



PRACTICE MAKES PROFIT

by Shannen Ferry, Ron Adams, Dan Jacques, Bill McElhannon, Paul Schill and Bob Steinkamp

The following is the second in a series of articles from Greenhouse Grower magazine. They have agreed to our reprinting the articles in SUPERVISION.

The last SUPERVISION contained:

Part 1 - "Five major media components and their properties".

Part 2 in this issue is "Media selection and storage"

Part 3 - "EC, water quality and pH management"

Part 4 - "Media testing" will follow in the next SUPERVISION issues.

When it comes to today's soilless mixes, industry people have come to realize one size does not fit all. Indeed, growers have to make a conscious media formulation choice based on crop need and the smartest management practices.

Once a particular product is chosen, there are chemical and size options to consider. Research shows crops such as pansies or pentas need different growing pH levels. Zonal geraniums have higher pH requirements than petunias. Plug seedling mixes require a finer media texture to manage the moisture level. Too fine a mix in a tub will increase the chance of root rot when grown outdoors during a wet period.

Watering methods also will help determine mix texture. Media requirements for ebb and flood irrigation are different from overhead irrigation or tube watering. Listed in the tables are options to show the complexity of the task.

TRIALING NEW MEDIA

Before changing growing mix, test the new product to determine its suitability. The mix sample size is an important consideration. If too small a sample is trialed, the benefits might not be apparent.

If the texture is different, then watering

is compromised with small sample populations. Any mix test should be large enough to water and feed the sample by itself. Ideally, a whole bench of product would make a good sample size.

Cost is always a consideration when comparing mixes, but finished plant quality and the number of finished plants are even bigger considerations. Just because a particular mix works in one operation does not mean it is a perfect fit for another operation. It should only be considered after adequate testing.

MANUFACTURERS' LOT NUMBERS

Should a grower be concerned with manufacturers' lot numbers? The answer is yes and no.

Yes, growers need to know that specific lots of production can be identified if necessary. But in most situations, growers never need to look up a lot number for a mix.

Lot numbers are developed by producers to track production. If a complaint is filed against a particular product, then the producer

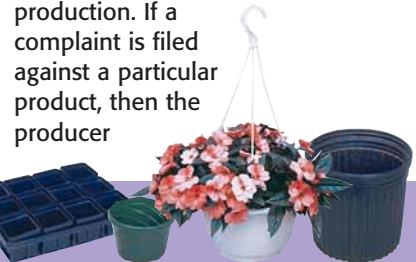


TABLE 1

SOILLESS MEDIA USAGE OPTIONS	PLUG TRAYS	CELL PACKS	POTS 4"-6"	HANGING BASKETS & LARGE POTS	TUBS & PLANTERS
FINE TEXTURE	✓				
MEDIUM TEXTURE		✓	✓	✓	✓
COARSE TEXTURE			✓	✓	✓
EXTRA COARSE TEXTURE			✓	✓	✓
LOW pH	✓	✓	✓	✓	✓
HIGH pH		✓	✓	✓	✓
LOW CHARGE	✓	✓	✓	✓	✓
SLOW, OR CONTROLLED RELEASE FERTILIZERS		✓	✓	✓	✓
CHEMICALS* * FUNGICIDES, INSECTICIDES OR HYDROPHILIC POLYMERS		✓	✓	✓	✓

can verify when the mix was produced. Each company develops a code that uniquely indicates production information.

MEDIA STORAGE

Most producers would prefer growers to use the mix within 3 months of production. Follow a mix manufacturers' recommendations when slow - or controlled-release fertilizers are incorporated to prevent soluble salt buildup.

There are several elements of a mix that can change during storage. Longer time spent in storage means the mix will have a greater chance of drying out. And when the mix is dried out, it's more difficult to wet after filling containers.

Storing bulk mix requires greater protection than packaged product to prevent contamination from weed seeds, insects, and diseases. Ideally, a packaged mix should be stored on pallets off the ground. There should be good air circulation around and through the bags or bales.

Product stored in direct sun can develop a slime mold in the area between the mix and the bag where condensate forms. Molds that are brown, yellow, red, or white can develop in the product during storage. These molds are saprophytic and are not plant pathogenic. The saprophytic molds normally disappear within a couple weeks after planting.

Storage also can cause chemical changes, such as a pH increase along with a decrease in soluble salt and nitrogen levels. It is advisable to test any product that has been stored for 6 months or longer to determine what changes have occurred and compensate for any change.

AVOID OVERHANDLING

Commercially prepared growing media are formulated with certain built-in aeration and water-retention properties. After repeated use, growers develop a watering rhythm

TABLE 2 SIZE OPTIONS

Mix companies have many different packaging options available to suit growers' needs. Check with your supplier to see which are available in your area.

