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Do Foliar Applications of Sugar Improve Soybean Yield?

Shawn Conley, Soybean and Wheat Extension Specialist

High commodity prices have led growers to consider many novel soybean inputs. One input that has garnered considerable attention is the foliar application of sugar products to increase soybean yield. The objective of this research was to evaluate soybean yield in response to various sources of foliar-applied sugar across four states in the Midwest. Field research studies were conducted at Arlington, Wisconsin; Urbana, Illinois; St. Paul, Minnesota; and West Lafayette, Indiana in 2010.The four sources of sugar evaluated in this study were:

1. granulated cane sugar
2. high fructose corn syrup
3. molasses
4. blackstrap molasses

All treatments were applied at the equivalent rate of 3 lb sugar a^{-1} and applied at 15 to 20 gal a^{-1}. The treatments consisted of an untreated check, all four sources of sugar applied at V4, granulated cane sugar and blackstrap molasses applied at R1, granulated cane sugar applied at V4 and R1, and blackstrap molasses applied at V4 and R1.

No positive or negative (phytotoxic) effects were visually observed on the soybean foliage at any location within 10 days following foliar applications (data not shown). Furthermore, sugar did not increase soybean yield within location (data no shown) or across locations [P = 0.60 (Figure 1)], regardless of source. While this study cannot conclusively prove foliar applications of sugar will not increase soybean yield, the authors conclude that other management strategies to improve soybean yield should take precedence over applying sugar.

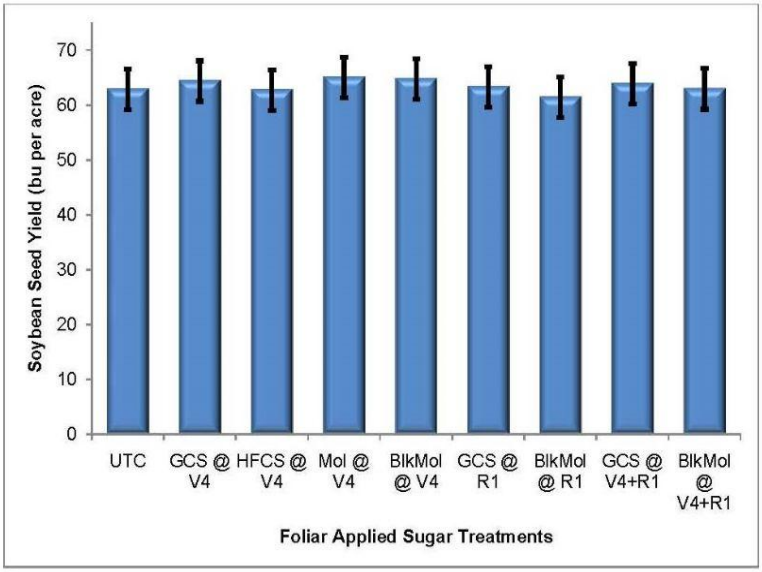

Figure 1. Soybean seed yield for nine foliar sugar applications averaged across four field trials located in West Lafayette, Indiana; Urbana, Illinois; Arlington, Wisconsin; and St. Paul, Minnesota in 2010. Abbreviations: untreated check (UTC), granulated cane sugar (GCS), high fructose corn syrup (HFCS), molasses (Mol), and blackstrap molasses (BlkMol). Vertical error bars represent the standard error of the mean.

The source of this data is:

Furseth, B. J., Davis, V., Naeve, S., Casteel, S., and Conley, S. P. 2011. Soybean Seed Yield Was Not Influenced by Foliar Applications of Sugar. Crop Management. Accepted: 6/1/11.

Please visit: http://dx.doi.org/10.1094/CM-2011-0615-01-BR to view the entire manuscript. **This manuscript is scheduled to be posted in the next 24 - 36 hours. Please check back if the data is not immediately available.

Using soil test results for more than just nutrient recommendations

By Amber Radatz, with assistance from John Peters and Matt Ruark, of The Department of Soil Science, UW Madison and Dennis Frame of UW Discovery Farms

June 14, 2011

Results from soil tests continue to be one of the most important indicators of current soil fertility and a great source of information when determining nutrient recommendations for an upcoming crop. Recently, soil test results are being used as a way for a renter to show the landlord positive change or maintenance in soil fertility levels throughout the life of a land lease. It's important to be very careful when using soil tests for these situations. An acre of soil to a 6-inch depth weighs about 1,000 tons, yet less than 1 ounce of soil is used for each test in the laboratory. Therefore, it is very important that the soil sample is representative of the entire field. Variability can result from a number of factors including: from the number of cores taken, the depth cores are taken from, time of year, and field moisture conditions.

Even though soil tests remain one of the most useful and basic crop and soil management tools we have, it is important to understand the limitations of the results for both accuracy and potential uses. Soil tests effectively distinguish soils with low and high probabilities of crop response for most nutrients (Bruulsema, 2004). The actual number presented to you on your soil test results sheet should be used to gauge that probability of crop response, and not necessarily as a finite value where one number is tremendously better or worse than another.

Here are some links to helpful resources with further information on the variability that might be present in your soil test results.

