

Fertilizer 101 by SummerWinds Nursery



Over centuries of examination, science has learned a great deal about the nutrients essential to plant development and the ways that those nutrients are absorbed. The end goal of all of this research is to understand the nutrients that a plant needs, when the plant needs them, and how best to replace them when they become depleted – that’s where fertilizers come in!

There are 17 elements essential to plant development. Of these elements, 3 are available through air and water – Carbon, Hydrogen and Oxygen. The remaining 14 must be taken up by the roots from the soil surrounding them. These elements are what make up fertilizers, and they are divided into 3 categories: primary macronutrients, secondary macronutrients and micronutrients.

Primary Macronutrients

Every box and bottle of fertilizer is labeled with the ratio of the 3 primary macronutrients it contains – Nitrogen (N), Phosphorus (P) and Potassium (K). Each of these fundamental nutrients plays a key role in plant nutrition and development and are required in relatively large quantities – together, they are the foundation of all fertilizers.

Nitrogen (N)

The most essential and readily absorbed macronutrient, Nitrogen is essential to the formation of proteins, and protein is what makes up the vast majority of the tissues of living things! This means that Nitrogen is directly responsible for vigorous upward growth, foliage production, and the deep green color we associate with a healthy, happy plant.

Phosphorus (P)

Phosphorus is absolutely essential for photosynthesis – it is what enables a plant to convert sunlight into chemical energy. It is also important for respiration, cell division, and cell growth. It encourages sturdy overall structure and aids in the development of roots, blooms, seeds, and fruits.

Potassium (K)

Potassium, or “potash” is vital in hardening plants against abrupt changes in environmental conditions. If it suddenly gets too hot or too cold, potassium helps shore up the plant’s defenses against these stressors.



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Nitrogen (N) = 5

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Phosphorus (P) = 6

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Potassium (K) = 3

Secondary Macronutrients

The secondary macronutrients are required in smaller quantities than those in the primary category, but still perform essential functions for growth and development.

Calcium (Ca)

Calcium is used to increase the pH of overly-acidic soils, and aids nutrient absorption within the plant itself. It is essential to strong cell wall structure and cell division, so when it is deficient, new tissues such as blooms, young leaves, and root tips will often exhibit distorted growth.

Magnesium (Mg)

Magnesium is a component of chlorophyll so, like phosphorus, is necessary for photosynthesis. It's also important to help the plant metabolize that very same phosphorus molecule.

Sulfur (S)

Sulfur is a major constituent of one of the enzymes required for the formation of the chlorophyll molecule, and is therefore essential for chlorophyll formation. It is active in the metabolism of nitrogen and used in the production of many proteins, amino acids, enzymes and vitamins. Sulfur also increases a plant's resistance to disease, and assists formation of seeds.

Micronutrients

Micronutrients are elements that, relative to macronutrients, are only required in trace amounts.

- Zinc (Zn)
- Iron (Fe)
- Manganese (Mn)
- Copper (Cu)
- Boron (B)
- Molybdenum (Mo)

However, don't let the fact that they are only needed in trace amounts fool you into thinking these elements are unimportant!

Liebig's "Law of the Minimum" – a principle formulated in the 17th century by Carl Sprengel, a German botanist, and further studied, published, and promoted by biochemist Justus von Liebig, whose work would later earn him the title of "Father of the Fertilizer Industry" – states that the overall growth and health of a plant is controlled not by the total nutrients available in the soil, but instead by the scarcest of the nutrients available in the soil. Growth is dictated and limited by the scarcest resource the same way a chain will always break at its weakest link, making micronutrients extremely important components of an overall healthy soil biome!



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