

AgriEnergy Resources



Mark Your Calendars!

AgriEnergy Resources
Summer 2006 Seminar
 and
Field Day
SATURDAY, AUGUST 12
 Princeton, Illinois
 Conference (with lunch provided)
 8:30 a.m. — 2:30 p.m.
 Plot Tours and Breakout Sessions
 3:00 p.m. — 5:00 p.m.

News for organic growers:

Our website now contains a list of almost 50 products available from AgriEnergy Resources for organic growers. There's a brief description with many of the products.

Check it out by visiting the organic section of our site at:

<http://www.agrienergy.net/organics.htm>

Thank You, Ed! The AgriEnergy Resources family wishes a long and happy retirement to Ed Jensen and his wife Sharon. Ed retired on April 30 after more than 10 years as AgriEnergy's electrician and fertilizer production assistant. Thanks for sharing your time and talents with us!



Have it your way! If you are holding a hard copy of this newsletter, but would prefer to receive it electronically, all you have to do is sign up and we'll make the switch for you. Just go to our website at www.agrienergy.net and click on **Join our Mailing List**. Fill in your name and e-mail address — and future issues of *AgriEnergy Resources* will show up in your e-mail inbox rather than your U.S. mail box.

Foliar Fertilization: a key to turn crop potential into reality

Each winter, growers plan their fertility programs to maximize yields at the most economical level of fertility inputs.

In the spring that program is put into place to enable the crop to succeed. But as the growing season progresses, challenges arise to stress the plant and limit the crop's potential. Weather conditions, insects and diseases begin to impact the crop, threatening to cut crop yields and the bottom line. How can we fight back, and respond to each season's yield-limiting forces?

Foliar feeding nutrients, plus biological enhancements can be significant tools to raise crop yields and quality. Here are four factors to consider, to "make your good crop better":

1. **Timing.** Foliar applications should be timed before or during key stages of crop development or nutrient demand by the crop. One of those key times is just prior to fruit initiation, to "set the table." Too often, plants run out of energy to develop all of the blooms or seeds they have formed, and abort fruit or grain formation to preserve themselves.

Another key period is during grain or fruit fill, to help build density and "bulk out" the crop.

2. **Placement.** The reason a foliar application can be effective at a reasonable cost is the placement of the nutrients on the leaf. Nutrients absorbed through the leaf surface will stimulate plant processes. A key benefit of this stimulation is the formation of new root growth which in turn increases extraction of nutrients from the soil.

This is why application of only a few units of nutrients via foliar feeding can increase plant nutrient levels significantly.

3. **Plant Nutrient Balance.** Because of crop stress and soil deficiencies, plants can lack nutrient balance at key stages of growth.

Dr. Larry Phelan, researcher at the Ohio Agricultural Research and Development Center (OARDC), has studied how an imbalance of nutrients in the plant can trigger insect and disease problems.

Observed Phelan: "Where corn was in balance nutritionally, we had low levels of free amino acids in the leaves. Corn out of balance had high levels of free amino acids - and the highest level of insect infestation." Utilizing AgriEnergy's soil and plant testing services can help identify these imbalances, enabling AgriEnergy agronomists and representatives to tailor the foliar program to your crop's needs.

4. **Complete Foliar Packages.** Time and again the foliars which have shown the best results contained these common components: biologicals, liquid potassium, fish fertilizer, carbon sources, and micronutrients. In 2006 we have combined these into one package, called *Foundation*. Foundation contains fish hydrolysate, organic nitrogen sources, potassium, carbons, and balanced micronutrients, along with biological components. An application of Foundation and SP-1 together provides the most complete foliar fertility package available, conventional or organic. Using Foundation and supplementing additional N, K or micronutrients, AgriEnergy has the ability to provide complete foliar packages that are customized to meet your crop's needs.

