

Why Drip Irrigation Is Gaining Popularity

- **Improved crop yield and quality.** Water and nutrients are spoon-fed to the crop uniformly and on the desired schedule.
- **Water conservation.** Drip irrigation helps stretch limited water supplies by reducing water runoff, deep percolation and/or over-irrigation due to poor application uniformity.
- **Reduced costs.** Water, fertilizer, energy, labor, chemicals, weeding, insurance and field operations tend to cost less compared to alternative irrigation technologies.
- **Improved logistics.** Because crop wheel rows remain dry with drip irrigation, drip fields are typically more accessible regardless of the irrigation schedule.
- **Reduced disease.** Since water is not applied within the plant canopy, humidity and associated disease problems are reduced. Reduced puddling can also decrease the opportunity for E. Coli to grow.

Toro Irrigation Solutions

PRECISE. EFFICIENT. PRACTICAL.

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SUMMER 2009



Closer Emitters Can Yield Better Results



▲ Toro Aqua-Traxx drip tape, 12" spacing, .22 gpm/100' on left, 8" spacing, .22 gpm/100' on right.



▲ Aqua-Traxx 8" spacing, 0.22 gpm/100' after 30 hours of irrigation.

Closely spaced drip tape emitters can enhance salt management for seed germination, leach salts in permanent crops, dilute soil salinity for salt-sensitive crops and manipulate the wetting pattern — all with less cost and more efficiency than widely spaced emitters. But with so many variables in farming applications, how do you know this is the best option? Cal Poly San Luis Obispo's *Drip and Micro Irrigation Design and Management Manual*, published by the Irrigation Training and Research Center (ITRC) in 2007, offers the following guidance.

Seed Germination

In more arid areas, widely spaced emitters (such as one tape for every two rows, or emitter spacing greater than 16") can cause salt buildup between the holes, which will prevent seeds from emerging in these areas. To help push salts away from seeds and enhance germination:

- Use drip tape on the soil's surface or just a few centimeters below with closely spaced emitters to leach salts downward.
- Shape drip-irrigated beds with an indentation at the high points so that salts accumulate away from the seed line which is planted below the indentation.

Orchards and Vineyards

Drip laterals typically wet less than 40% of the total soil surface, and over time, salts carried to this wetted strip through the irrigation water will safely leach away from the soil close to the emitter. However, salts will concentrate in the soil as distance from the emitter increases. Periodic "reclamation" leaching is needed to remove the salt from these outer zones of the soil.

Using broadcast flood or sprinkler irrigation to leach these concentrated salts below the root zone can be wasteful, since only 20% to 40% of the surface area of the orchard or vineyard needs to be leached. If 100% of the soil area is wet, to treat this 20% to 40% of the area, 2.5 to 5.0 times the necessary leaching water will be applied. Instead, ITRC researchers suggest using a portable drip tape system to "target leach" the orchard or vineyard dripline zone.

Improved Yield

Crop yields typically decrease once the soil salinity reaches a threshold value, and as the soil dries between traditional irrigations, salinity concentration becomes worse. Irrigating frequently with closely spaced emitters can help. In fact, if soil salinity remains dilute, yields can be higher than they would be with the same water quality using sprinklers or furrow irrigation.

Wetting Pattern

Wide spacing of drip emitters in Subsurface Drip Irrigation (SDI) applications requires higher pressure during germination, as well as heavy-wall drip tape to handle the high pressure without damage. Water is also applied to the soil until the surface becomes very wet, often resulting in standing water in the furrows. Initial buying costs and post-purchase operation costs will be higher, and soil surface wetting may damage crop quality and/or encourage unwanted weed growth. For optimal performance, closely spaced emitters are often the best choice to achieve the right wetting pattern, increase crop quality and reduce costs compared to wider-spaced emitters.

For more information about the advantages of properly managed drip systems with closely spaced emitters, visit www.itrc.org.



Choose Closer Emitters Without Higher Costs

Toro Aqua-Traxx® with the PBX Advantage lets you choose closer-spaced emitters without additional cost — so you don't have to settle for wider emitter spacing to save money. Aqua-Traxx features high-precision, continuously molded emitters, which are less expensive than individual, injection-molded emitters. They're also more clog-resistant and deliver water uniformly to every plant, regardless of the emitter spacing.

Aqua-Traxx premium drip tape is sold by the foot, not the emitter, so you can choose emitter spacing anywhere from 4" to 24" based upon the desired wetting pattern, not cost. It's also available in a more economical 4 mil wall thickness as well as 5, 6, 8, 10, 12 and 15 mil thicknesses for tougher applications. In addition to 5/8", 7/8" and 1-3/8" tube diameters, Aqua-Traxx PBX is now available in a 1" diameter to improve hydraulics during flushing. The emitters in Aqua-Traxx are available in a variety of flow rates, including ultra-low and ultra-high flow, to fit your needs. Call your Toro representative or click www.toromicroirrigation.com for additional details.



Learn About Drip Irrigation Online

Want to know more about the benefits of drip irrigation? Visit www.dripirrigation.org, a new educational Web site from Toro. Aimed at the agricultural, landscape and greenhouse industries, this site offers articles, illustrations, software, videos and other links to answer questions about drip irrigation technologies.

Topics range from basic to advanced, including:

- Drip irrigation basics
- Design and installation
- Operation and maintenance
- Research and related articles
- Monthly questions
- Tips and trends
- Testimonials and case studies

Whether you want a quick overview of drip irrigation — or an up-close look at how actual growers are using it with crops like hops, corn, lettuce, celery and onions — you'll find it on this site. You can also post your questions and register as a Local Expert to share your experiences and solutions with others.



Find These Educational Tools on www.dripirrigation.org

Payback Wizard

Find out what upgrading to drip or micro irrigation could mean to your bottom line with Toro's new Drip/Micro Irrigation Payback Wizard, developed in partnership with the Irrigation Association's (IA) Drip/Micro Common Interest Group. Just answer five questions about the crop, and this online tool will analyze average production and investment costs, as well as projected revenue increases, to estimate the payback period and additional acres that could be farmed with the water saved. Go to http://www.dripirrigation.org/design_tools.html to get started.



Typical Drip System Layout



Picture The Possibilities

If you've ever wondered how a drip system works, Toro makes it easy to visualize. A new illustration shows typical layouts with key components for five different types of drip irrigation systems: field crop Subsurface Drip Irrigation (SDI), short-term vegetable crop, longer-term vegetable crop, vineyard and orchard. Go to http://www.dripirrigation.org/typical_layout.html to download a copy.