

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 can't 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 you 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 yields 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 readily 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. Do not add more than one inch per season without conducting a

soil test to evaluate potential salt build-up. Incorporate organic mulches into the vegetable garden soil in the fall after frost ends the growing season but before the soil freezes for winter. The **standard application rate for manure or compost made from manure is one-inch per season**. Higher rates may be used on compost free of high salts. For additional details, refer to GardenNotes #711, *Vegetable Garden: Soil Management and Fertilization*.

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. To reduce soil compaction and help conserve moisture in the soil during the winter, cover the newly cultivated garden with mulch.

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.

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. Some of these cover crops fix small amounts of nitrogen in their roots that is tilled into the soil for plant use.

For additional details on soil improvement, refer to the CMG GardenNotes on soils and fertilizer, available on-line at www.cmg.colostate.edu.

Reducing Water Need with Drip Irrigation and Mulching

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

For details on efficient irrigation (including drip irrigation), refer to the CMG GardenNotes #714, *Irrigating the Vegetable Garden*. With a drip system, water timers added to the hose at the faucet help reduce over-watering. Some simple timer, turn off the water flow at the set time or gallons. More complex timers can turn on and off the water at a set day of week and time.

For details on mulching, refer to the #715, *Mulches for the Vegetable Garden*.

As part of an efficient irrigation system, check soil moisture regularly. Squeeze soil in your hand; if it sticks together, it is moist and should not be irrigated. If it does not stick together, then it is time to irrigate. Irrigate in the morning when temperatures are cool but rising. A house plant water meter is a useful tool to evaluate the irrigation needs of the garden.

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. They use 0.25 to over 0.50 inch of water per day (depending on temperature and wind) during blossoming and fruit development. 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 impact 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. Consider planting containers with vegetables (if restrictions allow) and plant non-or-minimally-irrigated cover crops in the vegetable garden area. For information on growing container vegetables, refer to CMG GardenNotes #724, *Vegetable Gardening in Containers*. For information on cover crops, refer to CMG GardenNotes #244, *Cover Crops and Green Manure Crops*.

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