Want clear evidence of how your soils have improved? Look at neighboring farms

For many years, Brad Lauber has upgraded his soils at Lauber Seed Farm near Geneva, Nebraska. This spring, he told us,

"When I rent a new farm, it reminds me of why I farm biologically."

He gets a reminder the first time he sinks a chisel plow or field cultivator into a pivot-irrigated farm which has seen only anhydrous ammonia and salt-type fertilizers.

"Running a field cultivator on a new rented farm typically takes 25% more fuel," says Brad. "That soil is tight, not mellow, and lacks sufficient microbial activity. Residue decomposition isn't as far along compared to my own fields, which have benefited for years from AgriEnergy's biological products such as Residue and SP-1."

On newly rented fields, Brad jump-starts biological life with the fall residue program including Residue, liquid lime, ammonium thiosulfate and some sugars. In the spring he comes back with SP-1 and a half-gallon of molasses, plus a phosphate starter on corn ground.

"By the third year, biological activity on the new ground kicks in,

and soil tilth mellows up," he says.

Brad has learned from long experience that soil biological life didn't disappear in one year of conventional farming — and it recovers gradually as well. That fact requires some patience and careful observation. If you're just beginning with AgriEnergy's system of Renewable Farming, here are ways you can "benchmark" biological recovery:

1. In representative sections of each field, dig several holes 12 to 20 inches deep so you can see the soil profile. A PTO-powered post hole auger makes this digging fast and easy, with a clean sidewall.

Slice a knife blade upward through the sidewall of this hole, and note the varying amount of cutting resistance to detect the depth of any compaction layer. Make field notes on this layer's depth and density.

An excellent tool for measuring soil density is a penetrometer — a

soil probe with a pressure gauge — from AgriEnergy Resources.

Note the depth of the soil's "aerobic zone," where soil particles are loose and granulated. One way to do this in early summer is to work your bare hand into the soil as deep as you can.

2. In midsummer as corn is filling ears, dig up several roots and check size of the root mass. Soil should cling to a massive root system.

Split a cornstalk down to the base of its roots. In biologically healthy soils, the entire lower tip of the stalk should be white and healthy. If the lower extremity is yellow and plugged, that's a signal of soil toxicity, which is hampering uptake of moisture and nutrients.

Visit with your AgriEnergy representative for other ways to measure progress, such as a consistent sequence of soil tests over several years. An old farming adage holds true: "The best fertilizer for any field is the footprint of its owner."



Double crop beans present unique opportunities, challenges

Many farmers have a love-hate relationship with double crop soybeans. They love the idea of getting two crops in one season, but hate the fact that double crop beans often perform poorly.

Reports and observation show that double crop beans perform poorly, even when preplant fertilizer is applied, for one of two reasons:

(1) there are too few blossoms, or
(2) the existing blossoms don't set or fill. Essentially, the plants lack the fertility energy to support the desired growth.

How can this be?

Soil right around roots is always an area of relatively low nutrient concentration because roots constantly remove nutrients like potassium, calcium and manganese.

When a plant removes nutrients, the soil always seeks to regain equilibrium

between the depleted areas and the surrounding soil.

It does this by moving nutrients from areas of higher nutrient concentration to areas of lower nutrient concentration. This movement takes time, especially in heavier soils.



Double crop beans typically follow a small grain. Grains are aggressive feeders because of their fibrous root system. Beans, with their tap root, are comparatively poor feeders. So in the typical double crop system, we're asking a weak feeder to bulk up right behind a crop that has licked the plate clean.

And during the critical reproductive phase, soybeans are competing for nutrients with soil microbes which are decomposing grain roots.

Here are ways to help offset these fertility challenges:

❑ **For pod set and fill**, foliar applications are consistently effective. We particularly like an organic foliar such as AgriEnergy's Foundation, which gently delivers a wide range of nutrients.

❑ **If you first need to set blooms**, this can be accomplished by applying our product Ten at 1 gal. per acre after the beans have put on their first set of flower buds.

