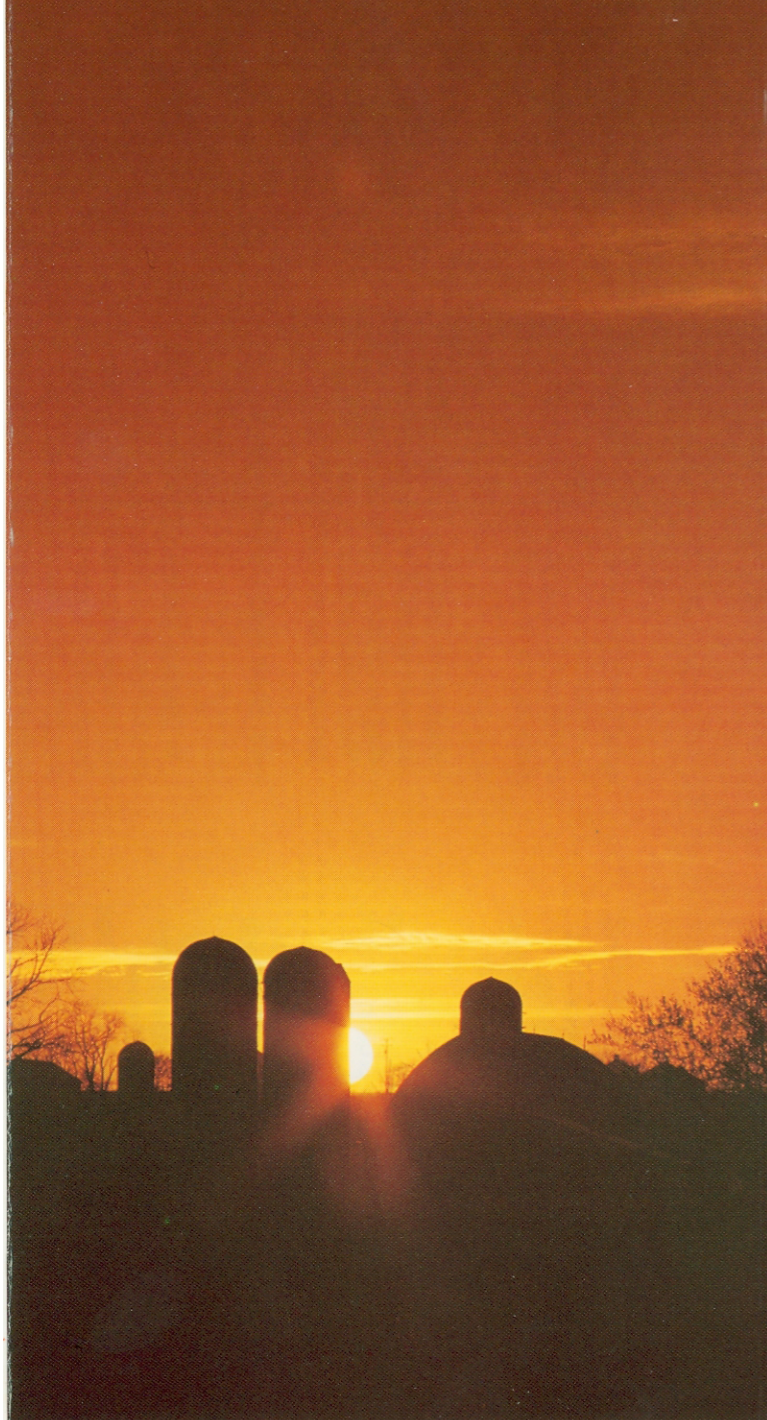


# SULPHUR

DO NORTHEAST CROPS GET ENOUGH?



Farmers growing shallow-rooted crops should be extra careful of sulphur deficiency—especially if crops are grown on coarse, sandy-textured soils that are prone to leaching.

Growers of corn, hay and other field crops also need to be concerned about sulphur deficiency, particularly early in the season before deep root systems develop. In addition, fields with low organic matter are more susceptible to sulphur deficiency.

### Testing For Sulphur

Sulphur-deficient crops are typically small and spindly, with short and slender stalks. Young plant leaves are yellowish-green in color—with even lighter-colored veins. (Nitrogen deficiency symptoms are similar, but older leaves are yellow.) On legumes, nodulation is frequently reduced. And in fruit crops and potatoes, spotting of leaves may occur.

Agronomists advocate tissue testing to confirm sulphur deficiency. While more conclusive research on sulphur deficiency in the Northeast is needed, more on-farm trials by farmers and fertilizer dealers can also help assess the problem. If a sulphur deficiency is suspected, a test plot with a sulphur fertilizer may provide some answers.

