

A saga of soil sampling

By Larry Reichenberger

Thirty years of soil-test records track soil health



Soil sampling can sometimes be lost in the hi-tech hustle that surrounds precision agriculture. Although it lacks glitz and glitter, an on-going soil testing program is a vital cornerstone supporting successful crop production.

The value of soil testing hasn't been lost on Yates Center, Kan., farmer Glen Massoth. "I can't imagine operating without a soil-testing program. We have results from some of our farms going back more than 30 years and that information is one of our most important assets," says Massoth.

Massoth says his long-term, soil-testing system analyzes his crop production efforts both coming and going. "Current results tell us fertilizer and lime needs for the coming crop year. However, past results are just as valuable because they give us an indication of the impact our farming practices are having on the soil."

Soil sampling legacy. The oldest soil-test reports that Massoth has on file date back to 1968—when his father Raymond was in charge. With his first farm in 1976, Glen began recording test results including soil pH, organic matter, P and K levels, and lime and fertilizer recommendations. In separate files, he also records the crop rotation and the yield for each field.

Over three decades these records have resulted in an armload of worn binders and dog-eared folders. "I currently operate 1,150 acres of cropland and work with 17 landlords. This acreage is divided into 68 fields ranging in size from less than one acre to almost 90 acres," says Massoth.

Despite the complexity, Massoth says time spent cataloging and analyzing test results is well spent. "I can

▶**Left:** Glen Massoth depends on regular soil testing for current lime and fertilizer recommendations. Then, he analyzes more than 30 years of soil-test records to monitor long-term changes to his soils. ▶**Right:** On one of Massoth's farms, soil tests that go back to 1976 show the trend in soil pH. While initially high, the pH declined steadily for 20 years before reaching a critical level where lime was applied.

look back and trace declines in soil pH and then monitor the response when lime was applied (shown in the example below). Also, I've noted a slow but steady increase in soil organic matter levels that we credit to returning all the crop residue to the soil."

A major benefit of the soil-test records has been the ability to monitor levels of phosphorus and potassium. "I color-code high, medium, and low test results in my records. High-test results are like money in the bank and we've sometimes chosen to make a withdrawal by applying no P and K to some fields," says Massoth.

Following trends. Massoth can study his soil-test records and point to the impact of various management changes. "Some time ago, we began deep-placing phosphorus and also banding it with the planter," he recalls. "We noted that P soil-test levels had declined. The Kansas State University agronomist we work with assured us we weren't picking the nutrient up because of the narrow bands and deeper placement. As we saw yields increase, we knew he was right and there was no reason for concern."

Massoth tests individual fields on a three-year cycle—more often if problems are detected. He submits 25 to 30 samples in an average year. Individual fields are typically divided by soil type or farming history for sampling.

"I do the sampling myself and usually gather 12 to 15 cores and mix them in a plastic bucket to make up

a sample. It's important to let samples air-dry, so sometimes our basement becomes quite a sight," says Massoth.

Scott Murrell, north central director of the Potash and Phosphate Institute, says poor record keeping prevents most farmers from getting the full benefit of soil testing. "It's short-sighted to only use the results to determine fertility rates for one or two years. By putting years of test results together, you can look for trends that will help evaluate and modify your management approaches," he says.

In Kentucky, farmers benefit from long-term soil-test information thanks to efforts of University of Kentucky soil-test coordinator Frank Sikora. For the last 17 years, Sikora has archived soil-test records on a county-by-county basis. Initial analysis of some of the data is allowing farmers to put their own test results in perspective.

Long-term value. "In one county, our analysis of 1,122 soil-test results from a 15-year period showed how soil phosphorus levels climbed with the influx of poultry production," he says. "That raised water quality concerns, but data shows an educational effort is cutting soil P levels."

Sikora cites another case in which a long-term decline in soil K levels in grain-producing counties has fertility experts questioning if fertilizer recommendations they're making are adequate. "There's a lot of value in all this data, but we're just beginning to understand how to use it," he says. ■

