propagation. Mixes with fine particle size tend to stay wet for extended periods, which reduces the availability of oxygen in the media which slows callus- and root formation. This also frequently translates to heavier losses due to soft rot and *Botrytis* and poor liner uniformity.

To avoid cutting losses and poor liner uniformity, select a mix with better drainage and porosity than you would typically use for plug production. Also, be sure to look at your options for liner media types and don't be afraid to experiment with new products if you tend to struggle with a given media type or configuration. For example, some growers have better success with Preforma Plugs or Oasis strips compared to loose-fill liner media or Ellepots and vice-versa.

Wetting Agent. Most soilless media components are naturally hydrophobic (do not absorb water easily on their own), so the presence of a wetting agent or "surfactant" in propagation mixes is critical. This ensures water distributes uniformly throughout the plug/liner profile and allows all plants in each tray to reach and maintain similar moisture status after being watered throughout the propagation cycle.

Surfactants break down over time, so avoid the use of old batches of plug/liner media with degraded wetting agent as much as possible. Wetting agents *CAN* be applied to young plants on the bench, but this is not a good practice and the need to do this should be avoided at all costs. Spot-check your propagation media *BEFORE* inputs are sown or stuck to ensure a wetting is present in your mix and functioning appropriately. This is especially important any time you switch between batches of media, so be sure to send a few "dummy" trays through your water tunnel to ensure plug/liner cells are fully wetted by the time they reach the end of the sow or sticking line.

Initial Moisture Level. Even when a wetting agent is present, nothing takes the place of appropriate soil moisture in plug or liner media at the time of sow or stick. On the 1 to 5 scale

(1 = air dry; 5 = saturated), propagation media moisture should be somewhere between a level 2–3 when trays are filled. If media is drier than this, moisture will be sucked away from your seeds or cuttings after they are sown or stuck, respectively. This can cause germination to terminate and cuttings to desiccate, which translates to poor young plant uniformity and crop losses. If media is too wet when trays are filled, this often leads to compaction and poor gas exchange. Insufficient oxygen in the soil can slow or terminate seed germination and often causes cuttings to callus slowly or rot.

To avoid issues with initial soil moisture, ensure that crew leaders in your sowing and sticking operations communicate regularly. Establish a protocol to properly moisten propagation media before it enters your hopper or flat filler and spot-check trays for even soil moisture levels throughout the day. Also, get feedback from your growers on how easily and uniformly trays dry down after they are set down in the greenhouse to help close the communication loop and make adjustments that set your young plants up for success.

The verbal and written technical recommendations of Ball Horticultural Company, including but not limited to crop culture, sanitation, IPM, and environmental controls are provided by Ball without any representation or warranty of any type, expressed or implied.