❑ It may be appropriate to apply a little nitrogen and calcium ahead of bean planting.

If you want to have a better "relationship" and higher profits with your double crop beans, give us a call. We can help.

Sidedress applications can recapture fertilizer use efficiency

It's well-known that you gain the greatest fertilizer efficiency by precision application of nutrients *just before the plant actually needs them*.

That's why sidedress applications of nitrogen were common and beneficial in row crops for years.

As farms grew larger, farmers found it harder to get all their acres sidedressed — and the trend shifted toward broadcast applications.

But today's fertilizer prices and environmental concerns encourage a renewed look at sidedressing.

The highest priority nutrients for sidedressing are the mobile ones which leach through the soil profile: nitrogen in the nitrate form, sulfur and boron — followed closely by potassium and calcium.

Rainfall and soil texture are the two main variables that determine the amount of leaching loss. Higher rainfall takes the mobile nutrients with runoff into streams, where the nutrients become pollutants.

Coarser soils, such as sands, allow water to move through them more readily. These same coarse textured

soils have less ability to attract and hold onto nutrients as well as water.

Low organic matter soils have an inherently limited ability to supply nitrogen and sulfur from soil reserves, making the application of these two nutrients in sidedress applications even more critical on sandy soils.

Sidedressing liquid fertilizer allows you to take advantage of the three major factors that increase fertilizer efficiency: (1) timing, (2) form and (3) placement of fertilizer.

Sidedressing improves the timing of application by putting some of the nutrients on closer to the time when the plant needs them.

AgriEnergy's liquid fertilizers are in a readily available form allowing quicker crop response than other options.

Sidedressing usually involves band placement of nutrients, which is many times more effective than broadcasting those same nutrients.

Sidedressing also provides a great opportunity to precision-apply expensive micronutrients such as

boron, manganese, zinc and others in a very efficient manner.

Rules for successful sidedressing include:

(1) apply adequate nutrients at planting to carry the crop until the sidedress application,

(2) provide the nutrients most apt to be lacking for the remainder of the growing season,

(3) anchor nutrients with sulfates and/or carbons, and

(4) use SP-1 to provide beneficial organisms that recycle and anchor crop nutrients.

Products used in typical sidedress applications are liquid nitrogen, ammonium thiosulfate, Bio Humus, Bio C, 0-0-30, K-Sulfate Solution, Trace Pak or a customized trace blend. Products typically used in organic production include our Ten and Five to provide nitrogen, K-Sulfate Solution, Drammatic Liquid Fish, Bio C and Foundation or trace elements according to soil test.

Sidedressing is one way to maximize return on your fertilizer inputs. The need for nutrient efficiency will keep rising if energy costs climb.

Using lab tests to maximize sidedress and foliar dollars

At AgriEnergy Resources, we offer two easy ways to fine-tune your summer applications:

1. Pre-Sidedress Nitrogen Test (PSNT)

The high cost of N this season can make this simple test a big dollar-saver when determining how much nitrogen to apply to a corn crop.

Pulling a soil sample when the corn is 6-12 in. tall can indicate how much nitrate N is present in the soil.

Then sidedress rates can be adjusted accordingly. Iowa State University uses 21ppm (42 lbs/a) as the point above which no additional N is needed.

While this is no guarantee that a little more won't help yields, the results can be used to prioritize where to put more or less N, to be most efficient.

2. Plant Analysis

In addition to monitoring the soil for nitrogen and other nutrients, a plant analysis offers insight into what the plant is actually receiving, what it is lacking, and what nutrients are out of balance.

The most commonly asked question is "what part of the plant should I sample?"



Sample from the most recent fully developed part of the plant. Take leaf samples from long-growing plants (fruit trees, shrubs, onions, berries, etc).

Take petioles (stems) from short-term crops (beans, tomatoes, peppers, etc). Take 30 to 50 individual leaves or petioles, depending on the stage of growth or size of the leaf or stem. Be sure to identify the plant species on the sample submittal form to help us in our analysis.

