

FARM INSIGHT



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BOOST SOIL & PLANT HEALTH

Are you Farming the Controllables?

"Recipe for Success"

The key controllables that impact profitability include:

- ✓ Manage crop residue
- ✓ Optimize crop stands
- **Boost soil health & plant health**
 - Minimize plant stress (*hint – discover the value of ethylene inhibitors*)
 - Reduce tillage cost
 - Utilize crop rotation & cover crops
 - Biologically treat manure

Build Soil Health to Boost Plant Health

When you've got soil challenges, you've got farming challenges. Just ask Bill Banken, who farms near Appleton, Minnesota, an area known for high-magnesium soil. These soils tend to form hard crusts, making them difficult to till. High-magnesium soils also lock up valuable crop nutrients.

"You can keep putting on fertilizer, but it just gets tied up in these soils," said Banken, a third-generation family farmer who raises corn and soybeans. "Too much magnesium also makes the soil more 'sticky,' so it doesn't crumble like good-quality soil."

An experienced no-till farmer, Banken noted that it's also getting harder to get crop residue to break down properly in the field without tillage. "I know there are nutrients in that residue and in the soil, if we can just unlock them."

Continued on the next page...

Science shows Banken is right. There are 40,000 pounds of potassium per acre in just the top six inches of many Midwestern soils, according to the Regenerative Agriculture podcast episode “*The Fallacy of Mainstream Potassium and Nitrogen Fertilization*.” When the plant roots reach the lower subsoil levels, they find large quantities of potassium that they extract with the biological functions of the root system, according to podcast guest Dr. Richard Mulvaney, a University of Illinois soil fertility scientist.

In addition, there are high levels of soluble potassium carbonate in crop residue. The residue from 200 bu/A corn contains 190 pounds of potassium, along with 80 pounds of nitrogen, 30 pounds of phosphorus, 16 pounds of sulfur, 35 pounds of calcium, 25 pounds of magnesium and an abundance of carbon. “There’s a tremendous amount of nutrients we’re not utilizing if we don’t break down residue properly,” said Dennis Klockenga, a crops specialist with ProfitProAG.

The more carbon, the better the soil holds together

“When residue is improperly managed, it can do more harm than good. Before it finally rots, it often harbors harmful microbes,” Klockenga said.

Contrast this with residue that breaks down efficiently, putting nutrients and carbon back into the soil. Carbon enhances soil structure and improves the soil’s water-holding capacity, which can help drought-proof your crop.

“Carbon is also a food source for beneficial microbes. It enables the production of glomalin, the substance that holds soil particles together,” Klockenga said. “This helps control soil erosion and protects soil from the explosive power of raindrops during a heavy rain. The more carbon you have, the better the soil holds together.”

Put biology back into the soil

How do you get this carbon from crop residue back in the soil, while controlling or eliminating tillage? It’s a challenge, due to today’s seed genetics.

Stalks produced by modern Bt corn hybrids are more like tree trunks than cornstalks. “It’s important to put the power of biology to work,” said Klockenga, who recommends **MeltDown** from ProfitProAG.

This blend of beneficial bacteria and fungi helps break down lignin in the stalks. “The microbes and fungi poke holes in the stalks as they digest lignin and cellulose,” Klockenga said. “This allows Mother Nature to break down the residue.”

ProfitProAG offers MeltDown in a premix that includes a fish-based, liquid fertilizer (Pacific Gro) with fungi to accelerate residue breakdown. Banken has used MeltDown with good success.

“I can tell where we sprayed it and where we didn’t apply it,” Banken said. “On the areas that were sprayed with MeltDown, you can tell that the inside of the stalks are a lot softer. It still takes time to break down the residue, but MeltDown works.”

MeltDown, combined with the fist fertilizer costs about \$13 an acre. “When you consider all the nutrients you unlock when the microbes break down residue properly, it pays for itself,” Banken said.

Cover crops are another solution to help build healthier soil. “Oats raise soil phosphorus levels, which leads to more phosphate uptake,” Klockenga said. “Plants feed the soil, and the soil feeds the plants. That’s why you want to have plants growing in your fields throughout the year. There’s still some biological activity out there, even in the winter.”

Not only do cover crops control erosion from water, wind and snow, but they help feed the soil’s microbial system. “Think back to the days when there were a wide variety of prairie plants growing on the land,” Klockenga said. “The more diversity you have in your cover crop mix, the more diversity you’ll feed into the soil.”

Banken is adding cover crops to his farming operation. He plans to seed annual rye into corn at the V6 growth stage. He trusts Klockenga to help him learn practical, proven ways to improve soil health and plant health. “My goal is to improve my soil, not only for today, but for years to come,” said Banken, whose son Cody wants to farm.

