



Manage Nitrogen Wisely for Good Plant Growth

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Plants need nitrogen to grow. Without nitrogen, a plant cannot complete its life cycle. Nitrogen plays an important role in many essential functions in plants, such as photosynthesis, formation of amino acids, protein, and nucleic acids. This nutrient promotes vigorous and succulent growth. Deficiency of nitrogen in plants can lead to stunted growth, low yield, and quality. Chlorosis (yellowing) on leaves is a typical symptom of nitrogen deficiency and the symptom appear on older leaves first, progressing to the whole plant when nitrogen deficiency is severe. On the other hand, too much nitrogen can cause excessive vegetative growth, poor root growth, delayed maturity, higher disease incidence, poor tolerance to heat, cold, drought, traffic, and other environmental stresses.



Photo by dmp, 2021

Plants take up nitrogen in soil primarily by their roots. Therefore, sufficient nitrogen in soil during the crop season, especially when active growth and nutrient uptake begin, is important. While nitrogen levels are not evaluated when soils are submitted for a standard nutrient analysis at the UConn Soil Nutrient Analysis lab, nitrogen recommendations are given. They are based on previous field studies as well as the assumption that any nitrogen applied the previous growing season has either been used up by plants and soil organisms or has leached from the soil.

For example, according to researchers, cool season turf grasses require 3 pounds of nitrogen each year per 1000 square feet. This would be put down in 3 separate applications containing 1 pound of nitrogen per 1000 square feet. Researchers also found that leaving the grass clippings down supplies the plants with one-third of the nitrogen they need so only two fertilizer applications are necessary. Depending on the vegetable, typically 1 to 4.5 pounds of nitrogen per 1000 square feet is recommended. Often the UConn Home & Garden Education Center gets calls about vigorous, large pepper plants that are not producing any peppers. Typically this is due to overfertilization with nitrogen that promotes green leafy growth at the expense of flowering and fruiting.

There are many types of nitrogen fertilizers available on the market and they all have different guaranteed nutrient analyses that are listed on the containers or bags. Some fertilizers only contain nitrogen, for example, urea has a nutrient analysis of 46-0-0 which means 46% of the urea fertilizer is nitrogen. Some fertilizers contain multiple nutrients, for example, a fertilizer that has nutrient analysis 20-27-5 means the fertilizer contains 20% nitrogen, 27% phosphorus as % P_2O_5 , and 5% potassium as % K_2O . If your soil test phosphorus and potassium levels are above optimum, it is best to use fertilizer that does not contain either phosphorus or potassium because excessive phosphorus can potentially cause environmental pollution. Calculating the fertilizer rate is simply based on this percentage of nitrogen in the fertilizer analysis. For example, if the recommended nitrogen application rate is one pound nitrogen per 1000 square foot, then amount of urea needed would be calculated by dividing 0.46 into 1 pound which comes to 2.17 pounds of urea per 1000 square feet. If you need assistance figuring out how much of what fertilizer to apply, feel free to call the UConn Soil Nutrient Analysis Lab at (860) 486-4274.

Fertilizers are generally applied topically to lawn areas. It is best to apply them before rain is predicted or one can irrigate afterwards to help the nitrogen move into soil. It takes about a half inch of rainfall within 24 to 48 hours after surface application to transport urea in fertilizers to the depth that will minimize volatilization loss. Once in the soil, the urea is converted into forms of nitrogen that can be leached easily. The ideal situation would be that nitrogen is available for plants when it is needed. This is why split applications are often recommended as they result in better nitrogen use efficiency and reduced nitrogen loss. Slow-release nitrogen fertilizers release urea slowly, providing a continued availability of nitrogen for long period of time at the same time reducing nitrogen loss. However, the right amount of nitrogen application is important even with slow released nitrogen fertilizers. Excessive nitrogen of any forms can lead to nitrogen leaching into the environment and causing eutrophication of waterbodies. Excessive nitrate in drinking water can also cause human health issue.

For questions on soil testing and nitrogen fertilizers or if you have any other gardening questions, contact the UConn Home & Garden Education at (877) 486-6271 or www.ladybug.uconn.edu or your local Cooperative Extension Center.