

The content of this article was written by the [University of Maryland Extension](#)

- Fertilizer, whether organic or synthetic, is used to supply nutrients to plants when they need them.
- Fertilize based on [soil test](#) results and plant needs.
- Nutrient needs vary between plant families and species. For example, leafy greens require more nitrogen than beans and peas.
- Vegetable crops generally need nutrients most when getting established and during flowering and fruiting.

Vegetable fertilizer tips

- **Refer to the label directions** of the fertilizer you select for the amount to use.
- **Fertilize spring seedlings and transplants** with a soluble fertilizer mixed with water then switch to a granular vegetable fertilizer as the plants grow.
- Mix dry fertilizers into the **top 2-4 inches of soil**. Water-in fertilizers after application if rainfall is not expected.
- Nutrient availability is reduced by competing weeds, leaching and run-off, and cool spring soil that limits nutrient release from organic matter.
- Fertilize the actual planting area where roots will be growing, not walkways.
- Slow growth, stunting, pale leaves, and low yields may indicate a need to fertilize. But these symptoms can be caused by other factors, such as crowding, low sunlight, compacted soil, and root-knot nematodes.
- **Sidedress** established plants (apply fertilizer next to plants) when needed. Pull mulch away before sidedressing and replace it afterward.
- **Use nitrogen-only fertilizers** (organic fertilizers) rather than complete fertilizers (contain N, P, and K) if a soil test report indicates high levels of P (phosphorus) and K (potassium).
- One cup (8 ounces) of a dry organic fertilizer like cottonseed meal weighs approximately 0.33 lb. (5 ounces).
- One cup (8 ounces) of a synthetic granular fertilizer like 10-10-10 weighs approximately 0.50 lb. (8 ounces).
- **Boron** is an important micronutrient that is sometimes deficient in sandy soils causing disorders in some vegetable crops. If a soil test report shows a low Boron level dissolve 1 tablespoon of Borax in 1 gallon of water and apply the solution evenly from a sprinkling can over 100 sq. ft.

- **Overfertilizing** vegetable plants (especially nitrogen) can produce lush, green plants but little fruit.
- Both chemical and organic fertilizers can be overapplied and burn plants or stimulate leaf growth at the expense of fruit.

Fertilizing using nitrogen (N) only

- **Nitrogen is needed by plants in large quantities.** The general nitrogen (N) recommendation for vegetable crops is 2 lbs. per 1,000 square feet or 0.20 lbs. (3.2 ounces) per 100 sq. ft.
- “Heavy feeders” like tomato, broccoli, and beet (see below) should receive 3 lbs. of N per 1,000 square feet or 0.30 lbs. (4.8 ounces) per 100 sq. ft.
- **High nitrogen organic fertilizers** include cottonseed meal (6-2-1), nitrate of soda (15-0-0), calcium nitrate (16-0-0), blood meal (12-0-0), and fish meal (8-10% N) and fish emulsion (5% N).
- Example of an N fertilizer calculation: How do I apply 3.2 ounces of N per 100 sq. ft. using nitrate of soda (15-0-0)?
 - $3.2 \text{ ounces of N} \div 0.15 \text{ (the \% of N in nitrate of soda)} = 21.33 \text{ ounces (1.33 lbs.) of nitrate of soda.}$

How to convert a synthetic (chemical) fertilizer recommendation for organic fertilizer

Example: the recommendation is to apply 2 lbs. of N per 1,000 sq. ft. by applying 4.35 lbs. of urea fertilizer (46-0-0). You want to substitute cottonseed meal (6-2-1).

Solution #1:

Divide the percentage of N in the synthetic fertilizer by the percentage of N in the organic fertilizer and multiply by 4.35 (amount of urea recommended):

$$0.46 \div 0.06 \times 4.35 = 33.3 \text{ lbs. of cottonseed meal per 1,000 sq. ft.}$$

Solution #2:

Calculate the amount of fertilizer product needed by dividing the pounds of N needed by the percentage of N in the product.

$$2.0 \div 0.06 = 33.3 \text{ lbs. of cottonseed meal fertilizer per 1,000 sq. ft. If your garden is 500}$$

sq. ft. you would apply $\frac{1}{2}$ the amount.

Nutrients from organic matter

- [Soil organic matter \(OM\)](#) releases plant-available nutrients slowly during the growing season. Your reliance on organic or synthetic fertilizers will probably decrease as your organic matter content increases.
- Aim for a soil organic matter content of 5-10% (it's measured by weight by soil testing labs). Soils in this range are fertile, easy to work, and have a large number of earthworms.
- For each 1% of OM, about 0.4 lbs. of nitrogen/1,000 sq. ft. is available for plants (conservative estimate). A soil with a 5% OM level would release about 2 lbs. of nitrogen/1,000 sq. ft. which is a typical nitrogen recommendation for vegetable gardens.
- Soil organic matter may not supply sufficient nutrients at particular times of the season and at particular stages of plant development. For example, in the early spring and when fruits start to form. The peak for nitrogen release typically occurs in July if soils have adequate moisture.
- Nevertheless, many people with well-established, high organic matter gardens, achieve large harvests without using fertilizers.

Ways to apply fertilizer

Broadcasting

Spreading fertilizer (usually sprinkling by hand) over an area where plant roots will be growing, either before or after planting.

Banding

Applying fertilizer in a **narrow band** next to a line or furrow where seeds or seedlings will be planted.

Side-dressing

Applying fertilizer **around individual plants** or along the sides of plants in a row, after plants have become established. Be careful not to pile fertilizer next to the stems.

Foliar

A mixture of soluble fertilizer and water is **sprayed on the foliage**.

Fertilizing the different vegetable families

Bean family

Beans, Southern peas, and green peas: light-medium feeders; side-dress beans, if necessary, when pod set is heavy. Excess N delays flowering. Plants produce some N for their own use but peas produce less than beans.

Beet family

Beet, Swiss chard, spinach, callaloo: heavy feeders

Cabbage family

Brussels sprouts, broccoli, cauliflower- heavy feeders; side-dress 3 weeks after transplanting (side-dress broccoli a second time after central head is harvested to encourage small heads on side shoots).

Cabbage, kale, turnip, collards- medium feeders; side-dress 3 weeks after transplanting

Radish: light feeder; avoid excess N.

Carrot

Light-medium feeder.

Lettuce

Medium-heavy feeder; **romaine** and **crisphead** types may require side-dressing.

Okra

Heavy feeder; side-dress after first fruits form.

Onion family

Onion and garlic: heavy feeders; side-dress onion once as bulbs enlarge and side-dress

garlic twice- mid-April and mid-May.

Leek: light-medium feeder; side-dress in May or June.

Squash family

Cucumber, squash, melon, pumpkins: medium feeders; side-dress when fruits start to form.

Sweet corn

Heavy feeder; side-dress when plants are 12-18 inches tall and when plants start tasseling.

Sweet potato

Medium feeder.

Tomato family

Tomato, tomatillo, pepper, eggplant, potato: heavy feeders; side-dress when fruits or tubers first form.

Epsom salt (magnesium sulfate) does not prevent blossom-end rot. Don't add it to the soil unless soil testing shows a magnesium deficiency.

Perennial crops

Asparagus, rhubarb, horseradish: medium-heavy feeders

Prior to planting, prepare the bed as early as possible and enrich it with compost and/or manure. Apply one inch of compost around plants yearly. Fertilize in early spring and after harvest if needed