



Quality Analyses for Informed Decisions

# NEWS

# REPORT

A & L GREAT LAKES LABORATORIES, INC. SPRING 2008



## A & L Great Lakes Continues to Evolve

**2007** was a year of many changes at A & L Great Lakes Laboratories. The departure of several long-term employees gave us the opportunity to evaluate our team dynamics, and allowed us to search for some new people to help reach our evolving business goals. Our full time staff increased from 35 to 40 employees during the year, and we are very excited about our new laboratory team and our ability to handle future challenges.

The management team at A & L took this growth very seriously, and spent the summer in weekly sessions with a Business Coach. Coach Jerry Hogan helped our management team learn how to work together more effectively. We identified several challenges facing our business, and learned new techniques to help us achieve our goals.

One of the goals set at the beginning of the program was to develop a statement to capture the essence of A & L Great Lakes Laboratories.

The lab motto  
*Quality Analyses for Informed Decisions*

was introduced to our staff at our fiscal year end meeting, and the motto was immediately added to reports, literature and posted throughout the laboratory. Our employees understand the importance of their work quality, and we strive to provide the high quality data that you demand.

We expect to see changes throughout 2008 and beyond, but we want you to know that the quality expectations at A & L Great Lakes Laboratories will not change.



### Professional Activity Provides Information and Insight

Several of our employees are active members in groups and associations related to their job responsibility and professional background. This enables us to be informed about new and changing information, hopefully getting it "straight from the horse's mouth" so that we can confidently pass pertinent details along to our customers.

This professional involvement represents a significant (and well-spent) investment in time and resources by A & L Great Lakes. Our objective is to continue to develop informational resources to benefit the ever-changing needs of our customers.

# Starter Fertilizer:

WHERE, WHEN and WHY will it make sense

**In today's** evolving agriculture industry, the demand for optimum crop performance, profit, and environmental stewardship enhances the need for greater fertilizer efficiency. Starter fertilizer is a management practice that remains highly debated on its effectiveness in increasing profit. While the drawbacks may include decreased planting efficiency due to longer time to load the planter or increased possibility of seedling salt damage (Figure 1), the positive aspects of improved early growth (Figure 2) and development are worth addressing. Assessment of the benefits of starter fertilizer should be made by the individual producer for their specific management practices.

The benefit most associated with starter fertilizer is placement of nutrients in relatively close proximity to the recently emerged seedling. Whether "pop up" (nutrient placement directly in the seed furrow), 2"x 2", or another placement method is adopted, the purpose of starter fertilizer is to create an enriched zone of nutrients readily available for plant access, which can be beneficial in a few scenarios. First, cool soil temperatures, characteristic of today's earlier planting dates and/or reduced tillage practices, often retard seedling growth; especially early root development. Phosphorus (P), for example, is required in extensive amounts by emerging seedlings, but P is highly immobile in the soil (movement is thought to be less than 1 centimeter in distance). These characteristics of P combined

with decreased root exploration of the soil due to slowed growth, may lead to P deficient seedlings especially in soils that are P limited. Placement of a P source close to the seed can alleviate these potential problems commonly associated with P (and some other nutrients) and early season growth.

Second, concentrating nutrients in a band may lead to increased availability and possibly greater uptake and efficiency of application. Elements such as potassium (K) as well as P can form complexes in the soil rendering either nutrient unavailable. Applying nutrients in a localized "zone" can saturate this small proportion of soil with nutrients ultimately leading to increased availability due to the enhanced concentration in this specific region. In K and/or P

deficient soils where fertilizer applications required to raise soil test levels to the critical level cannot occur, utilization of starter fertilizer can improve availability and has been shown to improve yield in these specific conditions.

