



## **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. Water stress affects the flavor of many vegetables. They may become strong flavored when underwatered or weak flavored when overwatered. 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.

In sandy soils, organic matter holds over ten times more water and nutrients than the sand. In clayey soil, organic matter glues the tiny soil particles together into larger aggregates, increasing pore space. 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, helps remediate soil compaction, and buffers soil salts.

Manure and compost made from manure may be high in salts that will interfere with crop growth. 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 in Colorado markets found extremely high salt levels in some products. For high salt products, the one-inch application rate may be too high.

The standard application rate for plant-based compost (free of salts) is two to three inches per year, cultivated 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. Periodically evaluate the soil to ensure that organic matter does not exceed 5%.

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 throughout 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 Colorado's alkaline soils.

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 summer-fallow beds, plant a spring-seeded green manure crop such as clover or buckwheat. Refer to CMG GardenNotes #244, *Cover Crops and Green Manure Crops*.

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

## Reducing Water Need With Drip Irrigation and Mulching

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

## Other Water Saving Techniques

- **Plant in blocks, rather than rows.** This creates shaded soil for roots and reduces evaporation. For details, refer to CMG GardenNotes #713, *Block Style Layout in Raised Bed Vegetable Gardens*.
- **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.
- **Breathable fabric row covers** can reduce evapotranspiration from the soil, reducing the watering frequency.

## Critical Water Periods for Vegetables

You can target the timing and amount of water to add. Normally, water is most critical during seed germination during the first few weeks of development, immediately after transplanting, and during flowering and fruit production. Critical watering periods for selected vegetables are as follows:

- **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 the 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). With inadequate moisture levels, blossoms drop, 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 demands peak 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 eliminating ear production. Yield is directly related to quantities of water, nitrogen, and spacing.
- **Lettuce and other leafy 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.
- **The nightshade 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 in the home garden are often over-watered.
- **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 plants in the home garden are often over-watered.

### **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 twenty 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 allow, consider planting containers with vegetables, and consider planting non-irrigated or minimally irrigated cover crops in the vegetable garden area.

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