



MASTER GARDENER

COLORADO STATE UNIVERSITY
EXTENSION

CMG GardenNotes #716

Water Conservation in the Vegetable Garden

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In vegetable production, an adequate supply of water during the growing season is directly related to produce quality and yields. Many vegetables become strong flavored with water stress. Unlike bluegrass and other landscape plants, vegetables cannot go dormant when the water supply is inadequate. However, there are several techniques that will significantly reduce the water requirements of the home vegetable garden.

Always follow efficient irrigation practices. The following practices will allow gardeners to have a productive vegetable garden and still reduce water consumption.

Water Conserving Techniques

Amend Garden Soil with Coarse, Decomposed Organic Matter

In the vegetable garden, the routine addition of organic soil amendments, such as compost, will optimize potential yield- and produce quality. The goal in soil management is to increase the organic content to 4-5%, over a period of years.

On sandy soils, organic matter holds over ten times more water and nutrients than the sand. On clayey soil, organic matter glues the tiny soil particles together into larger aggregates, increasing pore space. This process takes place over time. This increases soil oxygen levels and improves soil drainage, which in turn increases the rooting depth allowing roots to reach a larger supply of water and nutrients.

Organic matter also encourages the beneficial activity of soil organisms and helps remediate soil compaction

Manure and compost made from manure may be high in salts that will interfere with crop growth. The standard application rate for plant-based compost (free of salts) is two to three inches per year, cultivate into the soil six to eight inches deep. After a few years, the application rate should be cut back to avoid excessive soil salts, phosphorus, and potassium.

Manure and manure-based compost may be high in soil salts. The standard application rate is one-inch maximum per year, cultivated into the soil six to eight inches deep. Do not add more unless a soil test on the specific batch indicates low soil salt levels. Soil testing on many commercially available products available in Colorado markets found extremely high salt levels in some products. For high salt products, the one-inch application rate may be too high.

Be sure that the organic matter is thoroughly cultivated into the soil. Leaving chunks of organic matter will interfere with seeding, root spread, and water movement through the soil profile.

In the vegetable garden, do not plow in woody materials such as bark or wood chips, as they may interfere with seedbed preparation and may result in soil nitrogen depletion. Wood chips take several years to decompose in the soil.

Due to a health issue (*E coli* contamination), fresh manure additions should be made at least four months prior to the harvest of any edible crops. In other words, apply fresh manure only in the fall after crops are harvested.

Another method to add organic matter is to replant the fall garden with a green manure crop such as winter rye or Austrian peas. For details, refer to *CMG GardenNotes* #244, **Green Manure and Cover Crops**.

For additional details, refer to *CMG GardenNotes* #711, **Vegetable Garden: Soil Management and Fertilization**.

Reducing Water Need with Drip Irrigation and Mulching

Use of a drip system on a mulched garden reduces water need by around 50%.

Other Water Saving Techniques

Plant in blocks, rather than rows. This creates shade for roots and reduces evaporation. For details, refer to the *CMG GardenNotes* #713, **Block Style Layout in a Raised Bed Garden**.

Control weeds that compete with vegetables for water.

Group plants with similar water needs in the same section of the garden for easy irrigation. Cucumber, zucchinis, and squash, for example, require similar water applications.

Protect plants and soil from wind with windbreaks to reduce evaporation.

Critical Water Periods for Vegetables

You can target the timing and amount of water to add. As a rule of thumb, water is most critical during seed germination, the first few weeks of development, immediately after transplanting, and during flowering and fruit production. The critical watering periods for selected vegetables follow:

Asparagus needs water most critically during spear production and fern (foliage) development. Less water is needed after ferns reach full size.

Cole crops (broccoli, cabbage, cauliflower, collards, Brussels sprouts, kale, and kohlrabi) need consistent moisture during their entire life span. The quality of cole crops is significantly reduced if the plants get dry anytime during the growing season. Water use is highest and most critical during head development.

Beans have the highest water use of any common garden vegetable. During blossoming and fruit development, beans use 0.25-inch to over 0.50-inch of water per day (depending on temperature and wind). Blossoms drop with inadequate moisture levels and pods fail to fill. On hot, windy days, blossom drop is common. When moisture levels are adequate, the bean plant is a bright, dark, grass-green. As plants experience water stress, leaf color takes on a slight grayish cast. Water is needed at this point to prevent blossom drop.

Carrot and other root crops require consistent moisture. Cracking, knobby, and hot flavored root crops are symptoms of water stress.

Corn water demand peaks during tasseling, silking, and ear development. Water stress delays the silking period, but not tasseling. Under mild water stress, the crop may tassel and shed pollen before silks on ears are ready for pollination. The lack of pollination may result in missing rows of kernels, reduced yields, or even eliminate ear production. Yield is directly related to quantities of water, nitrogen, and spacing.

Lettuce and other leaf vegetables need water most critically during head (leaf) development. For quality produce, these crops require a constant supply of moisture.

Onion family crops require consistent moisture and frequent irrigation due to their small, inefficient root system.

Peas need water most critically during pod filling.

Potato tubers will be knobby if they become overly dry during tuber development.

Tomato family (tomatoes, peppers, and eggplant) needs water most critically during flowering and fruiting. Blossom end rot (a black sunken area on the bottom of the fruit) is often a symptom of too much or too little water. The tomato family has a lower water requirement than many vegetables and plants are often over-watered in the typical home garden.

Vine crops: cucumbers, summer and winter squash, and assorted melons need water most critically during flowering and fruiting. Vine crops use less water than many vegetables and are often over-watered in the typical home garden.

Vegetable Gardening When Irrigation Interval Is Restricted

- Restrictions that allow for thorough watering only twice a week should not have a major effect on the vegetable garden. With adequate soil organic content, a standard in vegetable production, the garden should be able to go two to seven days between irrigations. Follow recommendations listed above.
- Avoid heavy water use crops such as beans and sweet corn.
- Grow only what you need. Consider that one tomato plant can yield over 20 pounds of fruit.

Vegetable Gardening When No Watering Is Allowed

- When water restrictions prohibit outdoor watering, do not plant a vegetable garden. Vegetables do not go dormant like Kentucky bluegrass lawn. If water restrictions allows, consider planting containers with vegetables and consider planting non-irrigated or minimally-irrigated cover crops in the vegetable garden area.

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