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Added sulfur improves corn yields

Phosphorus may be the first nutrient that comes to mind when a farmer is planning to use corn starter, but new studies show that sulfur may be just as important.

In testing conducted by three land-grant universities, adding sulfur to corn starter increased corn yields by 14 to 31 bushels per acre.

The studies were conducted in areas of the Midwest where soils have high organic matter levels and don't fit the typical profile for sulfur fertilization.

"In previous testing, most of the documented sulfur responses occurred in sandy, low organic matter soils," says George Rehm, agronomist with the University of Minnesota. "Now, we are seeing yield increases on heavier soil types, with higher organic matter levels."

During the 2000 growing season, Rehm saw a 15-bushel yield increase when he included 12 pounds of sulfur as ammonium sulfate (21-0-0-24S) in corn starter treatments. The corn in this study was ridge-tilled on a heavy loam soil.

In Kansas State University testing, from 1999 through 2001, Ray Lamond recorded an average yield increase of 14 bushels per acre, when adding 10 pounds per acre of sulfur to corn starter. In this study, corn was no-tilled on a fine-textured soil, with 3% organic matter.

In a third study, Howard Woodard, South Dakota State University, saw no-till corn yields grow by 25 to 31 bushels per acre, when he applied 25 pounds per acre of sulfur at planting time. This study was conducted in 2000, and soils involved were highly eroded, with organic matter levels of 1.9 to 2.4%.

The researchers say these yield increases are largely due to the upswing in conservation tillage throughout the northern and western Corn Belt.

"Under no-till, ridge-till and other form of reduce tillage, corn is planted into soils that are five to six degrees cooler than conventionally tilled soils, explains Lamond. "This slows down the release of sulfur from organic matter mineralization and creates early-season sulfur deficiencies."

The same thing can happen in conventional-till soils, when corn is planted early. "Even if

you have done some pre-plant tillage, you won't get sulfur mineralization until the soil warms up," says Lamond.

According to Woodard, eroded soils also are more prone to sulfur deficiency, because they tend to lose organic matter, which is the storehouse for sulfur.

For best results from starter applications of sulfur, agronomists advise using the sulfate form. It is the only form that is readily available for crop uptake.

Roots can't absorb elemental sulfur until it is converted into sulfate, explains Rehm. In University of Minnesota studies conducted during day-time temperatures of at least 65 degrees, it took 30 days for elemental sulfur to convert into the sulfate form. Cool soil conditions make the conversion time even longer.

"When you use ammonium sulfate, you are paying about 25 cents per pound for sulfur," reports Dean Collamer, agronomist with Honeywell, a fertilizer producer based in Hopewell, VA. "With corn selling at $2 per bushel, the yield increases reported by the University of Minnesota, Kansas State University and South Dakota State University would be worth an extra $25 to $56 per acre in net return."

In starter applications, ammonium sulfate can be placed with the seed or banded two inches below and two inches beside the seed.

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