

September, 2020

EVER HEARD OF A DERECHO BEFORE?

We have experienced lots of different storms over the years here in Illinois, but we had never heard this term before. The official definition of derecho describes this event as a widespread, intense, and fast-moving windstorm, and some people refer to it as a land hurricane. Either way, the descriptions are accurate after seeing a derecho come through here on August 10.

According to the National Weather Service, the storm path ran from southeast South Dakota to Ohio. The storm picked up strength in central Iowa, and the strongest winds exceeded 120 miles per hour near Cedar Rapids, Iowa. We recently drove through eastern Iowa, and some corn fields were mostly flat while nearby fields were barely touched. We have also heard that at least 100 million bushels of on-farm and commercial grain storage in Iowa may be damaged beyond use for this fall season.

The storm had lost some of its power by the time it crossed the Mississippi River, so we did not have any structural damage and only lost the top from one tree. There was some notable wind damage to crops, trees, and buildings in our area, but nothing like the impact in parts of eastern Iowa to the west of us. Interestingly, there was a small pocket of 100+ mile per hour winds near Clinton, Iowa, to our northwest, and some folks in that area were without power for more than a week.

If you were in the storm's path, we hope your experience was as modest as ours. Just one more challenge to tackle in 2020!

SOIL HEALTH AND LAWN CARE

For the past two years, we have been helping with an interesting soil health study in central Illinois. The project is associated with Midwest Grows Green, which is a group of community-based programs that encourage natural lawn care and reduced pesticide use. The study compared the soil health impacts of a natural lawn care program based on compost top-dressing versus a traditional lawn care program that uses synthetic fertilizers and pesticides.

In early 2019, we collected soil samples from four parcels that had been managed with traditional lawn care practices, and we ran the Solvita CO₂ Burst and SLAN (amino nitrogen) tests to generate baseline measurements. Later in the year, two of the parcels were switched to the natural lawn care program.

We collected new samples from all four sites in July, 2020. After running the Solvita tests on the new samples and comparing against the baseline measures, we found clear evidence of higher microbial activity under the natural lawn care program. In particular, the natural lawn care sites averaged 76 parts per million (ppm) more CO₂ and 21 ppm more amino nitrogen.

For more information about the Solvita tests, you can review our recent newsletters or visit the Soil Health Lab page at our website (midwestbioman.com). To learn more about natural lawn care, you can visit the Midwest Grows Green website or the webpage for the Lawn and Land Forum (lawnandland.org).

SOIL STRUCTURE AND TILLAGE SYSTEMS

There are many dimensions to soil health. In the newsletter published last September, we focused on soil aggregate stability, which can be measured with the Solvita VAST (volumetric aggregate stability test) procedure. Soils with stable aggregates tend to have less erosion, higher water holding capacity, deeper root penetration, and less compaction. Soil aggregates are bound together by decomposed organic materials, so aggregate stability is affected by biological activity and can be managed.

In the last two newsletters (March and June, 2020), we provided information about available carbon, which is an important part of soil organic matter. Unlike heavily decayed organic compounds like humus, available carbon can be used as an energy source by growing colonies of beneficial microbes. We recently added a soil health test for available carbon to the set of tools offered by our soil health lab.

We recently conducted a comparison of long-term no-till and conventionally tilled soil samples of the same soil type. All of the soils were silt loams and silty clay loams from northern Illinois. Interestingly, there were only small differences in the Solvita carbon dioxide respiration and amino nitrogen test values for the no-till and conventionally tilled fields. However, there were very large differences in the soil structure measures across the tillage systems. In particular, the long-term no-till soils had 35% higher available carbon and 25% higher aggregate stability.

The first major lesson we learn from these test results is that practices that encourage beneficial microbial activity like no-till farming, cover crops, or biological products can have a substantial impact on some important soil properties. The second thing we learn here is that these benefits may not appear in all soil health dimensions at the same point in time. Thus, we have to look at several aspects of soil health over time in order to get a complete picture of what is actually going on beneath the surface.

THE ABC'S OF THE SULFUR CYCLE

In the June newsletter, we included a short article on the relationship between microbial activity and available potash and phosphorus in soils. We received a lot of positive feedback on this information, and several farmers have since told us how they have cut back on their P and K application rates by using the Chandler products to enhance soil health. For this newsletter, we focus on the sulfur cycle, which is also driven by soil microbial activity.

Plants use sulfur to form amino acids and proteins, so it is an essential nutrient. Corn requires about 0.10 pounds of S per bushel produced, and soybeans require about 0.16 pounds of S per bushel. Nearly all sulfur enters plants through the roots in the sulfate form, which must be converted from mineral sources, soil organic matter, or fertilizers by microbial activity. Several key bacterial species and other microbes are involved in this biological process, so sulfur availability is related to overall soil health.

