



## FERTILIZER BASICS

Plants need to be fertilized because most soil does not provide the essential nutrients required for optimum growth. Even if you are lucky enough to start with great garden soil, as your plants grow, they absorb nutrients and leave the soil less fertile. Remember those tasty tomatoes and beautiful roses you grew last year? It took nutrients from the soil to build those plant tissues. By fertilizing your garden, you replenish lost nutrients and ensure that this year's plants have the food they need to flourish.

**There are six primary nutrients that plants require. Plants get the first three—carbon, hydrogen and oxygen—from air and water. The other three are nitrogen, phosphorus and potassium:**

**Nitrogen** helps plants make the proteins they need to produce new tissues. In nature, nitrogen is often in short supply so plants have evolved to take up as much nitrogen as possible, even if it means not taking up other necessary elements. If too much nitrogen is available, the plant may grow abundant foliage but not produce fruit or flowers. Growth may actually be stunted because the plant isn't absorbing enough of the other elements it needs.

**Phosphorus** stimulates root growth, helps the plant set buds and flowers, improves vitality and increases seed size. It does this by helping transfer energy from one part of the plant to another. To absorb phosphorus, most plants require a soil pH of 6.5 to 6.8. Organic matter and the activity of soil organisms also increase the availability of phosphorus.

**Potassium** improves overall vigor of the plant. It helps the plants make carbohydrates and provides disease resistance. It also helps regulate metabolic activities.

*There are three additional nutrients that plants need, but in much smaller amounts:*

Calcium is used by plants in cell membranes, at their growing points and to neutralize toxic materials. In addition, calcium improves soil structure and helps bind organic and inorganic particles together.

Magnesium is the only metallic component of chlorophyll. Without it, plants can't process sunlight.

### How to Choose a Fertilizer

In most cases, an all-purpose, 5-5-5 fertilizer will provide the nutrients all plants need for healthy growth. If a soil test reveals certain nutrient deficiencies, or if you want to tailor your fertilizer to the needs of particular plants (tomatoes vs. flowers), you can select a special formulation. What you choose will depend on your soil and what you are growing.

The three numbers that you see on a fertilizer label, such as 5-5-5, tell you what proportion of each macronutrient the fertilizer contains. The first number is always nitrogen (N), the second is phosphorus (P) and the third is potassium (K). This "N-P-K" ratio reflects the available nutrients —by weight—contained in that fertilizer. For example, if a 100-pound bag of fertilizer has an N-P-K ratio of 5-7-4, it contains 5 pounds of nitrate, 7 pounds of phosphate (which contains phosphorus), 4 pounds of potash (which contains potassium) and 84 pounds of filler.

Note that the N-P-K ratio of organic fertilizers is typically lower than that of a synthetic fertilizer. This is because by law, the ratio can only express nutrients that are immediately available. Most organic fertilizers contain slow-release nutrients that will become available over time. They also contain many trace elements that might not be supplied by synthetic fertilizers.