

# Six Ways to Automate Irrigation

*There are many ways to automate the watering process in commercial greenhouses. Here's a look at how professional growers do it.*



*Boom systems provide quicker rooting, more uniform growth and less crop loss thanks to the control of water delivery. (Photos: McConkey Co.)*

By John Rowe



*Close-up of a turret head nozzle*

**T**he industry's most reliably successful growers are increasingly automating their irrigation systems for the significant improvements it makes to both their efficiency and crop quality.

When a machine runs irrigation, plants receive a consistent amount of water, which makes the crop much more uniform. Irrigation consistency also reduces the amount of plant loss caused by stress induced by delivering an inconsistent amount of water or fertilizer.

Larger growers have been among the first to adopt these methods because of the capital costs, but small- to medium-sized growers also are realizing opportunities to automate on a tight budget. For example, in a typical 30x96-foot greenhouse, basic overhead irrigation can be installed for as little as \$325. That's certainly not a budget limited to big growers. This inexpensive entry investment allows growers more free time while machines take care of their plants.

Even at that cost, a smart grower would run the numbers to determine whether the system made financial sense for him. Applying 1 inch of water to that typical greenhouse requires 1,795 gallons of water, which would take 4.3 hours using a nozzle with a typical 7 gallons per minute output — assuming perfect labor efficiency. At minimum wage, that's \$36 per watering, so the

\$325 investment is recouped in nine waterings. Run the numbers for your own operation to see how the economics work for you.

There are six ways to irrigate your greenhouse, but choosing the wrong system for your operation and crops can lead to big issues. Use the following guide, compiled by the experts at McConkey Company, to help you choose.

Each of these irrigation methods are a delivery mechanism for water, but they still require a corresponding controller to regulate when and how much to water. Controllers can be as simple as \$45 units that switch on the system at certain times of the day and as advanced as units that sense solar heat, air humidity and soil moisture.

## 1 Drip Systems for Hanging Baskets

Drip systems are intravenous tubes feeding directly to each emitter from a main supply line running the length of the bay. Hanging baskets are one of the first crops growers choose to automate with drip irrigation. Drip systems help reduce disease by keeping plants' foliage dry. With this system, the drippers turn on and off in unison, even if the greenhouse is sloped or the lines are uneven. The drip emitters are pressure compensated so the entire line of hanging baskets will be irrigated with equal amounts of





water. Drippers come preassembled in various lengths to accommodate various suspension heights in greenhouses. Baskets up to 12 inches are ideally suited for drip systems. Larger baskets may require spray stakes or several emitters per basket.

## 2 Drip or Spray Stakes for Potted Crops and Nursery Containers

Potted crops or outdoor nursery containers can also be watered automatically with drip emitters or spray stakes. Drippers are used on smaller containers from 3½ square inches up to gallon and larger containers. Small containers allow the dripping water to migrate outward and saturate the soil profile. For larger containers, spray stakes help convey water across the soil surface area for adequate saturation. Drip systems and spray stakes ensure the water is injected directly to the soil, which reduces overspray.

## 3 Microsprinklers (Overhead)

Microsprinklers simulate a light rain or mist. They are typically installed overhead and are ideally suited for flat material such as cell packs or square containers. Any crop grown edge to edge in a greenhouse and not sensitive to wetting foliage is a good candidate for microsprinklers. With