Corn plants take up about one-third of their required sulfur in the late vegetative stages and another half after tasseling. Although little sulfur is used before V10, deficiencies tend to appear early in the season because microbial activity is lower in cooler soils. Also, plants with small root systems are unable to absorb much sulfate. These points emphasize the importance of enhancing early-season microbial activity and supporting early root development.

About half of the sulfur in corn plants remains in the field with the residue after harvest, and soil organic matter is one of the most important sources of sulfates for plant growth. However, sulfur deficiencies can also arise in fields with low soil organic matter or with limited capacity for microbial activity. As we indicate on the next page, a good share of the sulfur required for the next crop can be recycled from the residue. These points highlight the potential value of using Chandler Biocat 1000 to accelerate microbial decay of residues and increase available sulfur for the next crop.

RECYCLE THE NUTRIENTS IN YOUR CROP RESIDUE

Chandler Biocat 1000 is a liquid enzyme product that multiplies the decay organisms that recycle crop nutrients and build soil organic matter. Biocat 1000 may be applied by itself or in a tank-mix with most liquid fertilizers and herbicides. For high-yield corn fields, we recommend applying 14-16 ounces per acre, and we recommend using 8-10 ounces per acre for soybean residue and small grain stubble.

Many of our customers have used Biocat 1000 to accelerate the decay process, release more crop nutrients before the next planting season, and fine-tune their applied fertilizer program. Some farmers have cut their total fertilizer cost without reducing crop yields or soil nutrient levels. Other farmers have reduced their NPK and S rates and used the savings to buy more gypsum, lime, or micronutrients.

Based on the observed decay rates from treated and untreated residue in on-farm trials, Biocat 1000 applied in the fall can decay an additional 1.5 to 2.5 tons of corn residue per acre (or more) by early May. To estimate the value of recycled nutrients, we gather retail fertilizer prices for several different sources of NPK and S and derive the average cost per pound. We multiply these costs by the nutrient content in a ton of corn residue to get total value per ton.

For this fall, the nutrients recycled from corn residue are worth \$19.22 per ton. Biocat 1000 costs \$10.50 per acre under our fall discount, and we deduct \$5 per acre for product application. After subtracting these costs, the expected net returns from accelerated corn residue decay are:

	1.5 tons	2.0 tons	2.5 tons
Nitrogen	\$12.00	\$16.00	\$20.00
P ₂ O ₅	2.88	3.84	4.80
K ₂ O	13.50	18.00	22.50
Sulfur	0.45	0.60	0.75
Total value	\$28.83	\$38.44	\$48.05
Application	-\$15.50	-\$15.50	-\$15.50
Net return	\$13.33	\$22.94	\$32.55

DECAY DROPPED EARS TO REDUCE VOLUNTEER CORN

Another valuable benefit of accelerated residue decay is improved weed control, including volunteer corn. Weed seeds and dropped ears can be decayed like any other form of plant residue, and our customers have reported less weed pressure where they have used Biocat 1000 after harvest to boost the microbial decay process.

There are several other benefits of faster crop residue decay, and these include:

- Faster build-up of soil organic matter, which holds water, nitrogen, and other nutrients for use by the crop throughout the growing season.
- Fewer problems with tough corn stalks that hamper tillage implements, planter openers, and tires.
- Less trouble with heavy residue covers that keep soils cool and wet in the spring and reduce emergence rates for the following crop.
- Reduced chemical carryover and fewer insects and plant diseases that use residue as winter habitat.

DID YOU KNOW?

About 45% of all the microbes that exist on earth live near the ocean floors, and these microbial habitats include some of the deepest parts of the oceans. These deep-sea microbes live on nutrients that drift down through the water from the surface. As nutrients and other sediments filter down through the water and settle on the ocean floors, some of these microbes are buried, and they survive by going into dormancy rather than dying.

Recently, biological scientists have drilled cores into the deep ocean floors and have recovered sediment samples containing dead and dormant microbes that were buried millions of years ago. In some cases, the scientists were able to revive dormant microbes that were over 100 million years old and buried in sediments that were more than 110 yards deep.

NEW ONLINE EVENT FOR FALL 2020

For the first time, we have signed on as a title sponsor for the National Cover Crop Summit. The third annual summit will meet online during November 17 and 18, and it will feature several free presentations by cover crop experts. The first two events attracted thousands of participants from all 50 US states and 47 countries.

