

Water Management - More an Art Than a Science.

By: Brian Krug; University of New Hampshire Cooperative Extension
brian.krug@unh.edu

I think every seasoned grower will agree with me that watering is one, of if not the most difficult task to master as a grower. To make matters worse, there is really only one way to learn it, experience. In this issue of e-GRO Alert I'm going to discuss a number of typical water management problems I see, even in greenhouses taken care of by seasoned growers.

The difficulty begins with the reality that, in many cases, the least experienced person on the payroll is the one with the hose in their hand. I think this happens because on the surface it seems like a fairly mindless job, when in fact the person watering needs to be a plant expert, meteorologist, soil physicist, and logistical guru all at the same time. Each crop has its own preferences for moisture levels, the grower needs to have a good idea what the weather is going to do over the next 12-36 hours, and has to anticipate what needs



Figure 1. Edges of the bench often dry out faster than the rest of the crop.



Cornell University
Cooperative Extension
of Suffolk County

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CONTRIBUTORS

Dr. Nora Catlin
Floriculture Specialist
Cornell Cooperative Extension -
Suffolk County
nora.catlin@cornell.edu

Dr. Brian Krug
Floriculture Ext. Specialist
Univ. New Hampshire
brian.krug@unh.edu

Dr. Roberto Lopez
Floriculture Extension Specialist &
Research
Purdue University
rglopez@purdue.edu

Dr. Brian Whipker
Floriculture Extension & Research
NC State University
brian_whipker@ncsu.edu

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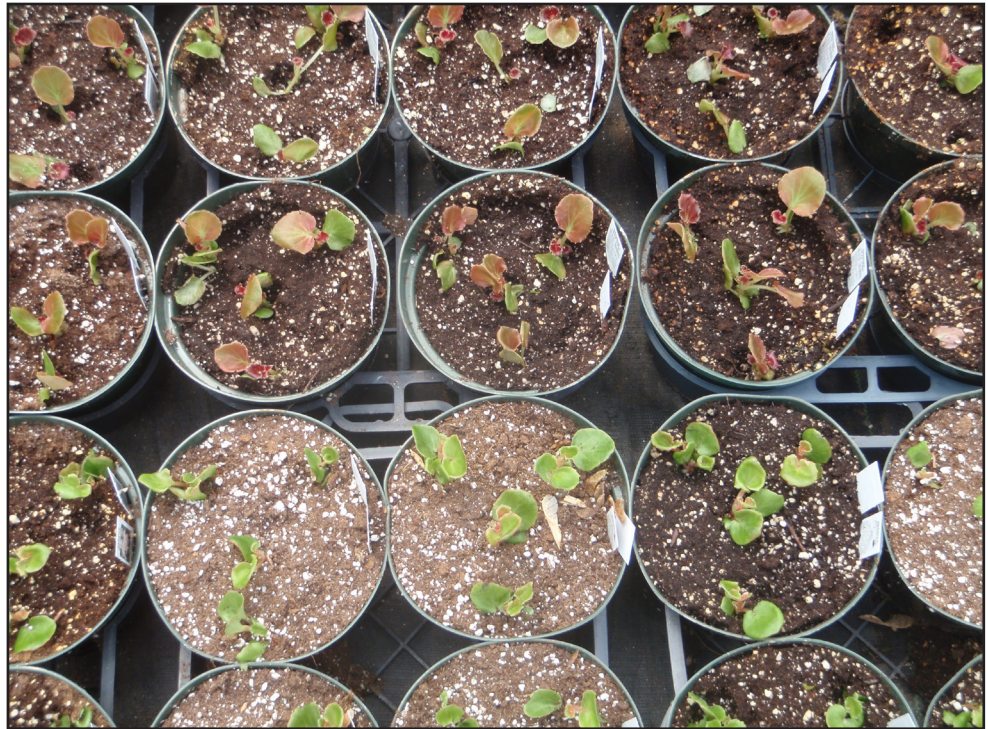


Figure 2. Spot watering can create vast differences in substrate moisture throughout the crop

to be well watered and ready to go out the door for the upcoming day. The task gets more difficult because there is never an equation that can be used to predict the water needs of a plant; this is why growers refer to watering as an art form.

Before we dive into what not to do, let's cover what you should do. Regardless of the method of irrigation the goal is to adequately saturate the root media to sustain the plant to its next irrigation. In most cases we want that to be at least 24 hours away, but we need to take in account how sunny, how warm, and how much water the plant will probably use in that 24-

hour, or longer, period. Generally we want to bring the root media up to container capacity at each watering. Container capacity can



Figure 3. Uneven watering caused by not watering all containers to container capacity.

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Figure 4. Not keeping the watering wand a consistent distance from each pot will cause under, over, and correct watering all on the same bench.

be defined as the maximum amount of water that the root substrate in a container can hold against gravity. To put it simply, the amount of water in the substrate when it is completely saturated, but water has stopped dripping out of the bottom

of the pot. Finally, I prefer to water an entire crop all at once so every pot is at container capacity and will, in theory, dry out at the same rate.