As mentioned above, starter fertilizer application has the potential to damage seedling emergence and development, and should be used with some caution. The potential of salt damage (seedling desiccation) substantially increases in dry soil conditions or when placement of fertilizer is very close to the seed (2"x 2" placement). Decisions on whether to use starter fertilizer, type of material (elemental composition) and application rate should be made prior to planting. Purdue recommends that nitrogen (N) application should not exceed 40 pounds/acre, and when both N and K are components of the starter fertilizer, application should not exceed 100 pounds/acre of N plus K<sub>2</sub>O. In more sandy soil types, N application should be lowered to 30 pounds/acre. Placement of fertilizer closer to the seed also requires rates to be lowered. For instance, in "pop up" applications the total N and K additions (N+K<sub>2</sub>O) should not exceed 8 pounds/acre.

More information regarding fertilizer salt index can be found in our Fact Sheet #15, which is available on our web site.

Figure 1

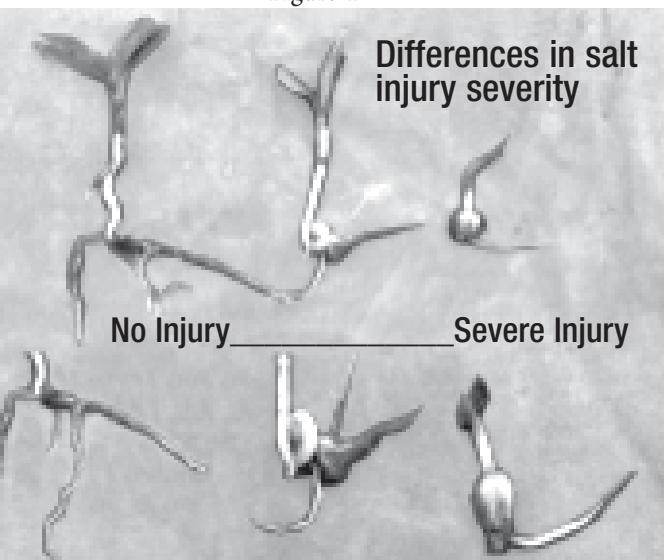
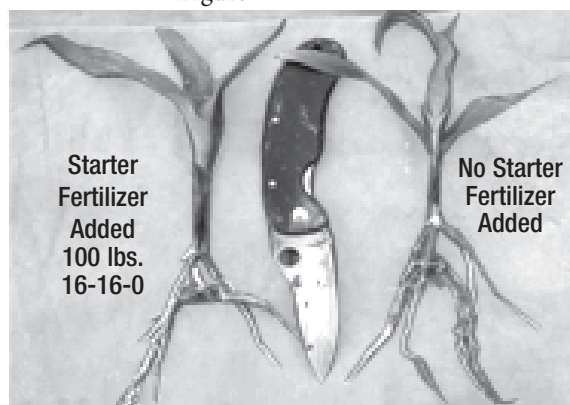
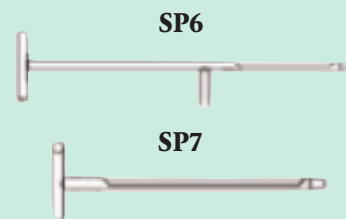


Figure 2



## New Soil Probes Available

We are now offering two new soil probes manufactured by JMC. Our SP6 probe is a 36" long step style probe and the SP7 is an 18" hand probe. Both have self sharpening tips, are lightweight, and make the job of soil sampling much easier. They can be ordered on our website store or by telephone or with the supply order form available on the website.





## Concentrated Animal Feeding Regulations

Due to the environmental impact that large livestock operations can have, State and Federal regulatory agencies are requiring monitoring and testing of manure, soil, and stormwater runoff at these sites. We offer comprehensive testing services for manure, soil and water to help clients meet their regulatory monitoring requirements.

Like many other Midwest States, Indiana has established and approved regulations that monitor concentrated animal feeding operations (CAFOs). The Indiana Department of Environmental Management (IDEM) follows 327 IAC Rule 15-15 and 327 IAC 16. Under these rules, CAFOs are required to establish management plans and follow guidelines specific to sample collection and analysis.