Registration for the National Cover Crop Summit is free of charge, and continuing education credits will be available. You can find the registration page at the Cover Crop Strategies site (covercropstrategies.com). After you register for the event, you will receive a link to the conference website where you can view all of the presentations during the scheduled days for the summit. Unlike a live or in-person conference, you can view the recorded presentations at any time or in any order you prefer during the conference dates. Also, you can upgrade your registration to the VIP level for \$49, and this extends your online access to the summit presentations for 12 months.

If you have questions about the National Cover Crop Summit, please send email to info@covercropstrategies.com, call (866) 839-8455 or (262) 432-0388, or visit the conference web address provided above.

FALL DISCOUNT PRICES REMAIN THE SAME

The newsletter includes our fall discount price list for all Chandler crop products. The fall discounts begin on September 1 and run through the end of October, 2020. You must pay for the product within the stated discount period to qualify for that discount. Also, you can place an early order, and we can hold it for later delivery.

Our Fall 2020 discount prices and the shipping fees are the same as last year. Also, please note that we ship all orders over \$800 freight free. So, you can save the shipping costs by ordering about ten or more gallons of liquid product or ordering six or more buckets of Dry Seed Treat.

WINTER FARM SHOWS STILL SCHEDULED FOR NOW

All of our summer marketing events were cancelled or shifted to online programs this year, but we are looking forward to better days ahead. We have already signed up for our usual slate of winter farm shows that run from late November through early March. The show organizers have been careful to survey advanced interest among the exhibitors, and it looks like most of the companies want to go ahead with the winter shows if they can be safely conducted.

For now, we hope the shows go on as planned, but things may change depending on how COVID-19 evolves during the next few months.

NEWSLETTER BY EMAIL?

We distribute our quarterly newsletter in printed form by mail and in electronic form by email. Both versions of the newsletter are identical, and they are sent at the same time. If you would like to switch from the printed newsletter to the electronic version, please call our office (309-659-7773), send email to info@midwestbioman.com, or drop us a note by postal mail.

The Midwest Bio-Tech News

The newsletter is published quarterly in March, June, September, and December, and the first newsletter was published in March, 1993. An electronic archive of the newsletters published during the past 5 years is posted at our website, www.midwestbioman.com.

We only send the quarterly newsletters to past and present customers of Midwest Bio-Tech and to people who have requested additional information about our products. We do not purchase external mailing lists or gather names for the mailing list from other sources. To have your name and address added to or deleted from the newsletter mailing list, please send email to info@midwestbioman.com, call 309-659-7773, or send a letter to Midwest Bio-Tech, Inc., PO Box 156, Erie, IL 61250. Also, if you prefer to receive the newsletter in electronic form, please send us your email address.

In accordance with our privacy policy, we do not provide our mailing list or any other identifying information about our past, present, and prospective customers to any other party without obtaining their express permission in advance.

**2020 FALL DISCOUNT PROGRAM
for CHANDLER CROP PRODUCTS**

**ORDER FORM
MIDWEST BIO-TECH, INC.**

P.O. Box 156 – ERIE, IL 61250
Phone 309-659-7773

Chandler Products	Retail	Oct 16-31	Oct 1-15	Sept 16-30	Sept 1-15
15# bucket of Dry Seed Treat	160.00	154.00	149.00	144.00	140.00
2 to 5 buckets (per bucket)	155.00	149.00	144.00	140.00	136.00
6 or more buckets (per bucket)	150.00	144.00	140.00	136.00	132.00
Single gallon of Liquid Seed Treat	134.00	129.00	125.00	121.00	118.00
2.5 gallon Liquid Seed Treat (per gal.) (per 2.5 gal. jug)	128.00 320.00	123.00 307.00	119.00 298.00	115.00 288.00	113.00 282.00
30 gallon Liquid Seed Treat (per gal.)	120.00	115.00	112.00	108.00	106.00
Single gallon of Chandler Soil	102.00	98.00	95.00	92.00	90.00
2.5 gallon Soil (per gal.) (per 2.5 gal. jug)	98.00 245.00	94.00 235.00	91.00 228.00	88.00 220.00	86.00 215.00
30 gallon Soil (per gal.)	90.00	86.00	84.00	81.00	79.00
Single gallon of Biocat 1000	100.00	96.00	93.00	90.00	88.00
2.5 gallon Biocat 1000 (per gal.) (per 2.5 gal. jug)	96.00 240.00	92.00 230.00	89.00 223.00	86.00 215.00	84.00 210.00
30 gallon Biocat 1000 (per gal.)	88.00	84.00	82.00	79.00	77.00
Single gallon of Chandler Foliar	124.00	119.00	115.00	112.00	109.00
2.5 gallon Foliar (per gal.) (per 2.5 gal. jug)	118.00 295.00	113.00 283.00	110.00 275.00	106.00 266.00	104.00 260.00
30 gallon Foliar (per gal.)	110.00	106.00	102.00	99.00	97.00
Single gallon of Chandler Organic	116.00	111.00	108.00	104.00	102.00
2.5 gallon Organic (per gal.) (per 2.5 gal. jug)	110.00 275.00	106.00 265.00	102.00 255.00	99.00 248.00	97.00 242.00
30 gallon Organic (per gal.)	100.00	96.00	93.00	90.00	88.00