“Sustainability has an ecological component and an economic component,” Banken added. “As fertilizer prices rise, I’m hoping that we can cut our fertilizer bill by putting biology back in the soil. The more you can build soil health and plant health, the less need you have for chemicals and commercial fertilizer.”

Making Sense of Heat Stress, Climate Change and Plant Health

When the rain quits falling but the mercury keeps rising, dry conditions are just part of the equation when it comes to drought damage. Heat stress is also a threat.

While there are ways to make your soils and crops more resilient, no matter what Mother Nature throws at you, let's start by understanding some basic biology first.

Heat stress occurs when the air temperature is hot enough for a sufficient period to cause irreversible damage to the plant's function or development. At 95°F, photosynthesis drops drastically while plants increase their respiration to resist the heat. Think only daytime temperatures have an effect? Not so. When nighttime temperatures are high, plants don't have time to recover from the daytime heat.

Plants respire at night. During respiration, plants break down sugars produced during photosynthesis, plus the plants release oxygen. This oxygen is used later to create glucose, which becomes an energy source for the plant. If plants can't break down the glucose, however, they can suffer tissue damage. This occurs because the plant can't remove waste efficiently.

Also, if respiration goes too fast, due to high nighttime temperatures, plants will lose precious water that becomes essential during a drought.

But what about climate change?

With all this talk of drought and heat stress, you may be wondering, "What if we're really experiencing climate change?"



Drought stressed corn

Annelisa Brown, a degreed meteorologist with the ProfitProAG team, looked at temperature data from three locations in the Upper Midwest with different populations (St. Cloud, MN, Minneapolis, MN and Algona, IA) to determine if summers and winters are becoming warmer. She used data from the National Centers for Environmental Information (NCEI) by collecting the maximum and minimum temperatures.

As part of her research, Brown also studied heat waves. A summer heat wave is defined as a span of two or more days when the daily high temperature was 90°F or above. A winter heat wave is a span of two or more days when the daily high temperature is 32°F or above. While Brown expected to see an increase in the number of heat waves during the summer and winter, her research suggested this is not the case most of the time, at least with the places she studied.

Now what?

If climate change isn't the culprit, but natural cycles indicate an impending drought on the horizon in some areas, are you just at the mercy of Mother Nature? No.

You can take steps to drought-proof your soil and protect your crops. Learn more in the blog "Weatherproofing Your Crops in 2021" on our website (profitproag.com under the 'BLOGS' tab). We welcome your questions and look forward to working with you this year.

Interested in more of Annelisa's work? Email her at adminassistant@profitproag.com for more information.

Dennis' In-the-Field INSIGHT

Dennis Klockenga, CCA, ProfitProAG Crop Management Consultant • 320-333-1608 (cell)

How does Uneven Seedling Emergence Affect Corn Yield?

We've all seen a field or two that didn't come up even. There are nice, tall corn plants right next to tiny, scrawny ones. Does this affect yield? If so, how much?

Researchers at the University of Illinois, University of Wisconsin and University of Minnesota have conducted trials to answer these questions.

The Trial

The trial was conducted using two hybrids in seven environments in Illinois and Wisconsin. The researchers based ideal planting time on May 1st. That represented 100% yield, based on a final stand of 26,000 plants/A. Then they simulated uneven emergence within rows by having one fourth, one half and three fourths of the plants delayed in emerging. In addition, they planted one and a half weeks after May 1st (medium delay) and three weeks after May 1st (late delay). The researchers also looked at the effect of stand loss when one fourth, one half and three fourths of the plants were missing.

The Findings

If planting was medium delayed (1 ½ weeks), there was a 5% yield loss. When half or three fourths of the plants within the row came up late, researchers saw up to an 8% yield loss.

When the corn was planted late (three weeks after May 1st), yield was reduced by 12%, down to as much as 22%, when one fourth of the plants emerged on time and three fourths of the plants emerged late.

When researchers analyzed stand loss, they saw a 10% loss in yield when one fourth of the plants were missing. When three fourths of the plants were missing, researchers observed a 51% yield loss (See Figure 1 for more details). Click here to read the entire study:

[Effects of Uneven Seedling Emergence in Corn.](#)

