

Gaining Insights into Top Production with Summer Crop Analysis

At our headquarters here in Illinois it has been a cold, wet start to the growing season. Many corn fields in the area are yellow and uneven. Soybean fields have taken up to 10 days to emerge. More than 9 inches of rainfall since April 30 has raised the question, "How much fertility is now in the topsoil for the new crop?" and, "What can I do to get this crop into high gear?"

One approach to answering these questions is to consider doing some summer testing of the plants and the soil. Here are a couple of analysis tools to consider:

Soil Testing: We have advocated for many years the use of the **Pre-Sidedress Nitrate Test (PSNT)**. Studies in plots have shown a good correlation of the PSNT results with nitrogen rate plot yields. A standard-depth soil sample sent to our lab with next-day results can give a good indication of the additional need for sidedress or foliar applied nitrogen. A **complete soil analysis** can provide a bigger picture of the current balance (or imbalance) of many soil nutrient levels, along with important indicators such as conductivity and pH.

Tissue Testing: A good resource for fine-tuning a crop is a plant tissue test. An analysis prior to foliar or pivot applications can direct your fertility dollars to where they are most needed. Samples taken from numerous crops have correlated to results seen in soluble extracts of



AgriEnergy's Soil Lab in Princeton, is outfitted with state of the art technology, to serve all your testing needs.



Tools like those shown above can assist you in gathering important information about your crop.



An AgriEnergy agronomist discusses crop health with several farmers.

the soil, as routinely performed in our lab. It is always helpful to have the soil analyzed the same time as the tissue.

A good example of this is when a corn crop is nitrogen deficient - if both the soil PSNT and tissue N are very low, a foliar may not provide enough N to make a difference. It is then critical to apply additional N through the soil, either by sidedress or by drops on a sprayer.

In-Field Tools: There are several tools available which will enable you to collect information from your crop. These include: **Pocket pH, Conductivity, pNa, and ORP meters.** These meters can give you an instant snapshot of several key soil indicators, just by mixing a soil sample with distilled water and taking the readings. Another tool is the **penetrometer**, which along with a **spade** can tell you if you have compaction layers or a plow pan. Side by side comparisons of different fields, plots, or even with the neighbors, can tell you if your soil is making progress toward better till and productivity. **Sap meters for pH and Conductivity,** along with the **refractometer**, are another piece of the diagnostic puzzle. Crops that are out of range in pH or EC indicate the need for additional cationic or anionic nutrients, depending on the results.

Put all of these tools together, and you have many pieces of information with which you can make summer fertility decisions; an important part of top crop production.

Plant Tissue Sampling Tips

AgriEnergy Resources now has tissue sample bags, mailing envelopes, and crop-specific sampling guides available. Call or email our soil lab today for more information! You can email us at soiltests@agrienergy.net

Sampling Instructions:

1. Collect leaves from 15 - 30 plants depending on the crop.
2. If samples have fertilizer, spray/dust residue on them; they will need to be washed or wiped off; pat dry with clean towel.
3. Complete plant sample submittal form for all samples.
4. Place samples and submittal forms in large envelope and ship.



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Summer Seminar Schedule

Plan now for AgriEnergy's summer events:

Current Tentative Dates

Princeton, IL: Aug. 14
Greenville, OH: Aug. 26 or 27

More dates are coming - Please contact us for more details.

The Effectiveness of Foliars

Foliar fertilization is catching on fast. You may wonder how such a small amount of nutrients applied to a crop can be effective. When compared to dry broadcast applications, the amount of nutrients applied may seem insignificant. This article will list some of the reasons why foliar feeding can be beneficial.

As with starter fertilizers, **timing** and **placement** are key factors that favor foliar fertilization. They can be timed to be applied before or during key stages in crop development or nutrient demand by the crop. This can help the plants overcome the **"hidden hunger"** where nutrient availability falls short of crop demand for top performance. One of those key times is just prior to fruit initiation. Another peak nutrient demand time is in the early flowering stage. Quite often, plants run out of energy to maintain all the blooms or

kernels that have been initiated. We have all seen too many times when many of the blooms fall off or kernels slough off in the early stages of development. Supplemental nutrition can help the plant hang on to more flowers or kernels and keep pushing for **higher yields**.

Placement of the nutrients on the leaf surface where there is rapid absorption is another reason foliars can be effective as seen in the chart below.

