

March, 2022

TOP TEN LESSONS ABOUT SOIL FERTILITY

On February 10, we co-sponsored our tenth webinar with *No-Till Farmer*. The objective of the webinar was to review the ten most important lessons we have learned about soil health and soil fertility over the past 40 years. If you missed the webinar, you can find links to the recording at our website (midwestbio-tech.com) or the No-Till Farmer site (no-tillfarmer.com).

The ten lessons about soil fertility that we discussed during the webinar are:

1. Soil health is built over years and can be ruined in moments – you can cause compaction or other damage very quickly.

2. “You can make good soils better, but you can also make marginal soils into good soils.” This quote reflects the experience from many customers who improved the structure and fertility of heavy clays, sands, and other soils that are challenging to farm.

3. Residue is not trash – we should recognize the whole value of crop residue, which protects soils from erosion and is a source of carbon and nutrients.

4. Decay organisms and fall covers require adequate fertility – in general, decay organisms and cover crops mutually build soil fertility. However, these processes can compete if nitrogen or other nutrients are scarce, which can limit cover crop growth or slow residue decay. If your fields are short on available nitrogen in the fall due to heavy rains that leached nutrients during the season, you may need supplemental N to support cover crops and residue decay.

5. Biologically active soils mineralize more soil nutrients – beneficial bacteria mineralize nutrients to make them available to plants. Biologically active soils can have more available nutrients and produce more yield with less applied fertilizer.

6. Yield gains from foliar and side-dress fertility programs – many of our customers have used foliar feeding and side dressing to apply more of their nutrients. These practices add trips across the field and can be tough to manage during wet weather, but some people have seen solid bumps in their yields, especially on soybeans or for crops raised on lighter soils that have lower nutrient holding capacity.

7. Excess nitrogen can hurt corn yields during a drought – this observation dates back to 1988, but the evidence on the relationship is complicated. We explain the details on page 3 of the newsletter.

8. Temperature matters – microbial activity doubles with each 10 degree jump between 30 and 70 degrees F and grows more gradually up to about 90 degrees F.

9. Moisture matters – soil microbes are most active when soil moisture is about 60 to 80 percent of field capacity. Activity drops off quickly as soils become very dry or saturated.

10. Every situation is different – some companies promote a program or system for improving soil biology. Based on our experience, it is very important to learn about the soils and farming practices on each farm before recommending changes. We try to fit into the way you farm rather than promoting a single system.

RECENT TEST OF FOLIAR APPLIED TO SOYBEANS

Last summer, one of our customers from north central Iowa applied Chandler Foliar to some of their soybeans. In the treated plots, he applied the recommended rate of 10 ounces of Chandler Foliar per acre. All other management practices and inputs on the treated and untreated plots were the same, including planting date, seed variety, fertilizer program, and pesticides.

At harvest, Chandler Foliar generated a 10-12 bushel per acre increase in the soybean yields across the side-by-side plots. Our long-term average increase from Foliar applications is 4 BPA on soybeans, so we were all pleasantly surprised to see this yield result.

Why did this set of plots perform better than our average results? Our customer indicated that they had adequate moisture early in the season but were relatively dry during the late summer months. Chandler Foliar includes micronutrients, enzymes, amino acids, and plant growth hormones, and the product is specifically formulated to enhance photosynthesis. As conditions turn dry, soybean plants enter dormancy as a means to survive. Based on our previous experience, we find that Foliar helps bean plants avoid dormancy and continue to grow when moisture is scarce. As a result, the yield response from Chandler Foliar tends to be larger during short dry spells and extended droughts.

At the full retail price, Chandler Foliar costs \$9.80 to \$11 per acre when applied at the recommended 10 ounce per acre rate. The difference in the per-acre costs reflects the volume discounts from purchasing product in larger containers. As well, the per-acre cost is lower if you purchase Foliar during the March discount period.

We have also seen very good results with Foliar applied to corn, wheat and small grains, alfalfa, and other forages over the years. If you have questions about using Foliar this season, please give us a call at (309) 659-7773 or send us an email message (info@midwestbioman.com).

LATEST REPORTS ON TAR SPOT IN CORN

One of the hot topics at the farm shows this winter was the damage done to corn fields by tar spot infestations last season. We talked to farmers who lost 30 to 60 bushels per acre in some fields, and everyone talked about the rapid emergence of the problem.

Tar spot is caused by a harmful fungus that forms black lesions on corn leaves and can quickly affect late-season growth and yield development. The fungal species are native to Mexico and Central America, and experts believe they were transported to the Midwest by wind storms. Tar spot was first seen in Illinois and Indiana back in 2015, and the first damaging infestations were identified in 2018. Over the past few years, the pathogen has spread across the upper Midwest from Nebraska to Pennsylvania.

