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## Drip Irrigation: Salvation for the Gardener

*Courtesy of Dr. Larry A. Stein, Extension Horticulturist, Texas Cooperative Extension, Uvalde*

In this day and age, when water is in the spotlight as a critical resource, there is a great potential for water conservation using drip irrigation. Drip irrigation, also commonly known as trickle- or micro-irrigation, is merely the precise application of water where and when plants need it. The concept is not new, as the Germans and Italians worked out the basics in the 1930s, and, according to Dr. Jody Worthington, former TAES Research Horticulturist who did extensive research on drip irrigation, Texas Extension specialists in the 1940s were showing growers how to make concrete lines to sub-irrigate gardens from windmills.

However, it took the development of UV-light resistant plastic pipes and fittings to make drip irrigation practical for home gardeners. The greatest selling point for drip irrigation in its earliest applications was that great savings in water could be realized. Some sources claimed plants under drip required only a third as much as water as usual. These erroneous assumptions have caused tremendous headaches in the industry. A plant's water requirements are the same regardless of how the water is applied. Initially, water savings are

realized when plants are small, and only a small volume of soil must be wet. However, as plants grow, more and more soil volume must be wet for drip to be effective. The real conservation features of drip irrigation come from the precise application of water and minimal runoff, less evaporation from an essentially closed system, and less water lost to weeds and undesirable plants, since the system is placed exactly where the desirable plants need it.

The basic component parts of a drip irrigation system are as follows: (1) water source (well or city), (2) filter, (3) delivery lines, and (4) emitters. The water source used will dictate the amount of filtration needed. If the water is sandy or dirty or from an open pond, there is a greater need for filtration as opposed to using city water. Although it is best to filter city water, it can often be used unfiltered without too much problem. However, the life of the lines and emitters can be prolonged using filtration.

Basically there are two types of drip emitters. In one, the water path is very long thus reducing the amount of water that comes out of the emitter. The other type utilizes a very

tortuous or crooked path. Emitters are also designed to be either low- or high-pressure. Low-pressure emitters usually apply one to two gallons per hour at operating pressures of 2 to 5 psi, whereas high-pressure emitters typically apply one gallon per hour at 15 psi.

Such devices can be purchased or made. Considering the low cost of emitters, it is best to purchase them. They can be placed at the desired spacing along a poly hose, or hoses can be purchased which already have holes or emitters within. Three common types are Bi-wall, At@ tape, and Ram tubing. The hose with pre-formed holes works extremely well for garden applications. Spacing between holes varies with the product; 12-, 18-, and 24-inch spacing is common.

There are many drip irrigation products on the market. All are basically good, and there is no great advantage of one over another, but regardless of how good the products are, they all eventually stop up. Drip systems must be maintained and cared for, as with other water systems; hence, it is best to leave the emitter and loops on top of the ground so they can be checked regularly. The

most practical applications for drip irrigation in the home landscape are in gardens, hedge rows, shrub or flower beds, and combinations of these along with trees.

The key to making drip irrigation work in home landscapes is scheduling – knowing when and how long to water. The best absorptive roots for most plants are in the top 6- 12 inches of the soil, since this upper soil area contains a lot of oxygen. The deeper one goes into the soil, the less oxygen is present, and root growth is less. In order for water to be absorbed by the plant, oxygen must be present. If oxygen is not present, plants cannot take up water, and the roots will drown if the saturated conditions continue. An irrigation system should never be operated for longer than 8- 12 hours a day. In no case should the system be turned on and forgotten. Some turn the system on for 24 hours, or until the water reaches the surface (buried systems), and then leave the system off for several days. Such operations present extreme wet and dry periods that are deleterious to plant growth. An ideal situation is to maintain uniform moisture and oxygen in the soil.

In garden applications, the hose with holes is laid down the plant row. One hose will work for two rows of vegetables, or emitters can be placed at each transplant. Either way, the plants or seeds are well watered at planting, and then left alone until regular growth begins, unless it is very dry. The system should maintain uniform moisture down the plant row. If saturated conditions occur, the time interval between watering will need to be increased.

Generally speaking, when using drip around hedges, one emitter per plant is sufficient. The hose and emitters are placed around the shrubs at planting, and are used to maintain uniform moisture as needed. The hose can be tied into lawn sprinkler systems or operated manually. Hose with holes, hose with emitters, or micro-sprinklers can be used for flowerbeds. Basically, the size and shape of the bed will dictate the system employed. Remember to water early in the morning to avoid excess humidity and disease pressure.

Tree applications begin with emitters but are usually best served later with micro-sprinklers. As the best absorbing roots are at the dripline of the trees, the emitters need to move out as trees grow. This requires hose loops with emitters, which can cause problems with maintenance operations. Hence after five years, micro-sprinklers which wet the area covered by the canopy of the tree work best. Micro-sprinkler heads can be changed as the tree grows to provide greater water coverage.

The key with trees is to wet as much of the tree root system as possible, but maintain water in the top 18 to 24 inches of the soil. Drip irrigation is a wonderful, labor-saving and water-conservation device for the home owner. For some, such devices have been the salvation for their gardening efforts. Many wish they had discovered it years ago, and wonder how they made it before. Most large nurseries and seedsmen carry drip irrigation kits, which can be purchased to get a feel for how the system works. These same folks carry supplies to upgrade and increase the range of your drip irrigation system. ☺

## Leadership Profile



### *Jon Klement*

TNLA Region VII State  
Director and Treasurer,  
Governmental Affairs  
Committee Board  
Representative

Owner, Southern Landscapes

### Hometown

McAllen, Texas

### Education

Sharyland High School  
Texas A&M University

### TNLA Service

Region VII State Director  
and Treasurer  
Governmental Affairs  
Committee Board  
Representative

### Certification/Training

Texas Master Certified Nursery  
Professional, Texas Certified  
Nursery Professional,  
Texas Certified Landscape  
Professional, Licensed Irrigator,  
Licensed Pesticide Applicator

### Hobbies

Fishing, Hunting, Outdoors

### Spouse

Patty Klement

### Children

Jonathon, Jessica, and Madeline