

NEWS & VIEWS

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Using Fertilizer Efficiently

THE CURRENT price level of fertilizer is boosting interest in efficient nutrient use. The industry supports applying nutrients at the right rate, at the right time, and in the right place as “best management” for achieving efficiency. Whether you farm or advise farmers in the Northeast or in the Northern Great Plains, here are some tips for getting the most revenue-generating yield while keeping fertilizer bills reasonable.

- 1. Measure what the soil can provide.** Soils can contain rich reserves of nutrients. Test once every 2 to 3 years for stable nutrients like phosphorus (P) and potassium (K). For mobile nutrients like nitrogen (N), test for each crop, but at just the right time. For corn in the Northeast, the soil nitrate test is effective only if the sample is taken “pre-sidedress”, when the corn is 6 to 12 in. tall. For cereals and oilseeds in the Northern Great Plains, late fall and early spring

nitrate samples effectively estimate N supply. Be sure you understand whether your soil test lab is including any N credits from previous legume crops.



- 2. Consider crop removal.** Do you know how much P and K the last crop took out of the soil? You can estimate it if you know yield levels. Unless soils contain so much that you don’t worry about depleting fertility, what was removed should likely be replaced.
- 3. Set realistic yield goals.** Being sure that nutrients are applied to meet the target crop yield is critical to optimizing fertilizer efficiency. However, over- or under-application is going to result in reduced nutrient use efficiency or lost yield or crop quality. Be sure yield goals reflect past production history, appropriate for each field.

- 4. Use all nutrient sources available.** Making sure that manures are applied in a manner to minimize nutrient losses can be challenging. Storage should protect against those losses. Manure application shouldn’t get in the way of timely planting. Manures and other organic materials should be directed to the soils that need the organic matter most. Analysing the material helps predict its nutrient credits to ensure that fertilizers appropriately supplement what is applied.
- 5. Keep the proper balance of nutrients.** When fertilizer prices rise, it is common to see growers reduce the application of all nutrients except N. For a soil with adequate supplies of P, K, and sulfur (S), this can work in your favour. However, if soil is low in any of these nutrients, it may be better to lower the rates of all those required to optimize crop yield and quality. Remember, low levels of other nutrients will prevent the full yield expression of applied fertilizer N.
- 6. Manage soil pH. Liming acid soils produces many benefits.** Among these are more effective N fixation in legumes, and better availability and more efficient use of P and K. Soils with a pH of less than 5 to 6 are candidates for liming, depending on the crop grown.
- 7. Manage crops for maximum economic yield.** Anything that limits yield usually limits nutrient use efficiency. Choosing the right genetics and plant spacing, planting at the right time, and managing soils for optimum structure are all important. Ensuring that all field operations get done on time requires a lot of attention to logistics, but pays off with a better ratio of nutrients harvested versus applied.



Co-author:
Dr. Adrian Johnston
Northern Great Plains Region Director
Potash & Phosphate Institute (PPI)/
Potash & Phosphate Institute of Canada (PPIC)
Suite 704 – CN Tower, Midtown Plaza
Saskatoon, Saskatchewan, Canada S7K 1J5
Phone: (306) 652-3535
E-mail: ajohnston@ppi-ppic.org



Co-author:
Dr. Tom W. Bruulsema,
Northeast Region Director
Potash & Phosphate Institute (PPI/PPIC)
18 Maplewood Drive
Guelph, Ontario, Canada N1G 1L8
Phone: (519) 821-5519
Fax: (519) 821-6302
E-mail: tom.bruulsema@ppi-ppic.org

- 8. Time applications.** Especially for N, the closer before plant uptake, the better. In the Northeast, fall-applied N is unreliable, and it's often better to split the application with some at planting and the largest part when the corn is about 6 to 12 in. tall. In the Northern Great Plains, N applied in the fall should be in the ammonium form (urea or anhydrous ammonia) and banded below the surface only after the soil has cooled to below 10 degrees C (50 degrees F). Applying all the crop N requirement prior to—or at—planting is effective in the Northern Great Plains.
- 9. Control release.** You may not always be able to apply just before plant uptake. “Just after” is too late. Many useful products that delay conversion of N sources to nitrate have entered the market. These include inhibitors of urease or nitrification, or coatings that slow the release of urea into solution. The key is to find a product that releases N in the root zone just before the plant needs it.



- 10. Band in the right place.** Phosphorus is particularly effective at invigorating young seedlings when it's placed in a band close to the seed. The starter band should include N and K as well if they are required. Higher rates need to be moved further from the seed to avoid damage from salt or ammonia ion effects.
- 11. Test on-farm.** Recommendations are only as good as the research relating to crop response. For important nutrient questions that your local recommendations can't answer, replicated strip trials on your own farm may be the only solution.
- 12. Consult a credible adviser.** Managing nutrients is complex and site-specific. Certified Crop Advisers (CCAs) should be able to balance not only the nutrients needed for a crop, but all the many pieces of advice that farmers encounter as well.

Every farm and field is different. It is always important to select the best management practices suited to field conditions. Efficiency has many facets. Nutrient management is more than applying the minimum to get an average crop. It needs to consider how the productivity of a cropping system is going to be maintained over the long-term.

The tips above are oriented towards sustainable efficiency, the real goal of nutrient management. ■

Looking for More?

More information and additional tools to help you with these suggestions can be found at our website: www.ppi-ppic.org.

In addition to various current items you will find there, look under **Features**, then select **Toolbox Resources**. There are links to the following software applications and more.



Crop Nutrient Response Tool—This evaluation tool was designed to assist in interpreting results from on-farm trials, specifically, trials involving multiple rates of any added nutrient. Its main goal is to provide the best possible estimate of “optimum rate” or “most economic rate of N (MERN)” from limited data.



PKalc—Are P and K nutrient additions keeping up with removal by crops? The spreadsheet PKalc v1.12 is an interactive tool that allows you to keep track of

historical nutrient additions and removals for a field or field area.



Fertilizer Chooser—*Fertilizer Chooser* is the final step in preparing a fertilizer program. *Fertilizer Chooser* assumes that a fertilizer recommendation for balanced plant nutrition is available and helps the user to:

—Translate a nutrient recommendation into the correct amounts of different fertilizers needed to make up the right amount of nutrients.

—Select a combination of meaningful fertilizer nutrient sources based on quoted prices for fertilizer products and the cost of application.

—Evaluate the cost of different fertilization programs.