

GROWERTALKS

Features

2/26/2015

Too Wet or Too Dry?

Paul Fisher, Jinsheng Huang, Rosanna Freyre & Ryan Dickson

When was the last time you walked through the greenhouse and noticed that the plants were too dry or (more likely) too wet? You probably told your watering staff in that growing zone multiple times to “run the crops drier,” but the message just isn’t getting through. Or perhaps your staff yo-yos through under and over-watering as they try to adjust to the latest blast of instructions from their boss.

There’s no more important decision in greenhouse growing than when and how much to water. Incorrect watering leads to crop shrinkage for a variety of reasons, such as root and foliar diseases, fungus gnats and shore flies, algae, slow rooting, delayed growth, soft crop tone and increased need for PGRs or corrective pesticides.

Automation alone isn’t the answer; especially in propagation, sensor-based control using vapor pressure deficit (VPD) can do a great job. There are also promising new moisture sensors available for larger containers. However, growers’ subjective decisions are usually the most important driver of watering decisions.

Given that the human element is critical, we need effective training and communication—as Dr. Will Healy of Ball Horticultural Company states, we need to know “how wet is wet.”

Leading growers use a common language of moisture level in the root substrate. This is typically based on a five-point scale ranging from 1 (bone dry) to 5 (completely saturated) (Figure 1).

In Back Pocket Grower, we’ve developed online training videos and fact sheets in both English and Spanish that are accessible and formatted for any device, such as a smartphone or tablet. Go to backpocketgrower.com on your browser, click on “Training” and then “Irrigation—Riego” (Figure 2).

Just watching a video isn’t an effective training exercise. Break the skills down into identifying moisture level, deciding when to water and how much to water. Develop a simple training program for your staff.

The first skill is to consistently identify the moisture level. Show your watering crew the training video and fact sheet out in the greenhouse or on a large screen in the break room. Set up examples of trays or pots at different moisture levels and discuss. Now run a little test: show staff another group of numbered “evaluation”

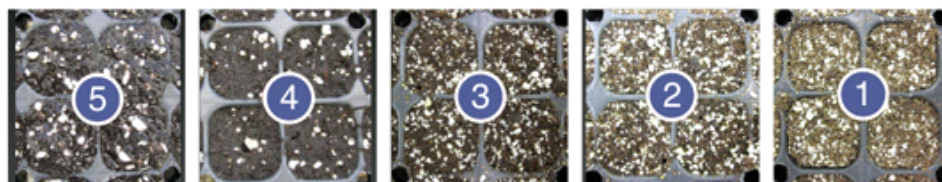
containers and ask individuals to write down the stage. Compare their answers and discuss. Walk through the crops together with growers from different zones, so you can develop a common team perspective on your wetness language. Reviewing the video and re-calibrating periodically or as new employees are introduced will maintain consistency.

The next training step is to decide when different crops need watering at each production stage. Let's take cutting propagation as an example. For most crops, hydrating and callusing cuttings immediately after sticking requires moisture level 4 to 5, followed by 3 to 4 during root initiation as plants need more aeration in the substrate, and cycling between 2 and 4 when plants are off mist and compact growth is required. The same five-point scale can be used in finished crops and seedling plugs. Ranges will vary between crops that are grown wetter (for example, germination of seed impatiens at level 4 to 5) or drier (for example, verbena germination at level 2 to 3).

After training the stage of dryness when growers should apply water, a following step is how much water to apply. This is more challenging because in some cases a grower may need to spot water, apply a light irrigation to moisten the surface of the substrate, apply deep watering or water to the point of leaching.

One way the moisture scale can help is to define the starting and end points of moisture (for example, irrigate at level 2 up to a level 3). That needs to be translated into practical terms, such as setting boom speeds or number of passes, the time to walk between posts in the greenhouse with a hose or seconds of watering per container by hand, a dripper or overhead sprinklers.

Document these crop targets in a simple table. Beware of the common trap of developing crop plans and then filing them away unused on someone's spreadsheet. Make sure your training documents are accessible and used by the grower team. Deliver the crop plan into growers' hands using a printout pasted next to the sowing line, on a clipboard in the greenhouse or on a document that can be accessed on their phone or tablet in the greenhouse.



5. The substrate is completely saturated and appears shiny and black in color. Free moisture can be seen at the substrate surface and dripping from underneath cells. Trays may bend under the heavy weight of the water. In your hand, moisture drips from substrate without squeezing.

4. The substrate is at maximum water-holding capacity and appears dark. It is not shiny, and no free moisture is visible at surfaces. The tray may still bend under the water weight. Lightly pressing down on the substrate will force water from underneath the cells. Squeezing the substrate will quickly release moisture from your hand. After squeezing, the substrate will retain its shape.

3. The substrate is drying due to plant uptake and evaporation. The substrate appears brown in color and is lighter in weight. Strongly squeezing or pressing the substrate only releases a few water droplets. After squeezing in your hand, the substrate begins to crack apart into chunks.

2. The substrate appears light brown to tan and has become light in weight. Most rooted crops irrigated at this stage. Plants may begin to wilt. Squeezing the substrate as hard as possible releases no water droplets. After squeezing, the substrate is loose and falls apart in your hand.

1. Completely dried and tan to grey. No water is available and the substrate is very lightweight. Many plants may not recover if wilted to this stage. Substrate may separate away from tray cell walls. Squeezing the substrate as hard as possible will not release any water droplets. After squeezing, the substrate crumbles in your hand and resembles dust.

We hope you find the moisture scale and other tools in Back Pocket Grower help improve consistency, communication with your growing team and bottom-line profitability. **GT**

Paul Fisher, Jinsheng Huang, Rosanna Freyre and Ryan Dickson are with the University of Florida IFAS Extension.