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Improving Rewetting

Keeping containers healthy depends on media's ability to hold the right amount of water.

by BILL ARGO, Ph.D.
and PAUL FISHER, Ph.D.

ONCE mixed containers or baskets are sold to a customer, their subsequent watering greatly affects the "use by" date of the plant product and overall consumer satisfaction. How easily the medium rewets is a key to your consumer's success. It may be unrealistic to educate all our customers to become expert irrigators. If water runs out through channels or flows off the media surface because of poor rewetting, customers are unlikely to water thoroughly. The choice of media components or the use of a wetting agent can improve rewetting.

Understanding Rewetting Characteristics

Rewetting ability refers to how rapidly a root medium absorbs water, and thus reaches its potential for maximum

Improving Water Relations In Large Containerized Plants

In the last three articles, we have outlined various methods for extending the time between watering. Here we give our opinion on benefits and costs (Table 1).

1 **Maximize rewetting.** The reapplication of a wetting agent before you ship baskets improves their potential to rapidly and easily absorb water without having to change your media. At about $0.015 to $0.03/10-inch basket (see assumptions in Table 1), this is also low cost.

2 **Increase available water-holding capacity.** This requires that you change your medium. In general, you want to switch from components that are solid (polystyrene or perlite) to ones that absorb water (vermiculite or rockwool). Another way is to increase the percentage of peat and decrease the percentage of other components, which may decrease or increase cost. Media with high available water-holding capacity are unfortunately easier to overwater, especially just after planting. Changing the components or peat percentages can also change lime rates.

3 **Change water release.** Changing the water release characteristics of your media is a lower priority because you will get a greater benefit at a similar or lower price by increasing available water-holding capacity than by changing water release. Having said that, adding a gel or calcined clay to a medium will reduce the maintenance required to keep plants alive through the summer, and therefore should be considered.

Average cost of various media components and amendments obtained from 12 commercial growers ranging in size from 8 to over 50 acres of production. Your costs may vary.

	Price/yd [3]	Price/10-inch basket [3]
Sphagnum peat [1]	$33.50	$0.21
Perlite	$42.00	$0.26
Vermiculite	$50.00	$0.31
Rockwool [2]	$81.00	$0.50
Polystyrene	$8.50	$0.05

[1] The price given is for peat after it has been expanded from a compressed bale. Growers reported an expansion ratio from the compressed bale of between 1.6 and 2:1 (i.e. 1 ft^3 of compressed peat yielded 1.6 to 2.0 ft^3 of loose peat).

[2] The price given is for rockwool after it has been expanded from a compressed bag. Grower reported an expansion ratio of about 2:1.

[3] The price per basket assumes that you can fill 160 10-inch baskets per cubic yard of media.

To calculate the price of a specific media, multiply the price of a component by the percentage (by volume) that it takes up in the media. Add the values for each component to determine the price per basket (or price per yd3).

Example: Cost of a 80% peat/20% perlite media
Peat cost: 80% (0.8) x $0.21 = $0.168
Perlite cost: 20% (0.2) x $0.26 = $0.052
Total cost: $0.220/basket

Other media components

	Price/unit	Rate	Price/ 10-inch basket [4]
Gel	$6.00/lb.	1.5 - 4 lbs./yd^3	$0.06 - $0.15
Wetting agent	$0.40/fl.oz.	7.6 to 15.4 oz wetting agent/ 100 gallons	$0.015 - $030 [5]
Calcined Clay [6]	$0.10/lb.	50-100 lbs./yd^3	$0.03 – $0.06

[4] The price per basket assumes that you can fill 160 10-inch baskets per cubic yard of media.

[5] This assumes that a drench volume would be 64 fl.oz. of solution.

[6] The bulk density of calcined clay is assumed to be about 40 lbs./ft3, so consider the increased weight if high rates are used.

Amendments do not fundamentally change the composition of the media components, so the cost of adding an amendment can be directly added to the media cost.

Example: Cost of 80% peat/20% perlite media with gel at 1.5 lbs/yd^3 rate.
Media cost (from above) + gel cost
$0.220 + $0.06 .--.$0.280/basket

available water-holding capacity, with minimal leaching. Unfortunately, many of the components used to make container media do not absorb water easily. For example, organic materials such as peat or bark tend to be hydrophobic and may be difficult to rewet if allowed to become too dry.

Researchers have shown that when the water content (by volume) of pine bark was allowed to decrease below 35 percent, little of the water applied in a single irrigation was retained. As moisture levels increased to 50 percent, the bark became progressively more efficient at retaining the applied water.

The state of decomposition of the peat or bark may also affect the ability to rewet after drying. Older, more degraded peats contain relatively high amounts of humic acid. Humic acid plays an important role in the lime requirement and the cation exchange capacity of peat. However, if degraded peats are allowed to become excessively dry, the humic acid may form hard granules that have lost their initial capacity to absorb water, making them more difficult to rewet.

Amendments such as vermiculite, rockwool, sand or calcined clay can be added to a root medium to increase rewetting. These materials improve rewetting ability because they absorb or distribute water independent of their moisture content prior to water being applied. Water can therefore be absorbed and distributed by the root medium even when the peat or bark is dry. When using amendments like vermiculite or calcined clay to help with rewetting, it is important to add them into the medium at a high enough percentage to influence water absorption (often 30 percent or more by volume).

Wetting Agents

Much of the research to improve rewetting ability of peat has evaluated wetting agents (also termed surfactants). Many surfactants exist but many are phytotoxic to plants. Wetting agents used in horticulture are nonionic materials that bind to the surface of the root media particle and decrease the surface tension of the water, thus increasing the penetration of water into the root media. Because of the hydrophobic nature of peat and bark, wetting agents are commonly added to root media at mixing to aid in rewetting.

The useful life of a wetting agent depends on factors such as media storage duration and temperature before planting, media components, watering practices and wetting agent rate and type. For example, impatiens were grown in 10-inch baskets using 18 commercial media, each containing a wetting agent added at mixing. After six months, AquaGro wetting agent was reapplied as a drench to half the baskets from each media.

The reapplication of the wetting agent had no effect on available water-holding capacity in the media containing long-fibered grower-grade peat. However, in media containing more degraded peats, the reapplication of a wetting agent increased available water-holding capacity by as much as 50 percent compared to the same media without the wetting agent drench.

Reapplication of a wetting agent is necessary if you notice that considerable leaching is needed before the medium is moist through the entire profile. About 10 minutes after an irrigation, pull off the pot and check whether the entire root zone is moist. Patchy drying of media can sometimes indicate poor rewetting. You can also measure rewetting directly.

Rewetting ability, available water-holding capacity and water release characteristics determine whether your customer is able to keep a plant alive during the summer, and whether you will have a repeat sale next year. Next month, we will turn our focus to fertilization for success with baskets. GG

About the authors: Bill Argo (bargo@blackmoreco.com) is technical manager at the Blackmore Company and Paul Fisher (pfisher@ufl.edu) is an associate professor in the Environmental Horticulture Department at the University of Florida. The authors thank John Biernbaum at Michigan State University. The authors acknowledge support from the Michigan Agriculture Experiment Station, Western Michigan Bedding Plant Association, The Bedding Plant Foundation, The American Floral Endowment, Partek, Inc. and greenhouse growers throughout the state of Michigan.

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