

The High Cost of Fertilizer and Best Practices for Management

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Growers saw fertilizer prices spike in 2021 but are now seeing them hit even harder in 2022, resulting in sky high prices or an estimated increase around 80% since last year. Supply chain disruptions continue to wreak havoc and a fire at a U.S. fertilizer plant at the end of January are only just some of the factors fueling the dramatic increase. With all that being said, countless studies have proven a strong correlation between nitrogen (N) and crop yield; as nitrogen rates increase so does crop yield. So, how can growers maintain yield goals while balancing the high cost of fertilizer? Growers can achieve profitable application of nitrogen fertilizers through the implementation of best management practices (BMPs). A few BMPs are discussed below in more detail.

The first BMP has been preached many times and will continue to be preached. Soil test! It is the most important practice growers should be doing and it should be done at least once every three years. A soil test will provide an overview the nutrient status of the soil and current pH allowing for more precise nutrient applications; not applying a nutrient where there is excess and ensuring enough is applied where there are deficiencies. For example, many LI soils are very high in phosphorus (P). This allows for an opportunity to adjust rates when a soil test comes back very high for P. So, instead of applying 100 lbs P/acre (A), the rate can be reduced to 40 lbs P/A, reducing the cost of the fertilizer blend or overall program. Additionally, a soil test will provide the pH of the soil. For most vegetable crops, a soil pH between 6.0-7.0 is desirable. Adjusting soil pH to a recommended value can increase the availability of important nutrients making better use of your fertilizer dollar.

Another recommended BMP is to consider split applications of nitrogen instead of applying all the N at once. Nitrogen-use efficiency can be improved if N is made available when crop demand is greatest. Early in crop growth when plants and roots are small, demand for N is low, especially under cool, spring conditions. As temperatures warm, crop growth increases and demand for N also increases. Multiple, smaller applications will ensure N is available when the crop needs it most compared to a single application of N at planting where the potential for N leaching and/or denitrification is increased. One approach would be to apply 40% of the total N needs of the crop at plantings and apply a sidedress application of the remaining 60% 3-4 weeks after seeding/transplanting.

Controlled release nitrogen fertilizer (CRNF) is another BMP growers can use to increase crop nitrogen use efficiency. The basic concept behind CRNF is like the one described above for using split applications where it is more beneficial (economically and agronomically) to make multiple, smaller applications of N compared at applying all the N at once. CRNF technology is designed to match N release with crop N demand which increases overall use efficiency. N is available when the crop needs it most and not as readily available early in the crop growth cycle when demand is low and leaching and/or denitrification potential is high. Multiple studies conducted at the Long Island Horticulture Research and Extension Center over the past 15 years have demonstrated that CRNF is a reliable alternative to conventional soluble N fertilizer as crop yields were either maintained or increased at reduced N rates (a reduction of up to 20% is recommended). When using CRNF it is important to match the release duration of the product with the crop. A 90-day CRNF is more commonly available commercially and has shown, through our trials, to be a good fit for crops like potatoes, sweet corn, tomatoes, and pumpkins (to name just a few) who reach maturity between 70-100 days.

The last BMP we will discuss involves fertilizer placement. To make the best use of your fertilizer dollar, fertilizer should be placed where it is most accessible to the growing crop. Banded fertilizer applications place the fertilizer in the root zone of the growing crop while broadcast applications may place some fertilizer outside the crop root zone where it can be leached or used by weeds. Overall,

banded applications provide higher concentrations and better efficiency of the fertilizer applied than broadcasting. Phosphorus is not very mobile and is primarily supplied to the roots by diffusion and root interception. This fact is important as P is not supplied to the plant roots by mass flow. Mass flow is the movement of nutrients to root surfaces through soil water movement. Because it is not supplied by mass flow and instead primarily supplied by root interception and diffusion, roots need to contact P in the soil for them to take it up. Broadcast applications of P limit the amount of P the roots will encounter by placing it outside the root zone. P applications will be much more efficient and have a higher cost benefit if band applied. When banding fertilizer, remember to place the fertilizer at least 2" the side and 2" below the seed to minimize injury. Additionally, to prevent salt burn when banding fertilizer, avoid using more than 80-100 lbs of N+K₂O per acre in the band at planting or move the band so it is 3" away from the seed.

With fertilizer prices estimated to be 80% higher this season than in 2021, no one wants to risk lower crop yields or quality because of nutrient deficiencies. The only option is to increase fertilizer use efficiency and make better use of your fertilizer dollar by implementing one or all the above mentioned BMPs. *(Note: this article only discusses a few BMPs and is not inclusive of all fertilizer BMPs a grower can implement)*. Your local Extension Office can help interpret soil test results and make fertilizer recommendations based on those result incorporating many of the above mentioned BMPs.