



clean water starts at home

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Drip Irrigation for the Home Garden

Use drip irrigation to more efficiently water your garden, saving time, money, and water.

About Drip Irrigation

Drip irrigation is an efficient and economical method of watering. Used commonly in dry regions with scarce water resources, the use of drip irrigation is increasing in the Northeast. This irrigation method is typically more than 90% efficient at allowing plants to use the water applied. Unlike other forms of irrigation, such as sprinklers that are only 65-75% efficient, drip irrigation reduces runoff and evaporation. Drip irrigation applies the water slowly at the plant root zone where it is needed.

Drip irrigation has more commonly been used in commercial nursery and agricultural operations, however, homeowners are beginning to take advantage of its uses and benefits. As a homeowner, you can use drip irrigation in your vegetable and perennial gardens, and to water trees and shrubs. You can see examples of drip irrigation at the URI Cooperative Extension Master Gardener Demonstration Vegetable Gardens located at the URI Learning Landscape and at URI East Farm.

Drip Irrigation Benefits

Drip irrigation involves placing tubing with emitters on the ground along side the plants. The emitters slowly drip water into the soil at the root zone. Because moisture levels are kept at an optimal range, plant productivity and

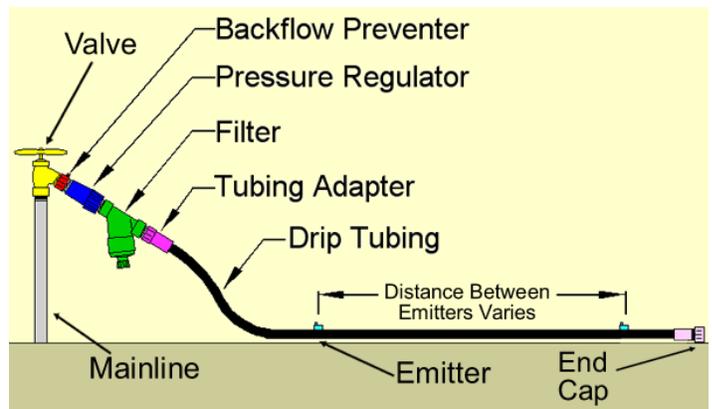
quality improve. In addition, drip irrigation:

- Prevents disease by minimizing water contact with the leaves, stems, and fruit of plants.
- Allows the rows between plants to remain dry, improving access and reducing weed growth.
- Saves time, money, and water because the system is so efficient.
- Decreases labor.
- Increases effectiveness on uneven ground.
- Reduces leaching of water and nutrients below the root zone.

Drip Irrigation System Design and Components

The main components of a drip irrigation system include the mainline, valve, sub-main, backflow preventer, pressure regulator, filter, tubing adapters and fittings, drip tubing, emitters, and end caps. The mainline is the pipe that runs from the water source – typically your outdoor faucet - to the valve; and the sub-main runs from the valve to the point where the drip tubing is connected. Generally, sub-mains are used only when there are multiple lines

of drip tubing and zones feeding off of the same mainline water source. The combined length of the mainline and sub-main should not exceed 400 feet. The valve controls water flow into the system and can be set for either automatic or manual control. Backflow preventers are necessary to ensure that irrigation water does not flow back into the pipes and contaminate your main water source. Pressure regulators are only necessary if your water pressure is



The above graphic and information contained in this factsheet is partially adapted from Drip Irrigation Design Guidelines. Jess Stryker. See Other Information listed at the end.

over 40 pounds per square inch. If you do not know your water pressure it is a good idea to install one just in case.

Filters keep dissolved substances in your water from clogging the emitters over time. Install filters either at the emitters or at the water source to protect both the valve and pressure regulator in addition to the emitters. It is best if the filter has at least a 150 mesh screen or higher. Tubing adapters and fittings are used to attach the drip tubing

to the rest of the system. It is important that these are the right size for the tubing to prevent them from blowing apart under pressure.

Drip Tubing and Emitters

Drip tubing is a polyethylene tube with emitters placed along the plants. The emitters release the water from the drip tubing. Drip tubing and emitters come in various types and diameters depending on your needs. The length of a single drip tube should not exceed 200 feet from the point where water enters the tube. You will need to stake the tubing to keep it from moving. As a rule, don't bury the drip tubing and emitters, even if they are designed to be. This helps to prevent clogging and rodent damage.

Emitter Spacing and Design

Emitters can be spaced evenly for row crops, and this design is known as an emitter hose. Emitters can also be spaced intermittently for plants spaced further apart, such as trees, shrubs and perennials. With an emitter hose, the emitters will generally be spaced about 18 inches apart. When watering trees and shrubs, there should generally be two emitters per plant. Emitters typically have a flow rate of 1 gallon per hour, though a flow rate of ½ gallon per hour may be better for maximum efficiency. The end cap is placed at the end of the drip tubing to prevent water running out the end.

Basic Operation and Maintenance

Drip irrigation can be set to run automatically, like sprinklers, or

controlled manually. Manual operation allows you to take advantage of rainfall before applying unnecessary water. For more information on proper watering, view our Water Wisely factsheet.

Because small amounts of water are applied slowly, drip irrigation is designed to run daily unless it rains. How long to run the drip irrigation system will depend on how much water your plants require per day and the flow rate of your emitters. Water is applied either once or twice a day. Early morning is the best time to water because there will be less evaporation. Watering in the evening increases the plant's susceptibility to disease.

You should check filters and emitters on a regular basis to ensure they are functioning properly and not clogged. To prevent winter damage, you should take up the drip irrigation system at the end of each gardening season.

Most suppliers/manufacturers of drip irrigation systems will provide specific design, installation, operation, and maintenance specifications and guidelines that should be carefully followed.

The cost of a drip irrigation system will vary depending on the size of the area to be irrigated and the type of emitters and tubing used. However, regardless of the size of the area being irrigated there is an initial upfront cost for standard items such as the valve, pressure regulator, and backflow preventer. Typically, a drip system for a home garden area will cost between \$200 and \$600. For example, the drip irrigation system at the Demonstration Vegetable Garden at URI's East Farm irrigates 4,300 square feet in three

separately controlled zones, and cost about \$500 in materials.

Soaker Hoses

Soaker hoses are another irrigation alternative. Soaker hoses require less equipment and are easier and cheaper to install than drip irrigation. A soaker hose is a porous hose that can be connected to an outside faucet, garden hose, or rain barrel and laid out along the base of the plants. The hose allows water to slowly seep out along its length. This system works well with plants that are close together, like ornamental beds with clumped flowers or groundcovers. However, a soaker hose should not be used to irrigate plants, trees, or shrubs that are spaced far apart because the area in between the plants will be unnecessarily watered.

For more information:

Drip Irrigation Design Guidelines. Jess Stryker.
<http://www.irrigationtutorials.com/dripguide.htm>

Drip Irrigation for Every Landscape and All Climates: Helping Your Garden Flourish, While Conserving Water!
Robert Kourik and Heidi Schmidt. 1993. Metamorphous Press.

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