For manure, annual testing requirements include total Kjeldahl nitrogen (TKN), ammonia-nitrogen, total phosphorus and plant available nitrogen (PAN). Soils need to be collected at a frequency no less than once every five years. Soils are then tested for available phosphorus and if the levels exceed 200 ppm or 400 pounds per acre, manure application is restricted. If the P test level falls below 50 ppm or 100 pounds per acre, application rates are nitrogen based. Levels between 50 ppm and 200 ppm result in application rates being based on crop phosphorus removal.

In addition, stormwater management must be monitored. A management plan should identify the run-on and run-off sources on the site. Each run-off site will represent a unique sampling location; testing for BOD, TSS and ammonia-nitrogen is required annually.

For more information on concentrated feeding regulations, contact your state environmental regulator or NRCS office. In Indiana, Dennis Lasiter is the technical specialist with the confined feeding permit program of the Office of Land Quality at IDEM.

## Maximum Return to Nitrogen

Across the Midwest from Minnesota to Ohio, Land Grant universities are adopting new guidelines for corn nitrogen recommendations. Recent research has shown that using the corn price and the cost of N is a more profitable approach to determine N application rates than the historical yield goal basis. This is termed Maximum Return to Nitrogen (MRTN) and is also an effort to create a more uniform approach to N recommendations across states.

Trying to adopt uniform guidelines across such a large area can be very difficult. Some states have customized their guidelines to fit local soil and environmental conditions. For example Ohio State does not incorporate organic matter as a component of their guidelines, but the University of Wisconsin does.

Iowa State University (ISU) has developed an MRTN rate calculator website which shows the approaches developed in Minnesota, Iowa, Illinois, and Wisconsin. It can be found at: <http://extension.agron.iastate.edu/soilfertility/nrate.aspx>. The underlying calculations for N recommendations use a common approach so that new research information can be easily incorporated and evaluated, both within and across states. The goal is to have a system in place that can change when new information indicates a need.

On the ISU MRTN website there is an option of looking at a single price ratio or multiple price ratios. After entering field-specific inputs (corn market price, nitrogen, etc.) the following is calculated: MRTN rate (lb of N/acre), profitable N rate range (lb of N/acre), net return to N at MRTN rate (\$/acre) and the percentage of times you will reach the maximum yield at that MRTN rate. It also shows how much of a particular N source to apply per acre and what the total cost of that N source would be.

There is some flexibility with MRTN since a N rate range is actually recommended. Riskier growers may want to work with the lower end of the range while more conservative farmers may gravitate to the upper end. A graph is also shown with a response curve which shows what would happen to profitability as you continue to apply N above the MRTN point.

Ohio State has developed their own rate calculator: [http://agcrops.osu.edu/fertility/documents/New\\_Nitrogen\\_Recommendations\\_2008\\_000.xls](http://agcrops.osu.edu/fertility/documents/New_Nitrogen_Recommendations_2008_000.xls). In 2008 Purdue has plans to link with the Iowa State N rate calculator and Michigan State will likely adopt a MRTN approach. According to Emerson Nafziger, the University of Illinois has been supporting MRTN since it's inception in 2002. The current edition of the Illinois Agronomy Handbook (IAH) was published in 2002. There are plans to publish a new addition in 2008 which will recognize MRTN for corn. Illinois NRCS does not currently recognize MRTN, but will when it is published in the IAH.

Universities in the region admit that it will take a long term effort before MRTN is widely accepted as the standard for making corn N recommendations. However, most university extension agronomists across the Midwest think that MRTN is a useful tool when making nitrogen recommendations for corn to maximize economic return.



## Managing Plant Nutrient Status with Plant Analysis

Routine soil analyses are an excellent tool for monitoring soil nutrient levels in a given area. While soil tests report extractable nutrient concentrations which estimate potential nutrient availability, these analyses do not indicate actual plant uptake of essential elements. Plant tissue analysis allows for examination of mineral concentrations, and when combined with interpretive crop-specific guidelines, can be used to determine nutrient status at that point in time.

