

## Wireless Nursery and Greenhouse Management

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Remember the days when you ran back and forth between your office and your greenhouse to check the moisture and temperature of your plant growth medium? Greenhouse and nursery managers with smaller operations may be able to get away with this method. However, managers of large facilities will often spend many hours a day checking environmental conditions in multiple fields and greenhouses. Fortunately, new tools have been created to help nursery and greenhouse managers monitor environmental parameters from the comfort of their desks. One tool currently undergoing field trials is Decagon Devices' new wireless ECH2O monitoring system, which measures a variety of environmental parameters. The ECH2O system is showing promise as an innovative tool for managing large-scale greenhouses and nurseries.

One such field trial was held at a wholesale nursery in the Willamette Valley of Oregon. The ECH2O system was tested to see if it could help a Pacific Northwest nursery manager monitor water use across various fields. ECH2O systems were installed in five fields and one greenhouse in the spring of 2007 to determine if soil moisture sensors, which are typically used in research agriculture, could be used to understand water use in nurseries and greenhouses. Each system consisted of two ECH2O-TE sensors (soil moisture, temperature, and electrical conductivity), one leaf wetness (LWS) sensors, a rain gauge monitoring irrigation (ECRN-50), and a wireless data logger (Em50R), which transmitted data back to the nursery office via a Data Station. At any given time, the nursery manager could look at each of the six locations on her office computer and see the volumetric water content, EC, and temperature of her pots.

To date, the nursery manager has been using the data set from the five fields as a water management tool. For instance, the volumetric water content data are being used to determine if watering is really occurring when the irrigation system is scheduled to turn on. More advanced use of the data set includes determining how much water is enough water for the plants while at the same time preventing excess leaching from the pots. In the greenhouse, an installation scheme which has ECH2O-TE sensors in both pots on the edges and the interior of the greenhouse has allowed the nursery manager to ensure that the irrigation water is being applied equally to all of the plants. The installation scheme has also allowed the manager to observe the efficiency of the greenhouse watering system.

Data, however, are not only used to schedule or monitor irrigation. For instance, by monitoring the soil temperature, the nursery manager was able to understand how an overnight freeze had affected the root temperature of plants in both the nursery and the greenhouses. Leaf wetness sensors were used to determine if leaves were staying wet for too long, thus increasing chance for disease. Decagon is currently working on recommendations to nursery and greenhouse managers on how to use the bulk EC measurements taken by the ECH2O-TE sensors as a tool in fertilizer scheduling. Possibilities are limited only by the grower's creativity.

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