



Proper Use of Fertilizers in the Vegetable Garden

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The nutrients in fertilizers and manures that give us the lush, quick growth we want in our vegetable gardens may also contribute to pollution problems. If we apply nutrients at the wrong time or incorrectly, they can move through the soil by leaching, erode with surface soil, or wash into storm drains in heavy rains, polluting our groundwater, streams, lakes, and ultimately, the Chesapeake Bay.

Fertilizers are derived from either chemical or organic sources and may be purchased in many different formulations. Composts and manures can be used as fertilizers and soil amendments. Most organic fertilizers contain small amounts of nutrients that are released to the soil over an extended time. The major benefit of adding these organic materials is in improving the soil structure, allowing it to drain better, and, at the same time, hold nutrients longer. Mulches such as straw, wood chips, and pine needles can hold nutrients longer as well as slow down the movement of water, reducing erosion.

Both processed organic fertilizers, such as fish meal, and synthetic fertilizers, such as 10-10-10, are identified by their analysis, that is, the three numbers on the bag or container. The numbers refer to the percentage of nitrogen, phosphorus (expressed as P₂O₅), and potassium (expressed as K₂O), respectively, in the fertilizer. For example, a 100 lb. bag of 10-10-10 contains 10 percent nitrogen, 10 percent phosphate, and 10 percent potash, or converted to weight, 10 lbs. nitrogen, 10 lbs. phosphate, and 10 lbs. potash.

A 40 lb. bag of 10-10-10 would contain:

40 X .10 = 4 lbs. nitrogen

40 X .10 = 4 lbs. phosphate (P₂O₅)

40 X .10 = 4 lbs. potash (K₂O)

Synthetic fertilizers for the home garden are most often available in two forms: a granular form that usually is sprinkled on the soil and worked in with a tiller or hand tool; and a water-soluble form that can be mixed with water and sprinkled on the leaves of the plant or used to water-in a transplant.

Nitrogen is used by plants for producing leaf growth and greener leaves. The timing of the application of nitrogen is very important. Too much, or application at the wrong time, can lead to an overabundance of foliage with delayed flowering or plant death due to excess fertilizer salts around the roots, causing leaf and root burn. Research has shown that up to 50 percent of the nitrogen from inorganic fertilizers can be lost to leaching and other breakdown processes. Much of this lost nitrogen can be retained by the incorporation of organic matter, proper mulching, careful watering, and the maintenance of proper soil pH.

Phosphorus is necessary in the plant to increase fruit development and produce a strong root system. Phosphorus does not leach as much as nitrogen does, but phosphorous that is not used by the plant can contaminate water by attaching to soil particles and moving with these particles during erosion.

Potassium, the third major element, is also important to the strength of the plant. It contributes to the formation of carbohydrates and proteins. It does not leach, but can move during erosion. Soil lost during erosion can also be very damaging to our water supplies and the Bay.

Before applying fertilizer to the garden, it is best to test the soil. Soil test forms can be obtained from your local Extension agent. The soil test will tell you the level of nutrients in the soil and the pH of the soil. Nutrients become unavailable to plants if the pH is above or below a certain range. Most vegetables do best between pH 5.8 and 6.8, allowing the optimum uptake of all nutrients, but especially the micronutrients that are essential even though only small amounts are needed. If the pH is too low, the addition of lime may be necessary. Along with the soil test results, the Extension Service provides recommendations for needed additions of lime and fertilizer.

Vegetables can be grouped into three categories according to their fertilizer requirements. Heavy feeders, such as sweet corn, lettuce, and broccoli, will require more fertilizer than medium feeders, such as beans and spinach. Light feeders, such as peas, have the lowest requirement. Members of these groups should be planted close together in the garden for easier fertilizing.

Fertilizers may be applied by broadcasting granular fertilizer over the entire garden according to directions on the fertilizer bag and tilling it into the top 6 inches of soil. This can be wasteful, however, if fertilizer is spread in areas where there are no plants, and it can leach through the soil and contribute to water pollution. Another method, called banding, is more efficient although it takes a bit more work. Narrow bands of fertilizer are placed in furrows 2 to 3 inches from the seeds in the row and slightly deeper than the seeds to provide a buffer zone.

Side dressing is the application of dry fertilizer after plants are up and growing. Scatter fertilizer on both sides of the row 6 to 8 inches from the plants. Rake it into the soil and water thoroughly. The most suitable use for soluble fertilizers is to be mixed with water and applied to plants when transplanting them. The nutrients are rapidly available to help the plant adjust and begin growth.

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