AE254

Microirrigation in The Landscape[1]

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Florida receives more than 50 inches of rainfall each year, but most of the rainfall occurs during the summer. That would be about enough water to satisfy most plants on an annual basis. However, most of Florida's soils are sands with very low water holding capacities (WHC), and many landscape plants have shallow or limited root systems. These characteristics promote rapid stress conditions during periods of long term and some short term droughts.

Attractive landscapes are highly desired and have resulted in the use of a variety of turf, woody ornamentals, and flowering annuals. This has also resulted in a strong competition for water between agricultural and urban demands. While microirrigation is used extensively for the production of Florida's high value citrus, vegetable, and ornamental crops, uses of microirrigation for the turf and landscape industry is not as widespread. However, with microirrigation system exemptions from landscape water restrictions and increasing rate structures for municipal water uses, an increased public and commercial interest exists to use these systems and other associated products in the landscape. However, availability of products is limited and design considerations are different than those used for sprinkler installations.

Microirrigation products generally have been developed for use in commercial agriculture. Support stakes for micro-sprayers (or sprinklers) may be orange or red for high visibility in groves or orchards. However, these colors may not be acceptable for use in the landscape. Drip tape typically used in row crops comes in 3000 to 8000 foot rolls, more than the general home or business landscape area could use. Recent efforts by some manufacturers have aimed at providing homeowner oriented microirrigation products in landscape acceptable colors, reasonable quantities, with conversion fittings to change from sprinkler systems, and have provided some installation guidelines. However, in general, most microirrigation products are not available to the retail purchaser through the local hardware store or "do-it-yourself" outlet.

Drippers are often thought of when the term microirrigation is mentioned. However, spray-jets (micro-sprayers and micro-sprinklers) may be more desirable for many landscape applications in Florida. Lateral water movement on sands from point-source drip emitters is generally limited to 10 to 12 inches. Therefore, turf applications of drip tape or tubing would probably require maximum lateral line spacings of 18 to 24 inches. In addition, many

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landscape plants are shallow-rooted and are planted on relatively close spacings. Combining the soil and plant characteristics can result in the need for close drip emitter spacings.

Precise, point-source applications are possible with drippers. Drip products are well suited for narrow strip plantings, such as along hedge rows or in commercial landscaped or garden areas where wind drift of water from sprayers would be a problem. Drippers may be placed under mulch or buried in the soil to minimize exposure for either aesthetic purposes or to minimize damage through plant maintenance activities. However, such positioning does not provide for easy access for inspection of operation or replacement of damaged items and places the dripper in a location susceptible to root intrusion. This problem has been addressed by some manufacturers who have incorporated root deterrent chemicals into the emitters to control root intrusion. The quiet action of drippers is also an advantage for many indoor garden locations. Yet, it is difficult for the operator to know when these systems are operating and excessive irrigation is possible without proper use of timers, control clocks, and water meters. Similarly, the homeowner could leave the house or go to sleep while drippers are running, and without the aid of a time-clock, a large loss of water could result. Sprinklers and spray-jets can be seen and heard.

Spray-jets cover greater areas with water (diameters of coverage from 3 to 20 feet). Thus, fewer emission devices may be required to irrigate certain landscaped areas by using spray-jets rather than drippers. Various spray patterns are also available depending on the type of spray-jet used to accommodate the different landscape designs. In addition, flow rates of spray-jets are greater than drippers, 10 to 20 gallons per hour (gph) versus 0.25 to 2.0 gph. This results in larger flow paths which are less susceptible to clogging, the primary problem associated with microirrigation in Florida. Spray jets can also be easily observed while operating, thus allowing inspection for clogging, misting, proper spray orientation, or some other distortion of the discharge. However, plant branches and foliage can easily distort spray patterns, possibly necessitating placement of the sprayer above the canopy on a stationary or pop-up riser.

Micro-sprayers emit water from an orifice onto a deflector plate and creates a fan type of water distribution pattern (fan-jet) with fine water droplets. In general, fan-jets have performed well when used for directional sprays and confined area applications. The addition of shaping vanes (spokes) to the deflection area creates streams of water which are less susceptible to distortion, and result in spoke-shaped application patterns (spoke-jets). These work well as single tree emitters and can be fitted with deflection caps to confine the application to smaller diameter areas (2 to 5 feet) limiting use in the landscape to large trees and shrubs. Applications to sandy soils result in dry areas between "spokes" which could result in poor growth of small plants in those areas. Some manufacturers have added spinner devices to create a sprinkler effect. These "micro-sprinklers" have more uniform water distribution than the fan-jets or spoke-jets and can provide excellent water coverage. However, under commercial grove and orchard conditions the spinner mechanisms tend to malfunction either due to precipitates, dust, dirt, or insect associated debris (nests or spider webs) accumulating on or adjacent to the spinner device. Yet, regular inspection and maintenance are not difficult for the homeowner or landscape manager.

Water treatment and filtration are necessary to ensure continued operation of any microirrigation device. It is not wise for homeowners to consider injecting any treatment chemical into their system for maintenance or cleaning. In general, an appropriately sized water filter in addition to the water treatment provided by the municipal water supply should be sufficient to keep most homeowner microirrigation systems in proper operational condition. Water from private wells may require some chemical treatment to eliminate or at least minimize biological or chemical clogging. However, chemical treatment of the water may be avoided by maintaining a small supply of back-up emitters (whether drippers or spray-jets) to be used in a safe and easy maintenance program for homeowners and commercial businesses. Clogged devices could be easily replaced with clean units and then placed into a small container of acid or chlorine

for cleaning, depending on the nature of the clogging problem. Periodic flushes of poly pipe laterals should remove accumulated precipitates and biological growths.

Landscape applications of microirrigation systems will provide marketing, design, and installation opportunities for the commercial industry, especially in areas with high water costs or competition for use of limited supplies. However, proper selection, placement, and operation of microirrigation irrigation equipment is essential for successful use and water conservation.