Effect of sampling time on soil test potassium levels, presented at 2010 Wisconsin Crop Management Conference, Vitko, Laboski, Andraski

Why are soil test potassium levels so variable over time in the Corn Belt?, International Plant Nutrition Institute website, Murrell

Seasonal variability in soil test potassium, presented at 2005 Wisconsin Crop Management Conference, Laboski

Understanding the science behind fertilizer recommendations, International Plant Nutrition Institute website, Bruulsema

An excerpt from "Agronomic and Environmental Implication of Phosphorus Management Practices", Mallarino, Bundy

Sampling soils for testing, UW Extension Publication #A2100, Peters, Laboski, Bundy

Fusarium Head Blight Update - June 13, 2011

Paul Esker, Extension Field Crops Plant Pathologist

While most of the wheat in Wisconsin has flowered, there are still areas where flowering will occur over the next few days to week. I just spoke with Mike Ballweg in Sheboygan County and wheat closest to the lake is in the Feekes 10.2 to 10.4 range, meaning 1/4 to 3/4 of the inflorescence are visible. A check of the Fusarium head blight forecast from June 12 indicated that there were a few pockets around the state where the risk was higher than we have seen earlier in the week. In particular, along Lake Michigan, there is a moderate to high risk and this risk remains moderate to high over the next 24-48 hours. Forecast temperatures indicate cool conditions in this area and there are scattered chances of rain over the next few days. Another factor to consider is that in this part of the state over the past few years, we have heard many reports of dockage or rejection of grain due to Fusarium head blight. This is an area where much of the wheat has followed corn silage, so noting what your previous crop was can also help determine if the risk of infection may be higher. Make sure, however, to check closely the wheat growth stage before making a decision to apply a foliar fungicide since timing is critical for suppression of the FHB and fields may vary greatly in terms of flowering especially as you move inland from the lake. Please see our earlier postings and articles about different foliar fungicides for suppression of FHB as well as pre-harvest intervals based on products.

Black Cutworm Feeding on Corn - Out of the Woods Yet?

Eileen Cullen, Extension Entomologist

Black cutworm (BCW) larvae are in the larger stages (4th to 6th instar) and corn in the V4-V6 stages from what I have seen in the field and reports received this week from consultants, growers, and UW-Extension agriculture agents in Dane, Dodge, Jefferson, Jackson and Vernon counties. Reports are ranging from 3% cut plants to 6-8%, 10-12% or more (30 to 40% in fields that were not scouted previously). Please see earlier WCM articles from this season for details on BCW Black Cutworm Damage Potential for Corn (WCM Vol. 18, No. 8) and Black Cutworm Feeding on Bt Technology (WCM Vol. 18, No. 13).

On Friday June 10th, I visited a field with Bill Stangel, CCA Soil Solutions Consulting, in Dodge County. I post some photos here from our field visit with tips on how to gauge how much longer early V stage corn plants are at risk if you have BCW larvae and stand loss in the field. The particular field pictured in this post was at 3% cutting on June 10th.

Fourth (left) and sixth (right) instar black cutworm larvae. The large, dark gray larvae curl up into a tight "c shape" when handled or disturbed in the soil. (Photo: *Roger Schmidt, UW-Madison Nutrient and Pest Management Program*).

The most important aspect of cutworm control is careful field scouting as soon as plants begin to emerge. Obviously, corn field scouting should have been underway for the last two to three weeks. In typical years, BCW is only an occasional pest, but this year the heavy moth flights have given us a large larval population that has reached and exceeded the economic threshold of 5% cut plants. (note: with high corn prices, a more conservative BCW threshold is approximately 3% cut plants).

Black cutworm damage and cut plants on approximately V3 corn, Dodge Co. WI (June 10, 2011). (Photo: *Roger Schmidt, UW-Madison Nutrient and Pest Management Program*).

The question now is ... how much longer will the larvae feed and can they still cut plants?

Stage of corn plant, original plant population, and BCW larval stage should all be considered. BCW larvae are in the cutting stage (capable of cutting plants) from 4th through 7th instar. One cutworm is capable of cutting several plants. Generally, the cutting stage larvae are between 0.5 inch and 1.5 inch when full grown. However, body length is not always an accurate indicator of how "old" a BCW is. The best technique is to measure the insect's head capsule (just the head, not the pronotum_first segment_ directly behind it) between the shaded areas under the head capsule width column in Table 2-9 below from UWEX Publication A3646, Pest Management in Wisconsin Field Crops 2011 (Pg. 63).

Table 2-9. Guide to black cutworm development and damage in corn

Larval instar (stage)	Head capsule width	Approximate days left to feed	Potential number of plants —that may be cut— 1-leaf	2-leaf	4-leaf
4		25	4	3	1
5		21	4	3	1
6		14	4	3	1
7		5	1	1	1

For example, a sixth instar BCW larva will feed for approximately 14 days. In later crop stages, by V4, large larvae may not be able to cut plants. Instead, they will burrow into the corn plant, below ground level, and result in "wilted whorl" or "dead heart" symptom where newly emerging whorl leaves wilt.

At this point in the field, you should determine if BCW larvae are 6th instar or smaller, and if corn plants can still be cut. By V5-V6, the plants should be out of the woods. By 7th instar, BCW will only feed for a few more days before pupating. There are three BCW generations per year, but it is only the first generation which is active in May and June that causes damage to field corn.