Plant tissue analysis in vegetables and orchard/fruit production usually provides a better assessment of plant nutrient status than soil tests. Soil tests are correlated with nutrient concentrations in the typical sampling depth (8 inch sample depth) which provides information only regarding a small percentage of the soil explored by deep-rooting cropping systems such as perennial fruit plants. Plant tissue analysis integrates nutrient uptake throughout the effective rooting zone by evaluating overall plant nutrient status.

Tissue analysis is often used to evaluate problem plants and/or areas in a field, but more recently plant analyses are being utilized (in conjunction with soil tests) to assess the effectiveness of nutrient management programs.

Plant mineral composition can help identify limiting conditions that

have not caused visual symptoms. While acute deficiencies often have unique and easily identifiable foliar symptoms, identification of nutrient deficiencies through detection of “hidden hunger” stresses may assist in management decisions. In addition, immediate reaction to acute nutrient stress through a rescue application of the deficient element may lead to improved yield and/or quality of the fruit. Plant analysis may also identify nutrient imbalances or potential toxic nutrient levels, which provide information which can be used to make in-season as well as future nutrient management decisions.

Plant analysis at a specific sample date reflects the environmental factors that have affected plant growth and development to that point in time. These influences must also be accounted for when considering sampling date and comparing results to established guidelines. For instance, the impact of soil water content and temperature fluctuations may not only influence plant growth and development, but also nutrient availability in the soil profile. While these fluctuations may have a greater impact on shallow rooting annual plants than on more developed root systems of perennial plants, environmental factors must still be considered. When using plant analysis as a diagnostic tool, the recommendation is not only to sample plant tissue from the questioned or “stunted” plants but

also sample plants from the “good” or normal plants. By taking these two samples, local environmental influences can also be considered.

Elemental composition will vary within a plant by plant part. This variation is due in part to partitioning of certain elements to specific plant tissues to support physiological processes. Depending on the mineral nutrient (or even nutrient form), plant species, and age of the plant, there are differences in the proper plant tissue (part) to sample. For example, with potato as well as several other vegetable crops, monitoring nitrate levels in petioles as compared to a total nitrogen analysis of plant leaf tissue is a reliable indicator and a widely accepted practice in assessing nitrogen fertility. When nitrogen supply is abundant, nitrate is one compound that can be used to store nitrogen in the plant. In some plant species, monitoring nitrate instead of total nitrogen may provide a better estimate of nitrogen supply, stored plant N reserves, and overall plant status at that particular sample time. These subtle differences may seem insignificant, but proper plant sampling and analysis is extremely important when trying to assess nutrient needs and correlate with interpretive guidelines.

It is important to understand that sampling technique can impact elemental composition of the plant tissue. When sampling plant tissue, be sure to sample the correct plant part for the particular crop and growth stage. Collect an appropriate amount of plant material. Plant samples should be placed in a bag or container which allows them to dry. Submit samples with documentation indicating the sample ID, location, plant type, and analyses needed.

Information gained from plant tissue analysis can help manage nutrients to improve crop yield and quality while improving margins. Additional information regarding plant sampling is available on our website [www.algreatlakes.com/lab\\_agr\\_pla.asp](http://www.algreatlakes.com/lab_agr_pla.asp)

**Quality Analyses for  
Informed Decisions**

*Nitrogen fertilizer*  
**\$0.50/lb**

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*Bushel of corn*  
**\$5.00**

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*Pre-sidedress  
nitrate test*  
**Priceless**

With input costs for corn production at an all time high and grain prices also increasing, why wouldn't a grower want to minimize the amount of fertilizer required to grow corn and yet improve returns? Nitrogen is the most elusive nutrient to manage and, when deficient, will significantly limit yield potential to a point that profits are lost. Having the right amount of nitrogen available at the right time is essential to achieving profitability.

