

Drip Irrigation Vegetable Garden

[Chris Hilgert]

Hi, Chris Hilgert here from WSU Extension Spokane and today we are going to talk about drip irrigation systems. First I want to talk about the benefits and uses of drip irrigation systems. A good overhead irrigation system is only about 75 percent efficient. Meaning, that only about 75 percent of the water actually makes it to the plant roots where it is usable. A drip system is close to 100 percent efficient. Meaning that about 100 percent of the water that is applied actually makes it to the soil and to the plant roots where it is available for use of the plants. With overhead irrigation systems, the water can be lost through evaporation, through wind, through drift and so the benefit of drip irrigation is that the water is applied directly to the soil, to the root zone of the plants where it can be used immediately by the plants.

So let's take a look at some of the uses of drip irrigation systems. Not all landscape areas are going to be well suited for drip irrigation. Large trees and shrubs, because of their extensive root systems, are probably not good candidates for drip irrigation. Lawns are another example of a landscape area that is not good for drip irrigation. Overhead irrigation systems can cover large areas of land, particularly for watering lawns, trees, and shrubs. Overhead irrigation systems can work just fine. But there are several places where we can save water, we can save money, and we can save time and energy by using drip irrigation systems. Vegetable gardens, flower gardens, and container gardens are three great examples of where we can use drip irrigation systems in our landscapes to grow our vegetables, our flowers, and other plants that we want to grow.

First, let's take a look at a raised bed garden where I have installed a drip irrigation system. The drip irrigation system that you see here is a simple design. We have drip tube that has emitters built into the line, they are spaced out every twelve inches across the line and they are preinstalled. So the design of this drip irrigation system is very simple. I have just run a perimeter line around the bed and then I branched off of that with lateral lines spaced out twelve inches apart. These lateral lines help me to plant my rows and give me good water coverage for seedlings and for transplants.

The irrigation system is very easy to work with. You don't need any special tools; a good pair of pruners will do a good job of cutting the pipe where you need it to be cut to put your lateral lines in and to tie into the main water line. This system is tied into a PVC pipe that runs underground that is controlled by a valve and is set to a timer to run. Once the pipe is run out from the PVC line into the bed, as I mentioned, I ran a perimeter line around the bed and then I branched off every twelve inches with these lateral lines.

In order to do that, I simply cut the pipe where I want to make a connection and you can use a ninety degree elbow in the corner like I have used here. You can use a t-coupler, which connects two lines that run this way and then a perpendicular line that runs the length of the bed. Or a coupler which just connects two pieces of pipe together that are going to run in the same direction. These types of couplers don't need to be clamped, they are barbed and so once they are installed into the line they are water tight, they are sealed, and unless there is extreme water pressure the fitting will not easily be removed. So putting it together is as simple as that - cutting the pipe, inserting the couplers and then attaching the other end of the pipe and cutting it to the appropriate length. That is all there is to it. Once you have the pipe laid out, you will want to stake it down using something like this u-shaped staple that will just hold the line down to the soil surface and hold it in place. This irrigation line comes coiled up in a circle and so when first unrolled the line is not going to be flat and straight. It will want to bulge up and sit above the ground. So these stakes hold it down to the ground and hold it in place.

Timers can make watering much easier on you. Because we can use these to set your irrigation system to run at any time and even at multiple times during the day when we want to water the plants. So I have set this timer to run three times a day for twenty minutes at a time and that is providing enough water to grow our vegetables. This is a simple timer. It is a digital timer that is battery powered. It takes one 9 volt battery and one battery will last you about one year. Just replace the battery every spring when you plant your garden and you are good to go for the rest of the season. The timer is connected to a valve that controls the flow of water. It turns the water on and off. It is connected by two wires. The wires come preinstalled on the valve. Very simple to connect it to the timer and once that timer turns that water on it opens the valve. The valve can also be turned on manually as well if you want to go out and check your irrigation system to make sure that it is running properly. And the other important component here is this filter. These emitters that are built into the drip irrigation system are microemitters. They are very small water emitters. Water just drips out of them and they can become clogged quite easily. And so we install a filter right after the valve so that the water that comes through the PVC pipe goes through that filter and it filters out any fine particles that may clog the emitters and the drip line. So your drip system, if it is not controlled by a timer, it should at least have the valve that turns the water on and off followed by the filter that is going to keep the water clean and keep the emitters from plugging up.

