

The Dangers of Excessive Lime

by Neal Kinsey

Can you have too much lime? Perhaps the most frequently asked question by those using our soil fertility program is, "Can I put on a higher rate of lime than you are recommending for this sample?" Generally, this has to do with getting the limestone spread, because the owner of the lime trucks says he either cannot or will not apply such a small amount.

Many times a farmer has been told, "You can't use too much lime." That is not true. From our experience in working with thousands of acres that have previously been over-limed, we know you can easily apply too much lime, not just on crops such as berries and potatoes, but on whatever crop you are intending to grow. And if this happens, it can be far more expensive than just the cost of the extra limestone that was not needed, with the added cost of getting it spread.

IT TAKES 3 YEARS TO SHOW

What makes identifying the problem somewhat complex is the fact that it may take three full years to see the whole picture of total effects from any lime applied on a field. If too much is used, it is not normally noticeable in the first year. In fact, if any lime was really needed, improvements will be most evident in the first year. But by the third year, when problems are more likely to begin showing up, many growers have already forgotten the possible long-term effects of the limestone application, and tend to place the blame elsewhere (on weather, fertilizer, seed, and so on).

The adverse effects from over-liming can show up in a number of ways. Principally we must deal with the damage caused from too much calcium and/or magnesium as well as the effects of increasing the soil pH.

EFFECT ON PH

For example, adequate phosphate is a big concern for most farmers in terms of fertilizer. Just by increasing soil pH, phosphate may be released and increased in the soil. But if the pH goes too high, phosphates can also be tied up. Using

more than enough lime can cause the pH to increase so much that this happens. In addition, pH can tie up other elements such as boron, iron, manganese, copper and zinc, as it increases.

EFFECT ON TRACE ELEMENTS

The higher the calcium level climbs from the use of calcium carbonate limestone, or gypsum, or from the calcium makeup of dolomite lime or any other significant calcium source, the more chance the trace elements, plus potassium and magnesium, have of being tied up in the soil — to the point that the crops can no longer take them up. Then plants suffer in terms of quality and yield. This is also a critical point to understand, if the levels of any of these elements, which can be tied up by too much calcium a high pH, are already borderline in the soil. In terms of availability for plant use, deficiencies can occur unless they are able to be determined beforehand by testing, and treated accordingly.

EFFECT ON WATER USE

Use of calcium also increases the pore space in the soil. This is a desirable result until pore space reaches 50 percent of the total soil volume. But when too much calcium is applied by over-liming, so much pore space can result that the soil dries out much easier than before. So you can lose efficiency of water use, whether it's from rainfall or irrigation, if you over-lime your soils.

CONSIDER ALL SOURCES

Some growers might think that just as long as there is not too much limestone applied, there is no problem. High calcium limestone (calcium carbonate) and gypsum (calcium sulfate) are generally considered the most common sources of calcium. But the problem can be caused by other materials, too. The list includes oyster shell, rock phosphate, kiln dust, marl rock (ground sea shells), sugar beet processing lime, and stack dust from the scrubbers of utilities or industrial facilities burning high-sulfur coal. All of these,

as well as poultry manure, especially from laying hen operations (where calcium is supplemented to strengthen the egg shells), can be a significant source of additional calcium.

Certain types of wood ashes that are applied at high tonnage rates, and some sources of irrigation water, can also contribute substantially to the levels of calcium in the soil. Don't be fooled: Too much calcium can cost you money in terms of lower crop yields. On the other hand, even in crops such as berry or potato, so called "low pH crops," too little calcium, or too low of a pH, can cost you just as much or more if not corrected.

USE A SOIL TEST

The best way to determine what is actually needed or not needed in terms of liming is to use a detailed soil analysis. The soil analysis should include measurement of calcium and magnesium and the percentage saturation of each in the soil. Growers cannot determine whether lime is required simply by measuring the pH of the soil. The soil testing methods should always include checking for both calcium and magnesium levels to determine if there is too little, too much or if the proper amount is already there.

An overall picture of what over-liming actually does to a soil can be seen by taking a soil sample prior to the use of the lime and following up each year for the next three years.

So when someone asks, "Why can't we just go ahead and apply 2,000 pounds anywhere that you call for less than that?" the answer is: If you can never apply too much limestone, that would be fine. But too much limestone can be a problem for the soil and for the crops

grown there, because it ties up other nutrients also needed for the growing crop. So it is far better not to use too much lime. The correct amount of lime makes a real difference in how your crops are going to respond, whatever the crop you may choose to grow. ❖

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