

2009: A Year to Fine Tune Fertility

Several soil fertility experts see a silver lining in the current state of farming affairs.

While higher input costs and volatile markets have cast a gloom over rural America, a positive result is that farmers are paying more attention to their crop nutrient programs.

"The hot question right now is, 'How much fertilizer can I cut?'" notes Dr. Antonio P. Mallarino, professor of soil fertility and nutrient management, Iowa State University. "Many producers continue to invest in the best seed available, pay huge amounts of rent, buy fuel and pest control. Most will not trim nitrogen, but they are ready to cut P and K. That's what's happening all over the Midwest, and it's a huge concern.



"If they are spending money in all these other things, but then cut on plant nutrition, they are severely limiting not only the return they'll see on yield, but the performance of the other inputs."

Farmers must get back to making informed – not emotional - decisions about soil fertility, Mallarino says. "Now is the time to soil test, because it pays. The cost has come down in relation to inputs and grain prices; it is the primary index on which to base fertilizer decisions."

Dr. T. Scott Murrell, Northcentral director of the International Plant Nutrition Institute, Lafayette, Ind., says regular soil testing allows farmers to put smart management practices in place, which in turn helps capture more yield.

"Good soil fertility is going to get you farther down the road to yield than poor fertility. It's a risk-management strategy that applies in both good and bad weather, and in good or not-so-good economic conditions."

To cut, or not to cut

Mallarino says fertilizer cuts seldom make sense on low -testing soils. "It's proven to be effective and profitable to fertilize on low -testing soils," he says. "Farmers may have some flexibility on optimum- or medium-testing soils for which maintenance fertilization usually is recommended. Maintenance of optimum soil-test levels is the key for long-term profitability, especially with safe land tenure."

Across the Corn Belt, where Murrell has practiced agronomy for fifteen years, he has noted two distinct fertilizer philosophies.

"In the eastern Corn Belt, there's a build-and-maintenance philosophy, whereas the drier western region has adhered more to "just-in-time" sufficiency practices," he says. "In the West, they ask how much they can cut back, but the answer is that, 'they can't.' They're already operating on the fringe, and cuts would run a high risk of yield reductions.

"Eastern farmers may have a little more flexibility this year, as many have built up their soil bank account of nutrients," he continues. "The issue there is variability, and how well farmers have characterized exactly what that soil is capable of supplying in any one area of a field."

Mallarino adds that variable-rate application technology is available in many regions and its cost has decreased compared with prevailing grain and fertilizer prices. "Combined with soil testing and estimates of nutrient removal, this practice can improve fertilization efficacy."

Murrell says "managing by the wire" places an even higher importance on soil testing. "You've got to be able to characterize that field well in order to manage fertility .

"The challenge is that fertility is not visible," he adds. "It's not like controlling weeds, where the impact of management is obvious. Fertility becomes visible to the eye only when you have a big problem."

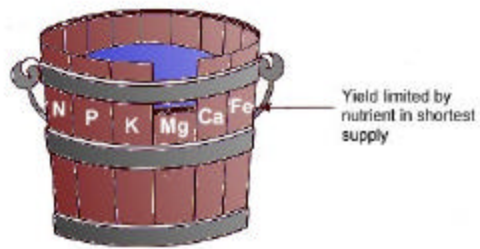
Got magnesium?

Getting the most fertilizer "bang for your buck" also requires paying attention to the secondary and micronutrient needs, Murrell says. "Once a good N, P and K program is in place, the job still may not be done. Secondary and micronutrient needs are also important, especially when trying to achieve a high-yielding, high-quality crop."

Secondary nutrients, such as magnesium or sulfur, and micronutrients, like zinc or manganese, each play unique roles that contribute to the plant's health and vigor, he explains.

"If one or more nutrient is lacking, crop yields will be reduced even though an adequate amount of the other elements is available," he says. "This 'Law of the Minimum' is analogous to the fact that a wooden bucket will hold no more water than its shortest stave. Crop yields can be limited by the nutrient that is the most limiting."

University Extension guidelines are a good place to find science-based information on these other important nutrients.