A corn plant uses around 10% of the nitrogen it needs during the first three weeks of growth. Then, during the next five weeks (V4 to V18), it needs to take up 65% of its total seasonal nitrogen requirement. If nitrogen supply is limited during this period, yield and profits will suffer.

Taking a pre-sidedress nitrate test (PSNT) at the V4-V5 stage indicates how much nitrogen is available in the soil from cover crops, legumes, applied manure and other sources.

Timing is very important; samples should be taken five to ten days before sidedressing to allow time to collect the sample, have it analyzed and receive the results. Samples taken too early will not be as accurate because nitrogen is continually released (mineralized) in the spring as the soil warms. A & L Great Lakes analyzes PSNT samples and reports results the next business day after receipt.

PSNT soil samples should represent no more than 20 acres. The sampled area should be consistent for past crop, soil types and manure applications. Probe the soil 12 inches deep, taking 15 to 20 cores per field. Avoid probing through the starter band. If fields have significantly differing soil types or drainage patterns, sample these areas separately.

*More information on the PSNT is outlined in our Fact Sheet #18, which is available on our website.*



## **SoilTrak and Windows Vista**

Most new computers now come with the Windows Vista operating system already installed. New security features in Vista may create compatibility issues when you install SoilTrak 4.0 from an older installation CD, because it was created before the new operating system was released. Contact us for an updated SoilTrak 4.0 installation CD if you have Windows Vista.

## **Soil Test Summaries On-Line**

At the end of each calendar year we summarize soil test information in a number of ways: all samples, samples by state, samples by area within a state, and samples by customer. This is very useful information which can be used to evaluate soil test trends, along with other factors related to soil fertility management.

Our general soil test summaries are free and available on our website, while individual soil testing customers receive their summaries confidentially. Please let us know if you have suggestions on how to make this a better informational tool.

## On-Line Data Access Coming Soon

A & L Great Lakes is pleased to announce development of an on-line data and report retrieval system for our customers. Many of our customers have requested that they be able to access reports and analytical data 24 hours a day, seven days a week – their work never seems to be done! Clients will soon be able to securely review and download their data and reports using any computer with internet access. Search-able and sort-able fields will give the customer the ability to retrieve data using various pieces of information. Clients will also be able to download data in pdf, csv or xls file formats. Expect On-Line data access to be available early summer 2008.

## Invoices and Statements by E-mail

We recently added the capability of sending invoices and statements by e-mail. This reduces paper and handling, both for us and you. It also allows copies to be easily sent to multiple e-mail addresses if needed. Please contact us for more information.



# Fertilizer Analysis Update

New fertilizer products are continually introduced to the wholesale and retail markets. Quality control monitoring of the different fertilizer products can include analyses for nutrients, herbicides, and pesticides. Once these products are manufactured, they must be delivered on a timely basis to local distributors.

A & L Great Lakes understands the need for fast turnaround time on fertilizer samples and to facilitate this, we have increased our sample handling capacity. A new fertilizer preparation room has recently been constructed giving us more space for sample storage as well as new grinders and riffing equipment. We've added a liquid chromatograph for herbicide analysis. Most importantly, we have added full time employees to help maintain quality sample throughput.

Our experienced professional staff can develop and validate testing methods for analysis of active ingredients in formulated fertilizer products. There are several chemical compounds not listed on our website or fee schedule that we are able to analyze, so please call for a current listing.

We also conduct **GLP (Good Laboratory Practice)** storage stability studies on fertilizer products under the EPA Federal Insecticide, Fungicide and Rodenticide Act, Notice 86-5.

For fertilizer nutrient testing, our comprehensive fertilizer department offers complete nutrient and metals testing services.

Regardless of the type of analysis required if you have a new product, GLP study or unique project, give us a call and see how we can help.



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