DigBits
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Water conservation
DIG Durham Integrated Growers FOR A SUSTAINABLE COMMUNITY

Gardening with Reduced Water

Wayne Hingston, May 2020

Water's importance

Water is essential for life, but too much water is often worse than too little. I am dismayed when I see gardeners sprinkling their community garden plots with water, daily. Just because the surface looks dry, doesn't reflect the amount of water that is 1 cm or more below the surface. Apart from wasting water and their time, they usually reduce their productivity.

Background

To accept advice, it seems essential to know the experience of the person giving the advice. I lived on the Oak Ridges Morraine, south of Uxbridge for nearly 30 years. I maintained a vegetable garden, and assisted my wife with her extensive perennial gardens. Our soil was sand, with some gravel. We measured the thickness of our topsoil, that rich and dark upper layer, in millimeters. Our well was over 60 meters deep. When it rained hard, the surface of exposed garden soil often looked dry within an hour of sunlight. We rarely watered our gardens, yet most years we fed a family of four on homegrown vegetables for more than half of the year. Once we moved to Ajax, I have grown in a plot in the community garden for 10 years, and understand the effort to obtain water in that situation.

Focus

Plants need water, as well as sunlight, carbon dioxide, and soil nutrients to grow. Once established, most plants will obtain the necessary water except in extremely dry (ie. desert) conditions. Water is needed for tissue growth and maintenance, plus photosynthesis. Leaves are constantly losing water to the environment, so roots are tasked with the job of replacing this water need. Healthy plants have many mechanisms that balance the water needs with the availability of water.

So, I would like to share some tips that reduce your anxiety related to your plants being thirsty. Originally, I agreed to provide a talk after being asked by Mary Drummond. However, COVID-19's arrival has made that very difficult. This article is a substitute for that talk. You won't have the same opportunity to ask questions of me, but there are other experienced gardeners that can clarify and hopefully reinforce the message.

Environmental factors

There are three main environmental factors that are critical to compensate for in terms of managing the water demands for plants. They are soil, sunlight, and wind.

Ideal gardening soil retains moisture without being waterlogged. Whereas clay is composed of very tiny particles and holds moisture well, it can reduce essential oxygen for roots. On the other hand, soils composed of larger particles like silt, sand, and gravel are less able to maintain water while providing good access to oxygen. As you may have guessed, the ideal situation is to be intermediate between these two extremes. For less than ideal soils, the solutions are very similar. Adding organic matter, like compost, opens and aerates clay soils while increasing the water retention of sandy soils. Organic matter also improves the nutrient levels and encourages soil organisms that contribute to better plant growth.

Sunlight, essential for plant growth, also heats and dries out the soil. As light levels rise, water demands increase due to increased photosynthesis, transpiration (water loss from leaves through stomata), and growth. Shade decreases all of those effects, but many vegetables demand higher light to strive. Walls, fences, and reflective surfaces can intensify the effects of sunlight. Wind increases the water loss from plants and soil surfaces.

Good practices for reducing water usage

Plant Choices determine water demand. Large soft leaves, like melons, lose greater amounts of water. These plants will often wilt midday as water absorption cannot keep up with water loss. Wilting is a normal response and allows plants to moderate their water demand. Excessive and repeated wilting can result in reduced growth, so it is a signal that you should improve the plant's condition. Watering is a temporary fix, so consider longer term solutions. Plants with tap roots, like carrots, or narrow and stiff leaves, like onions, tolerate drier conditions better.

Soil Amendments are one of the most effective means of sustaining water availability for your plants. Adding organic matter, compost, worm castings, and leaves, increases the ability of the soil to retain the moisture that it has. This material will become depleted over time, so continuously adding some is recommended. Mother Nature continuously adds a layer to the surface, and this blanket acts similar to a mulch by reducing water loss at the surface of the soil. So, mulching between rows reduces the soil temperature and lessens water loss to evaporation. Eventually, this mulch will decay into the soil adding organic matter.

Planting Procedures can reduce the need to water. Spring and early fall, August and September, are favoured by cooler temperatures which allow young plants to establish without the stress of excess heat. Transplanting on cloudy days, especially when rain is imminent, reduces the shock to seedlings. Loosening tightly compacted roots for cell pack seedlings allow them to seek outwardly, establishing a bigger root system. Placing some organic matter and water in the bottom of holes ensures greater success for transplants. Spacing plants at optimum separation reduces competition for water, while maximizing the shading of the soil. For large seeds, place them into plastic containers and cover them with water, then soak them in water for 6 to 10 hours, before planting. This increases the speed of germination, as they do not need to slowly gain water from the soil. When planting smaller seeds, like beets, water the bottom of the trench, add seeds, then cover and firm down the soil. For very small seeds, like carrots and lettuce, sow them on the surface, pat them down lightly, moisten the soil, cover the area with a solid, opaque cover for about a week. Inspect and uncover once germination has started.

Mulching, as mentioned earlier, reduces watering needs. Mulch shades the soil surface and reduces the temperature, as well as creating a porous barrier that reduces evaporation from the soil. To plant, you just pull the mulch aside. Large plants can be mulched around, while seedlings may need some time to grow before mulching. Eventually, the mulch will break down and enrich the soil for future benefits.

Best watering practices

Plants are like children! If you pamper them with daily waterings, why should they make much effort to expand their root system and seek out stable sources of water. Wetting the surface by sprinkling water encourages shallow root systems, but the surface soil is the fastest to dry out. Secondly, watering the surface can have a wicking effect that draws water upward, to be evaporated. Strive to keep the water below the surface, so roots penetrate downward. Encourage plants to struggle a little on their own to develop a deeper and more extensive root system. This tough love develops resilience, not dependence. If there is a prolonged dry spell, water early in the morning or late in the evening, and ensure that you thoroughly soak the ground to a depth of several centimeters, where it will last.

I am not suggesting that your garden needs to be a desert, but even a desert has water below the surface that sustains the tough plants that survive there. I hope that I have contributed to you becoming a more successful gardener, with less water. It is spring, so it's time to get started.

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