

# THE MIDWEST

# BIO-TECH NEWS

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**September, 2010**

## **RECENT FOCUS ON SOIL COMPACTION**

For the past year, the farm newspapers and magazines have run several articles on soil compaction and with good reason. The weather was quite wet last fall, and the rain continued into the spring planting season and throughout the summer in most parts of the Midwest. Due to the limited amount of time available for harvesting and planting, most farmers had no choice but to operate machinery on these wet fields. Although most parts of the Midwest (except central Iowa) have dried out over the past month, any work completed on wet land last fall or in the spring may have contributed to soil compaction problems for next year.

Most of these articles about compaction were written by university and company agronomists or by other ag professionals who have considerable experience with wet soils and soil compaction technology. Unfortunately, many of these folks tend to focus on part of the problem and only part of the potential solution. For example, one of the most commonly offered solutions is to always drive in the same wheel path. However, this practice does not solve the problem and only restricts the compaction to a limited area of the field. Also, this approach can work for larger farms that use wider equipment and GPS technology, but it may not be practical for smaller farms.

Another common recommendation is to improve drainage in wet fields by investing in tile. While tile can be a valuable tool for draining wet and heavy soils that are not compacted, the long-term effectiveness of

the tile depends on the nature of the soil around and above the tile network. If the soil is compacted, the water will not be able to reach the tile and will not drain from the field. Although the soil compaction will be temporarily broken up when the tile is installed so that the tile works for a while, the compaction problem will return if the root cause of the drainage problem is not permanently resolved. Subsoilers and other deep tillage tools do about the same thing by providing a temporary solution to a long-run problem with the soil structure.

In general, there are two main causes of soil compaction, and the one that gets most of the attention in papers and magazines is heavy machinery. However, the impact of wheels or tracks on the soil only extends through the top twelve inches of the soil profile. Most of the problems associated with compaction that affect crop growth and yields occur deeper in the root zone and are due to the second main cause, limited microbial activity in the soil.

Many of the compacted fields that we have seen in the past 30 years have severe problems that extend down 15 to 24 inches below the surface (as measured with a soil penetrometer). Plants in these fields tend to have shallow root systems that spread out near the surface because they cannot go deeper. Given that these plants are not able to reach the moisture and nutrient reserves in the deeper soil, they tend to be much less drought tolerant and produce lower yields and test weights. In this issue of the newsletter, we discuss how you can use Chandler Soil and the other products to permanently reduce soil compaction.

## **THE BIOTECH WAY TO REDUCE SOIL COMPACTION**

The various forms of life in the soil build the soil structure and keep it porous so that air and water can move up and down through the soil layers. These life forms include microbes like bacteria and fungi as well as larger organisms like earthworms. When we take actions that kill or hamper these organisms, the soil structure can become more compacted and less porous throughout the entire soil profile (not just on the surface). After this happens, air and water cannot move freely into the soil, which leads to standing water or surface erosion. Also, plant roots cannot penetrate to lower soil layers, and the plants will be more susceptible to extreme temperatures, excess water, drought, nutrient deficiencies, and standability problems.

Although we have enjoyed the many yield benefits and cost advantages of using chemical fertilizers and pesticides in crop farming for more than 60 years, these products are toxic to the soil life forms when used in excess quantities. Over the years, I have seen several notable examples of these problems first hand, and the product that seems to cause the most trouble for life in the soil is anhydrous ammonia, which is cheap but very toxic to soil microbes.

To illustrate this point, I can tell you about two brothers who farm some of the best soil in north central Illinois. For many years, they applied their nitrogen fertilizer as a liquid 28 percent solution. After they used Chandler Soil for three years, we could not find any evidence of compaction in the top 27 inches of the soil profile with our Dickey-John penetrometer. They later switched from liquid 28 to anhydrous ammonia as their primary source of nitrogen fertilizer. We checked the field two years after the change and found a solid layer of soil compaction that extended down about 16 inches across each of their fields. The anhydrous ammonia was killing the life in their soil, and the soil structure was quickly becoming less porous.

Another commonly used fertilizer product that is very toxic to soil organisms is 0-0-60 potash, which contains 200 times more chlorine salt than cities use in their water purification programs. For example, one of our users in Indiana had no prior indication of compaction in his fields. After he applied 250 pounds of 0-0-60 per acre for two years, we found a solid layer of compaction that started at the surface and continued down 14.5 inches into the soil. Again, the salts in the potash fertilizer are killing the organisms that keep the soil porous.

Of course, we are not attempting to recommend that you stop using 0-0-60 or anhydrous ammonia, but we have learned that higher rates of Chandler Soil are required in order to offset the detrimental effects of these fertilizer products on the soil organisms. We have also learned that it is possible to reverse the degree of compaction and other problems that result from limited life in the soil. In some cases, we have been very surprised at how quickly this improvement can occur. For example, we work with a farmer in Iowa who had no earthworms at all in his fields when we started, so the amount of life in the soil was quite limited. After he used Chandler Soil for three years, we found 30 to 50 earthworms in the roots of every corn plant that we dug out of his field.

