

Nutrient Availability and Soil Tests

*By Klass Martens from the November 2006 PASA
3 day soil fertility workshop with Neal Kinsey*

Next to weed control, interpreting soil tests and deciding which fertilizers to use are THE most common questions that organic farmers struggle with. There are some very important differences between fertility management strategies we use on organic farms and those used on conventional farms but the basics are still the same. When you get back soil test results, they will give you levels of calcium, magnesium, potassium, hydrogen, pH, CEC, phosphorus, and often sulfur, sodium, zinc, iron, manganese, copper, boron, and aluminum. In addition, many tests report "base saturation" percentages of the major cations. If they are all testing for the same things, then why are there such big differences between the numbers you get from different labs? Neal Kinsey explains it this way: If you see a word that is written in English, and then see the same word written in French, German, and Spanish, even though each different language uses the same 26 letters and appear similar, they will look like 4 different words and make no sense to you unless you can read the language that the word is written in. Looking at different soil test reports is a lot like seeing different languages in print. They may all say the same thing using the same set of letters and numbers but will appear different until you have learned how to read them. Even 'percent base saturations' may not be calculated the same way by each lab that reports them. For this reason, there are no 'right' or 'wrong' soil test labs to use. You just need to learn how to understand the reports from the lab you decide to use, and realize that comparing results from different labs may be confusing.

Most fertilizer programs are based on something called "The law of the minimum". This is a theory that says that crop yields will be limited by whatever element is in the shortest supply. Often an illustration of a barrel with several broken staves is used to explain this. The barrel can only hold as much water as the shortest stave, no matter how high the others are.


We all know that often the most limiting factor is not a mineral element at all, but instead is rainfall. We also know that it is possible to have so much rainfall that yields are lowered by it. That illustrates a less known and understood law called "The law of the maximum". This law states that when you have an excess of one thing, it will cause something else to become short. In the case of too much water, this causes a shortage of soil oxygen which limits yields. With fertilizers, the interactions aren't always as obvious or as simple as with too much rain, but they can hurt your crops just as

much. That is why when a little is good, a lot more may not be better - it may cause a disaster instead.

Soil tests are as important for avoiding excesses as they are for determining what is deficient. Organic fertilizers like compost and manures contain many different minerals. That is usually an advantage because we put on trace elements along with the major elements whenever we fertilize with these materials. However, when we already have an excess of something, putting even more of it on can cause trouble even if the material we use contains something else that we really need. Putting on too much of something is often much worse than having a shortage and can cost you in at least three ways: First, buying the unneeded material wastes money, second it lowers yields and quality, and third it may cost even more money to correct the imbalance caused by the over-application of fertilizer.

An excess of some materials can cause things you need to leach out or be tied up. That not only costs you in lost fertility, but can also impact water quality. Excess nitrogen can cause calcium or potassium to leach out of the soil and cause loss of organic matter. Excess sulfur can leach out many of the cations on the soil colloids. Excessive phosphorus ties up zinc, excessive po-

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tassium can tie up magnesium, and excessive magnesium ties up everything including magnesium! Excessive calcium can do the same. Even something as good as organic matter can be overdone – if the organic matter has too wide a carbon-to-nitrogen ratio, it can tie up nitrogen so severely as to cause crop damage. Too much organic matter can also cause weed problems.

It is important to not put on materials unless you know what nutrients they actually contain. There is a tremendous possible range in nutrient content in materials like manure and compost. For this reason, it is important to test each amendment before application to soil. Be sure you understand whether the test results are on a ‘dry matter basis’ or ‘as is’. If the test is on a dry matter basis, and you are putting on something with varying moisture like compost, you will have to take the moisture level into account by varying the application rate.

Klaas Martens, along with his wife Mary-Howell and their three children, farm 1,400 acres of organic grains in the Finger Lakes area of western New York. They also own and operate Lakeview Organic Grain, an organic feed and seed business in Penn Yan, NY. They can be contacted at kandmhfarm@sprintmail.com. ♦

Grain, Grain, Where's the Organic Grain?

By Kathie Arnold

Along with the current big increase in organic milk supply, comes perhaps what could be called a perfect storm to limit a similar increase in organic grain supplies. I recently had an opportunity to testify before the Senate Ag Committee on behalf of organic needs for the 2007 Farm Bill and had a chance to visit with Lynn Clarkson, who was also testifying. Mr. Clarkson is current president and founder of Clarkson Grain Co., Inc. in Illinois. In the business of contracting with grain growers and supplying organic, non-GMO, and conventional grains domestically and internationally, he is in a position to know what is going on in the grain business. He related that he is concerned that the supply of domestic organic grain may actually go down this year as he sees farmers deciding to make the switch from organic grain production back to conventional because of what they are perceiving as less risk with conventional production. With the government subsidies for corn based ethanol, conventional corn prices have been driven to record heights that look very attractive. And crop insurance, although not working very well for conventional producers, works considerably poorer as a risk management tool for organic grain growers.

That was made clear to me by Rick Glenister, a grain grower from Moravia, NY that we buy from who has this to say: *“While transitioning to organic grain farming, I recognized just how vulnerable crop farmers are since their income and financial survival depends on just the current crop season. Therefore in late 2004 I began researching crop insurance options for the 2005 season. After studying the various crop insurance programs it became clear to me that none of the policies really offered very much effective protection at affordable premiums. Nonetheless I enrolled in the standard corn and soybean policies thinking that some insurance was better than none.*

Unfortunately the 2005 season was exactly the kind of drought year that tests a farmer's mental health. You could practically draw a line running east west across Central New York about half way between Auburn and Ithaca with record drought to the south and perfect growing conditions to the north. I could stand here in my dooryard and hear the thunderstorms pass to the north just out of reach. Of the 10.6 inches we received that growing season (our average is 16-18) 6 inches came on or before June 12th (with 3 inches in one event) and the remaining 4 inches two days after Katrina de-



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