
A Consumer's Guide to Understanding Fertilizers

-What exactly is a fertilizer?

Fertilizers are to plants what food is to animals, except plants can't forage widely for food like most animals. Plants are stuck in one place and can only absorb the nutrients present in their root zone. By fertilizing plants we can help supply the nutrients that may be lacking in the soil and provide for enhanced growth and production. Plant scientists have long known that plants require 15 elements to grow and develop normally, in addition to air and water.

-What nutrients are fertilizers made up of?

The primary nutrients, Nitrogen (N), Phosphorus (P) and Potassium (K), are those used in the greatest quantities by plants. Lesser amounts of secondary minerals, Sulfur (S), Magnesium (Mg) and Calcium (Ca), and minute amounts of nine other micronutrients including Iron (Fe), Copper (Cu) and Boron (B) are all necessary for healthy plant growth. Micronutrients are usually present in adequate amounts in good soils, but the primary nutrients need to be replenished regularly to replace what crops remove from the soil. Liming, which makes soils less acidic, makes fertilizer nutrients more available to plants. Lime also supplies calcium and magnesium if dolomitic, or 'hi-mag' lime is used.

-Do I need an applicator license to apply fertilizer?

New Hampshire does not require an applicator license in order to apply fertilizer, however, if the product is also a pesticide then you will need to obtain proper certification and licensing through the Division of Pesticide Control. For more information on the Division of Pesticide Control, please visit: <https://www.agriculture.nh.gov/divisions/pesticide-control/index.htm>

-How much fertilizer do I use?

Fertilizers come with label directions for you to follow and adjust your spreader settings as indicated but it's always best to fertilize based on the recommendations of a soil test. Too much of some plant food elements may cause plant damage. Excess fertilization can also lead to non-point source pollution that harms water bodies and leads to the growth of excessive algae. Fertilizer applications should always be avoided around surface water or near wells.

-How do I identify the nutrient content in fertilizers?

Commercial fertilizers are required by state fertilizer labeling laws to state the percentage of the nutrients present in the form of a guaranteed analysis. In addition, the grade, or "the big 3" can be found on every fertilizer bag in the form of **N-P-K**. For example, a fertilizer product with an N-P-K listed as '**5-10-5**' specifies that the product is **5% Nitrogen (N)**, **10% Phosphate (P₂O₅)** and **5% Potassium (K₂O)**. That means that a 50lb product with an N-P-K of 5-10-5 would contain 2.5 lbs. of **N (5% of 50 lbs.)**, 5 lbs. of **P (10% of 50 lbs.)** and 2.5 lbs. of **K (5% of 50 lbs.)**. Thus, that 50 lb. bag would only contain a total of 10 lbs. of actual plant food and the other 40 lbs. would be inert ingredient or filler.

Sometimes, fertilization guidelines refer to a certain plant food ratio. The 5-10-5 example above has a 1-2-1 ratio of N to P to K. A 10-20-10 provides the same ratio of N-P-K, but has twice the nutrient concentration. An application of one-half as much 10-20-10, say 10 lbs. per 1,000 square feet will provide the same feeding level to plants as 20 lbs. per 1,000 square feet of the 5-10-5, plus less handling and fewer bags to dispose of. If a 5-10-5 costs \$10 for a 50 lb. bag, the cost for the actual nutrients (10 lbs.) is \$1 per pound. If the 10-20-10 sells for \$15 per bag the cost per pound of actual plant food (20 lbs.) is only \$0.75 per pound - *clearly a better buy!*

-What is the difference between chemical & natural based fertilizers?

Fertilizers can be chemically based or natural based. Most chemical fertilizers are simple compounds. Nitrogen is synthesized from the atmosphere, which contains 78% N in a gaseous form, to create ammonia and urea. Phosphate and Potash fertilizers are obtained from naturally occurring mined deposits that are minimally processed to make the nutrients more available to plants. The fertilizer ingredients that carry the nutrients are then mixed together to create any number of different grades to suit the needs of different crop types and soil fertility levels. Natural based fertilizers are derived from organic materials such as bone meal, fish waste, or food processing by-products. Generally, natural based fertilizers are lower in plant nutrient content than chemical based fertilizers. They also tend to be slower to release their nutrients in a plant-available form. On a cost per pound of nutrient basis, chemical fertilizers are usually far less expensive.

-What does it mean if a product says “slow” or “controlled” release?

Some fertilizer packages make claims to be “slow release”, “slowly available” or “controlled release”. These slow release claims generally refer to the nitrogen content, since nitrogen is relatively soluble and may not last long in the soil, especially during rainy periods. Chemical fertilizers can be manufactured so they mimic natural based fertilizers inherently slow release characteristics. By coating the nitrogen particles with sulfur or other materials, the particles dissolve slowly, feeding plants over a longer period of time. Expect slow release fertilizer products to cost more. Gardeners may wish to apply smaller amounts of fertilizer more frequently, adjusting for plant growth response and rainfall to accomplish the same objective, which is to feed plants just what they need when they need it, to maximize crop production while minimizing impacts to the environment.

For more information on this topic and others, contact the Division of Regulatory Services at (603) 271-3685, registrations@agr.nh.gov or visit our website at www.agriculture.nh.gov.