NACHURS® Field Notes
NOTES FROM THE AGRONOMY TEAM

ISSUE 5 FALL 2014

HARVEST AROUND THE CORNER

THOUGHTS AND TIPS FOR A PRODUCTIVE HARVEST

By John Holdsworth,
U.S. Central Sales Agronomist- Wisconsin

Walk Your Fields:
As the 2014 growing season is drawing to a close, a reminder to scout/walk your fields during the final growing days which will allow you to observe crop conditions and diagnose potential problems as they develop before harvest. Such scouting and troubleshooting are critical steps in identifying yield-limiting factors that need to be determined before crop-management and remedies can be considered.

Stalk rots are favored by growing conditions early in the season, followed by stress after pollination. These stresses can be caused by the lack of moisture, (which seemed not to be the problem in a lot of areas this year) nitrogen deficiency, foliar diseases, hail damage, and prolonged cool/wet/cloudy weather conditions. With these stresses prior to pollination and several weeks after silking favor the development of most stalk rot fungi.

The most common stalk rots include Anthracnose, Diplodia, Fusarium and Gibberella.

Stalk Rots and the role of Potassium (K):
Stalk rots are among the most common and damaging of the corn diseases. The yield losses can result from premature plant death and stalk lodging. The severity of the stalk rot loss can be minimized with optimum balance between Potassium (K) and Nitrogen (N) levels in the plant tissue.* Too much Nitrogen (N) that is out of balance with Potassium (K) can cause a rapid flush of growth, which may cause the plant to have insufficient structural composition to guard against fungal pathogens. Potassium (K) has been associated with the improvement of stalk strength. When corn plants take up sufficient Potassium (K), stalk dry down is moderate after maturity and the risk of lodging may be reduced.

Soil fertility tests should be conducted at least every other year to verify that the appropriate fertility levels are maintained. It's important to apply fertilizer based on the values of the soil test, always consider residual fertility from previous crops and manure applications when determining application amounts.

Source: Pioneer.com

IN THIS ISSUE...

Always consider NACHURS High Quality N-P-K starter fertilizers to get your crop off to a fast and uniform start. The key is to provide a balanced fertility program early in the growth stage of the corn plant with the combination of Nitrogen (N), Phosphorous (P) and Potassium (K) to help set the potential for maximum yields. NACHURS has a great portfolio line-up of N-P-K starters to choose from: **NACHURS W18®, NACHURS G24®, NACHURS HKW18®, NACHURS imPulse™, NACHURS 6-22-6-1S, NACHURS Triple Option™** and **NACHURS raPid™** to name a few. For more details, be sure to ask your NACHURS authorized retailer/distributor, DSM or Agronomist for fertility recommendations.

Take the time to scout fields, regardless of when they were planted. Plan to harvest fields with potential lodging or harvest-loss problems first. Under severe stalk rot conditions, it may be more economical to harvest early at higher moisture and dry down than to experience severe harvest losses…..Have a SAFE and productive harvest.

Source: * Draper, M.A. et al. 2009. Corn diseases in South Dakota. Best management practices for corn production in South Dakota… South Dakota State Univ. Ext, EC929.

NACHURS FOCUSED ON THE 4-R'S

By Joe Pflum,
U.S. Northeast Sales Agronomist- Indiana

As a Corn, Wheat, and Soybean producer in East Central Indiana, I too know of the importance of making fertility decisions when it comes to plant nutrients and the cost associated with inputs. When I talk with growers about foliar/seed applied starter fertilizer I often get the response that, " I've tried it in the past and I didn't see any results." There are many factors that determine how successful a nutrient management program will be. The 4 R's help us to understand the process more clearly. They are Right fertilizer source, at the Right rate, at the Right time and in the Right place. According to nutrient stewardship,"4R nutrient stewardship provides a framework to achieve cropping system goals, such as increased production, increased farmer profitability, enhanced environmental protection and improved sustainability." By implementing these objectives set fourth we can expect to see big dividends with our yields.

