



Laboratories, Inc.

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MVTL Newsletter

Fall, 2009

MVTL News & Updates

Using %Base Saturation for fertilizer recommendations vs. traditional soil test K ... by George Rehm.

Soil Tests Measure Readily Available Potassium

The potassium soil test used for fertilizer guidelines measures “readily available” forms of potassium, and is reported as an index (for example: 160 ppm). Using %Base Saturations may not be a fundamentally sound foundation for making fertilizer recommendations, however, they (along with CEC) can be useful analytical tools to help clarify soil properties and provide a more distinguished road map for placement of crop inputs. Recently, George Rehm, responded to some information surrounding %Base Saturation that could potentially be misleading.

George Rehm Blog... www.agbuzz.com

“Telephone calls and e-mail messages provide a reasonable indicator of marketing activity in the world of fertilizer sales. Based on what I read and hear, a bogus concept that I once thought was near death has come back to life. I’m referring to the idea that base saturation should be used as a basis for making fertilizer recommendations for potassium and possibly calcium and magnesium. This concept is bogus, misleading, not based on science, and can easily lead to wasted money and lost profit.

I could probably end this communication with this last statement. However, I will try to briefly explain now and add to that explanation in educational meetings when I’m on the program this winter. Let’s consider potassium (K⁺). Those who promote the base saturation concept suggest that about 5% of the “exchange sites” in soil should be occupied by the K⁺ ion. The source of this 5% value is a mystery to me. It is certainly not based on research. I’ve searched for the science base for this number for 35+ years. To the best of my knowledge, that base does not exist.

Using this percentage value or any value can lead to major mistakes in the use of potash fertilizer. For sandy soils with a low Cation Exchange Capacity (CEC), use of this value or a similar saturation value can result in under-application of potash fertilizer with a strong possibility of reduced yield. For fine textured soils with a higher CEC, use of this value can result in over-application of potash fertilizer thereby increasing fertilizer cost without a subsequent increase in crop yield.

The currently used analytical procedure for measurement of K⁺ in soils is the best indicator of the need for potash fertilizer. Although not perfect, it is certainly better than the base saturation approach. The concentration of K⁺ measured is not a measure of the amount of K available to the crop. The value measured is a relative indicator of the probability of a response to the application of potash fertilizer. If the soil test for K is low or very low, the probability of a response is high. Likewise, if the soil test for K is classified as high or very high, there is a low probability that the application of potash fertilizer will increase yield.

In case you haven’t guessed by now; I believe that it is a major mistake to follow the base saturation concept when considering fertilizer applications. To those who market this concept: i’ve challenged you in the past and I challenge you again. Show me the unbiased data that support the use of this bogus concept.”



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In conjunction ...

Most nutrient uptake by plants occur on an “as needed” basis and are not easily influenced by one nutrient having a higher concentration than another. That does not mean some nutrients like calcium won't accumulate near the root, but does imply that plants can and will determine which nutrient ions are most critical, regardless, the concentrations. This logic supports reasoning that managing soil-nutrient-ratios is not a reliable management tool since the plant will manage critical nutrient needs regardless available concentrations. Some soil-types (calcareous in nature) may accumulate high concentration of Ca & Mg near the root surface and have the potential to interfere with phosphorus uptake (interrupt diffusion process), specifically, in early plant development when P demand is high and root systems are limited. With proper fertilizer placement and normal root development, we'd expect the plant to become more capable and selective in determining it's nutrient needs throughout it's vegetative stages.

Proper Soil Processing Is Still The Best Solution

Proper soil processing will have a high impact on providing quality potassium analysis, especially, when it comes to soils containing high Ca & Mg levels. Doing a quality job of measuring Ca, Mg, Na, and K with accuracy and consistency is THE BEST SOLUTION to providing quality data to be used for fertility guidelines. CEC and %Base Saturation can be very useful information to many ag professionals, but we have to keep in perspective they are calculated results based on summations. Understanding plant requirements and determining sufficient soil nutrient levels is still the focal point.