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***“My gut feeling is that our sulphur ‘bank’ has a lower balance than it used to. And for that reason, I think all farmers should be aware of sulphur deficiency and test their soils and crops periodically. If you suspect a sulphur deficiency, a test plot with a sulphur fertilizer could answer a lot of questions.”***

**—Lynn Hoffman, Penn State University**

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Because both sulphur and nitrogen work together to synthesize protein, a shortage of either nutrient can reduce the crop's ability to make good use of the other. Applications of high rates of nitrogen over the years have prompted sulphur deficiencies in other regions of the country, and farmers in the Northeast must also consider keeping their N:S ratio in line. Generally, a N:S ratio of 15:1 or greater may signal a sulphur deficiency.

### Livestock May Also Benefit

Fertilizing with sulphur may increase the protein of



grains and forages, while improving the vitamin A content and palatability of hay crops and pastures. This means better performance—in terms of overall production and quality—from beef cattle, dairy cows and sheep. Recent research by Virginia Polytechnic Institute, the University of California, and other institutions has shown that sulphur supplementation can often boost meat and milk production in cattle and better gains in lamb.

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***“If farmers find they need it, I have no doubt that sulphur fertilization will provide a good return. Both your crop and your livestock would suffer without sufficient levels of this nutrient.”***

**—Dr. Jerry Jung, USDA Pasture Research Laboratory, University Park, PA**

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### **Think About It**

Some farmers in the Northeast already see economic benefits to sulphur fertilization. And more will in the future. That's why it makes good sense to keep close tabs on the sulphur content of your crops and soils. Learn to diagnose sulphur deficiency symptoms and, if necessary, talk to your local soil specialist and fertilizer dealer about the best way to incorporate sulphur into your fertilizer program.



## Sulphur—The Fourth Major Nutrient

For more than 200 years, scientists have known about sulphur and its critical role in plant and animal nutrition. Sulphur is one of 16 basic elements needed to support plant life. Without adequate levels of available sulphur, crops cannot reach their full potential in terms of yield, quality or protein content. Nor can they make efficient use of nitrogen, phosphorus and other vital elements. It's no wonder that agronomists frequently call sulphur "the fourth major nutrient."

Sulphur deficiency and its effect on crops and livestock have already been documented in parts of the Midwest, Northwest and South—and sulphur has since become a staple in many farmers' fertilizer programs. Here in the Northeast, however, where sulphur dioxide ( $\text{SO}_2$ ) emissions from local and westward industries have created higher levels of atmospheric sulphur, it has not been perceived as a serious problem in field crops.

At least not yet, anyway.

Such trends as record crop yields, more intensive land use, the absence of sulphur in most modern fertilizers, and a sharp reduction in industrial  $\text{SO}_2$  emissions brought about by the Clean Air Act of 1970 and subsequent pollution-control regulations, could cause a sulphur deficiency to appear where it has not been seen previously.

***"If sulphur deficiency isn't a big problem now, it appears to be working toward us. If nothing else, local farmers need to be aware of the problem's potential and learn to recognize deficiency symptoms."***

—Dr. Jim Paterson, Rutgers University

## Why Sulphur Is Needed

For many years, crops received significant amounts of "free" sulphur from the air and rain. Now that  $\text{SO}_2$  emissions are declining nationwide—a recent report by the Environmental Protection Agency states that  $\text{SO}_2$  emissions were reduced 13 percent between 1980 and 1987 and 28 percent since 1970—sulphur deficiencies are becoming more noticeable. This

trend will continue with enactment of the 1990 Clean Air Bill, which calls for a 10 million ton reduction in  $\text{SO}_2$  emissions by the year 2000.

***"With more pollution-control measures in effect, it's safe to assume that we're not getting as much 'free' sulphur from air pollution or fertilizers as we did the 1970s."***

—Dr. Shaw Reid, Cornell University

In the past, traditional fertilizers, such as ammonium sulphate (21-0-0-24S) or single superphosphate (0-20-0-12S), also provided crops with a steady dose of sulphur. But many of today's high-analysis fertilizers—urea, conventional nitrogen solutions, triple superphosphate and muriate of potash—contain little or no sulphur.

And the push toward higher crop yields and more intensive land use has naturally withdrawn more sulphur from the soil.