- **2 cu. ft. LOOSE**
- **3 cu. ft. LOOSE**
- **4 cu. ft. LOOSE**
- **BULK BAGS**
- **BULK TRUCKS**
- **3.8 cu. ft. COMPRESSED BALE**
- **6 cu. ft. COMPRESSED BALE**
- **SUPER BALE**

that allows the anticipation of watering needs. But it is important to know that handling mixes with potting machines, flat fillers, or other handling systems can alter aeration and water retention. Growing media's various components are somewhat fragile. During handling,

media are subject to a grinding effect caused by stirring and agitation. This grinding effect causes particles to break up into smaller pieces, which brings increased water retention and decreased aeration. Perlite and vermiculite are most affected by this grinding effect. Peat moss and bark also are affected.

Often, when mixes are handled frequently, damage occurs. Wet or otherwise heavy mixes are subject to particle breakdown. The most damaging equipment are mixers and screw conveyors.

Some growers add granular fertilizers or other additives to the mix using a drum mixer or ribbon blender. Tumbling action in these mixers causes a severe grinding effect. The mixer should be run only long enough to stir the additive. Any additional run time unduly damages the mix.

Screw conveyors can be very damaging to wet mixes. Even belt conveyors can cause damage to a heavy or wet mix. Overloading pot or flat fillers, or bale busters can be damaging to mixes containing vermiculite or perlite.

Mixes that have been damaged by overhandling can feel greasy or appear to be coated in vermiculite dust. Often, the damage is not uniform. Overhandling can cause uneven drying that is particularly noticeable in cell packs and smaller pot sizes. While all mixes can be damaged by excessive handling, those containing higher percentages of vermiculite or perlite are most susceptible.

AVOIDING WEED PROBLEMS

Greenhouse weed infestations can develop quickly. Common greenhouse weeds like oxalis and bittercress grow quickly and each plant produces hundreds of seeds that can spread many feet from the parent plant.

Aside from obvious sources like weeds under a bench, the source of weed seeds, can be hard to pin down. Weed Lot numbers are developed by producers to track production. If a complaint is filed against a particular

SURE
MICHIGAN GROWER PRODUCTS, INC.™

Choose from three convenient size options:

- 3 cu. ft. SUREMIX LOOSE BAGS**
- 54 cu. ft. SUREMIX BULK BAGS**
- SUREFILL FILLED CONTAINERS**

product, then the producer can verify when the mix was produced. Each company develops a code that uniquely indicates production information.

MEDIA STORAGE

Most producers would prefer growers to use the mix within 3 months of production. Follow a mix manufacturers' recommendations when slow - or controlled-release fertilizers are incorporated to prevent soluble salt buildup.

There are several elements of a mix that can change during storage. Longer time spent in storage means the mix will have a greater chance of drying out. And when the mix is dried out, it's more difficult to wet after filling containers.

Storing bulk mix requires greater protection than packaged product to prevent contamination from weed seeds, insects, and diseases. Ideally, a packaged mix should be stored on pallets off the ground. There should be good air circulation around and through the bags or bales.

Product stored in direct sun can develop a slime mold in the area between the mix and the bag where condensate forms. Molds that are brown, yellow, red, or white can

develop in the product during storage. These molds are saprophytic and are not plant pathogenic. The saprophytic molds normally disappear within a couple weeks after planting.

Storage also can cause chemical changes, such as a pH increase along with a decrease in soluble salt and nitrogen levels. It is advisable to test any product that has been stored for 6 months or longer to determine what changes have occurred and compensate for any change.

AVOID OVERHANDLING

Commercially prepared growing media are formulated with certain built-in aeration and water-retention properties. After repeated use, growers develop a watering rhythm that allows the anticipation of watering needs. But it is important to know that handling mixes with potting machines, flat fillers, or other handling systems can alter aeration and water retention. Growing media's various components are somewhat fragile. During handling, media are subject to a grinding effect caused by stirring and agitation. This grinding effect causes particles to break up into smaller pieces, which brings increased water retention and decreased aeration. Perlite and vermiculite are most affected by this

grinding effect. Peat moss and bark also are affected.

Often, when mixes are handled frequently, damage occurs. Wet or otherwise heavy mixes are subject to particle breakdown. The most damaging equipment are mixers and screw conveyors.

Some growers add granular fertilizers or other additives to the mix using a drum mixer or ribbon blender. Tumbling action in these mixers causes a severe grinding effect. The mixer should be run only long enough to stir the additive. Any additional run time unduly damages the mix.

