

# Fertilizers for Vegetable Crops

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For the profitable production of vegetable crops, commercial fertilizers must be used properly in conjunction with such important practices as: The selection of proper varieties, the use of good seed, a well pulverized seed bed, clean cultivation to keep down weeds, artificial watering where practical, the control of insects and diseases, and maintaining the soil in good tilth. The most satisfactory method of maintaining the soil in good tilth is by the addition of manure. Manure not only improves the physical condition of the soil but it also increases the fertility.

In fact the addition of manure, supplemented by commercial fertilizers in many cases, has been considered the ideal method of fertilizing vegetable crops. At present, however, with the increasingly high cost of manure, the use of cover crops as green manures, supplemented by commercial fertilizers is assuming much importance.

In using commercial fertilizers, the amount to apply, the composition, and the time of application vary with the soil. Because of the wide variations in soils, the fertilizer applications suggested must be adjusted to the soil upon which the crop is to be grown.

Commercial fertilizers may be classified as either low analysis or high analysis according to the amount of plant food they contain. It follows then that a small application of a high analysis fertilizer may give the same results as a larger application of a low analysis fertilizer. For example, 100 pounds of 4-12-4 fertilizer would supply the same amount of plant food as 200 pounds of 2-6-2, and if both were properly distributed the results would be the same.

## Method of Applying Fertilizers

If fertilizer is permitted to come in direct contact with either germinating seed or young roots, serious injury may result. The

most common practice of fertilizer application is to apply the fertilizer in the row a few days before, or at the time of planting, and work it well into the soil. Some recent investigations have shown that a better method of application is to apply the fertilizer at the time of planting in a band or strip several inches away from, and at a level slightly below, the seed or crown of the plant.

### Fertilizer Applications

**Potatoes.**—Potatoes, one of the most important vegetable crops in Missouri, require a great deal of phosphorus and potassium for best development. For most Missouri soils the application of 400 to 600 pounds per acre of either 4-12-4 or 4-16-4 at planting time is recommended. On the poorer soils the amount applied can be profitably increased. Following a legume green manure crop, or on very fertile soils, the amount of nitrogen applied can be reduced. For example, 400 to 600 pounds per acre of either 2-12-6, 2-14-4, or 0-14-7 or 200 to 300 pounds per acre of 4-24-12 may be used.

**Tomatoes.**—Tomatoes on most Missouri soils show a favorable response to applications of a complete fertilizer. On the average soil, an application of 300 to 600 pounds per acre of either 4-12-4 or 4-16-4 will be found desirable. For fertile soils one of the following will give good results:

200 to 400 pounds per acre of either 2-14-4 or 2-12-6  
 150 to 300 pounds per acre of 20% superphosphate  
 (Used especially where manure is applied in fall but also on fertile soils.)  
 100 to 200 pounds per acre of 4-24-12

A top dressing of 150 pounds per acre of a quickly available nitrogenous fertilizer, applied soon after the first few hands (clusters) have set, and a similar application two to three weeks later, will increase the yield and size of fruit on soils not having an abundance of nitrogen.

**Leafy Crops—Cabbage, Lettuce, Spinach, and Similar Crops.**—Crops which are produced for their leaves are heavy feeders of nitrogen. Cabbage, broccoli, cauliflower, brussel sprouts, col-lard, lettuce, spinach, mustard, endive, and Chinese cabbage belong to this group. On the average garden soil, 400 to 600 pounds per acre of either 4-12-4 or 4-16-4 at planting time, followed about three weeks later with a top dressing of 100 to 150 pounds per acre of a quickly available nitrogen such as sodium nitrate or sulphate

of ammonia, is recommended. Two or three top dressings at regular 10 to 14 day intervals will give increased production and a higher quality product.

**Cucurbits.**—Vine crops such as watermelons, cucumbers, cantaloupes, muskmelons, squash, and pumpkins are exacting in their requirement for a well-drained soil in good tilth. The condition of a soil can be improved by the use of stable or barnyard manures or crops and other organic matter to be turned under as green manures. The following applications of well-rotted manure, applied at planting time, will greatly improve the condition of the ordinary soil.

