

NPK RATIO: WHAT DO THE NUMBERS ON FERTILIZER MEAN? What's the Best Fertilizer for Your Lawn or Garden?

Fertilizer terms can be confusing. What is the NPK ratio? What are nitrogen, phosphorous, and potassium? Let us take the guesswork out of fertilizing.

It's all about the soil. Most soil doesn't have all the nutrients needed for optimal growth, which means you won't get the harvest or flower bloom desired.

There are six primary nutrients that plants require—carbon, hydrogen, oxygen, nitrogen, phosphorus, and potassium. The latter three nutrients come from the soil.





N-P-K FERTILIZER LABELS

Every fertilizer label will give information relating to its “N-P-K” content, expressed as a number ratio. On the label, you’ll see numbers like 5-10-10, 10-10-10, and 10-6-4.

There is valuable information in the labeled numbers: They indicate the amount of **nitrogen, phosphorus, and potassium** (standardized in that order) in the particular fertilizer blend.

For example, 100-pound bag of 10-10-10 contains ten pounds of each element. The rest is filler, which gives it bulk and makes it easier to spread.

- **Nitrogen (N)** is needed for leaf growth and is responsible for making plants greener. Plants that are almost all leaves need a lot of nitrogen, so look for a fertilizer with a high first number. The higher the number, the more nitrogen the fertilizer provides. This is why most lawn fertilizers are high in nitrogen, with formulations like 24-4-12 or 20-2-6.
- **Phosphorus (P)** promotes root development, which helps to anchor and strengthen plants. It also increases bloom and fruit production. Tomatoes and root crops favor “snacks” of 5-10-10.
- **Potassium (K)**, also known as potash, helps the plant fight off diseases and keeps it vigorous, enabling it to withstand extreme temperatures and ward off disease. Plants deficient in potash may display stunted leaves and fruit and be extra sensitive to drought. Because most soils already contain potassium, the third number in the fertilizer ratio tends to be the smallest.

OTHER PLANT NUTRIENTS

When it comes to fertilizers, much attention is paid to nitrogen, phosphorus, and potassium, but there are other key nutrients needed for overall plant health as well, though in smaller quantities.

- **Calcium (Ca)**, which improves general plant vigor and promotes the growth of young roots and shoots.
- **Magnesium (Mg)**, which regulates the uptake of nutrients, aids seed formation, and contributes to the dark green color of leaves, which is important for effective photosynthesis.
- **Sulfur (S)**, which maintains that dark green color, encouraging vigorous plant growth.

Soil test results sometimes come with recommendations to add these trace minerals to the soil if they are found to be deficient.

SOIL TESTING

How do you know what your soil needs? Knowing your plants' growing medium is key to knowing what kind of fertilizer(s) will benefit them. You want to add what they lack, not what they do not need.

The very first step in almost any gardening endeavor should be a soil test. For accurate and useful results, go through the folks at your County Extension Office. They will test the soil, explain the results, and provide recommendations for actions to take. Read more about soil testing for a healthier garden.

Because soil continually changes, you should have your soil tested every 2 to 3 years. Keeping records of test results, fertilizer applications, and any other soil amendments you make is always a good idea.

NATURAL AND ORGANIC VS. SYNTHETIC FERTILIZERS

Fertilizer providing the N-P-K nutrients mentioned above can come in both organic and synthetic versions. What's the difference?

- Organic fertilizers come from sources such as manure, blood meal, cottonseed meal, feather meal, crab meal, etc. (Bear in mind: Not all products labeled "natural" are organic. Greensand—derived from inorganic mineral-based or "rock" matter—is an example of a natural, although inorganic, material.) Organic fertilizers work in concert with soil microbes that break fertilizers down for plant uptake. Because they don't add excess salts and acid to the soil, organic fertilizers are beneficial in encouraging healthy soil biology rich in microbial activity.
- Synthetic fertilizers are lab-made and derived from compounds like ammonium nitrate, ammonium phosphate, superphosphate, and potassium sulfate. They expedite plant growth and can contribute to bloom rate in flowering plants. However, they are high in salts and can be detrimental to populations of beneficial microorganisms and also leach into water sources. Applying too much synthetic fertilizer can "burn" foliage and damage your plants. Synthetic fertilizers are great for a boost, but do little to improve your soil's long-term health, texture, or long-term fertility. Because synthetic fertilizers are highly water-soluble, they can also leach out into streams and ponds.

In general, organic fertilizers need time to enrich the soil, so they're best applied in the fall so the nutrients will be available in the spring. For the spring, some fertilizers combine the best of both worlds with an organically-based fertilizer mix that also contains small amounts of synthetic fertilizers to ensure the immediate availability of nutrients.

Note that the N-P-K ratio of organic fertilizers is typically lower than that of a synthetic fertilizer. By law, the ratio label can only list nutrients that are immediately available.

GRANULAR VS. SOLUBLE FERTILIZERS

You may also notice that there are both granular and soluble formulations.

- Granular fertilizers are solids that must be worked into the soil and given time (and water) before they dissolve and become available to plants.
- Slow-release fertilizers are a subset of granular formulations. A portion of the fertilizer is not immediately available to the plant. Nutrients are metered out over several weeks. Therefore, they are applied less frequently.
- Sometimes called "liquid feed," soluble fertilizers are sold as either ready-to-use solutions or packaged dry-milled materials that need to be dissolved in water. These tend to be quick-release fertilizers high in nitrogen that result in fast green growth. (Miracle-Gro is a good example of a soluble fertilizer.)

To build the long-term health and fertility of your soil, we recommend using granular organic fertilizers. Supplementing with an additional water-soluble fertilizer is a way to ensure that your plants have the nutrients they need when they need a boost (during active growth).

SHOPPING FOR FERTILIZER

Shopping for fertilizer can be confusing because plants have individual nutrient requirements.

- If you don't have any specific soil needs, a 5-5-5 fertilizer is an all-purpose fertilizer that provides plants with what they need for healthy growth.
- Evergreens — holly, rhododendron, yew, and others — not only need high nitrogen to keep them green, but several trace elements as well. Evergreen food may have an analysis of 30-10-10, plus a dose of copper, molybdenum, and iron.
- Flowering annuals, on the other hand, burst into bloom when nitrogen is held back. The tonic they need is 5-10-10.

- Good-quality bonemeal worked into the soil around newly planted bulbs keeps them springing up for several years.

ANOTHER KIND OF FERTILIZER: COMPOST TEA

Before buying bags or bottles of fertilizers, consider how you might add nutrients to the soil by improving its biology. Try compost tea, a liquid produced by extracting beneficial microbes (bacteria, fungi, protozoa, and nematodes) from compost.

Applying compost tea to both soil and plant foliage adds those beneficial microorganisms to the growing medium, which boosts plant health and encourages growth. Compost tea is made using a brewing process similar to that used for making beer. Active compost, a brewing kit, and a little information can go a long way toward turning your landscape into a thriving ecosystem. See information on how to make compost tea.

Now that you understand more about fertilizers, see how to apply fertilizer to your garden!