The right fertilizer source is a low salt, high orthophosphate NPK placed with the seed during planting. This is essential for corn and wheat, which have a critical demand for early phosphorus to establish a healthy root system. Followed by the right foliar fertilizer for in-season applications.

The right rate is typically 10-15 lbs./acre of P_2O_5 placed with the seed. This will vary according to soil test, row spacing and crop type. The right rate of foliar fertilizer will depend on tissue test deficiencies, visual deficiencies and growth stage of the crop.

The right time is with the seed during planting and in-season applications. The right time for in-season foliar applications is most successful when timed with the growth stage of the crop. Specific nutrients are consumed more during different growth stages; understanding these nutrient demands in the plant help determine the proper nutrients. Tissue test are always recommended. If a deficiency is discovered yield will be limited.

The right place is with the seed during planting and in-season foliar applications. We know location is everything when it comes to plant nutrients. Even if our soil test levels are sufficient, to optimize yield potential we must place nutrients were the crop would access them. This will ensure the highest recovery on nutrients we place on the seed or the foliage.

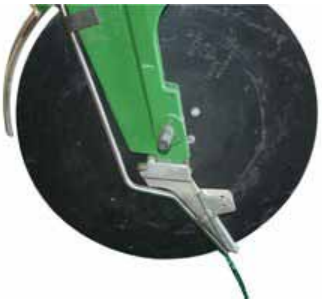
Ask your NACHURS representative on how you can expect more yields with efficiency.

YOUR RELATIONSHIP WITH NACHURS

By Rich Recker,
U.S. Northeast Sales Agronomist- Michigan

Relationships don't develop overnight no matter what it may be such as people, work, recreation or trusting someone to enhance your business which effects your family and life. At NACHURS we work to earn that trust to develop a relationship with you the customer to be able to offer information and products that will be a benefit to your operation. Look at how fast things did and can change not only on crop prices as well as production increases from just 2 years ago so who is in my relationship circle to work with me now. As we are harvesting this fall looking back on what choices we gave this crop in 2014 many questions arise what to do next year. Now as much as ever Balance, Placement and Recovery is at the top of the list as a grower to be as profitable as possible without going backwards on their fertility programs. This is why at NACHURS we are working so hard at bringing new products to market like our **Bio-K™** products for the seed applied NPK placement, when you may be considering less broadcast rates while still preparing for best yields possible. Then when looking at my next opportunity to maintain yields when I spray what choices are there and who in my relationship circle can provide choices that are in my best interest not just selling. If we are to look at a sidedress application a placement choice what combinations could help with my whole fertility programs while spreading my risks. As we look at some of these choices such as the **NACHURS MicroBolt®** lineup of micronutrients, **Bio-K**, and sulfur products that are there to help ensure the availability of a complete fertility program. During this harvest season while looking at test weights, drydown, yields talk to your NACHURS representative on what products can help to make a difference. Bottom line we have to work harder at this now as crop prices are much different so who is there to work on these challenges with you. Many growers are looking at cover crops, strip-tillage, manures (composts) ways to increase soil health, nutrient recycling and placement for increased uptake this works well we just need to be sure and balance all we are doing to have benefit. When adding these components or practices keep track of ratios and crop needs such as zinc, sulfur or boron. I know on so many of our customers fields that I have been on this year looking at their crops to monitor this years progress it is also to begin how to plan for next year because we are going to farm again. Thank you for thinking of us at NACHURS as part of your circle please give call we're ready to work to make the difference. In the field as always looking for those bushels.

Schaffert Rebounder (L) with Keeton Seed Firmer (R)



Totally Tubular

"V" Shot

Finished rig: Tank, ground drive pump, manifold, pressure gauge, and hoses

STARTER EQUIPMENT CORNER

By Keith Flaniken,
U.S. Southeast Sales Agronomist- Tennessee

In order to accurately place NACHURS starter fertilizer directly with the seed, certain planter attached equipment and plumbing is necessary. The cost and installation is very reasonable depending on the level of technology that best fits a particular producer's needs. Required equipment includes a tank, pump, manifold, hoses, pressure gauge, seed firmer of some form, and plastic ties.