The wooden bucket represents the soil's nutrient supplying capacity

Make informed decisions

Growing crops without regular soil testing is like banking without monthly statements, Murrell explains. Without these regular reports, farmers run the risk of overdrawing their accounts. Similarly, without periodic soil test reports, soil nutrient accounts may drop below adequate levels, leaving crops with insufficient nutrition.

"Now is the ideal time to be taking a really close look at those soil test results, or to be pulling soil samples if you haven't already," he says. "It's never too late to understand what's going on in the soil. Especially when farmers are thinking about cutting back, it's critical to make informed decisions, as opposed to emotional reactions that put yields at risk."

Left unchecked, soil nutrient levels can take years to restore to optimum.

This spring, as farmers fine-tune fertility applications, another once-routine test may be poised for a comeback, Murrell suggests.

"Plant tissue analysis, while not as common today because of the field scouting it requires, remains an important diagnostic tool, because it identifies nutrient shortages before visible symptoms occur. Often, by the time a deficiency symptom is revealed, crop yield already has been compromised."

Identifying and correcting a "hidden hunger" is basic agronomy, but what some people forget is the critical interaction between nutrients, and how a deficiency of just one nutrient can impede the performance of others, Murrell says.

"Nitrogen shortages are easy to spot in the field, but shortages of other nutrients are not always as obvious, and therefore can be easily overlooked," he says. "Many farmers focus on nitrogen, but for nitrogen to work effectively, phosphorus and potassium also must be in proper supply."

The four rights

Producers typically won't go wrong if they adhere to basic agronomic principles, and the "four rights" of fertilization, which call for the right nutrient source, applied at the right rate, the right time and the right place, Murrell says.

"This is a popular concept created to remind producers to be site-specific and apply nutrients only where they are needed and whenever they are needed," he says.

Whenever making fertilizer decisions, Murrell suggests farmers talk to their trusted crop adviser.

"Soil fertility issues always are defined locally and require local expertise," he says. "It's about making very informed decisions right now, and making sure we've got a long-term plan that accounts for any short-term needs."

Why fertilizer is good for the bottom line

Soil testing helps producers make agronomically and economically sound management decisions about soil fertility. Total fertilizer costs can sometimes be reduced through testing, but even more importantly, the dollars spent on fertilizer are invested only in the nutrients most needed by the crop.

A fertility management program based on soil testing offers many benefits:

- *Improved yields and profitability by providing essential crop nutrients*
- *Increased uniformity of nutrient availability across a field, so that optimum response to other management inputs can be achieved*
- *More uniform crop growth, helping individual plants compete with weeds and with each other*
- *More uniform plant maturity within a field, simplifying harvest and improving market quality*
- *Potential cost-savings and more precise allocation of fertilizer dollars to the nutrients that provide greatest potential for increased profits. Intensive sampling and variable-rate technology allow precise fertilizer applications.*
- *The environment also benefits from improved management of soil resources and fertilizer materials.*

Regular soil testing will help determine if current management is robbing future productivity and profits. Combined with sound record-keeping, soil testing remains the best guide for monitoring soil nutrient levels and determining nutrient needs for growing crops.

What exactly is a soil test?

A soil test is the analysis of a soil sample to determine soil nutrient content, composition and other characteristics. Tests are usually performed to measure fertility and indicate deficiencies that need to be remedied.

The quality of the original soil sample is critical in determining the practical value of test results. The greatest potential for error in the process is in the collection of samples in the field. For a representative sample, labs typically recommend 10-20 samples for every 40 acres of the field. Sampling from the correct depth also is important. The Extension Service in each state has

guidelines for sampling depth and these should be followed to ensure proper interpretation of results. Sampling tools must be properly cleaned prior to sampling, and between samples to avoid cross-contamination.

Both fall and spring sampling are common. However, once a time of year is decided upon, it is important to stick with it. Switching from fall to spring sampling or vice versa can cause results to differ significantly.

If a good sample is collected, and a reputable lab is used, regular soil testing will provide a reliable estimate of the nutrient status of the soil.

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