This is the second in a series of articles about drip irrigation. In the first of the series there was an overview of drip irrigation, some features, advantages, disadvantages, and benefits of drip irrigation. Often misunderstood are the different types of drip irrigation. What is surface drip as compared to subsurface irrigation? What components constitute a viable drip irrigation system? What are the differences between dripper line, drip tape, and drip irrigation? In this article we will try to clear up some of those questions.

You may hear the terms "surface" and "subsurface" drip irrigation. What do they mean? Which one should you chose? There are advantages and disadvantages to each.

Subsurface irrigation is the application of water underneath the ground surface, at the root zones of the plants. Two products are used, drip tape and dripper line. The same good design practices such as pressure regulation, filtration, and system design are applicable for all types of drip irrigation.

Irrigating plants from below the surface of the ground may sound difficult and problematic. There are some definite concerns about the application of water below the surface. The most common types of problems encountered are root intrusion into lines, animal damage and the plugging of nozzles with sediments. Manufactures have taken care of most of these problems with system engineering, emitter design, and Treflan® treated poly line.

Subsurface lines have an emitter placed inside the line at regularly spaced intervals, the most common being 12", 18" and 24". Typically, subsurface line is buried from 4 to 30 inches beneath the surface, depending on soil composition and crop needs.
Dripper line is a thicker-walled material than drip tape, is more durable and has a longer life. It is a semi-flexible material and can be run down an orchard or vegetable row, or hung from a support wire. It can be picked up using a reel system. Drip tape is a thinner-walled product than dripline. It is designed to last a season or two and therefore is lower cost. Often drip tape is used with high value crops, such as strawberries, vegetables, flowers, or nursery stock.

A drip irrigation system is simple to design and easy to install. The major components of a drip system include a filter, pressure regulator, valve(s), polyethylene (poly) tubing, line fittings and emitters.

All drip irrigation systems need to have a filter regardless of the water source to protect the small orifices used in drip emitters. This is true of well water and city water sources. Filtration is important! If your water source is a canal, lake, pond, stream or river or if there are organic materials, it may be necessary for special or extra filtration. Take the time to find a filter designed for drip irrigation. Traditional water filters, adapted fuel filters, or whatever else may be available generally do not work well for drip irrigation applications. If your system will be expanding, buy a larger filter at the beginning and grow into it. A quality filter designed for your particular system and drip irrigation will save hours of frustration and return its cost to you.

Drip irrigation systems are low volume and operate at lower pressures than "high volume" or traditional irrigation. They operate between at 10-30 pounds per square inch (PSI). The optimal pressure is 25 PSI. There are preset and adjustable pressure regulators available. They are designed to regulate downstream pressures at a constant level. Operating a drip system at too much pressure will jeopardize the integrity of the system, causing it to leak and not to operate at its optimum.

The type of line that is used for the supply lines is black polyethylene (poly) tubing. It comes in flexible coils, is available in different lengths and is easily handled. The commercial grade ½" size line dimensions are .700 x .600. This low-priced line is ultra violet (UV) light resistant, easily repaired, and weighs only 4
lbs. per 100’. This is the line into which the fittings, emitters, barb fittings are inserted. There is a wide assortment of fittings available.

Fittings, when used in drip irrigation, are used to describe anything that joins (couples), adapts different sizes, "tees" a line, make a 90° turn (elbow), changes line direction, makes an adaptation from PVC to poly drip line or ends a line. These are made of black durable plastic. Smaller lines require barbed fittings. 1/8" and 1/4" are the common sizes, with 1/4" the most frequently recommended and popular. The barbed fittings are used when joining the smaller lines or inserting into the 1/2" supply line.

1/2" and larger supply lines require different fittings. Larger line fittings available are compression fittings or spin-loc fittings. Poly line is inserted into a compression fitting using a twisting motion. The tubing is "walked" onto the fitting. A spin-loc fitting holds the tubing in place via a threaded ring. Poly tubing is slipped onto a sleeve and held in place by about one-half turn. Either fitting provides a watertight fit.

There are many different types of emitters that are used in drip irrigation. They all accomplish the same thing: getting water to the plants at a constant and even rate. The water flow is low in drip irrigation, and measured in gallons per hour (GPH). The different types of emitters are grouped into three major categories: drip, microsprayer/foggers and microsprinklers. Each is used for a different purpose or application.

There are pressure compensating and non-compensating emitters. Pressure compensating emitters apply the same amount of water at each emitter, over a range of different line pressures. These are used in long runs, uneven or hilly areas and where precise watering is wanted. Non-pressure compensating emitters' water output is increased or decreased as the line pressure is increased or decreased.

A system can be easily automated using low-cost battery-powered (DC) or household current (AC) programmable controllers and solenoid controlled valves.
Efficient fertilizer injectors for the home, farm or nursery are also available.

The controllers and fertilizer injectors allow a system to run efficiently and economically and reduce the amount of error when applying water or fertilizer.

In the next article we will discuss system planning, design and maintenance. How do you start up a system or shut it down in preparation for the winter? We will look at these items and more in the next article.

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