Seed firmers and covers are the most popular when used on multiple crops. The Keeton Seed Firmer (fig. 1) and Schaffert Rebounder (fig. 1) offer both seed placement advantages as well as accurate liquid fertilizer distribution. When used on multiple crops such as corn, soybean, and cotton, both offer a "Y" splitter option to dispense the starter fertilizer away from the seed and onto the side walls of the seed furrow.
Totally tubular (fig. 2) is an excellent tool for corn and cereals only. This attachment streams fertilizer directly under the seed as it mounts under the seed tube.

A new and growing method of creating a perfect seed furrow and fertilizer distribution system is the "V" Shot. (Fig. 3) This forged tungsten attachment is available for John Deere planters only for the moment but other planters are in production. The fertilizer is placed about 1" deeper than the seed drop and slices a near perfect furrow for the seed placement. We installed this unit on the JD 7100 6 row planter at the Moultrie, GA Sunbelt Ag Expo farm in 2014. Everything planted on the farm this season was planted using the "V" Shot and the stands were excellent.

Please contact your NACHURS DSM or Agronomist for more equipment information or how we can help you get your planter set up for NACHURS in furrow starter fertilizer.

We purchased our "V" Shots from Perkins Sales in Bernie, MO (877) 293.5794.

USING BIOLOGY TO IMPROVE FERTILITY IN PLANTS

By Joe Osterhaus
U.S. Plains Sales Agronomist- Nebraska

We don't think about it very often, if any at all. Constant ongoing activity in the cells of our bodies is keeping us alive and functioning. The constant regeneration of DNA and new cell formation is a process of all living things, both plants and animals. Biology is truly a fascinating process.

The key process in cell rejuvenation is the Kreb's Cycle or the Citric Acid Cycle. This process converts glucose, proteins and fats into energy in the form of ATP (adenosine triphosphate). Living cells then use the energy from ATP to synthesize proteins from amino acids to replicate DNA (Deoxyribonucleic acid). This process takes place in the mitochondria or the power plant of the cell. The chemistry gets complicated from here. A molecule called Acetyl-CoA combines with a chemical compound called oxaloacetate to create a citrate, or citric acid.

Read more: http://www.ehow.com/way_5754544_krebs-cycle-made-easy.html

Nachurs Alpine Solutions has **Bio-K™**. **Bio-K** is a unique form of an inorganic salt reacted with an organic acid to form potassium acetate fertilizer. The thing that makes **Bio-K** unique is the acetate carrier molecule. Acetate is a naturally occurring plant metabolite that is an important part of the Kreb's cycle as well as many other cellular functions in plants. Acetate is also a part of plant root exudate that acts as a mining agent to release soil nutrients so that they are available for uptake into the plants. Plants recognize the acetate as a plant metabolite so it is taken into the plants rapidly and makes for more efficient use of potassium by the plants. The rapid uptake makes **Bio-K** fertilizers great for in furrow use as well as foliar use. At Nachurs Alpine Solutions, we are testing and incorporating **Bio-K** into many of our fertilizers. **NACHURS HKW6®**, our soybean starter, is one of these products which has shown positive results even in high testing K soils. **NACHURS K24™** is a great fertigation product for getting potassium on crops. **NACHURS K19-S®** and **NACHURS Triple Option™** are a couple of our newer products with **Bio-K** that have great fits in a variety of situations. We have several products with **Bio-K** so ask your DSM or area sales agronomist for information that may fit into your programs.

REMEMBER THE RHIZOSPHERE

By Tommy Roach,
Director of Specialty Products & Product Development

It is easy to walk out into a field of corn, alfalfa, wheat, cotton, etc. and observe how the crop visually looks, whether it be good, bad, or indifferent. We often times are only focused on the above ground appearance and forget that what is below ground is where all plant growth begins and where it ends as well.

