LEGACY Seeds
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AGRONOMY NEWSLETTER

JANUARY 2021

WALKING FIELDS

"VIRTUAL" MEETING SEASON

Like many things in 2020, most winter agronomic meetings will be virtual. The University of Wisconsin will be hosting the Agronomy Update Meetings virtually and other major trade shows like the Wisconsin Agri-Business Classic have adapted a virtual format. Although many will miss the face to face interaction, watching these agronomic sessions in your pajamas can have some benefits. Growers can take part in educational sessions in their choice of topic and for their specific geography. This access to additional information is great but do not let it muddy the waters. Identify and focus on the goals and needs of your operation. There are a few things to keep in mind when listening to these virtual seminars.

With grain markets rallying late in 2020 and into early 2021, it can be easy to get caught up in products that "provide a positive ROI". Keep in mind that some of these additional inputs seem more attractive with the increase in market prices. Again, identify and focus on your operations' goals and needs; do not get caught up in a sales pitch. When analyzing information and yield data keep in mind that the past few growing seasons varied dramatically. Be aware of the year the data was collected and the geography that the plots were in.

In these unusual times, take advantage of the resources available even if it is from your pajamas.

PREPARING FOR 2021

HOW TO INTERPRET SOIL TEST RESULTS

In the November edition of the Agronomy Newsletter we covered the proper soil sampling process. Now with harvest data from 2020 and those soil samples processed, growers can begin to use this information to make decisions for the upcoming season. This edition will show how to interpret some of these important measurements. There are some very important analyses that help determine the characteristics and productivity of a soil.

Organic Matter is a measurement of the amount of plant and animal residue in the soil. Organic matter promotes the growth of beneficial bacteria and fungi. This portion serves as a reserve for many nutrients, especially Nitrogen, and soil moisture. Organic matter also helps provide soil structure which improves water infiltration.

Soil pH measures the active soil acidity or alkalinity with 7.0 being neutral. Soil pH measures the amount of hydrogen ions that are in soil solution. The scale is in logarithmic units which means that a pH of 5 is ten times more acidic than a pH of 6. Crop performance can be drastically affected by unbalanced pH, with corn performance varying from 100% at 6.8 and 83% at 5.7 and alfalfa at 100% potential at 6.8 to 42% at 5.7. Buffer pH is often reported, it is used to calculate lime rates.

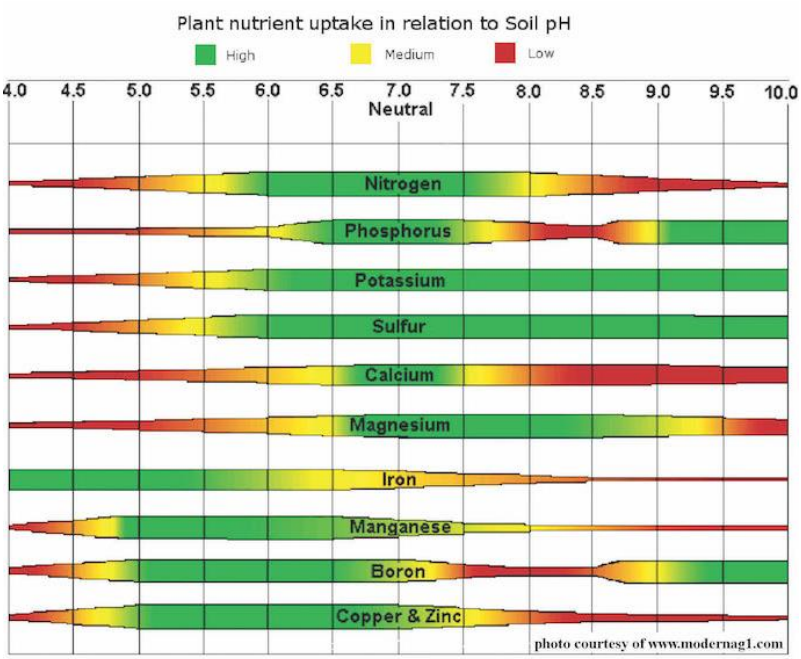
Cation Exchange Capacity has been explained to me as "how big of plate you are taking to the buffet." CEC measures the soil's ability to hold positively charged nutrients like potassium, magnesium, calcium, sodium and hydrogen. The higher the CEC, the greater the number of negative bonding sites the soil particles have. This number can range from 5 to 20+ meq/100g. Factors that influence CEC are mainly types of clay minerals present and soil organic matter levels.