When sampling grasses and forages, clip the whole plant. Corn differs from other grasses because sampling varies by plant stage.

The best times to sample corn are at 6-in. height, pre-tassel, and pollination.

Have questions? Call the AgriEnergy Resources office or lab or access our website for instructions specific to your crop.



AgriEnergy Resources

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AgriEnergy Resources consultant

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For a close-up look at your soils, ask the guy who sees them “down under”

One of cartoonist Bill Mauldin's most famous drawings of World War II infantry soldiers “Willie and Joe” shows Joe digging a trench. In the caption, Joe tells his buddy:

“Me future is settled, Willie. I'm gonna be a perfessor on types o' European soil.”

One of your best experts on all types and conditions of the soil profile on *your* farm is your experienced tile contractor. A tiling specialist runs trenchers and pulls tile plows through the full depth of soil layers on many farms — hundreds of miles of trenching every year.

One of the most experienced of these underground experts is Duayne Miller, who with his son Steve owns and operates Duayne Miller Tiling Company in Muscatine, Iowa. He installs tile for

Darel Hein, who has built biological life for more than 25 years on his 1,400-acre farm in Scott County, Iowa. This spring, Duayne trenched in some tile on Darel's farm, following a record-dry season in 2005.

Since Miller uses a wheel trencher, the tile trench reveals a clean vertical profile of the soil horizon from the surface to about four feet deep. “I don't find the usual compaction layer — a plow pan — anywhere on the Hein farm,” says Duayne.

“Darel's soil is nice and loose to dig through,” he adds. “Steve and I like to dig on that farm. It's not wound up tight like a lot of soils in that area. The heavy equipment farmers are using can make the ground really compacted.

“On Darel's ground, I see a lot of earthworms come up when we run the wheel trencher. I think the worms and nightcrawlers help his soil drainage a lot.”

This spring, Duayne found abundant moisture in Darel's soil profile all the way down to tile depth.

Duayne says, “I asked Darel if he got the big rain that went through Ottumwa, but he said it missed his place. And I didn't find anyone else in his area with as much moisture reserve this spring.”

In fact, in early May, Darel was watching his neighbors plant corn a day or two before his own fields looked fit for tractor traffic. With tongue in cheek, Darel teased us a little: “Maybe I should go back to a little more conventional farming, including anhydrous ammonia.”

Ways to capture more “free” nitrogen nutrients from the atmosphere

As soils warm in early summer and the sun's energy accelerates photosynthesis, demand rises for all plant nutrients, *especially nitrogen*.

Nitrogen makes up 78% of the earth's atmosphere. It's a key element of DNA, RNA and proteins, which are the building blocks of all life. Nitrogen is the most essential element; large amounts are required for plant health and productivity.

Above each acre is approximately 30,000 to 40,000 tons of atmospheric nitrogen gas. Unfortunately, it's unavailable to any plant until nitro-

gen fixing microbes convert it to ammonium or nitrate. That requires large amounts of energy in the form of carbon or sugars, as well as vitamins and amino acids that are provided by the plant or included with the fertility program.

The nitrogen needs of legume plants are met through the symbiotic relationship with the Rhizobium bacteria that initiates the formation of root nodules where nitrogen is fixed. Many free living microbial species naturally colonize the soils and are continually converting

gaseous nitrogen to a plant usable form, while also enhancing soil health and quality. Many of the diverse free-living nitrogen species (Algae, Azotobacters, Bacillus, Pseudomonas, Arthrobacter, Enterobacter, Klebsiella, Azospirillum and many others) are supplied by microbial inoculants such as Myco Seed Treat and SP-1, as well as our Bio C used in sidedress programs.

Incorporating foliar applications of SP-1, carbon and nutrients will supplement availability and uptake of “free nitrogen” to the crop.