If you are still thinking that the low usage rates couldn't possibly make a difference, consider this: the amount of nutrients in the soil solution, that film of nutrient rich water around soil particles, is very small. For instance, most soils contain less than 10 pounds per acre of potassium in the soil solution. Couple that with the fact that

plant roots only come in contact with a very small percentage of soil particles and it is easy to see how a foliar application can make a major difference. It is very feasible that a foliar application could more than **double** the amount of nutrients actually available to the crop at any given time. If that increase in nutrient availability comes at crucial times, it can have profound effect on yields. Try it on your farm and see for yourself.

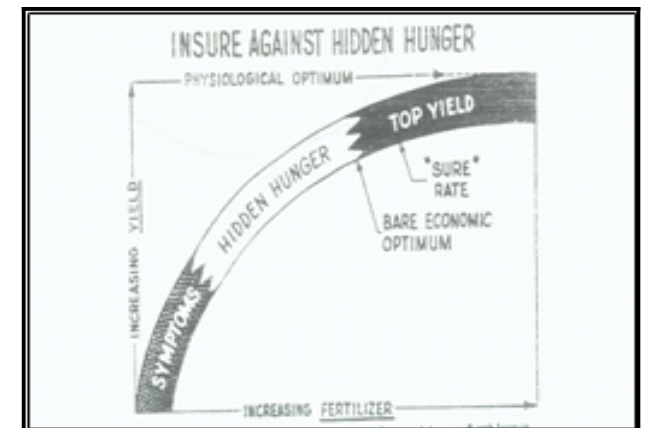


It is better to aim high and miss a little, than to aim low and hit the target.

Absorption Rates for Nutrients Applied to Plant Foliage

| Nutrient | Time for 50% Absorption |
|--------------------|-------------------------|
| Nitrogen (as urea) | 1/2 - 2 hours |
| Phosphorus | 5 - 10 days |
| Potassium | 10 - 24 hours |
| Calcium | 10 - 94 hours |
| Magnesium | 10 - 24 hours |
| Sulfur | 5 - 10 days |

Source: Michigan State University



Hidden Hunger is the point in between having adequate nutrients for top yield and nutrient deficiencies with visual symptoms on the plant.

Guidelines to Successful Foliar Feeding

Push Crops All Season Long

Summer brings the opportunity to monitor and push crops to their genetic potential. Too many producers leave dollars on the table because they plant their crops and ignore them until harvest.

A crop may endure many stresses during the course of the growing season that chip away at the final yield. Some of these yield losses can be prevented by making mid-season corrections in the fertility program. **Fertigation**, the practice of applying fertilizer with irrigation water, and foliar applications gives growers the opportunity to enhance yields all during the growing season. Fertigation is an excellent means of applying fertilizers and microbial products. The water makes sure that fertility and microbes are moved into the root zone where they are most needed.

We want to stay ahead of the game, providing crops with nutrients ahead of their peak demand periods. **1)** Most crops have two or three windows of opportunity for foliar application of nutrients. Prior to fruit or grain initiation is one window for any crop. **2)** Spray when plants are receptive to nutrients. Avoid spraying plants when they are under stress. This usually means spraying in the mornings or evenings when plant stomata are open. **3)** It is essential to get good plant coverage including the bottoms of the leaves. Using spray nozzles that create fine droplets similar to a fog or mist is essential to fully penetrate the crop canopy. *AgriEnergy Resources* has Delavan WRW nozzles available, that will perform in this manner. **4)** Adjusting the pH in your spray tank to 6.0 to 6.5 is important for nutrient uptake by the plant. Citric acid can be used to lower the pH. **5)** Choosing the right formulation is important for success in foliar applications. Soil and tissue tests as well as plant sap pH and EC can be used to determine what nutrients might be most effective. **6)** Spreader stickers should be used to keep nutrients on the leaf surfaces longer. **7)** Always include high quality biological products, such as SP-1, to increase the overall effectiveness of your foliar applications.

Many growers have faced a difficult planting season, hampering their ability to make all the intended fertilizer applications. For many there is an improved outlook for cash flow based on better prices or improved soil moisture than when fertility plans were made. It is not too late to fertilize those crops. Fertigation and foliar applications can be made to help assure that crops don't run out of nutrients during the critical filling or bulking stage. A high percentage of the total nutrients are required at the tail end of the season to keep pushing crops to their potential. Read the article "Summer Crop Analysis" in this newsletter for more information on determining nutrient needs during the growing season. Don't let your crops "run out of gas" and leave money on the table.

