Drip Irrigation Basics for Hoophouse Production

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See the video for Drip Irrigation Basics for Hoophouse Production online at www.mifma.org or on MIFMA's YouTube channel.

Drip irrigation is used in hoophouses to deliver water both efficiently and effectively. It also minimizes foliar diseases by applying water directly to the soil, which minimizes splashing and avoids irrigation water on plant leaves.

Common drip set-ups include a larger "header" pipe which brings water into the hoophouse. These are most commonly 1-inch pipes that the drip lines are then attached to using an irrigation barb adapter. These barb adapters are available in various sizes depending on the diameter of the header. For hoophouses, the most common size is 0.25 inches. They are also available with and without a shutoff valve. Barbs with the shut off valves cost approximately 4 times those without (approximately $2 each as compared to $0.50 each). Despite the higher costs, benefits include: the ability to turn individual lines off for repairs, to adjust the number of lines depending on the crop without adding or removing additional lines, and being able to manage irrigation amounts for crops that have different water needs within the same hoophouse. Barb couplings are used to repair holes or leaks in a drip line.

Various emitter spacings are also available with the most common being 6, 8, 12, and 24 inches apart. These spacings impact the flow rate of the drip tape and closer spacings often require higher volumes of water. Emitter spacing can be based on both soil type and crops being grown. Soil that drains more quickly may require closer emitter spacing since the wetting pattern is more vertical than horizontal in those types of soils. Twelve inch emitter spacing is the most common for diversified vegetable production in hoophouses.

Calculating the amount of water to apply and how long to run the drip system is based on the flow rate of the drip and the area being irrigated. One acre-inch of water/week is the most common recommendation for vegetable production during the peak season. This is equivalent to 27,000 gallons of water spread over 43,560 square feet (sqft) each week for the amount of water it takes to cover 1 acre in water 1 inch deep. To apply 1 acre-inch of water/week to a bed that is 4ft x 90ft (360sqft total) you would need to apply 223 gallons. Assuming there are two runs of drip tape in this 360sqft bed and that the flowrate of your system is 0.22 gallons/minute/100ft, then the drip system would have to run 9.3 hours/week to apply 1 acre-inch of water.

Below is an example of how to calculate the total number of minutes you would need to irrigate each week to apply 1 acre-inch of water to your beds using a 4ft x 90ft bed with two lines of drip tape.

step 1:

Calculate **the toal square footage of your bed** (length x width)

90′ x 4′ = **360 sq ft**

step 2:

Calculate the **total feet of drip tape in your bed**. To do that, you multiply the number of lines in each bed by the length of the bed.

For example, if you have a 96ft hoophouse and 90ft beds, and you have 2 drip lines per bed, to calculate the total feet of drip tape in your bed, you would multiply 2x90ft = **180 feet**.

step 3:

Calculate the gallons per minute flow rate for the bed (we'll call that "**X**")

from the drip tabe label → $\frac{.22 \text{ gal}}{100 \text{ ft}} = \frac{X}{180 \text{ ft}}$

180 x .22 = 39.6
39.6/100 = .396 gallons/minute
so **X = .40 gallons/minute** (rounded up)

step 4:

Calculate the 1 acre inch equivalent for your bed (we'll call that "**Y**")

$$\frac{27{,}000 \text{ gallons}}{43{,}560 \text{ sqft}} = \frac{Y \text{ gallons}}{360 \text{ feet (from step 1)}}$$

27,000 x 360 = 9,720,000
9,720,000/43,560 = 223.14 gallons
so **Y = 223 gallons**

step 5:

Calculate the number of minutes your system must run to apply 1 acre-inch equivalent of water

$$\frac{\mathbf{Y}}{\mathbf{X}} = \frac{223 \text{ gallons}}{.40 \text{ gallons/minute}} = 557.5 \text{ minutes}$$