No matter how good of a job of watering a grower does, plants

will dry out at different rates, but in most cases it is probably because of placement on the bench. Figure 1 shows marigold packs drying out on the edge of the bench. This is very common and the best we can do is come through the greenhouse and touch these areas up. But resist the urge to water the entire crop again; this will result in overwatering the plants that aren't drying out yet. In some cases, especially with boom irrigation, you can anticipate this and use higher volume nozzles on the edges.

Spot-watering is a necessary evil sometimes. However it can easily turn into a crutch that can get you into a cycle that can seem impossible to get out of. In Figure 2, the grower has been careful to



Figure 5. Over watering can lead to algae growth and/or root rot.



Figure 6. Phosphorus deficiency symptoms caused by over watering.

only water those plants that need to be watered, but tomorrow the other plants will need to be watered, and so on and so forth. The grower finds him or herself chasing the dry spots everyday and this is more time consuming and will cause more problems.

Failure to bring the entire crop to container capacity can cause uneven watering (Figure 3). When watering, make sure that all the pots are getting similar volumes of water. This begins with, when hand watering, by having your water breaker a consistent distance from the pots. Figure 4 shows a grower trying to reach hanging baskets from across the bay. The result is usually under watered pots farthest away, adequately watered pots in the middle, and overwatered pots closest to the grower. It is better to come from both sides of the crop, or use a longer wand that allows you to reach the other side of the bay or bench.

It is usually pretty obvious what happens when plants are under watered, but over watering can be just as big of a problem. Pots that are overwatered can begin to grow algae (Figure 5) that can promote insect populations like shore flies and fungus gnats, and also predispose the plant to root rots. Root rot symptoms can also mimic some nutrient deficiency symptoms, Figure 6. In fact the plants are deficient in a nutrient but they are deficient because the roots are damaged and cannot take up the needed nutrients.

So far it seems like hand watering is the culprit of watering problems, but of course that is not true. In Figure 7 you notice that the impatiens are flowering unevenly, almost in stripes down the bay. Upon closer inspection, Figure 8, the crop was not being watered evenly. The spray pattern of the nozzles on the boom was not correct for the spacing therefore

there were areas between the nozzles that were not getting adequate amounts of water. Those plants were therefore stressed and did not flower at the same rate as those being adequately watered.

An all too common problem is dripping water from overhead hanging baskets, Figure 9. This problem can be exasperated when the plants below the baskets are newly transplanted; root systems haven't been established and the canopy hasn't covered the root medium. These scenarios allow the force of dripping water to splash and displace the media. There are a few ways to avoid this. First try to avoid placing young crops under baskets if you can. Or if that isn't possible, locate where the drips occur and remove those flats or pots until they become established. Finally, do not allow the baskets to be watered to the point where excess water is draining from the bottom of the pot. Apply water just until the water begins to come out of the bottom of the basket.



Figure 7. Malfunctioning boom resulted in uneven watering. The result was "stripes" down the bay.

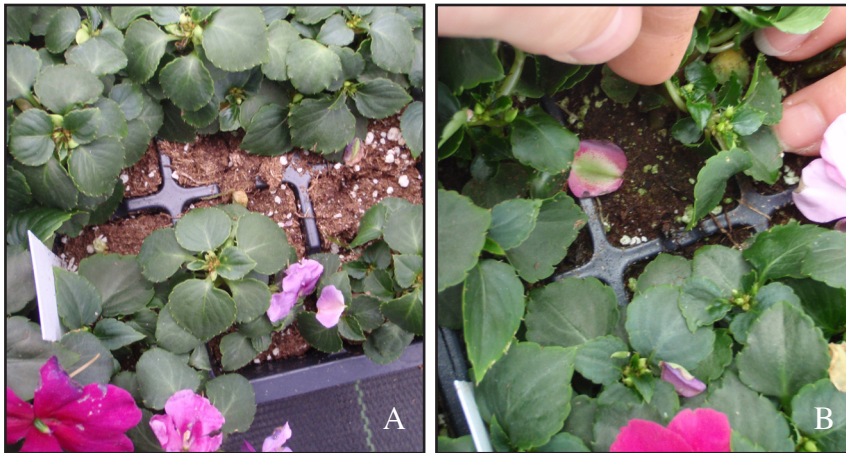


Figure 8. A boom with incorrect nozzles can under watered (A) and properly watered (B) flats at the same time.

Regardless of the method you use for irrigating your crop – hand watering, drip tubes, capillary mats, ebb and flood, be sure that you are using them correctly and that your staff is properly trained to perform this crucial task. Proper irrigation practices and the ability to identify problem situations will pay dividends when it comes to producing a high quality bedding plant crop this season. ❖

Finally, using the appropriate water pressure for the crop is key. Using too high of water pressure can displace media, change the physical properties of the media, or damage the plant itself, Figure 10. Less media in the pot will mean that the pot will hold less water and therefore irrigations will have to occur more frequently. Compacting the media will result in the same, lower watering holding capacity in the media. And of course we always want to avoid physical damage to the crop.



Figure 9. Hanging baskets and wreck havoc on young crops



Figure 10. Using too high of water pressure can damage plants, change media physical properties, or displace the media from the pot.