3 to 5 tons per acre worked into the hills  
6 to 8 tons per acre scattered on the row  
10 to 15 tons per acre broadcast over the field

Fresh manure broadcast at the rate of 10-15 tons per acre in the fall is a very satisfactory application. Vine crops also require a soil with an ample supply of available nitrogen, phosphorus, and potassium. To furnish this need, 200 to 400 pounds per acre applied in the row of either 4-12-4 or 4-16-4 is advised.

**Root Crops.**—Root crops such as beets, carrots, radishes, salsify, chicory, celeriac, and parsnips require an abundance of phosphorus and potassium. On soils of medium fertility, 400 to 600 pounds per acre of either 4-12-4 or 4-16-4 is recommended. If the soil is very fertile or the root crop follows a legume green manure crop then 400 to 600 pounds per acre of 2-12-6 or its equivalent, namely 200 to 300 pounds per acre of 4-24-12 may be used.

**Onions.**—Onions, for their best development, require a soil high in fertility. On fertile soils 400 to 600 pounds per acre of either 4-12-4 or 4-16-4 should be applied. Many commercial growers, on poorer soils, find it profitable to apply much larger quantities and spread the amount over several applications. Two to three top-dressings of 50 to 100 pounds per acre of quickly available nitrogen applied at three-week intervals, starting when the bulb begins to develop rapidly, have given increased production.

**Sweet Potatoes.**—The results on fertilization of sweet potatoes have been somewhat contradictory but in general, applications of nitrogen to date have not profitably increased the yield on fertile soils in Missouri. On soils of a lower fertility a complete fertilizer high in potassium such as 2-12-6 and applied at the rate of 200 to 400 pounds per acre should increase both the yield and quality of the crop.

**Eggplant and Peppers.**—Under Missouri conditions the most satisfactory commercial fertilizer for eggplant or peppers will be either 4-12-4 or 4-16-4 applied at the rate of from 300 to 600 pounds per acre. The heavier applications have been found profitable on soils of low fertility.

**Sweet Corn.**—For sweet corn under average Missouri conditions the application of 125 to 200 lbs. per acre of a complete fertilizer such as 4-12-4 or 4-16-4 is recommended. The fertilizer should be applied at planting time. Usually it is mixed with the soil in the row but if possible the application should be made in a band several inches to the side of the row and at the same level or slightly below the seed.

**Asparagus and Rhubarb.**—In fertilizing perennial crops such as asparagus and rhubarb, a yearly application of 10 to 15 tons of manure is a common practice. For asparagus the application is best made either early in the spring or after the cutting season is over. For rhubarb, fall application is considered the best. In addition to manure some growers find it profitable to add a top dressing of 100 to 150 pounds per acre of a quickly available nitrogen fertilizer (nitrate of soda or sulphate of ammonia) when growth starts in the spring and again at the end of the harvesting season.

When no manure is applied, 300 to 600 pounds per acre of 4-12-4 or 4-16-4, plus 200 to 300 pounds per acre of nitrate of soda or sulphate of ammonia, the total amount applied half in the spring and the other half at the end of the harvesting season, is recommended for these two crops.

### SUPPLEMENTARY SUGGESTIONS

1. In applying top dressings, care must be taken to avoid having any of the fertilizer coming in direct contact with the plants.

2. In the formula for a commercial fertilizer, the first number refers to the percentage of available nitrogen present, the second to the percentage of available phosphate ( $P_2O_5$ ), and the third to the percentage of soluble potash ( $K_2O$ ).

3. Calcium cyanamid is a source of both nitrogen and calcium. When it is used, three days for each 100 pounds applied must be allowed to elapse between application and planting, or injury may result to the germinating seeds.

4. Weeds in asparagus plantings can be controlled by using cyanamid early in the spring when the weeds are  $1\frac{1}{2}$  to 2 inches high. Apply at the rate of 300 pounds per acre in a band 12 to 18 inches wide directly on top of the rows. The application is best made when the soil and weed leaves are slightly moist. Weeds appearing at the end of the cutting season may be controlled by a similar application. Calcium cyanamid in addition to its sterilizing action, adds much nitrogen and calcium to the soil.