Name _____
(please print)
Address _____
City _____ State ____ ZIP _____
Phone _____ - _____

Qty	Products	Unit Price	Item Total
	15# Bkt Dry Seed Treat		
	Gal Liquid Seed Treat		
	2½ Gal Liquid Seed Treat		
	30 Gal Liquid Seed Treat		
	Gal Soil		
	2½ Gal Soil		
	30 Gal Soil		
	Gal Biocat 1000		
	2½ Gal Biocat 1000		
	30 Gal Biocat 1000		
	Gal Foliar		
	2½ Gal Foliar		
	30 Gal Foliar		
	Gal Chandler Organic		
	2½ Gal Chandler Organic		
	30 Gal Chandler Organic		

PRICES SUBJECT TO CHANGE WITHOUT NOTUCE Product Total _____
UPS Shipping _____

TOTAL AMOUNT ENCLOSED _____

Dry Seed Treat is priced per bucket. We offer quantity discounts for pallets of 48 buckets.
All other products are priced per gallon. We offer quantity discounts for 180-270 gal. totes.

All orders over \$800.00 will be shipped Freight Free.
For orders under \$800, add the following UPS fee:
\$17.00 for each 15# bucket of Dry Seed
\$16.00 for each single gallon of liquid
\$18.00 for each 2.5 gallon jug of liquid

- A – The early September and October discount periods end at midnight on September 15 and October 15, 2020
- B – The late September and October discount periods end on the last calendar day of the month at midnight
- C – Customer must pay for product within the specified discount period to get that discount
- D – You may take delivery of the product at time of payment or we can store it for later delivery
- E – Prices are subject to change, and product cannot be returned for credit or exchange due to insurance regulations
- F – All prices are F.O.B. Erie, IL

Enclose check payable to Midwest Bio-Tech, Inc.

Please provide your shipping instructions for this order on the back of this form.

RECOMMENDED APPLICATION RATES FOR CHANDLER CROP PRODUCTS

When would you like to receive the product that you have ordered?

What is the best way for us to contact you about the shipping details for this order? Please note that we will only use this information as needed to complete this order, and we never provide your name or other personal information to any other party without your prior permission.

Telephone call to:

Text message sent to:

Email message sent to:

THANK YOU FOR THIS BUSINESS!

Chandler Dry Seed Treat

4-5 oz. per bushel for corn, beans, and small grains and 4-8 oz. per bushel for alfalfa.

Chandler Liquid Seed Treat

2 oz. per bushel for corn, beans, and small grains and 4 oz. per bushel for alfalfa.

Chandler Soil

Broadcast 12-16 ounces per acre in the fall or spring, or apply 8-10 ounces per acre in the seed row at planting. Use the higher rate in these ranges if you are applying Chandler Soil for the first time or if your soil is heavy, compacted, or poorly drained.

Chandler Biocat 1000

Corn Residue – depends on the harvested yield

Up to 180 BPA 12 ounces per acre

180-200 BPA 14 ounces per acre

Over 200 BPA 16 ounces per acre

Soybean and Small Grain Residue – 8 to 10 ounces per acre

Chandler Foliar

Alfalfa – for new seedings, apply 10 ounces per acre. For established crops, apply 10 ounces per acre after the first spring growth. Later, apply 10 ounces per acre 10-14 days after each cutting. For seed production, apply 10 ounces per acre before flowering.

Oats – apply 10 ounces per acre at the second to third leaf stage.

Soybeans – for beans planted in rows, spray 8 ounces per acre in a band over the row at the second to third trifoliolate leaf stage. For drilled soybeans, broadcast 10 ounces per acre at the second to third trifoliolate leaf stage. Many users get an added yield boost from a second treatment (8 oz. per acre) applied between flowering and pod set.

Wheat – apply 8 ounces per acre at the second to third leaf stage. In the spring, apply 8 ounces per acre at the beginning of new plant growth or tillering.

Pasture – apply 8 to 10 ounces per acre when there is ample foliage to receive the spray.

Chandler Organic

Use the application rates listed above for Chandler Soil when using Organic as a broadcast or in-row soil treatment, and use the same rates as Chandler Foliar for foliar treatments.