

Two-Year L-CBF Research Summary: Stronger Starts & Higher Yields

SUMMARY: Findings from a two-year study at the University of Illinois show liquid carbon-based fertilizers (L-CBF) improve early season corn growth, promote drier grain at harvest and increase crop yields. Together, these improvements can improve farm profitability and allow for earlier harvest in fall.

In 2015 and 2016, a University of Illinois study tracked the impact of multiple L-CBF products on corn performance and yield.

Derived from cane molasses, L-CBF delivers quality plant nutrients in a carbon base to stimulate soil biology and increase nutrient availability. It can be applied to all major crops and can also be added to most other fertilizers and herbicides.

The study was overseen by Professor Fred Below of the University of Illinois Crop Physiology Laboratory and tracked plant development on multiple Illinois locations: DeKalb, Champaign and Harrisburg, Illinois, in 2015, and Yorkville and Champaign, Illinois, in 2016.



Figure 1: Plants treated with L-CBF 7-20-3 at 5 gal/ac (left), control (right). Year 2016. Photo from University of Illinois.

| Table 1: Taller Plant Height in 2015 | | | | | | |
|---------------------------------------|---------|---------|---------|-------------|--------------|-------|
| Treatment (gal/ac) | N (lbs) | P (lbs) | K (lbs) | Sugar (lbs) | Height (cm)* | Rank* |
| L-CBF BOOST (1 gal) + 10-34-0 (3 gal) | 3.7 | 11.2 | 0.3 | 2.8 | 53.8 | 3 |
| L-CBF BOOST (2 gal) + 10-34-0 (3 gal) | 4.2 | 11.2 | 0.7 | 5.5 | 56.2 | 1 |
| L-CBF BOOST (2 gal) | 0.9 | 0 | 0.7 | 5.5 | 51.2 | 6 |
| L-CBF 10-14-1 (3 gal) | 3.3 | 4.6 | 0.3 | 5.0 | 53.3 | 5 |
| L-CBF 10-14-1 (5 gal) | 5.5 | 7.7 | 0.6 | 8.3 | 54.4 | 2 |
| 10-34-0 (3 gal) | 3.3 | 11.2 | 0 | 0 | 53.7 | 4 |
| Control | 0 | 0 | 0 | 0 | 51.1 | 7 |

*Average of three sites

Table 2: Lower Grain Moisture in 2015

| Treatment (gal/ac) | DeKalb | Champaign | Harrisburg | Average |
|---------------------------------------|--------|-----------|------------|---------|
| L-CBF BOOST (1 gal) + 10-34-0 (3 gal) | 23.4 | 14.2 | 18.8 | 18.8 |
| L-CBF BOOST (2 gal) + 10-34-0 (3 gal) | 23.1 | 14.2 | 18.4 | 18.5 |
| L-CBF BOOST (2 gal) | 23.8 | 14.8 | 19.7 | 19.4 |
| L-CBF 10-14-1 (3 gal) | 23.8 | 14.7 | 19.0 | 19.2 |
| L-CBF 10-14-1 (5 gal) | 23.4 | 14.0 | 19.1 | 18.8 |
| 10-34-0 (3 gal) | 23.3 | 14.1 | 19.0 | 18.8 |
| Control | 23.8 | 14.8 | 19.5 | 19.4 |

Stronger Starts

2015 findings showed plants treated with L-CBF were taller on average than the untreated control and 10-34-0 treatments alone. Increasing early season growth in corn carries multiple benefits, including quicker canopy cover, less weed competition, reduced soil evaporation and lower moisture at harvest. A summary of each treatment and its resulting impact on plant height is summarized in Table 1.

Lower Moisture at Harvest

Grain moisture at harvest was also significantly lower in corn treated with L-CBF products in 2015. This indicates that corn treated with L-CBF can be harvested earlier in the season and will require less grain drying after harvest.

The sugar in L-CBF helps stimulate soil biology and cycle nutrients in the soil, which can help growers get into fields earlier by improving nutrient availability in cool soils. Combined, these benefits are especially helpful in northern climates with shorter growing seasons, or when planting operations are delayed. Final 2015 data on grain moisture is summarized in Table 2.

Higher Yields

The 2016 study tracked multiple L-CBF treatments on corn, including an early prototype (7-20-3) of the new L-CBF 7-21-3 MKP product.

The study was replicated at two different locations – Yorkville and Champaign, Illinois – with varying soil conditions. In Champaign, soil tests reported phosphorus

levels at 26 ppm; in Yorkville, phosphorus levels were reported at 126 ppm – nearly five times the level recorded at Champaign.

Soil conditions at each research location in 2016 played a significant role in crop yields. While L-CBF application in all treatments increased plant height and yields over the control, plant response on the low-phosphorus soils in Champaign was most notable. See Table 3 for a summary of 2016 plant performance.

On average, 7-20-3 application increased yields over the control by 5.5 bushels and the BOOST treatment increased yields by 8.5 bushels. However, at the low-phosphorus plots in Champaign, these advantages increased to 9 bushels (7-20-3) and 13.5 bushels (BOOST). □

Table 3: Taller Plant Height & Improved Yields in 2016

| Treatment (gal/ac) | Plant Height (taken at V6) | Yield at Champaign (low-P soil) | Yield at Yorkville (high-P soil) | Average Yield |
|--|----------------------------|---------------------------------|----------------------------------|---------------|
| L-CBF BOOST (1 gal) + 6-24-6 MKP (3 gal) | 92 cm | 241 | 246 | 243 |
| L-CBF BOOST (2 gal) + 6-24-6 MKP (3 gal) | 92 cm | 234 | 247 | 242 |
| L-CBF 7-20-3 MKP (3 gal) | 93 cm | 227 | 245 | 238 |
| L-CBF 7-20-3 MKP (5 gal) | 94 cm | 239 | 242 | 241 |
| Control | 83 cm | 224 | 245 | 234 |

Footnote: All plots received 180 lbs N preplant & Vt/R1 fungicide