

Determining Soil Type and Proper Irrigation

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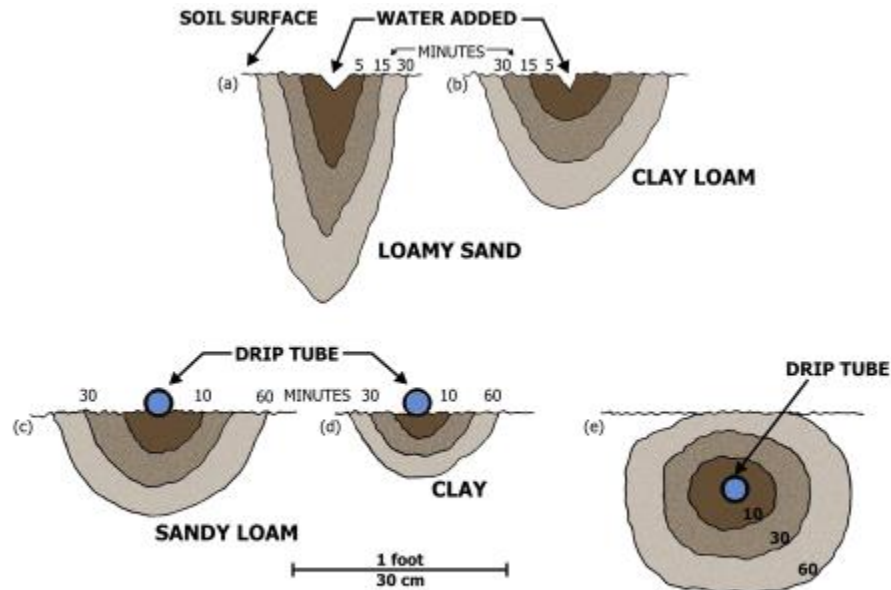
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There are over 10 soil associations, 64 soil series and nearly 200 soil classifications in Western Riverside County alone. There are hundreds of different soils throughout Southern California, many similar in texture and structure and many different in depth, extent and complexity. This makes it difficult to determine when and how much to water. In locations where the native soil still exists, using the USDA soils maps can help figure out what soil type you have, the depth, texture and structure as well as the water holding capacity (WHC) and infiltration rate. While the maps are fairly accurate, if you live in a newly built tract home, or one that was built decades ago, it is likely that the soil on the map is differently from the one you actually have in your yard.

Many developments are required to over excavate and compact the soil in order to build a home. Many contractors are required to compact the soil where the house will be built to 90% compaction, which is as hard as concrete. And many soils will compact to that density, making it difficult to grow plants and apply water without surface runoff or standing water in planting holes. Both the infiltration rate and WHC, along with your sprinkler application rate, or how many inches per hour of water is applied, will help you determine how long and how often to run your irrigation system.

Looking at soil texture is the best way to help determine when and how much to water. Making sure your system is uniform should be considered before you schedule irrigations. If there are dry or wet spots in your lawn, see about adjusting the sprinklers closest to the dry or wet spot. Usually this is caused by a difference in nozzle type (2 or 3 gal/min), the type of head (spray vs rotor or impact), the arc or spray pattern (180 vs 360) and distance of throw. If you don't know the amount of water, then look at the spray pattern and adjust the arc and distance of throw by using the nozzle pin that moves into the spray stream. You can also adjust how far the head turns by adjusting the arc screw if using a rotor head. If you have spray heads you can adjust the pattern by replacing the nozzle with a ¼, ½, or full pattern and adjust the distance of spray using the center adjustment screw using a Philips head screwdriver.

Once this is done, you can then determine your soil texture by either using the feel method or seeing how much sand, silt or clay is present in a small amount of wet soil. Roll into a ball and then form a ribbon. The longer the ribbon you can make, the more clay is in the soil. If you can't make a ribbon at least a few inches long, you have more sand and the more often you will need to water. You can also look at a soil survey and determine your location and what soil type may be there. As stated before, if you are in a new development, you may have something completely different, as most of the topsoil was probably moved off your house pad and what you have left is subsoil or compacted grade or fill. In this case, you may need to split up your irrigations to avoid runoff, or run the system every day for up to 20min in the summer in order to apply enough water for turf. With landscape plants, the application of water is usually less often than turf, and for less duration. The diagram on the following page shows the percolation rate of various soils using point source irrigation, or drip. But this can also be used for overhead irrigation which shows the amount to time it takes for water to penetrate clay, sand and silt soils, regardless of your location, based on texture.



Typical wetting patterns influenced by texture and location of the water source.

Compacted clay soils will hold more water longer, but take twice as long to get half that water into the ground, so your application may need to be split into two irrigations per day instead of one in order to avoid runoff. The sandy clay loam or loamy sand will take twice as much water in half the time, so that soil may need a 20 minute irrigation up to five days per week in order to keep a lawn from wilting in the summer. Even if you are not using drip, overhead irrigation can apply in inches per hour instead of gallons. A standard spray head can apply up to 1" of water per hour of water, and a clay soil may only be able to absorb a half inch per hour, so you would need to run that system for no more than 30 min per cycle.

During the summer, turf can evaporate up to 40" of water over the summer season, which in Southern California ranges from April thru October, or about 1.5" of water evaporated each week, so you would need to run your system up to 90 min per week if you apply 1" of water per hour. So, your water budget would be 1.5" of water needed per week, 1" of water applied per hour from your system, divide 90 by days to water per week (5), which equals 18 min per irrigation, 5 days per week. This amount may need to be adjusted if there is a really hot spell (temperatures over 100), or if you actually apply less water per hour than you estimated.

Once the time and amount are determined, you can easily schedule your irrigations each week based on your soil texture, root depth and air temperature. Tune up your irrigation system every spring so that you apply water as uniformly as possible. Look for any leaks, broken heads or spay that goes on sidewalks, driveways or areas you don't want water applied. And always turn your system off during rain or cool weather to conserve even more.