Amending the Effects of Excess Water

by Neal Kinsey

Loss of nutrients to excess water during the last few growing seasons has adversely affected certain agricultural cropping areas around the country. This has been especially true in the winter and spring months for most of those areas. Combined with high yields, this extra water has had a very detrimental effect on soil fertility. But the damage is not limited to areas that are seeing excess precipitation — growers with fields that have been heavily irrigated can experience the same type of problems.

In many fields, excess moisture has caused some fertilizer nutrients needed for good crop production to be leached out, washed downward out of the topsoil. This is especially true for nitrogen, sulfur and boron, which is generally expected to be the case with highly active soil water systems. But often overlooked is the loss of calcium, which is another element that can be lost from higher rates of moisture. And in recent years, less emphasis seems to have been given to the importance of liming than has been in the past. As suggested by common soil tests, the loss of crop yields to this phenomenon can be avoided through better attention to the calcium needs in many high-precipitation areas.

The need to apply limestone to increase crop yields has become a significant factor in more and more fields. Some fields being checked for calcium losses on a continual basis have changed drastically in the last three or four years. Such changes are particularly evident on fields that historically have had inadequate liming practices, and on fields that receive inordinate amounts of nitrogen fertilization.

WATCH THAT LIMESTONE

But just applying some type of lime to correct the pH is not the best answer. In fact, some of the fields that have received high magnesium (dolomite) lime can still have an adequate pH and yet be limiting your crop yields. This is because the levels of three other crop nutrients, in addition to magnesium, can greatly influence crop yield, and a need for them may not be properly reflected by the pH. Calcium, potassium and sodium are the other elements in question. If soils have too much magnesium (or too much of any one of the other three), the pH can appear to be OK or even too high, when in fact the soil does not have enough of one or more of the other three nutrients needed to produce at an optimum level.

The only way to know what is actually the case, though, is to have a detailed soil analysis run on the soils. Such testing must measure the levels of each nutrient properly. From this analysis it can be determined what lime, and in what quantity the lime is needed from the various available sources. Just putting on lime is definitely not the best route to take! Too much high-calcium lime (or calcium from other sources such as manure from laying hens, finely ground oyster shell, ground marl rock, and in some cases gypsum or soft rock phosphate) can tie up nutrients. This includes potassium, phosphate, boron, iron, zinc, copper, magnesium and/or manganese.

HIGH-MAGNESIUM LIME

Dolomite, or high-magnesium lime, can cause problems, too. When dolomite is applied in too large a quantity, it can cause an excess of magnesium and have a negative effect on yields. The problem is that it may take as long as three years after the excess lime has been applied to show the greatest amount of potential damage to the crop yields.

By this time, if the grower hasn't kept good records of applications, a connection between the liming and declining yields may be overlooked. The lesson here, of course, is to keep good records of when, where, how much and what type of lime each field receives. Have you applied dolomite lime on any of your fields in the last few years? If so, count three crop years from the time of application and check the yields that year and thereafter as compared to yields prior to liming. If the applied magnesium has been detrimental, expect to see that yields have dropped.

For example, when too much dolomite is applied to land for cotton, it can eventually cause the plant to send out two lesser roots instead of one longer taproot. These roots do not go straight down, but curve to the side. The also have shallower depth than the single taproot would normally have. (If you rip and hip, this effect will not always be as evident.) It will take three years to see the full negative effects of overusing dolomitic limestone. But when overused, it costs a cotton farmer about three-quarters of a bale of cotton per acre every year until the problem is corrected.

EXCESS MAGNESIUM COSTS MONEY

In corn, on medium to heavy soils, a high level of magnesium (above 15 percent) costs the farmer 10 bushels of corn per acre. Above 20 percent magnesium on the soil test reduces the yield by another 5 or more bushels per acre. In addition, it will require more nitrogen to produce each bushel of corn every year until the problem is corrected. In legumes, taking soybeans as an example, 13 to 14 percent magnesium levels can cause losses of 10 bushels per acre per year, even when all other nutrients are present in the proper amounts.

Even though too much, or the wrong type, of lime can cut yields, limestone should always be applied where it is shown to be needed. Applying the proper amount of lime in the right form can provide far greater increases in yield than the losses that occur from misuse. Have your yields suffered in certain fields in the past few years? If so, avoid the mistake of failing to correctly check for and properly apply any lime that is needed. Just be sure that you use enough to correct the problem, but not so much that it causes problems three years from application and several years thereafter. Do it correctly and you will see the difference it will make for several years. If there is a need for lime, autumn is the best time to spread it for the following spring crops. ❖

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