Base Saturation could represent the how much broccoli vs steak is on your plate when you leave the buffet. This calculation shows the proportion of the exchange sites on the soil particle that are occupied by a certain positively charge (cation) nutrient; potassium, magnesium, calcium, sodium and hydrogen; or any combination of these nutrients (referred to as bases).
Potassium – 2% to 6%
Magnesium – 10% to 20%
Calcium – 65% to 75%

SOIL TEST P

HOW PHOSPHORUS IS REPRESENTED

Phosphorus is an essential nutrient for plant growth and an expensive fertilizer, which makes it very important to manage. P is stable in the soil and grain yields remove the largest percentage. Phosphorus can be measured by a couple tests. One of the most common is the weak Bray test which measures phosphorus that is readily available to plants. An adequate phosphorus level for the weak Bray is 20-30ppm, with optimum levels most often being higher and based on soil conditions and crop yields. On most soils it takes about 9lbs of P2O5 fertilizer (DAP is 18% P2O5) to raise levels 1ppm. The strong Bray measures the available phosphorus and a portion of the active reserves of phosphorus in the soil. A level of 40-60ppm is desirable for most crops. When this level is above 50ppm, there will likely be a positive response to zinc fertilizer. Analyzing the ratio of weak Bray to the strong Bray can help evaluate status of phosphorus in the soil. A 1 :2 ratio with the weak Bray testing in the medium to high range has an ideal amount of available and reserve phosphorus. Olsen P tests should be used on high pH soils. Soil pH below 6.2 will limit P availability.



SOIL TEST K

HOW POTASSIUM IS REPRESENTED

Like P, potassium is stable in the soil but the stover or foliage portion of the crop removes the highest percentage of K. Crops where the entire plant is removed like alfalfa and corn silage require higher amounts of potassium. Legumes, like soybeans and alfalfa, also have high requirements of available K. Potassium is held in the soil three ways; Primary and Secondary minerals make up over 90% of K and can be trapped between layers of clay; Solution potassium, is readily available to plants and measured by a soil test. The optimum level of available K varies depending on crop, soil type and characteristics, however an acceptable range of potassium on a soil test is 120-175ppm. On most soils it takes around 12-15lbs of K2O fertilizer (Potash is 60% K2O) to raise levels 1ppm. Potassium is a positively charged particle and its bonding sites are measured by the CEC of a soil. Because of this we can use base saturation to measure soil K as well. A base saturation K of 2-6% is optimum for most crop production. Soils containing high levels of magnesium (above 18% base saturation) may also need higher levels of potassium. Low pH soils (5.8 and below) can limit the availability of potassium to the plant.

CA : MG RATIO

CALCIUM AND MAGNESIUM SOIL TEST RESULTS

Both of these nutrients are cations and will bond to sites quantified by the CEC and can be measured by using base saturation. Calcium and Magnesium levels are affected by soil type, drainage, liming and cropping practices. As soil pH raises the levels of Ca and Mg will also increase. Calcium deficiencies are rare when pH is adequate and Magnesium deficiencies happen most often in sandy soils. An optimum base saturation Mg is between 12-18%. Soils with a base saturation MG above 23% will show drainage and compaction issues. An optimum base saturation Ca should be between 65-75%. Liming can often influence this measure. Calcium and Magnesium are often analyzed as a ratio since both can occupy the same bonding site on a soil particle. The optimum ratio of Ca:Mg can vary from 1:1 to 8:1 depending on soil type. A more reliable way to evaluate Ca and Mg levels is with base saturation.

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