CERTIFIED CROP ADVISER

Common Soil Fertility Myths

by Craig Reid, *CCA-ON*

Unlimited access to information at our fingertips 24/7 has been a boon to production agriculture as new research is published daily, and we have instant access to it. The unfortunate flip side of that coin has been a proliferation of information taken out of context and improperly applied. I have tackled three of the more common soil fertility myths today.

The relationship between potash and magnesium

There is a relationship between potash and magnesium, and it is fairly straight forward. Elevated levels of potassium in the soil can inhibit a crop's uptake of magnesium, particularly on soils with lower levels of magnesium. This is important particularly in high-yielding forage production, where grass tetany might be a concern. However, this relationship only works one way. Elevated magnesium levels do not tie up potassium ions in the soil, or inhibit the ability of a crop to take potash up. Adjustments to potash rates due to the level of magnesium in the soil, or other methods of adjusting magnesium levels are largely a waste of effort.

CEC and Basic Cation Saturation Ratios

This is a large subject and ties into the previous myth. There are jurisdictions in North America that adjust potash rates using a soil's cation exchange capacity or CEC. This takes into account the ability of a soil to hold positively charges ions like ammonium, potassium, calcium and magnesium on exchange sites in a plant available form. The Ontario data shows no difference in potash rates giving the highest (or most economic) yields at different CEC levels, and in some cases CEC adjustment makes fertility recommendations much less accurate. Similarly, the base cation saturation ratio approach tries to establish an "ideal" ratio of cations on the soil exchange sites. Quite often this approach leads to over-application of potash, with no extra yield gains beyond normal fertility programs. The upshot of most of these approaches to soil fertility is added fertilizer costs, without a corresponding increase in marketable yield to pay for the expense.

Sulphur, gypsum and acidity

Sulphur has received a lot of attention in recent years, as the effort to clean up emissions has resulted in less "free" sulphur being deposited by acid rain in Southern Ontario. As we work to adjust rates of sulphur on different crops while working in this new reality, a number of different sources have been considered. One of the most heavily used sources in the past has been ammonium sulphate, and the breakdown of that product results in an acidic zone around the granule. This has more to do with the chemical makeup of ammonium sulphate, and less to do with sulphur itself being present. In our alkaline soils, this acidity is not likely to cause any problems and may provide a slight benefit. Gypsum (calcium sulphate) has received a lot of attention as a sulphur and calcium source in recent years as well. While gypsum has a neutral pH, it is because it doesn't release free hydrogen ions (acidic reaction) or react with hydrogen ions (basic reaction) as it breaks down in the soil. There are other benefits that proponents of using gypsum claim, including improving soil structure, improving drainage, and increasing uptake of calcium and other nutrients. While these claims are true in certain circumstances, they aren't the norm on the vast majority of soils in South-western Ontario. Research into the effects of gypsum on soil structure outside of saline or sodic soils, or on soils with extremely high levels of magnesium is very sparse, and results tend to be mixed and unpredictable. Rates that will have any effect on soil structure are much, much higher than the rates needed to meet sulphur fertilizer requirements. The other consideration with gypsum is that the release of sulphur or calcium can be quite slow as the solubility of gypsum is generally low at all pH levels. While sulphur is emerging as an important part of the fertility program we need to manage, the source of sulphur can have a dramatic effect on the final outcome.

These are just three areas where there exists some confusion surrounding crop fertility in South-western Ontario. Keep in mind that the native soil, climate and crops being grown can have a huge impact on how soil fertility is approached, and how different compounds will behave in the soil system.

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