On average, we find that Chandler Soil treatments tend to remove about 6 inches of compacted soil for each year the product is applied. Thus, we recommend that you use Chandler Soil for at least three years in a row in order to achieve the full product benefits. Due to the reduced compaction, most of our long-term users report that they are able to shift up by 1-2 gears during primary or secondary tillage operations, and their fuel savings almost return the cost of the product. Also, many of our users report quicker soil drying in the spring, even when the weather is wet and cold like this past year. They also find fewer problems with standing water, blowing soil, and excessive surface run-off after they use Chandler Soil for three or more years.

## **BOOST RESIDUE DECAY WITH BIOCAT 1000**

Throughout the month of August, we got a lot of phone calls and other inquiries about managing crop residue, especially for Bt corn. Chandler Biocat 1000 is a liquid enzyme product that stimulates the soil organisms that convert residue to soil nutrients. To completely decay the residue and make these nutrients fully available to the next crop, you should apply Biocat 1000 as soon as possible after harvest this fall.

The product may be applied in a tank mix with Chandler Soil and other products, and it is compatible with most liquid fertilizers and pesticides. For example, many users add 2-3 pounds of ammonium sulfate per acre, and the nitrogen helps Biocat 1000 to feed the microbes that decay the residue. We recommend that you test all new tank mixes for compatibility, and you should apply Biocat 1000 with enough water (at least 10-20 gallons per acre) to get good coverage of the residue. Also, the decay process requires some moisture in the residue, so Biocat 1000 will not work well under very dry conditions.

The post-harvest residue in a typical corn field contains the following amounts of nitrogen (N), phosphorus (P), and potash or potassium (K) in pounds per acre:

<b>Crop</b>	<b>N</b>	<b>P</b>	<b>K</b>
Corn	200	74	290
Soybeans	90	20	50
Oats	25	15	80
Wheat	40	10	70

The actual nutrient content of the residue in a particular field will vary with crop genetics, population density, stalk size, and other factors. For example, these nutrient values are based on average corn hybrids that produce 10 tons of residue and over 200 bushels per acre. Many farmers now plant hybrids that have higher plant populations and heavier stalks (especially Bt corn), and the nutrient content of the residue may be higher. Depending on your situation, the nutrients in your residue may be worth well over \$100 per acre at current prices.

## **DO YOU HAVE MUSHROOMS IN YOUR CORN FIELDS?**

One of our users in eastern Iowa recently called to ask about something that first appeared in his corn field this past spring --- mushrooms. He wanted to know if this was typical in fields that were treated with Chandler Crop Products and if there were any adverse effects from the mushrooms. He followed up on the call by sending three photos of the mushrooms by email.

We tend to find mushrooms in timbers where herbicides are not applied and there is plenty of decaying leaves and vegetation, but they can appear in other places under similar conditions. In particular, I have had a small patch of mushrooms growing in my yard near our warehouse. This particular spot is where I turn our lawn mower and sprayer. So, the mushrooms are growing in a spot that tends to have lots of decaying grass clippings and is treated with ample amounts of the Chandler products.

To explain why we might see mushrooms in these places, we can refer to the summary of soil organisms that we printed in the September newsletter last year. We explained that all types of soil fungi (including mushrooms) cannot make their own food and must feed on manure, dead vegetation, and other nonliving materials in the soil. At this spot in my lawn, there is plenty of vegetation and biological activity to support the mushroom growth. As well, the photo that we received from our Iowa user (posted at [www.midwestbioman.com](http://www.midwestbioman.com)) indicates that the residue decay process is nearly done in this field, so there is ample decayed material to feed the mushrooms.

Are there any adverse effects from the presence of the mushrooms in the lawn or the corn field? The short answer to this question is a definite NO! In fact, our report on soil organisms from last September stated that fungi are more important than bacteria for the formation of soil humus. Although we cannot see other types of soil organisms at work, the presence of the mushrooms is a clear and favorable sign of the biological activity in the soil.

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Address Service Requested

## **ARE YOU GROWING WINTER WHEAT FOR 2011?**

Although the recent moves in the wheat market may have over-shot the mark a bit, it looks like wheat prices will be higher for the next year or so due to short crops in Russia and elsewhere. We have already talked to a number of farmers in the southern parts of our sales area who are thinking about adding more winter wheat acres this fall in order to take advantage of the favorable price moves.

If you are considering some wheat acres for next year, don't forget to use Chandler Crop Products this fall in order to make the most of this profitable opportunity. You can apply Chandler Biocat 1000 to help decay any remaining residue in the field and release the nutrients for use by the plants, and Chandler Soil will help to keep these nutrients available through the growing season. Also, Chandler Dry Seed Treat will help to support seed germination, seedling emergence, and early plant growth and to avoid excessive winter kill.