Another benefit to drip irrigation system is that the water is not being applied to the foliage of the plants. Plant diseases, fungal diseases like powdery mildew and things like that can show up on many of our plants in the garden including our squash, zucchini, tomatoes can all be infected by fungal diseases and this can all be promoted by overhead irrigation. Drip irrigation systems are applying the water directly to the soil,

the roots of the plants, and the foliage is staying dry. And you can see here we don't have any disease problems. Our tomato plants are healthy, our pepper plants and onions, everything in this garden is well watered, but like I said the foliage remains dry except for when it rains which we have no control over.

Drip irrigation can be installed in any vegetable garden and it will do just fine providing the water needs of all of our plants. In the vegetable garden, one of the things that I have learned is that when you are planting from seed you want to plant very closely to the drip line. So when I planted these carrots and these radishes and the spinach and the lettuce over here, I grew those from seed so I planted the seed right into the bed. So the one thing that I have learned is that when you are planting, plant it almost directly under the line within an inch or so on either side of the line to make sure that those seeds are going to get plenty of water and germinate. The first time that I planted this bed I made the mistake of actually planting half way between the two drip lines. Well, I found out later that I didn't get good germination of my seedlings because they were not getting enough water out here. So this here, I did it correctly, I planted right next to the drip line and you can see here that my seedlings came up just fine.

For transplants, it is okay to plant them a little bit further away from the drip line. So since I have a line running every twelve inches through this bed, there is one here and one right here, it is okay to plant our tomatoes and peppers that were planted as transplants about half way between the two drip lines. The root system is still going to receive plenty of water. It is not necessary to plant it right up next to the drip line itself. That water as it drips out of the emitters does not just go straight down through the soil. It hits the soil and then it actually spreads horizontally. So it does go down, but it also spread horizontally so it actually does reach the roots system of the plants.

The question that I always get about drip systems is how long we run the drip system. Well, every system is a little bit different, so there is no one answer that I am going to be able to tell you exactly how long to run your system. So what we do is we turn the sprinkler system on and we set a timer and then periodically we go out and check the soil profile to see how far down the water has infiltrated through the soil profile. The idea is to get water down through about the top twelve inches of soil. That is where the majority of the roots are in the vegetable garden. So we turn the irrigation system on and maybe get our hands a little dirty here and dig down and we can see here that it comes down about six to seven inches that the soil is still wet. We dig down a little bit further and we see that the soil is still wet. What I did was when I set this irrigation system up; I timed it and found that it took about twenty five minutes to actually get water down through the soil twelve inches. So in this case, I set my system to run twenty five minutes at a time. That gets the water down to the entire root zone of the plant and provides everything that the plants need.

Another type of drip irrigation system is the black soaker hose. The soaker hoses have been around for a long time and there are a lot of uses for these, again in our vegetable gardens, our flower gardens. The nice thing about these is that they are flexible. We can weave them up and down the rows in our vegetable garden and supply water right to the base of our plants right to the roots where it is readily available. It has the same benefits of the drip irrigation system that I showed you earlier, in that there is no water loss due to evaporation or wind loss. So these are nearly one hundred percent efficient as well. The nice thing about these, as I said, we can make them fit into just about any size garden by weaving them up and down the rows. They will fit into just about any situation. The one limitation we have with the soaker hose is its lifespan. Over time as water is soaking through these hoses, soil particles start to clog up the soaker hoses. And typically these will last three or four years and then they will probably need to be replaced because the soil will eventually start to clog up the soaker hose material. But otherwise the same principles apply. It emits water very slowly; the water soaks in gradually down the base of the plant to the roots, and as far as timing goes, we can do the same thing. We can turn the system on, time it, and see how long it takes for the water to penetrate through the soil down about twelve inches through the soil profile. Again, that is just keeping the water in the root zone of the plants and that is where most of the roots are in our vegetable garden, in the top twelve inches or so.