The severity of a tar spot infestation depends on field conditions. The growth of the harmful fungus seems to be faster under somewhat cool temperatures (60 to 70 degrees F) and humid conditions (85% or more) when corn leaves are moist for 7 hours or more at a time. Naturally, tar spot can be a problem in irrigated corn fields, but it can also occur in dryland fields if the moisture and temperature conditions are favorable. However, even if a field has been previously infested, tar spot may not show up in a particular year if the late-season weather remains relatively dry.

The tar spot lesions can look like the lesions caused by corn rust or other fungal infections, but the tar spots do not rub off like corn rust spots. Also, the fungus that cause common and southern corn rust only survive on living plant tissue, so these harmful microbes do not survive in the upper Midwest over the winter. New rust outbreaks are caused by harmful fungus blown in to northern fields from southern areas. In contrast, the harmful fungus that causes tar spot in corn can reside on crop residue over the winter, so it can reappear in future years when the weather conditions are favorable for fungal growth.

DECAY CORN RESIDUE TO CONTROL TAR SPOT

Agronomy researchers still have a lot to learn about the conditions that spread tar spot and the means to control this harmful fungus. At this point, the most common recommendations are to select resistant corn hybrids and to apply fungicides once or twice after tasseling if conditions are favorable for an infestation. Also, you could rotate an infested field away from corn to soybeans or another crop for a while, but the agronomy researchers do not know how long it would take to diminish the harmful fungus in a given field.

The university extension services also explain that you can control tar spot by accelerating corn residue decay. Based on their current knowledge, the agronomists note that the harmful fungal colonies mainly reside on the leaves and husks from infected corn plants and may not overwinter on other crop residue. If we can decay the corn residue and remove the habitat for the harmful fungus, then the tar spot problem may be reduced in future years.

At this point, tar spot is a relatively new problem, and we do not have side-by-side test results from fields exposed to tar spot and treated with Chandler Biocat 1000. However, we have plenty of experience with other residue-borne diseases like Goss's wilt, gray leaf spot, northern corn leaf blight, and eyespot. Biocat 1000 can accelerate residue decay to substantially reduce these problems over time.

SPRING APPLICATIONS OF CHANDLER BIOCAT 1000

Biocat 1000 applied to corn, soybean, and other residue in the spring can release nearly as much additional nutrient value as a fall application. Spring field conditions tend to have ample moisture and increasing temperatures, which are favorable for fast residue decay. Some of the first residue components to break down are corn leaves and husks where harmful microbes like tar spot fungus reside.

CORN YIELDS AND N RATES DURING DROUGHT SEASONS

From our lessons learned about soil health and fertility on page 1 of the newsletter, the seventh item states that excess nitrogen can hurt corn yields during a drought. Jim Miller first noticed this relationship while analyzing field plot data after the 1988 season, which was a severe drought year. He also observed this pattern after the 2012 drought and during other years with more localized dry spells.

There is not a large amount of agronomy research on the relationship between corn yields and nitrogen rates during a drought, and some of the evidence runs contrary to our observations from 1988. In particular, some studies find no relationship between N rates and corn yields during droughts, and other research shows that corn can produce higher yields as N rates increase during a drought. The most common explanation is that corn plants produce more foliage with more nitrogen, and the larger leaf area shades the soil surface and reduces soil moisture evaporation during dry spells. As a result, the crop has a bit more moisture available to produce yield during the drought.

Several recent studies support the pattern that Jim Miller first noticed in 1988. For example, two studies published in the US and Europe in the past two years show that higher fertilizer rates reduce crop yields and can also affect the mix of plant species that survive an extended drought. Other studies show that excess nitrogen hampers the interaction between soil bacteria and fungal species, and nitrogen use efficiency can be substantially reduced.

Which set of results are right? We believe the impact of fertilizer rates on corn yields depends on the timing of the dry weather. If the crop can get established before conditions turn dry, then the plants may benefit from the added nitrogen. However, if the drought sets in early during the growing season or extends over multiple years, then the added N may not help the plants and can actually reduce yields.

NATIONAL COVER CROP SUMMIT

For the fourth time, we have signed on as a title sponsor for the National Cover Crop Summit. The summit is held twice per year (March and November), and the event for Spring 2022 will meet online during March 15 and 16. The twelve free presentations offered to conference participants include important topics like controlling weeds with cover crops, using cover crops on livestock farms, linking cover crops to soil health, managing cover crops on vegetable and organic farms, and seeding cover crops.

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). People who register for the conference can view the recorded presentations at any time or in any order on March 15 and 16. If you upgrade your registration to the VIP level for \$49, you can extend your online access to the summit presentations for 12 months and qualify for several bonus values, including free access to 35 presentations from the previous cover crop summits, a discount on the 2022 National Strip-Tillage Conference registration, and a one-year premium subscription to *No-Till Farmer*.

