MAINTAIN MOISTURE IN A RAISED BED

Maintaining even moisture levels in raised garden beds can challenging for the new community gardener. With enough organic matter and good watering habits, however, a raised bed can become a perfect controlled environment for building-up a garden’s moisture-retaining capacity.

Healthy soil structure and an evenly balanced, loamy texture (composed of different size soil particles) provide the ideal conditions for maximizing a raised bed’s water retention. Gardeners can strive to leave the soil undisturbed as much as possible.

SOIL STRUCTURE

Soil structure protects soil’s water retaining capacity and is improved when gardeners refrain from double digging, stepping on wet soil in the spring, and pulling out annuals at their roots in the fall. Non-diseased plants can be cut off at the stem base and chopped up and left on the soil at season’s end to minimize erosion and disturbance of the pores created in the soil by plant roots and microbial life. These pores are essential to getting water into the soil and keeping it there.Collapsed and compacted soil lacks infiltration capacity so water runs over and off, rather than sinking into the soil. When water is able to freely enter micropores and macropores in the soil, it also aerates the soil by pushing out old air.

MULCH

Mulch improves water retention and reduces evaporation, while providing additional organic material to fuel biological activity in the soil. Straw, hay, and other “green” mulches like grass clippings and alfalfa meal, are excellent mulches for the vegetable garden because they favor bacterial activity in the soil. Cocoa-shell mulch is also a favorite for organic vegetable gardeners. Perennials and trees prefer shredded bark and other “brown” mulches that encourage fungal activity, but can cause nitrogen deficiencies in vegetable gardens. Encourage gardeners to apply mulches in layers about 2 inches thick and provide space around plant stems so that air and water can still penetrate the soil.

INTERCROPPING

Quick growing, shallow-rooted annuals like lettuce, however, can be planted around young tomatoes and cucumbers in the spring as a shade canopy and living mulch. These early cover crops shade the soil while late summer plants are still small and minimize evaporation and nutrient loss that can result from bare soil. This practice, called intercropping, helps raised bed gardeners maximum their plots production without overcrowding the plants that are growing at the same rate and looking for the same nutrients.

The “Three Sisters” technique of intercropping corn, beans, and squash applies a related approach by using squash to act as a ground cover mulch and root stabilizer, while beans climb up the corn and lend their nutrient fixing roots and mychorrizae fungi nodules to provide fertilizer for the corn. With adequate nutrients and symbiotic microbial relationships, the three sister plants have an even greater capacity to maintain even moisture levels for their roots in the healthy balanced soil.

PROPER SPACING

Planting techniques and spacing also influence water availability as roots compete for moisture in the soil. Proper plant spacing gives seedling room to grow and keeps plants close enough together that bare soil does not lead to evaporation. Over-crowded plants struggle to get enough water because too many roots are competing in one spot, particularly in a raised bed with an impenetrable surface beneath the soil. Gardeners can give vegetables like tomatoes and cucumbers a head start in their quest to quench summer thirst by spacing them far enough apart. Their roots will be able to spread out further and extend each plant’s access to the moisture and nutrients available in the soil.
LESSON PLAN 4

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OBJECTIVES:

Teach gardeners that maintaining moisture in the soil requires more than watering every day.

Help gardeners understand that water is part of the soil’s composition and acts as an integral participant in the relationship between plants, soil, and microbial life.

MATERIALS NEEDED:

- Two watering cans filled with water – one with a rosette nozzle attachment, one without
- Three rimmed sheet pans or containers filled with soils with different structures
- A tall glass (see-through) jar or vase filled with potting soil

ACTIVITIES:

1. Ask gardeners how they generally water their plots. Discuss water flow rates, infiltration, and review how good soil structure helps maintain capillary moisture.

2. Demonstrate ways to test soil moisture below the surface with a finger test or by squeezing a bit of soil in a palm.

3. Demonstrate watering potting soil in a sheet pan or container with a rosette and without a rosette. Watering with a rosette mimics rainwater, a gentle sprinkling of water which greatly preserves the air spaces in the soil. Flooding the soil with water from a non-rosette watering can fills in those spaces, and with some types of soil such as a highly-clay soil, can contribute to compacting over time. The way the soil sinks and becomes much more dense when watering without a rosette is very obvious within a few seconds, whereas watering with a rosette provides a slower flow and better infiltration.

4. Discuss the effect of watering at different times of the day on the soil vs. on the leaves. Demonstrate why a rosette would be better for watering seedlings or applying foliar feed fertilizer, and why this would be best done in the morning or evening to avoid scorching of the leaves in the sun. Demonstrate how to water the soil only during regular watering to minimize susceptibility to pathogens growing on wet leaves.

5. Demonstrate infiltration differences by watering different types of soil in the garden or in sheet pans and observe how the soil is absorbed.

6. Demonstrate the difference between shallow frequent watering and deep watering with the tall glass jar or vase filled with potting soil. Water a small amount a few times so gardeners can see how little the water penetrates into the soil even though the surface is wet. Wait for 5 to 10 minutes, then apply a larger amount of water (preferrably with a rosette nozzle) and allow gardeners to watch the water penetrate the potting soil and slowly reach the bottom of the jar or vase. Discuss reasons why applying more water less often could be more beneficial than watering a small amount every day. Deeper watering encourages roots to seek water further down in the soil, rather than at the soil surface, and deeper roots greatly reduce drought stress.