Simple Product, Simple Choice

SP-1 is our choice biological product for use in foliar applications. It contains various types of extracts, including those from compost, vermicast, and other sources. **SP-1** has been scientifically formulated using our own expertise in our research greenhouse and in the field. We are very encouraged with the results of this product. We advocate the use of biologicals in foliar applications for three chief reasons. First, biologicals are very helpful in colonizing the leaf surface with beneficial bacteria and fungi. Secondly, biologicals aid in the stimulation of the plant's natural immune system. Using biologicals throughout the growing season triggers the metabolic activity of the plant and the systemic acquired resistance (SAR) or immune response of the plant. Finally, an excellent quality biological product also contains natural plant growth regulators. Products containing plant growth regulators, applied at the correct rates, have shown to increase root and shoot growth in a wide array of crops. Foliar applied biologicals can be easily added to a post-emerge herbicide or insecticide application or sprayed alone. Stable and sound, **SP-1** is the simple choice.

Francis Childs - Thoughts on Foliar Fertilization

If you are the world's champion corn grower and have exceeded 400 bushel per acre yields, what do you do to close in on 500 bushels per acre? **Francis Childs**, of Manchester, Iowa decided last year to add foliar fertilization to his arsenal of tools in pursuit of ever higher corn yields. He foliar applied **3-18-18, 9-18-9** and **trace elements** on August 21 when the corn was at brown silk and in the roasting ear stage. This is later than most people believe to be the optimum timing for foliar applications. This application resulted in a **20 bushel per acre increase** in corn yields.

Even more amazing are the results he achieved in his Visitors Plot. The Visitors Plot contains 11 acres of corn variety and planter applied fertility treatments. On all of these plots, he made foliar applications when the corn was one foot tall and again when it was two feet tall. These plots averaged 533 bushels per acre with the highest weighed strip yielding an amaz-

ing **579** bushels per acre. None of the rest of the farm had these two early applications of foliar fertilization. The highest yield achieved outside of the Visitors Plot was his world record yield of 442 bushels per acre achieved in one of his official National Corn Growers plots.

Why did the Visitors Plot average 91 bushels per acre over the next highest yield? It is not fair to say that two foliar applications boosted yields by 91 bushels per acre since they were not side by side comparisons. It is very reasonable to believe the foliar applications played a major role in the big yield difference. Normally, Francis would expect to harvest his highest yields from his contest acres. That is why the yield checks for the National Corn Growers Contest are taken from those areas. After years of competition, Francis knows where to harvest the highest yielding strips. Last

year the Visitors Plot provided an unexpected pleasant surprise with yields that are hard to fathom. We can only speculate what the true role of foliar fertility was in his phenomenal success.

Is Francis Childs a believer in foliar fertilization? If his plans for this year are any indication, then yes he is. He plans to foliar feed when corn is one foot high and again at two feet high and probably yet again in the brown silk stage based on last years experience. He is doing tissue testing, and will make appropriate applications.

When quizzed why he felt that foliar fertilization worked, he responded by saying that he felt that he had maxed out what the roots could provide to his corn crop and additional energy needed to be put into the plant by other means. That is quite a statement coming from a guy who has a **13 inch deep aerobic zone** with extremely high levels of fertility.



Photo Courtesy of *Farm Journal*

"When the roots are maxed out, foliar applications give you another opportunity to put energy into the plant."

-Francis Childs

deep aerobic zone with extremely high levels of fertility. If his roots have "maxed out", what about all the other soils that have 4 inches or less of aerobic zone and much lower fertility levels?

If foliar fertilizer can improve a 400 bushel corn crop, what can it do to a 100 or 200 bushel corn crop that has much less of a root system? An interesting thought to ponder as you consider how to take your yields to the next level.



Small Grains

Summer time harvest of small grains brings a unique opportunity to utilize an aggressive residue management plan. With lots of days of warm soil temperatures between harvest and the next growing season, there is ample time to convert residue to humus before the next crop.

A typical residue management program would include spraying the following:

| | |
|--------------|---------------|
| 28% nitrogen | 2-10 gal/acre |
| ThioSul | 1-2 gal/acre |
| AgriCarb | 1 gal/acre |
| Residue | 2 gal/acre |

Or

2.5 lbs/acre of Residue CoPak-Dry and 16 oz/acre of Residue CoPak-Liquid sprayed on the field or applied with dry fertilizer or lime. Residue management programs can be modified for organic programs also.

Residue should be incorporated or at least put into contact with the soil after application of the above products. Many growers are then seeding cover crops such as clover, hairy vetch or rye to further prepare the soil for the next growing season. Amazing results have been achieved using these practices.