

The **Ins** and **Outs** of **Irrigation**

Learn the basics of irrigation systems and how the right one may boost your bottom line.

By **Ellen C. Wells**

Drip systems, ebb and flood benches, overhead micro-sprays and sprinklers, automated booms: Irrigation options and their importance to the health and well being of crops can be daunting. If you've been analyzing your labor and water bills or are considering a new greenhouse facility, taking time to educate yourself about irrigation options can save you water worries in the future.

Importance Of Irrigation

Fred Harned, greenhouse and nursery market manager for Netafim, feels there are two important reasons to analyze an operation's irrigation needs: cost management and production

quality. "Very significant production costs are tied to irrigation: labor, energy, fertilizer, pest management," Harned said, "The reason it is important to take the time to examine your operations' irrigation needs is to manage those production cost inputs."

"Hand watering is one of the least cost-effective ways to do watering with crops that don't specifically require it," said Heiner Lieth, professor in the Plant Sciences Department at University of California, Davis. "In probably 80 percent of the cases where I see growers hand watering, they would do much better with an automated system that would provide a much more uniform irrigation to the plant."

Many critical aspects of plant growth are related to proper irrigation. Among them are nutrition, disease control, growth rate and cold tolerance. "Many growers today still give irrigation no more attention than seeing that plants are getting water and not wilting. Irrigation is often reduced to hiring someone with the stamina to stand and water for hours at a time," Harned pointed out. Taking the management of watering out of the grower's direct control and placing it in someone else's hands does not make long-term sense, considering the impact on both production costs and plant quality irrigation can have. Even simple automation can put watering control back into growers' hands, he added.

"Create a system that meets the needs of the plants and does it cost effectively and uniformly," Lieth said. "If you don't do precise irrigation, then you are not going to be meeting [those needs] optimally. That requires a good, strong focus on your irrigation needs."

Ed Naughton, northeast district manager for Senninger Irrigation, agrees it's important for growers to review their needs. "Establishing an irrigation system involves significant capital investment, so it's wise to spend the time ensuring that the system you choose will do the job you want it to," he said. Naughton



Nutrition, disease control, growth rate and cold tolerance are some of the aspects of plant growth that are related to irrigation. (Photo courtesy of Senninger Irrigation)

structures & equipment



In many cases, hand watering is not the most cost-effective method of irrigation.

advises growers to think about what they want: Do you want to maximize plant growth, control plant growth, minimize plant losses, keep plants cool in hot weather, encourage soft and lush growth, encourage root initiation or harden plants for sale?

System Considerations

“The first thing I ask growers is what are they growing,” said Jonathan Davidson, sales manager for Berry Hill Irrigation, “If it’s a hanging basket crop, that’s typically done with different sizes and types of emitters and drippers than if the crop was on benching.” Davidson also advised considering plant type. “If they are growing poinsettias, you’re definitely not going to water them with overhead irrigation because they can’t tolerate that kind of watering.” Flats grown on benches, he said, benefit from small, overhead sprays, and pots grown on the floor can be watered with overhead, subirrigation or drip, depending on the plants being grown.

In addition to the plant species, Naughton suggests growers consider crop height, pot size, potting mix type, the crop’s growing period and how long each pot will spend in a particular location. “Also ask yourself how much water is needed, and when and how often is the water needed,” he said.

According to Harned, growers need to consider the quality of water being used in the irrigation system and the final crop the grower is hoping to produce. “Growers also need to think about the crops’ sensitivity to water,” Harned said. He asks growers how versatile the irrigation system will have to be. Growers rotating different crop types through an irrigation space during the growing season or growing several different crops in the same space at the same time need an irrigation system that can adjust easily.

Davidson also said growers have to consider the greenhouse structure itself, especially the slope of the structure’s sides. “If you have Quonset huts or cold frames, lots of times when you try to spray water, it’ll just spray right onto the sides of the greenhouse and not get the plants wet,” Harned said.

Harned pointed out that the human side of the system should also be considered when determining what kind of irrigation to install: “Personal preference and grower experience is important. How much of a step forward or step up can the operation manage?” he asked. Harned also said customer service — support on the system’s use and spare parts — is key when considering something important to a crop’s development.

“Most of the producers paying attention to efficiencies and productivity are fertigating,” Lieth said. “They are not just delivering water. They are delivering water and nutrients at the same time. Even varying the concentration of the nutrients in the water dynamically depending on crop.” Lieth pointed out that if growers do their fertilization through this kind of system, they bypass the extra labor involved with the fertilizing process. “The key is really that it’s simply more uniform to do it through an automated system,” he said.

Size Considerations

There are plenty of differences between large and small growers, but should irrigation systems be one of them? There are different ways to look at it.