## **FALL DISCOUNT PROGRAM BEGINS ON SEPTEMBER 1**

Our Fall Discount Program for most of the Chandler Crop Products starts September 1 and runs through the end of October, 2010. The complete discount and retail price list is enclosed with the newsletter and is posted at our website ([www.midwestbioman.com](http://www.midwestbioman.com)). Please note that the discounts are higher during the initial weeks of the program and decline during the later weeks. You must pay for the product within the stated discount period to qualify for that discount, and you can take delivery of the product when you place the order or request later delivery. All product prices and shipping rates remain the same as last year.

**IF YOU HAVE AN UPDATED ADDRESS THAT IS DIFFERENT FROM THE ONE ON YOUR ADDRESS LABEL, PLEASE SEND IT TO US OR GIVE US A CALL SO IT CAN BE CHANGED FOR FUTURE NEWSLETTERS.**

**2010  
SPECIAL FALL APPLICATION PROGRAM  
for CHANDLER CROP PRODUCTS**

<b>Chandler Products</b>	<b>Retail</b>	<b>Oct. 16-31</b>	<b>Oct. 1-15</b>	<b>Sept. 16-30</b>	<b>Sept. 1-15</b>
15# Bkt Dry Seed Treat	150.00	144.00	140.00	135.00	132.00
2 to 5 Bkts - Per Bkt	145.00	139.00	135.00	131.00	128.00
6 or more Bkts - Per Bkt	140.00	134.00	130.00	126.00	123.00
(Each Bkt will treat about 60 Bu. or units of seed)					
Gal Liquid Seed Treat	125.00	120.00	116.00	113.00	110.00
2½ Gal Liquid Seed Treat - Per Gal	120.00	116.00	112.00	108.00	106.00
- Per 2½ Gal	300.00	290.00	280.00	270.00	265.00
30 Gal Liquid Seed Treat	110.00	106.00	102.00	99.00	97.00
(Each gallon will treat about 64 Bu. or units of seed)					
Gal Soil	92.00	88.00	86.00	83.00	81.00
2½ Gal Soil - Per Gal	90.00	86.00	84.00	80.00	78.00
- Per 2½ Gal	225.00	215.00	210.00	200.00	195.00
30 Gal Soil	82.00	79.00	76.00	74.00	72.00
Gal Biocat 1000	90.00	86.00	84.00	80.00	78.00
2½ Gal Biocat 1000 - Per Gal	88.00	84.00	82.00	78.00	76.00
- Per 2½ Gal	220.00	210.00	205.00	195.00	190.00
30 Gal Biocat 1000	80.00	77.00	74.00	72.00	70.00
Note - Biocat 1000 is a cellulose digester					
Gal Foliar	112.00	108.00	104.00	101.00	98.00
2½ Gal Foliar - Per Gal	109.00	105.00	101.00	98.00	95.00
- Per 2½ Gal	272.00	262.00	252.00	245.00	237.00
30 Gal Foliar	100.00	96.00	93.00	90.00	88.00
<b>Chandler Organic</b>					
Gal Organic	105.00	101.00	98.00	95.00	92.00
2½ Gal Organic - Per Gal	100.00	96.00	93.00	90.00	88.00
- Per 2½ Gal	250.00	240.00	233.00	225.00	220.00
30 Gal Organic	90.00	86.00	84.00	80.00	78.00

Chandler Organic can be sprayed on the soil or as a foliar on plants.  
Dry Seed Treat is priced per bucket --- **the rest of the products are priced per gallon**

- A – The early September and October discount periods end at midnight on September 15 and October 15, 2010
- 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 you
- 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

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

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

Name \_\_\_\_\_  
(please print)

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_ ZIP \_\_\_\_\_

Phone \_\_\_\_\_ - \_\_\_\_\_

<b>Qty.</b>	<b>Products</b>	<b>Unit</b>	<b>Price</b>
	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 NOTICE**      **Product Total** \_\_\_\_\_  
UPS Shipping \_\_\_\_\_

TOTAL AMOUNT ENCLOSED \_\_\_\_\_  
WHEN YOU WOULD LIKE DELIVERY OF THIS PRODUCT \_\_\_\_\_

All orders over \$800.00 will be shipped Freight Free  
All orders under \$800.00 add the following UPS fee  
Each 15# Dry Seed - \$14.00  
Each Gal of Product - \$13.00  
Each 2½ Gal of Product - \$15.00

Enclose Check or Money Order  
Payable to Midwest Bio-Tech, Inc.

**THANK YOU FOR THIS BUSINESS!**

## RECOMMENDED APPLICATION RATES FOR CHANDLER CROP PRODUCTS

### 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 a band over the seed row at planting. Use the higher rate 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 a new seeding, apply 10 ounces per acre. For an established crop, apply 10 ounces per acre at the first burst of spring growth. Later, apply 10 ounces per acre within 10-14 days after each cutting. For seed production, apply 10 ounces per acre just 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 at any time there is ample new growth or foliage to receive the spray.