Screw conveyors can be very damaging to wet mixes. Even belt conveyors can cause damage to a heavy or wet mix. Overloading pot or flat fillers, or bale busters can be damaging to mixes containing vermiculite or perlite.

Mixes that have been damaged by overhandling can feel greasy or appear to be coated in vermiculite dust. Often, the damage is not uniform. Overhandling can cause uneven drying that is particularly noticeable in cell packs and smaller pot sizes. While all mixes can be damaged by excessive handling, those containing higher percentages of vermiculite or perlite are most susceptible.

AVOIDING WEED PROBLEMS

Greenhouse weed infestations can develop quickly. Common greenhouse weeds like oxalis and bittercress grow quickly and each plant produces hundreds of seeds that can spread many feet from the parent plant.

Aside from obvious sources like weeds under a bench, the source of weed seeds, can be hard to pin down. Weed seeds can blow in through vents or come in with liners. Seeds can blow onto and stick to empty pots. Growers who irrigate with pond water can have weed problems caused by seeds blowing into the pond. But whatever the seed source, remember only a few weeds allowed to go to seed can result in a major infestation.

TABLE 3

WEED CONTROL STRATEGIES

1 STORE BAGGED GROWING MIX AND POTS INSIDE TO MINIMIZE CONTAMINATION. Weed seeds can stick to pots or to the outside surface of a mix bag. Weed seeds can also get into unopened mixes through the bag's small vent holes. Keep bulk mixes covered. All it takes is one gust of wind for weed seed contamination to occur.

2 CONTROL WEEDS AROUND THE OUTSIDE OF THE GREENHOUSE, PARTICULARLY NEAR DOORS, FANS OR OTHER OPENNINGS. Weed seeds can stick to shoes and clothing and can be tracked inside.

3 CONTROL WEEDS UNDER BENCHES AND IN HANGING BASKETS.

4 CONSTANTLY SCOUT CROPS FOR WEEDS AND NEVER PASS A WEED WITHOUT PULLING IT. A few weeds allowed to go to seed in the greenhouse can cause the majority of infestations. Common greenhouse weeds can go from seed to weed in three weeks, and each parent plant can produce hundreds of fresh seeds.

VOLUME CONSIDERATIONS

When determining their usage needs, growers should think about the number of bags or cubic yards needed to do the job. Most mix companies provide charts that show the pot count per bag or per cubic yard for various container sizes. At best, these charts provide a rough estimate.

Several factors affect the number of containers that can be filled with a given amount of mix. The most important factor affecting the pot count is the actual amount of mix that goes into each pot.

Because of its spongy texture, mix is easily compressed. During potting, mix can either be loose filled into the container or packed with varying degrees.

Compared to loose filled, even light to moderate packing can reduce the pot count by 10%-25%. The amount of packing that occurs varies by pot-filling method. Probably the most variation happens from hand potting by workers whose techniques vary.

The mix's degree of moisture can affect the pot count. Some growers moisten a mix before use. When a somewhat dry mix is moistened, the particles absorb water and plump up, increasing the mix's volume. The pot count from moistened mix can be somewhat higher than the dry mix's. But if too much water is added and excessive stirring occurs, the peat fibers collapse

and the mix loses some of its premoistened volume. This reduces the pot count compared to the drier mix. Most bagged and bulk mixes contain about 50% moisture when manufactured. Baled mixes and peat moss are somewhat drier but still contain moisture. As the material sits in storage, it can dry out. As the mix dries, particles shrink a little and the mix loses some of its original volume, reducing the pot count compared to a fresh mix.

Baled mixes and peat moss are compressed 2:1 when packaged, and the pot count can be affected by how the material is loosened. While it takes a lot of work to fully decompress bales that are fluffed out by hand on a potting bench, mechanical bale busters will fully decompress bales of peat or mix.

A higher pot count may be obtained by using a bale buster. But an overloaded bale buster can pound the mix or peat into dust and actually reduce the pot count and alter the material's physical properties.

Mixes that contain a high percentage of bark do not compress as easily as mixes with a high peat moss percentage. On average, a higher pot count can be achieved with bark mixes rather than peat mixes.

When figuring mix usage requirements, do not rely on pot filling charts to determine the amount needed. Instead, take a measure volume of mix and fill pots as usual. The pot count from this measured volume will give a closer estimate of actual mix usage.

Article reprinted with permission of [Greenhouse Grower](#).

TABLE 4

VOLUME CONSIDERATIONS

When determining growing medium usage needs, growers should think in terms of the number of bags needed to do the job. Most mix companies provide charts that show the pot count per cubic foot or per cubic yard for various container sizes. These charts only provide a rough estimate because many factors affect the number of containers that can be filled with a given amount of mix.