

Informed

Fertility Decisions

Soil Tests Take Guesswork Out Of Applying Expensive Nutrients

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Improving the efficiency of fertilizer in the face of very high prices was tops on the mind of Dr. Fabian Fernandez, assistant professor of soil fertility and plant nutrition, University of Illinois Extension.

“Basically I addressed making firm decisions in the applications that we make for phosphorus, potassium and also for maintaining pH with lime,” he said. “That means doing a good soil test. I show people how much it costs to do a soil test vs. how much it could cost to apply fertilizer without the knowledge of the soil test.”

With the cost of fertilizer and the nutrient status of the soil, that will vary. However, he showed an example in which the cost to obtain the needed information through soil test to apply adequate levels of potash was .7 to 1.5 percent of the cost to purchase the needed fertilizer..

“For instance, I was looking at a potash soil test with 50 pounds below the critical level, how much it would cost you to bring it up to critical level and then add sufficient to replace what the crop will remove,” he said. “In the example I gave, \$13,900 is what it will cost for an application over a 50-acre field for a four-year period. This is not a small amount, but the soil test information can really help you reduce cost by determining exactly how much you need to apply.

“I also gave another example of what happens if you applied a traditional 200 pounds of potash per acre, but the soil test actually showed that you don’t need to apply any potassium,” he continued. “That comes up to about \$4,000 worth per year of potash that you would be applying to that 50-acre field where you really didn’t need to apply any, because you are well above what the crop needs.”

The cost of an average soil test varies, but typically it costs between \$4-\$7, depending on how many nutrients are being tested and whether you want an explanation of the results.

When doing a soil test, the best approach is to know the field and look at the differences in that field, whether the differences are topographic, drainage, soil types, and past management. Then, divide the field into the different areas and take soil samples from those different areas, keeping them separate.

“If fields are fairly uniform, we typically recommend one sample every 2.5 acres,” he suggested. “If the field is more variable, then we recommend about one sample every 1.1 acres to try to capture the variability that you might have in that field.”

Today, with GPS, farmers are plotting their land, pulling samples and marking the exact location of those samples in their computers.

“By having the precise location of where that soil sample was taken you can always go back to that exact location, take a soil sample again and track what the change in fertility is over time.”

For \$4-\$7 per soil sample, a farmer can possibly save hundreds of dollars by not expending

more than needed for fertilizer or to make sure the crop is not going to suffer because of underfertilization.

Making informed decisions is paramount in farming.

“Looking at ways to improve the efficiency of any fertilizer is important too,” Fernandez added. “Looking at nitrogen, for instance, make sure that the nitrogen applications are done in



Dr. Fabian Fernandez, Assistant Professor of Soil Fertility and Plant Nutrition, University of Illinois Extension discussed making firm decisions in the applications of phosphorus, potassium and also for maintaining pH with lime.

Photo by John LaRose, Jr.

the spring not in the fall. That is one way to minimize losses under the environmental conditions in Southern Illinois. Choosing the right amount, source of nutrient, and method of application for specific fields can also enhance efficiency.

“Another point that I stress is really looking at improving rooting of the crop. Anything you can do to help that root to get well established and to grow throughout the soil profile will help that crop take the greatest advantage of whatever nutrient you are applying to that soil.”

If rooting is limited by soil compaction, disease or any other constraint, the ability of the plant to take up water and nutrients from the soil is reduced. Reduction in root proliferation can result in lower yield even in fields with adequate fertility.

“Watching those roots can provide a huge advantage,” he said. “Much of it is actually not very costly, for example, making sure that we don’t go into the field when it’s too wet to avoid compaction – things that don’t cost money just a little bit of management.”

He added the plant growth can be limited by the nutrient in shortest supply.

“So, knowing the fertility of your field and what is limiting your crop is critical so you can narrow in on the nutrient(s) that will result in the greatest yield response,” he concluded. Δ