Irrigation 101

The hardest gardening question I get asked when I work the gardening question Hotline is how much should I water my <insert your plant name here>? The reason this is such a difficult question is that there are so many variables to the watering equation and there's also a person's attitude toward water conservation. So I usually answer "it depends" which as we all know is sidestepping the question; then I try to cover some of the variables.

First there are the environment variables: soil type, organic content (have you added something to improve the soil quality?), planting location microclimate (i.e. sun direction, wind, reflective surfaces, humidity, slope, and mulch), and surrounding areas (buildings, walls, trees, etc.) that affect the planting location.

Next there are the plant variables: current size, size at maturity, water requirements, ability to adapt to our climate, whether this is a new planting or whether it's already established. This is why landscapers generally set your irrigation controller to run as frequently as possible and then they never come back to change the frequency to fit the season of the year. I've seen irrigation running daily with ice on the plants, and runoff freezing in the street.

You have to decide the best method for watering your plant(s) e.g. spray, drip, inline drip, or bubbler, how often to run water (frequency), for how long to run it (duration or run time), and the quantity of water to apply (how many emitters and what gph). Then you need to change this seasonally based on the amount of sun you're getting or the high and low temperatures, how much natural rainfall you're receiving and when, and if, the wind is blowing cold or dry.

You also need to understand the parts of an irrigation system: main shut off valve, filter, zone valve, backflow preventer, pressure regulator, ¾" poly tubing, ½" tubing, and finally an emitter (or bubbler or micro spray head). There's a valve for the whole system called the main shutoff valve that's used to let the water flow from the supply (this should be present, but isn't always installed). There should also be a filter that keeps dirt from flowing into the zone valves. The filter needs periodic cleaning. There's also one valve per irrigation zone, known as the zone valve. Only one of these zones should be running at a time to maintain the right pressure. Then there's the backflow preventer, which keeps irrigation water from flowing back into the water supply (picture dissolved dog poop, fertilizer, or pesticide flowing back into your house drinking water). The pressure regulator is needed for drip irrigation to reduce the pressure from the city supply and keep from blowing off the emitters. One remaining primary part is the controller which is tied electrically to each zone valve. You program the controller to control the valves. Controllers allow zones to be grouped into a program with a start time for the program. Typically the zones run in numeric sequence within a program. I have 3 programs: A is for drip irrigation (4 zones), B is for vegetable beds (2 zones), and C is for meadow (spray) areas (2 zones).

Now that you have a rudimentary understanding of the irrigation system lets return to the variables. Environment variables impact irrigation as follows: Soil type (sand, clay, loam, or decomposed granite) determines how quickly and widely the water flows through. Water flows quickly through sand and decomposed granite (large sand granules) and keeps a narrow profile. Water flows slowly through clay

because the particles are so closely bound and leaves a wide profile as a result. And caliche, that layer of hard lime, just impedes the flow of water. It has to be cracked in some way to allow water through or the plant has to be moved to a different location. The addition of organic matter improves the soil's ability to hold moisture as does mulch on top. Microclimates are areas around of your landscape that have a special environment, this may be a courtyard which has less wind, a hot west wall, a nearby driveway or sidewalk of hot concrete, a cold sink near the downhill wall, or a shady nook from your neighbor's house shadow. Generally hotter microclimates require more water for the plant, colder or shadier microclimates require less water for the plant. Slopes require that emitters be placed on the uphill side or the water will completely miss plant roots. (See the Low Volume Irrigation Design and Installation Guide booklet from the city for pictures and more information.)

Plant variables impact irrigation as follows: smaller plants need less water than larger plants, so as a plant grows you'll need to move the emitters out or plant other plants in the growth footprint. Larger plants have more roots and need more water in a wider area. How plants are adapted to our climate also impacts how much water is needed, the better adapted generally need less water. Xeric plants need less water than those which aren't adapted to Albuquerque, and are typically sold at the big box stores. New plantings need extra water initially to keep them from wilting and to help them get over the shock of being transplanted. Generally trees need more water than shrubs, shrubs more than perennials, and perennials more than grass. Blue grass is the exception since it typically needs more water than perennials. To get an idea of how much water a plant needs check out the City Xeriscape Guide in the back section. It tells you whether a specific plant variety is a low, medium, or high water user. Putting high water users into a protected (cooler, less windy) area and using mulch may allow you to provide less water for them. I have red twig dogwood on the north side of a wall on the east side of my house which allows me to water it the same as xeric plants even though it's a high water user.

Seasonality impacts irrigation because you need more water when it's hot and dry and less when it's cold with less sun. Typically you need the most irrigation when temperatures begin to exceed 85 degrees and you need to shut off the system once freezes begin and only run it once a month manually on days when the temperature warms (high 40's or above). If you run the system when it's freezing, you can crack your valves with water that gets left in them. In the perfect world we'd all drain our valves before consistent freezes begin! Having your valves and backflow preventers located at the highest point in your yard helps drain the water away from the valves. I use temperature highs to determine frequency with Spring and Fall running about the same frequency. In a typical year when we begin to exceed 85 in mid-May, I begin the summer frequency, resetting it to spring frequency when the monsoons come.

How deeply you need to water and your soil type determines run time or how long you run a zone. The plant's water needs determine frequency or how often you run your irrigation. To find out how deeply you're watering, run the system for an hour, wait a day to let the water disburse through the soil, poke a piece of rebar into the ground, and when you can't force it in farther, measure how deeply you've watered. Adjust your watering based on this. Group plants with similar watering frequency into zones. Again in the ideal world trees would all be on one zone. Landscapers seldom do this so trees are either under-watered or all other plants are overwatered.

Best method: lawns like spray because you can overlapping coverage – you're watering a wide area, groundcovers like spray for the same reason (or drip in a grid), vegetables like inline drip which has emitters placed every foot or so or soaker hose placed in columns, perennials like emitters, and trees and shrubs like bubblers or soaker hose coiled into a spiral or perennials in their growth footprint. Emitters need to checked annually or when a plant looks wilted (or brown). Emitters clog regularly and I use the type with flags that can cleared easily. I use 2 gph emitters because they don't clog with calcium like the 1 gph emitters do. Spray gets foliage wet so always run it early in the day to avoid fungal problems, when you can see it running to note irrigation problems. Spray heads that keep the spray closer to the ground are better in high wind areas.

As you may note, I still haven't told you how much water to give your specific plant, but hopefully you've got a better idea of how to determine this for yourself.