“Investment costs are going to be somewhat different for large and small growers, although large growers will probably have efficiencies that would make the cost per plant a little lower,” Lieth said. “Systems are driven by product, market and how the grower wants to put it into the market. If the crop needs to be produced so that it’s all out the door at once and uniformity is important, then you need the right irrigation system that would allow that.”

“A smaller operation will probably expect its irrigation system to be more versatile,” Naughton said. “A larger operation, on the other hand, will have the site organized into dedicated aspects of production. For example, into propagation areas, growing-out areas, holding-for-shipping areas and so forth.” Davidson agrees with a smaller grower’s need for versatility. “Smaller growers are growing 50 different things in the same greenhouse. And that gets a little tricky because they have to water things differently and for different lengths of time,” he said. “Larger growers tend to do things a little bit differently. Everything has to be the exact same because they are growing large numbers of the exact same plant.”

Davidson believes automated irrigation helps the smaller grower make things more manageable. “First thing we try to do is to keep everything simple. For a smaller grower you have to really keep labor costs to a minimum,” he said. “They really benefit, since they are the ones coming in every Sunday to water because they don’t have the money to hire someone. Automation keeps it simple and inexpensive.”

Bonzi® tip of the month

Avoiding Flowering Delay with Bonzi

An important part of greenhouse production is controlling crop growth and size without delaying flowering or reducing flower size. For many operations, a main objective is to maximize production space, and crop cycles are on tight schedules. Delayed finish timing adds to the overhead costs for that particular crop, but also affects the planting and scheduling of subsequent crops.

Flowering delay can also become undesirable when a crop is ready to ship but is being held in the greenhouse because of poor weather or customer delay in taking the crop. In this situation, the grower often must use a growth regulator to prevent the crop from becoming over grown, but the crop must remain in flower and ready to ship.

All of the plant growth regulators used to control size of greenhouse crops have the potential to delay flowering and/or reduce flower size. The successful use of Bonzi, like other products, requires following label directions and using appropriate application rates. The following are some additional guidelines for using Bonzi without affecting flowering.

- The earlier in a crop Bonzi is applied as a spray or drench the less effect it will have on flowering. It is particularly important not to apply strong applications late in the crop.
- On highly vigorous crops, start using Bonzi early in the crop before the plants are too big. This reduces the amount of Bonzi needed when the plants are flowering.
- Apply Bonzi to plugs and rooted cuttings before they are transplanted to reduce the amount needed on the finished crop.
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Make sure a higher degree of irrigation technology will generate savings in the long run before you invest in a new system.

Harned feels the gap between a smaller grower's irrigation needs and those of a larger grower is narrowing. Smaller growers are typically those with a diverse crop regime and require systems with a greater ability to manage small zones. "Even larger growers today may need this flexibility," Harned said. "The very high-end systems that include crop transport as part of the irrigation design or flooded floors with recirculation are probably relegated to large growers. Most every other technology is available and suitable to both large and smaller growers," he added.

Upgrade Considerations

Upgrading from a hose to something more complex has potential consequences. "An inappropriate irrigation system can result in a less-than-acceptable quality crop," Harned said, and a poor crop can lead to poor sales. "It also can lead to higher operational costs because of inefficient use of water, energy and fertilizer, and that can lead further to higher maintenance costs and a shorter life for the equipment," he continued. Naughton agreed: "In addition to poor plant quality, another consequence is time — too much time wasted to irrigate the operation."

Lieth advises careful consideration before investing in a higher degree of technology. "If you choose a system that is highly robotic, highly automated and it doesn't generate the kind of economic savings you're looking for, it just might put you out of business," he said. "It's important to match the investment to the product and the market for that product. If it's a high-value crop and it generates funds, it's worth investing in getting it produced more effectively."

An appropriate irrigation system that works best for a particular operation has many benefits. "The right system provides a better root environment for the plants," Harned said, "There will be better plant nutrition in the pot, it will prevent water stress and other stresses that

inhibit plant growth, and it will help prevent the spread of diseases." And there are other benefits for the grower: lower labor costs, a higher percentage of grade-A plants and better disease management.

Maintain Your System

Even the best irrigation system needs to be watched for proper functioning. "It's important to have regular maintenance, especially at the end of the year," Harned said. "Some systems will have flow meters, and with those, you can check to see if it's performing at the flow the system was designed for. There will be an accumulation of particulates in the sprinkler and dripper lines, even with proper filtration." He recommends flushing the system at least once a year and making sure the water's pH is within desired limits.

As for subirrigation, Naughton says weeds and algae need to be monitored and controlled. He also points out that overhead sprinklers, while good for cooling leaves, may lead to increased occurrences of foliar diseases. Even drip systems can need to be properly maintained to remain untangled.

It's clear that research and consultation is key to choosing the right system for the right space. Ask the experts, talk to colleagues who have recently installed irrigation systems and crunch the numbers. With a little work you'll find the best fit for your operation. **GPN**

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