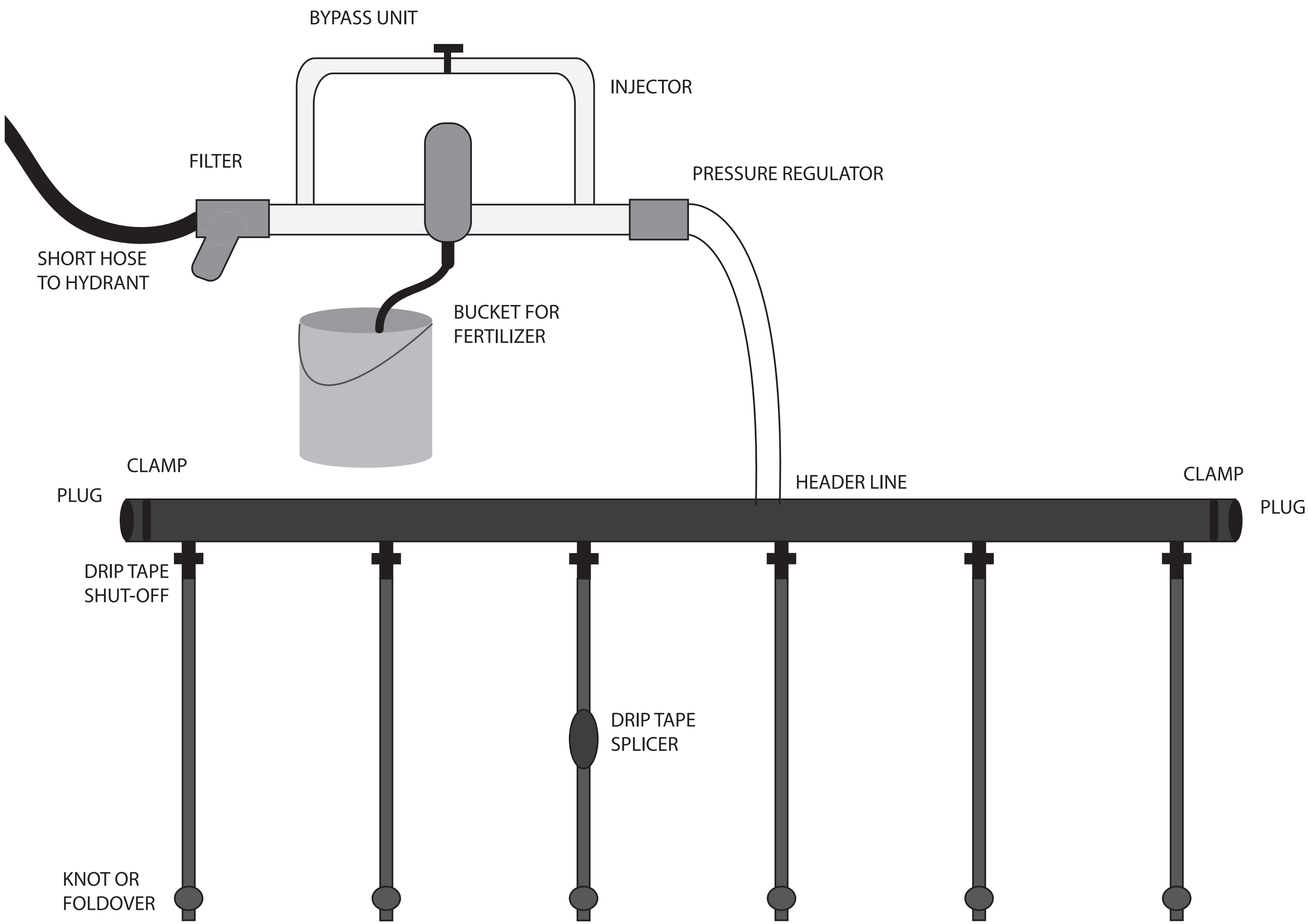
step 6:

Divide your answer by 60 (because there are 60 minutes in an hour) to determine the number of hours

$$\frac{557.5}{60} = \textbf{9.3 hours}$$

Drip Irrigation Setup in a Hoophouse

adapted from a drawing by Andy Stutzman, Kuntry Gardens in Homer, MI



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