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, send a fax to (262) 786-5564, or visit the conference web address provided above.

SPRING DISCOUNT PRICE LIST ENCLOSED

We announced new discount and retail prices in the December 2021 newsletter, and these prices remain the same for the spring season. The price list and shipping fees are provided on the enclosed one-page order form. Please note that the 4% March discount on all crop products expires on April 1, 2022. As always, we cover the shipping costs on all orders over \$800.

REPORT ON THE WINTER FARM SHOWS

Unlike last year, we were able to exhibit at all of the winter shows as scheduled. For the most part, we were fortunate to have good weather for all of the shows, especially for the Peoria and Indianapolis shows in December. Also, the shows were well attended, but it appeared to us that the attendance was not quite as strong as 2019 and 2020. We did enjoy the opportunity to visit with customers who we had not seen in at least two years.

Also, most of the shows had somewhat smaller exhibit space and fewer exhibitors than in previous years. At each show, a few companies had paid for exhibit space in advance but decided to skip the show at the last minute. In some cases, we know the companies wanted to attend but did not have enough people available due to labor shortages and staff who recently tested positive for COVID.

The Hawkeye Farm Show in Cedar Falls, Iowa is the last event on our winter show schedule. This show is set for March 1-3, and we will be at the show in our usual spot at the center of the arena floor.

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.

**2021-2022 PRE-SEASON 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	March	Feb	Jan	Dec
15# bucket of Dry Seed Treat	180.00	175.00	170.00	165.00	160.00
2 to 5 buckets (per bucket)	175.00	170.00	165.00	160.00	155.00
6 or more buckets (per bucket)	170.00	165.00	160.00	155.00	150.00
Single gallon of Liquid Seed Treat	152.00	148.00	144.00	140.00	136.00
2.5 gallon Liquid Seed Treat (per gal.) (per 2.5 gal. jug)	146.00 365.00	142.00 355.00	138.00 345.00	134.00 335.00	130.00 325.00
30 gallon Liquid Seed Treat (per gal.)	136.00	132.00	128.00	124.00	120.00
Single gallon of Chandler Soil	115.00	112.00	109.00	106.00	103.00
2.5 gallon Soil (per gal.) (per 2.5 gal. jug)	110.00 275.00	107.00 268.00	104.00 260.00	101.00 252.00	98.00 245.00
30 gallon Soil (per gal.)	102.00	99.00	96.00	93.00	90.00
Single gallon of Biocat 1000	113.00	110.00	107.00	104.00	101.00
2.5 gallon Biocat 1000 (per gal.) (per 2.5 gal. jug)	108.00 270.00	105.00 263.00	102.00 255.00	99.00 247.00	96.00 240.00
30 gallon Biocat 1000 (per gal.)	100.00	97.00	94.00	91.00	88.00
Single gallon of Chandler Foliar	142.00	138.00	134.00	130.00	126.00
2.5 gallon Foliar (per gal.) (per 2.5 gal. jug)	136.00 340.00	132.00 330.00	128.00 320.00	124.00 310.00	120.00 300.00
30 gallon Foliar (per gal.)	126.00	122.00	118.00	114.00	110.00
Single gallon of Chandler Organic	132.00	128.00	124.00	120.00	116.00
2.5 gallon Organic (per gal.) (per 2.5 gal. jug)	126.00 315.00	122.00 305.00	118.00 295.00	114.00 285.00	110.00 280.00
30 gallon Organic (per gal.)	116.00	112.00	108.00	104.00	100.00

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.
After January 8, add UPS fees for orders under \$800:
\$18.00 for each single gallon of liquid
\$22.00 for each 15# bucket of Dry Seed
\$24.00 for each 2.5 gallon jug of liquid

- A – The 12% December discount period ends at midnight on January 8, 2022
- B – The January, February, and March discount periods end at midnight on the last calendar day of the month
- 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 you until spring
- 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 ounces per bushel or unit for corn, beans, and small grains and 8 ounces per bushel for alfalfa, clover, vetch, or other small-seeded crops. The actual amount of Dry Seed Treat required depends on seed size and humidity, so you should adjust the rate if you need better seed coverage or have excess treatment in the seed hopper.

Chandler Liquid Seed Treat

2 ounces per bushel for corn, beans, and small grains and 4 ounces per bushel for alfalfa, clover, vetch, or other small-seeded crops.

Chandler Soil

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

Chandler Biocat 1000

Corn Residue – 12-16 ounces per acre. We recommend that you use the 16 ounce rate for heavy residue in corn fields that yielded 200 BPA or more.

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 – band 6-8 ounces per acre over the row or broadcast 10 ounces per acre. The best times to apply Foliar to soybeans are at the second to third trifoliolate leaf stage or 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.