



Flooding the floor waters plants from the roots up.

PHOTO COURTESY OF SMITH GARDENS

# Making every drop count

## Using water efficiently in the greenhouse

BY EMILY LINDBLOM

**O**NE OF THE MOST vital elements for growing plants is becoming more and more scarce. With agriculture, municipalities, and environmental communities competing over limited water supplies, growers have every reason to use it deliberately and efficiently.

Greenhouse growers have several options to consider that could help them do that, from advanced water system controllers to efficiency upgrades and even systems that recover, clean and recycle used water.

### Staying in control

Al Warren of **Power Development Solutions** said his company is adding computer intelligence to the agricultural system with a brand new product to help greenhouses use water more productively.

Known as the PowerTraker, this new system controls and monitors the environment. It measures temperature, humidity, soil moisture, carbon dioxide, light, pH levels and other data and decides when and how much to water each plant. If the temperature increases, the watering time increases, and if the humidity goes up, the watering time goes down.

Warren said with more control over water usage, the less water is wasted.

Power Development Solutions sells software that farmers can use to set up watering schedules and parameters for watering times, and then the PowerTraker makes the adjustments based on those factors.

"That saves the farmer from having someone monitor temperature and humidity and having someone to check the timer," Warren said. "We're trying to automate the whole process, which will save labor, be more efficient and be more accurate."

The PowerTraker can turn AC units on and off based on the time of day, and it monitors the amount of energy the irrigation system is using.

"You can control all of this over the internet," Warren said. "You can be on the beach in Mexico and use your phone to check what's going on in your greenhouse in Southern Oregon."

Cameras help nursery owners visually check in on how the equipment is doing.

Warren added he hopes this system will give farmers the freedom not to have to be tied to their farms.

"We've talked to small and medium-sized farmers who are excited because it gives them that freedom they've never had because they were tied to the farm, keeping everything going," Warren said.



## Making every drop count

Energy Trust of Oregon provides financial incentives for efficient irrigation systems

PHOTO COURTESY OF ENERGY TRUST OF OREGON



"With climate change and drought conditions, water will become less available, so it dictates the need to do things more efficiently and that's the niche we're trying to fill here," Warren said. "At some point in the future, there's probably going to be more regulations for water usage."

This new technology goes well with irrigation systems that target plants directly.

### Incentive programs

**Energy Trust of Oregon** provides cash incentives for customers using energy-efficient programs.

"When thinking of energy efficiency in greenhouse irrigation, there are two main concepts: use less water to begin with by applying it where it's needed; and deliver the water you need more efficiently," said Steve Ziemak, senior program analyst for industry and agriculture at Energy Trust.

That can be a challenge at nurseries that mainly water by hand. Ziemak suggested making sure employees are properly trained to water appropriately, and setting up a schedule to water the plants by type, pot size and temperature.

Automatic irrigation systems can make energy and water efficiency easier to achieve. Instead of overhead sprinklers, Ziemak recommends using micro-sprinklers for drip irrigation, directing the

water onto the plants as much as possible.

In a micro-irrigation system, tubes deliver water to emitters inside each pot at the base of a plant.

"Thus, irrigation is delivered directly to the roots of each plant at a consistent rate and can be precisely controlled," Ziemak said. "There is no waste from, for example, overhead sprinklers which would spray water everywhere, or from hand watering which would still likely get the leaf canopy of the plants unnecessarily wet and would likely provide inconsistent irrigation."

However, this micro-irrigation is only feasible for larger potted plants and can be labor-intensive to set up.

Once set up, automatic watering equipment requires less labor but still needs regular maintenance to prevent excessive watering from things like worn-out nozzles. The size of irrigation zones also needs to make sense for the quantity of plants in a specific area to ensure the water is hitting plants instead of empty ground.

According to Ziemak, the first step in delivering water more efficiently is to eliminate excess pressure loss in the system. This can be done by making sure the pipes are the right size and by eliminating any unnecessary valves or pipe fittings.

"Generating excess pressure is going to use more energy and show up on the electric bill," Ziemak said. "So one of the

biggest items we incentivize is a variable speed drive." This is a pump controller that can change the speed of the water at the pump based on the pressure in the system.

For example, if watering requires 70 pounds of pressure, the variable speed drive will speed up or slow down the pump to make sure it is running at that amount.

Energy Trust of Oregon offers two basic types of incentives: a rebate incentive and a calculated incentive. Nurseries usually receive the calculated incentive, which requires pre-approval of a project before they purchase the micro-sprinklers and variable speed drives. The incentive amount is meant to be proportional to the savings of that particular project.

These incentives are funded by the major electric and gas utility companies in the state, including Pacific Power, PGE, Northwest Natural, Avista and Cascade Natural Gas.

### Reusing water

John Morgan, head grower at Smith Gardens in Aurora, Oregon oversees three



Left and right: Advanced water system controllers improve grower water use. PHOTO COURTESY OF SMITH GARDENS



different types of irrigation systems across 30 acres of greenhouses.

All areas use overhead systems with boom irrigators. The facility also uses two types of flood floors to cater to the amount of water that different plants need. With a cascade floor system, water comes in on one side of the greenhouse and cascades down the floor to drain out on the other side.

The other is a soft cloth floor that slowly fills up with water from underneath and then drains out. According to Morgan, garden center staff members need to be careful about what kind of equipment they drive over the soft cloth so as not to damage it. In that way, the cascade flood floor is more user-friendly.

"With all those floor systems, once the floor's drained, that water is captured,

filtered and added back into a holding tank to reuse until it's uptaken by the plants," Morgan said.

**Smith Gardens** primarily uses the water from the holding tank and tops it off with water from on-site wells.

"We're not always pulling on the wells if there is already water in the system," Morgan said.

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40 thousand gallons of water each day, which also allows it to reuse the fertilizer retained in that water.

"We're saving money and resources by not always having to add more fertilizer to our irrigation water," Morgan said.

In addition to those savings, the facility saves labor costs and time by using automated watering systems. For example, the flood floor system is set on a computerized schedule so staff members don't need to be there physically.

Morgan said reusing water is becoming more of a common practice in the past decade.

"For a lot of growers it's becoming somewhat of a finite resource, because they can only drill so many wells or pump so much out of the ground," Morgan said.

Less than a decade ago, Smith Gardens' plants were all hand-watered

with hoses and water lines. Since then, Morgan said it's been hard to find skilled people in the industry, so the center has needed to cover the area with a smaller amount of staff members.

"So when you do find good people, you have to give them as many tools as possible to cover the ground," Morgan said. With automation, the equipment can run without any direct supervision.

Morgan acknowledged that these irrigation systems come with steep upfront costs, but over time a facility would save a lot by saving water and labor costs.

Andrey Kaya is a certified irrigation designer at Salem, Oregon-based **Clearwater Irrigation Supply**, which sells equipment for greenhouses including drip irrigation, drip tape and small irrigation travelers for nurseries to use in overhead watering.

Kaya said his company sells spinning irrigation systems with a hanging assembly that covers two or three lines in a greenhouse.

"With that type of system in greenhouses most of the guys will have drainage that will go to an overflow pond or retention pond," Kaya said. "Most of the systems are really efficient and most growers do a good job of retaining water in some way."

Kaya added Clearwater Irrigation Supply has been working with more and more greenhouses each year. ☺

*Emily Lindblom is an Oregon-based freelance journalist covering business, environmental and agricultural news. She has a background in community reporting and a master's degree in multimedia journalism. Visit her website at [emilylindblom.com](http://emilylindblom.com) or reach her at [emily@emilylindblom.com](mailto:emily@emilylindblom.com).*

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