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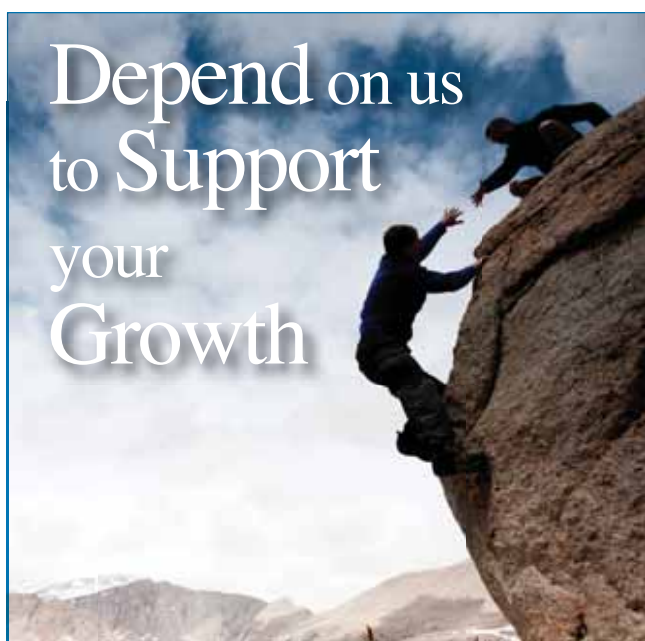
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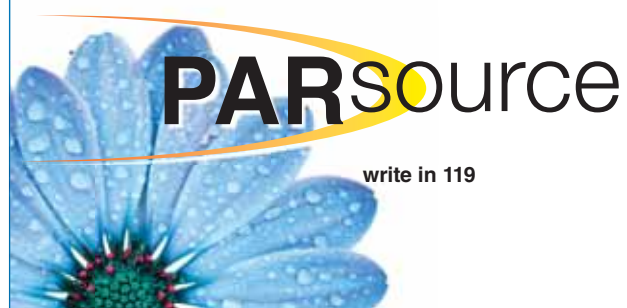
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their low cost and easy setup, overhead systems are among the most popular and offer one of the quickest returns on investment. They can be set up to irrigate the entire greenhouse area or be zoned to water different crops at different times and rates.



Spray stakes can be used to irrigate plants with a higher foliage canopy, such as lilies and tulips.

### 4 Ebb-and-Flood Systems, Capillary Mats

Ebb-and-flood systems and capillary mats both water from the bottom up instead of overhead. Crops sensitive to overhead watering, or those whose foliage creates a barrier to overhead watering, lend themselves to bottom watering. Ebb-and-flood systems are typically closed-loop systems where the water is applied, reclaimed, treated and reapplied to crop. These systems carry

the risk of spreading disease, as infected plants' water can drain out and into nearby healthy plants. Capillary mats require good aeration to prevent algae buildup because they do not drain dry between irrigation cycles. These systems minimize foliar disease because foliage stays dry, which allows for lower greenhouse temperatures and lower fuel costs in some situations.

### 5 Drip Tape

Originally used outdoors in field crops or orchards, drip tape has found a home in greenhouses. Because a variety of differently spaced, pressure-compensated emitters can be embedded into the drip tape, crops from poinsettias to mums to larger flowering annuals are now being irrigated in

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this way. Drip tape is ideal when larger numbers of a particular crop are being grown in 6-inch or larger material. The location of each emitter is marked on the drip tape to make positioning the pot under the tape quick and easy, which saves up to 20 percent in installation labor over drip tubes. Drip tape also helps keep foliage dry, thus reducing the risk of disease.

### 6 Boom Irrigation

With boom irrigation systems, a grower can apply water in precise amounts not possible with other systems. Precision of quantity is essential during propagation, whether from seed, plugs or cuttings. Booms provide quicker rooting, better growth, more uniform growth and less crop loss, mainly because the amount of water being delivered can be controlled and is being delivered more uniformly. Plug growers will irrigate with little else: Because of their small volume, plug cells dry out faster and require multiple waterings each day. Consider a 512-cell plug tray with 0.14 fluid ounces per cell empty. With just a few extra drops of more water in one cell than an adjacent cell, they will have drastically varying amounts of water and consequently their growth will not be uniform. Booms help avoid this issue and are ideal for any greenhouse crop (grown edge to edge) that is not sensitive to wetting foliage. Growers can water just to the leach point to save on fertilizer costs, or they can water just the top soil profile for newly transplanted material to save on water and fertilizer. Advanced boom controllers can change watering zones throughout a greenhouse, which saves growers water by not watering unplanted areas of a greenhouse.

Boom controllers in the past have been criticized as difficult to program, but growers are finding a new generation of easy-to-use, touchscreen controllers that allow for quicker training and fast staff adoption. When choosing a boom system, be sure to interact with the systems under consideration to evaluate how well they will be used after their installation, and gather feedback from any staff that will be using the system. **GPN**

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