The rhizosphere is the region of soil that is immediately near the root surface and that is affected by root exudates. There are different types of substances that diffuse from the roots which stimulate microbial activity, such as carbohydrates (sugars and oligosaccharides), organic acids, vitamins, nucleotides, flavonoids, enzymes, hormones, and volatile compounds. This results in a dense and active microbial population that interacts with the roots and within the roots. The release of root exudates can be affected by several factors in the plant, soil, and environment. Depending on plant species, between 10-30 % of photosynthates are secreted through the root system. Roots also secret polysaccharides, mucilages, and lose cap cells which are detached from the root tip when it grows through the soil. The physical-chemical conditions that predominant in the rhizosphere are useful in understanding the role that microorganisms play in soil nutrient availability.

Rhizosphere bacteria participate in the geochemical cycling of nutrients and determine their availability for plants and soil microbial community, such as fixing N2 into specialized structures (nodules in legumes). There are bacterial ammonifiers and nitrifiers that are responsible for the conversion of organic N compounds into inorganic forms (NH4+ and NO3-) which become available for plants. Rhizosphere bacteria can also enhance the solubility of insoluble minerals that control the availability of phosphorus (native or applied) thru the production of organic acids and/or phosphatase enzymes that act on organic phosphorus pools. The availability of sulfur, iron and manganese are also affected by redox reactions carried out by rhizosphere bacteria. Likewise, chelating agents can control the availability of micronutrients and participate in mechanisms of biocontrol of plant pathogens. Due to these and other benefits on plant growth, some rhizosphere bacteria have been called Plant Growth Promoting Rhizobacteria (PGPR).

Most terrestrial plants develop their root system to explore soil and find nutrients to sustain growth. A root is a complex organ made of distinct regions such as the root tip, root meristem, differentiation and elongation zones, and emerging lateral roots. Root system architecture (RSA) integrates root system topology, the spatial distribution of primary and lateral roots, and the number and length of various types of roots. Several abiotic and biotic factors can influence RSA, including PGPR strains. PGPR modify RSA and the structure of root tissues mainly through their ability to interfere with the plant hormonal balance (Figure 1).

Changes in RSA may result from interferences of PGPR with the main hormonal pathways involved in regulating plant root development: auxin, cytokinin, ethylene, and to a lesser extent gibberellin, and abscisic acid (ABA). The balance between auxin and cytokinin is a key regulator of plant organogenesis, and shapes root architecture. The auxin to cytokinin ratio can be affected by PGPR because they are able to produce a wide range of phytohormones, including auxins and/or cytokinins, as well as secondary metabolites that which can interfere with these hormonal pathways. Indole-3-acetic acid (IAA) is the best characterized auxin produced by many plant-associated bacteria, including PGPR. IAA is usually synthesized by rhizobacteria from tryptophan, which is found at different concentrations in root exudates according to plant species.

With all this in mind, it is important to consider fertilizer type and source when making applications to the soil (regardless of application method) so as not to erode and/or degrade the optimum growing conditions needed and required by rhizosphere bacteria (or PGPR). Rest assured, NACHURS fertilizers are made with high quality raw materials which are free of impurities and contaminates, as well as being very low in salt content. Deciding what fertilizer to use should not be made on price alone, but rather should take into account what is going on below ground level. Plants grow from the roots up, and they die from the roots up. Use a fertilizer that promotes a healthy soil environment in which both plants and rhizosphere bacteria thrive. Choose NACHURS!