***"A decent yield of alfalfa hay can remove up to 30 pounds of sulphur from the soil."***

—Dr. George Estes, University of New Hampshire

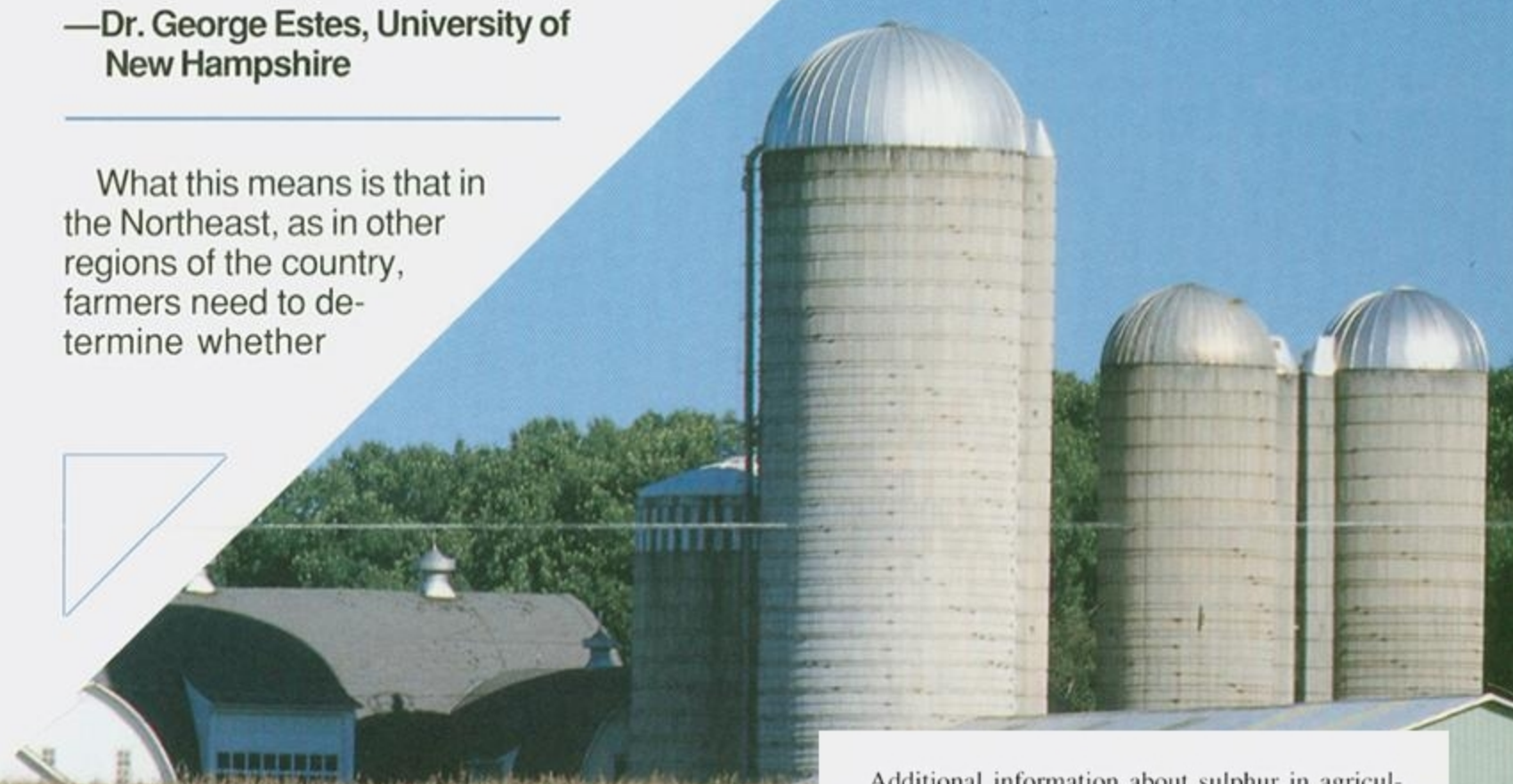
What this means is that in the Northeast, as in other regions of the country, farmers need to determine whether

they are depositing enough sulphur to cover their withdrawals. If not, fertilizing with sulphur could be profitable.

## Where It's Needed

Sulphur research in the Northeast, although limited and inconclusive to date, has demonstrated the nutrient's potential. For example, in upstate New York, at the Miner Institute, a non-profit research and education institution, a 6 percent increase in corn yield was recorded by fertilizing with 25 pounds of sulphur in the sulphate form. Penn State researchers increased wheat yields as much as 9.3 bushels per acre by topdressing with 34 pounds of sulphur.

Because sulphate sulphur is a mobile nutrient that can be leached from the topsoil, nutrient losses from rainfall must also be considered.



Additional information about sulphur in agriculture can be obtained by contacting:

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