

## **Fertilizers**

Vegetables grown in most California soils often require some fertilizer for best growth. In general, the plants will need nitrogen; however, some soils are low in available phosphorus, and a few are deficient in potassium. You can use either organic forms (manures, composts) or inorganic forms (chemicals) to supply needed nutrients. Often, a combination of the two forms gives better results with vegetables than either used alone, particularly if phosphorus and potassium are required in addition to nitrogen. Tables 3.7 and 3.8 in chapter 3, "Soil and Fertilizer Management," provide analysis of several organic and inorganic fertilizers.

If you use manure, apply it several weeks or even months before planting and work it well into the soil. This usually allows adequate time for the manure to decompose and some of the manure salts to leach from the surface soil before seeding or transplanting. Adding 1 pound (0.45 kg) of dry steer or dairy manure per square foot of soil surface is usually sufficient. If you use poultry manure, which is more concentrated, apply it more sparingly (1 pound to 4 or 5 square feet [0.45 to 1.2 or 1.5 sq m]). If you use manure that contains litter (straw, shavings, sawdust, or similar materials), also apply nitrogen fertilizer to avoid tying up nitrogen already present in the soil as well as that being added as manure.

Commercial fertilizers are available in a wide variety of compounds and concentrations. If you use manure or other organic materials, the usual commercial fertilizer need is for nitrogen alone. Nitrogen fertilizers suitable for home garden use include alfalfa meal, cottonseed meal, ammonium nitrate, ammonium sulfate, calcium nitrate, and urea. Limit application of these materials to 0.5 to 1 pound (0.23 to 0.45 kg) per 100 square feet (30 sq m) whenever they are used.

If you do not apply manure or other organic matter, it is usually wise to apply fertilizer that contains both nitrogen and phosphorus before planting. Ammonium phosphate (16-20-0 or 11-48-0) is one such material. Other commonly used inorganic fertilizers, which contain potassium also, include 5-10-5, 5-10-10, 8-16-16, and 12-12-12. Apply 1 to 2 pounds (0.45 to 0.90 kg) per 100 square feet (30 sq m) whenever these materials are used. Chapter 3 includes some sample calculations for applying fertilizer.

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You can apply fertilizer either by broadcasting it before preparing the seedbeds or in bands at seeding time. If you broadcast the fertilizer, work it into the soil fairly soon to prevent nitrogen losses through ammonia volatilization. Sometimes banding is a more efficient way to use fertilizer. To band a fertilizer, first determine where you are going to plant the seeds or plants. Then mark the row with a small furrow or a string tied from one end of the row to the other. Dig a shallow trench 2 to 4 inches (5 to 10 cm) to one side of the row and 2 to 4 inches (5 to 10 cm) below where the seed is to be placed. Place the fertilizer in the bottom of the trench and cover it with soil. To use furrow irrigation, place the fertilizer band between the seed or plant row and the irrigation furrow. To irrigate by sprinkler, band fertilizer on either side of the row. Use 1 to 2 pounds (0.45 to 0.90 kg) of fertilizer per 100 feet (30 m) of row.

After plants or transplants are well established and 3 to 4 inches (4 to 10 cm) high, it may be desirable to sidedress with nitrogen, particularly in sandy soils and where you have not applied any manure. Two or three sidedress applications will benefit crops grown for their leaves or other vegetative parts. Sidedress nitrogen at rates and in a manner similar to those described for banding fertilizer before planting. However, make the trench farther away from the plant row so the nitrogen is not placed close enough to burn plant roots.

It is also possible to apply fertilizer through a drip irrigation system. Follow the manufacturer's directions for this type of fertilizer application.