

KEYS TO WATCH FOR IN EARLY SEASON CORN AND SOYBEAN MANAGEMENT

CORN & SOYBEANS

Observations to Train the Eye

Stand Count: Observe the plant-to-plant relationship, spacing and size.

Color: How deep of green, any interveinal patterns? Any crinkling of the leaf margins? Where are they located? Edge / mid rib / tip? Older or newer leaves? Document this before you send in your tissue analysis and learn from it.

Stem Diameter: Great indication of better root growth and development is tied to stem girth.

Leaf Width & Length: This can range from variety to variety, but this gives you a good idea on if you are in the luxury range of Zn and Mn.

Early Season Root Growth: Knowing that in corn at V3 the root is vital, as the seed reserves are depleted, and the nodal roots take over. Know when a root stimulant can add greater value by observing the corn root structure at V2-V3 to create a nice transition from seedling root to the permanent root system. Structure of the root should be dominated by vertical roots, especially in soybeans.

****Early season observations are key**

Girth of the ear or rows around are determined from v4-v6, length or kernels long is determined from v6-v8 - from this point on its protecting yield until we can have an effect on seed weight.

The biggest yield change we can make to soybeans early in its life is the total node count on a per acre basis. Soybeans determine this in the V2-V6 stages. Once we create the node count, we are in the building of plant structure and stress tolerance preserving stage up until seed fill. We want to build sufficient nodulation early in the plant's life, we can affect this as managers of the crop as well. The more we get done early the better the plant can utilize its energy later in the plants life converting flowers to pods.

Early Season: Maximize sunlight every step of the way. These nutrients need to be on the high end of the ranges early, N, K and S can be in the sufficient or medium levels with no yield disadvantage they do not need to be in the high or luxury range.

Ca++: Trucker of 7 key nutrients all nutrients listed below, and you can add in its effect on Potassium uptake, activates enzymes, cell wall strength.

P-: The engine of energy.

Mg++: Center of chlorophyl production.

B-: Steering wheel of the truck - guides nutrients within the plant, cell wall strengthener.

Zn+: Creates the size of the solar panel in leaf length, enzyme activator and aids in providing energy for the plant. This is slightly more important in corn rather than that of soybeans.

Fe++: Helps create the amount of capturing potential of the solar panel we created with Zn. Fe helps provide the dark green color needed to maximize the suns potential. Fe is used by the plant to form the enzyme required for chlorophyl.

Mn+: Is an essential cofactor for the oxygen - evolving complex (OEC) of the photosynthetic machinery, catalyzing the water - splitting reaction in the photosystem II (PSII). Mn also influences leaf width. Mn is slightly more important in soybeans then that of corn.

Cation to Anion Ratio: Keep 1:1 or be cation dominant. Total nutrient density at V6-V8 in corn and V4-V6 in soybeans are very important. IF Brix levels are low currently, first thing to look at is Ca++, P-, and or Mg++.

**Cations are positive. Anions are negative.*

**Total nutrient density is just the addition of adding up all the nutrients reported in the plant analysis.*

Example of this 225-bushel corn at V3 (10.13) 318-bushel corn was (11.94) Very similar findings in that of soybeans as well.

KEYS TO WATCH FOR IN EARLY SEASON CORN AND SOYBEAN MANAGEMENT...CONT'D

**Cation to Anion relationship is primarily driven by the following Cations, which is the sum of Ca, Mg, K and divided by the Anion sum of N, S, P.*

**Early season wind damage that we are seeing across the area can be addressed by adding in Si, Ca and Boron as a foliar. These are all vital for cell strength and disease management.*

Soybeans: Goal of establishing a plant with early nodulation and creating a cytokinin dominant plant. Early nodulation is aided by moly, sulfur, and our keys above of capturing sunlight. Early cytokinin dominance is also important and the nutrients that are helpful are Cobalt, Phosphorus, Manganese, and calcium along with the nitrogen created by the nodules (not nitrate nitrogen).

