Using Soil Moisture Sensors to Control Irrigation of Hydrangeas

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Efficient water management is increasingly important in ornamental horticulture. The increase in water use in urban parts of Georgia will reduce the amount of water available for agricultural use in the future. It will become increasingly important that water used for agricultural purposes is used as efficiently as possible. Currently, many nurseries irrigate based on a set schedule, without paying much attention to actual water needs of the crop. This generally results in the application of much more water than what is needed to sustain plant growth, which may in turn result in runoff of both water and fertilizer.

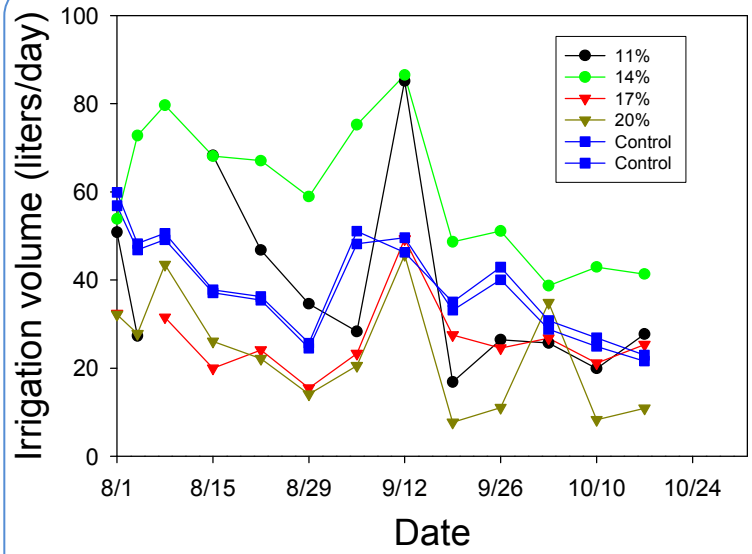
A simpler, and better, approach to irrigation is to irrigate based on the actual water use of the plants. Building on past CANR-funded research, we are testing a commercially-available irrigation controller (MoistureClick; Dynamax, Houston, TX) that can measure the water content of a substrate, and automatically irrigate as the substrate water content drops below a grower-defined set point.

We are using 6 groups of hydrangeas, four of which will be irrigated using irrigation controllers. The other two groups will be watered according to normal industry irrigation practices. For the four groups of plants with an irrigation controller, we are testing four different set points, ranging from approximately 11 to 20% water content. Water use by each group of plants was measured weekly.

Surprisingly, irrigation controllers with lower set points (11 or 14%) applied more water than controllers with higher set points (17 or 20%). The reason for this is not clear. Also surprising was the finding that the irrigation controllers did not save much water compared to the control treatments; the 17 and 20% treatments used about 30% less water than the controls, while the 11 and 14% treatments used more water than the controls. One reason for the lack of large differences in water use is that the grower who was in charge of the irrigation of the control treatments was also keeping track of water in all the other treatments. Therefore, the grower knew how much water was applied in the various treatments and he could adjust his own irrigation accordingly. The irrigation controllers did automatically adjust the irrigation volume based on changing weather conditions, with water applications decreasing as cooler weather set in.

In a larger, 'blind' experiment in a commercial nursery, we found that irrigation controllers resulted in 85% water savings, while also reducing leaching of fertilizers.

Potential benefits of using soil moisture sensors for irrigation control include water, energy, and fertilizer savings. We are also interested in using this approach of irrigation control as a height control method. By precisely controlling the water content of the substrate, it may be possible to expose plants to a mild, controlled drought stress to reduce stem elongation and grow more compact plants.



Weekly irrigation volume of hydrangeas. Irrigation was controlled either with MoistureClick irrigation controllers (with irrigation set points of 11, 14, 17, or 20%) or irrigation valves were opened manually as needed (controls).

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