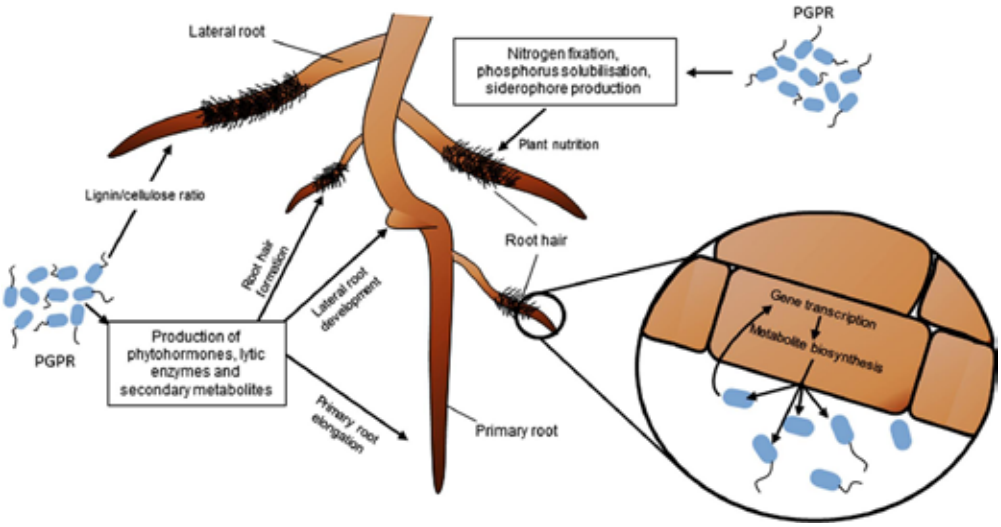


FIGURE 1 | Impact of phytostimulated PGPR on RSA, nutrient acquisition, and root functioning. PGPR can modulate root development and growth through the production of phytohormones, secondary metabolites, and enzymes. The most commonly observed effects are a reduction of the growth rate of primary root, and an increase in the number and length of lateral roots and root hairs. PGPR also influence plant nutrition via nitrogen fixation, solubilization of phosphorus, and/or siderophore production, and modify root physiology by changing gene transcription and metabolite biosynthesis in plant cells.

Frontiers in Plant Science, September 2013, Volume 4, Article 356

OVERCOMING FERTILITY LIMITATIONS TO IMPROVE WINTER WHEAT

By Wayne Becker,
U.S Mid-South Sales Agronomist- Texas

Early-season wheat fertility affects winter hardiness, tiller formation, grain maturity date, and ultimately forage and grain yield. Limited root development and complex interactions within the soil create obstacles to nutrient absorption for seedlings.

Broadcast fertilization builds fertility levels, but may temporarily lead to creation of non-exchangeable forms of nutrients. Placing fertilizer in a band with the seed limits soil-fertilizer contact and puts nutrients nearer the roots for quicker crop uptake. Banding high quality, low salt fertilizer with the seed enhances growing conditions for wheat, increasing efficiency. Phosphorus (P) fertilizers react readily with iron, aluminum, manganese or calcium in the soil which limits P availability to the seedling wheat. Likewise, soil type, temperature, soil compaction or soil pH may negatively affect potassium (K) availability. Usually the portion of K in the soil that is readily available is only 1–2 %; 1-10% is slowly available; and 9 - 98 % is unavailable. Banding highly soluble, immediately available liquid fertilizer that contains both P and K greatly increases wheat's winter hardiness and ability to form tillers.

The quality of fertilizer parent material is also very important. Efficiency can be hampered by fertilizer derived from low-quality material. Common problems are: 1) plant damage; 2) settling of salts/impurities in the fertilizer solution; and 2) corrosion of storage, transport, and application equipment. These problems are avoided simply by using quality parent material.

Providing nitrogen, phosphorus, potassium, secondary and/or micronutrients in an efficient manner proves to be an annual challenge. NACHURS is the leader in liquid fertilizer quality and technology. The fertilizers they produce can be tank-mixed with most crop protection products to reduce trips over the field, thus saving wheat growers time and money. By efficiently providing early-season fertility, wheat gets a healthier start - using NACHURS liquid fertilizer is the first step towards achieving efficient wheat fertilization and maximizing your wheat crops potential.

YOUR NACHURS AGRONOMY TEAM For more information, please visit www.nachurs.com

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