An in depth look at some of the key early season nutrients

CALCIUM

Early Season:

You need a luxury amount of calcium in every tissue analysis throughout the growing system in both corn and soybeans. Balanced anions to cations in the soil will help calcium uptake. What can affect calcium uptake? Overabundance of nitrogen and other nutrients, low boron, low beneficial fungi can affect calcium uptake as well. Calcium has been termed "the trucker of all elements" because it sponsors the uptake of nutrients such as manganese, zinc, potassium, iron, phosphorus, boron, and magnesium. Calcium also makes the plant hold in minerals better. Calcium's biggest job is to strengthen the cell wall and membrane to keep pathogens out. Calcium also kicks in plant immunity once the plant is under any type of stress. Calcium is also responsible for activating 146 enzymes in the plant. A good visual sign to see if you have a

sufficient amount of calcium is if the leaf thickness of the plant is greater than usual, also a high brix levels will tell you if you have a sufficient amount of calcium. Visual signs for calcium deficiency will first appear on younger leaves and tissues, growth is inhibited, and plants have a bushy appearance. Another good visual for calcium deficiency is ribbing of the leaves.

BORON

Early Season:

If calcium is the trucker of all minerals, then boron is the steering wheel. Without an abundant amount of boron then calcium will not do its many jobs. You also need good to excellent amounts of boron in every tissue analysis throughout the year. Optimum levels of boron would be from 40-60 ppm. Boron will be deficient in alkaline soils, it will also leach easily in light sandy soils. Nitrogen and potassium can antagonize boron uptake when we mismanage them. Over 90% of boron is found in the cell wall. Boron is primarily involved in the structural and functional integrity of the cell membrane and cell wall, it just as important as calcium for proactive pest management. Boron is really important for nitrogen fixation because the main bacteria called an azotobacter needs boron to survive. These bacteria take nitrogen gas and converts the nitrogen gas into ammonia. Zinc and molybdenum are also essential for these bacteria. Boron increases the rate of transport of sugars. Boron also opens the trap door that lets the sugars move out of the roots into the soil and the sugars feed the soil life. Boron can help calcium uptake and make silica soluble in the soil. Visual signs of sufficient boron go right with the same visual signs as calcium. Deficient Visual signs of boron are very similar to calcium as well but instead of ribbing on the inside of the leaf ribbing is visual on the outside of the leaf with boron.

PHOSPHORUS

Early Season:

Phosphorus is termed as the energy mineral. Phosphate enzymes are the most important thing in photosynthesis and ATP. ATP is Adenosine Triphosphate. ATP is the energy of the plant and without ATP photosynthesis does not happen. Plants will always need a sufficient amount of phosphorus in order to reach full photosynthetic potential. Phosphorus also builds root growth. Visual signs of abundant phosphorus would be a vigorous looking plant early. Deficient signs would be a lot of lateral roots in both corn and soybeans, and purple edged leaves. If the plant has severe phosphorus deficiency the whole leaf will be purple.

MAGNESIUM

Early Season:

Magnesium is the central mineral in the green pigment chlorophyll. The chemistry of chlorophyll has the magnesium atom as its center piece and 4 nitrogen atoms hooked into as magnesium is the center piece. Magnesium also plays a major role in phloem and carbohydrate partitioning. Magnesium is the most important mineral of enzyme catalyzing. Most of the phosphate-based enzymes that drive sugar production require magnesium. Magnesium is to phosphorus what boron is to calcium. Magnesium also helps the seed germinate. Having adequate magnesium in the plant will also help the plants uptake of nitrogen, unlike that of high levels of magnesium in the soil which slows down nitrogen uptake. Magnesium is a very fast-moving mineral so magnesium deficiency shows up in the older leaves first.

V5	N	P	K	S	CA	Mg	Cations	Anions	Total Density
#1: In-Furrow + 2x2	4.45	0.32	3.79	0.29	0.60	0.26	4.65	5.06	0.92/1 9.71
#2: Only In-Furrow	4.82	0.34	3.92	0.32	0.91	0.24	5.07	5.48	0.93/1 10.55

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