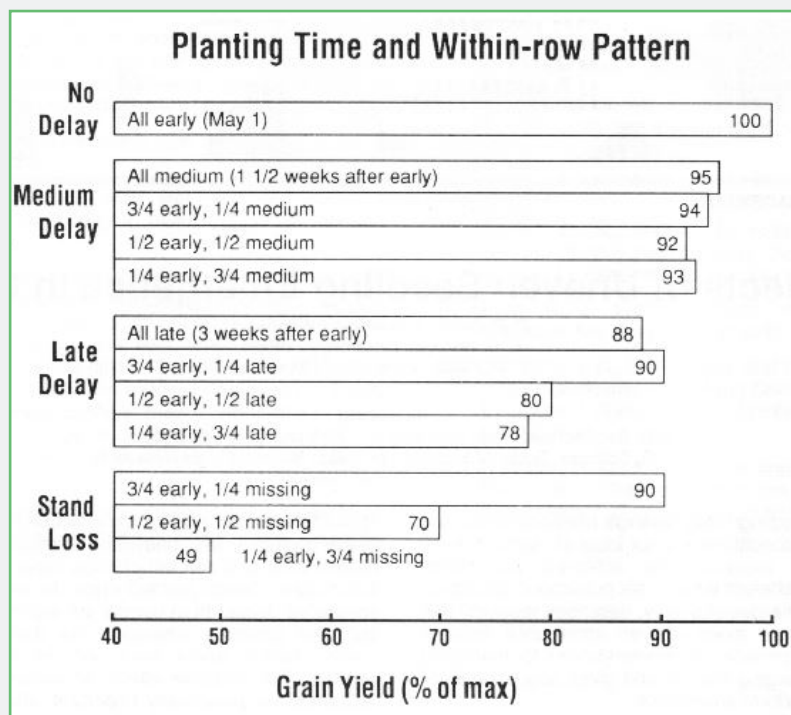


Figure 1

What does this mean?

When planting is delayed by one-and-a-half to three weeks after the ideal planting date, you're likely to lose yield. The greater the delay, the greater the yield loss. Make no mistake. Late-emerging plants cost you yield, just like when you have missing plants.

How Can I Help Germination?

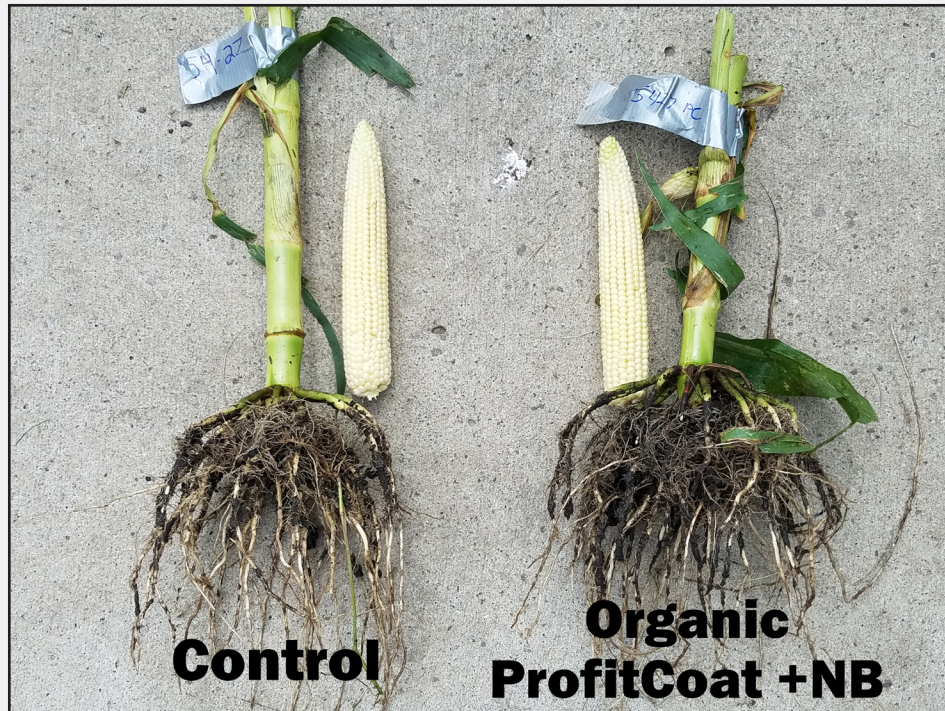
Fortunately, there are steps you can take to manage these challenges. Adding a biological seed coating like **ProfitCoat** can improve even germination and emergence.

ProfitProAG's seed coatings contain a blend of microbes, including multiple strains of mycorrhizal fungi, trichoderma, pseudomonas, Azotobacter, Bacillus, Penicillium and streptomyces. The formula includes an effective blend of minerals and nutrients to feed the microbes, while a biostimulant activates them.

Continued on the next page...

Seed coating for conventional and organic are available in liquid or dry form and can be applied on-farm or at ProfitProAG. Seed coating help get your plants off to a good start, improves germination and seedling emergence. ProfitProAG's **ProfitCoat** produces a more robust root system, larger stalk and an overall healthier plant.

Research proves how vital it is to have a healthy, complete, even stand for maximum yield potential. ProfitCoat can help you attain it. For more details, contact **Dennis Klockenga at 320-333-1608**.



**Want to read more blogs?
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the 'BLOGS' tab.**

Beyond-the-Barn INSIGHT

by Chris Chodur

Chris Chodur, ProfitProAG Manure Management Consultant ♦ 507-402-4195 (cell)

Fight Foam Without Killing Your Pit and Your Profit Potential: Iowa Pork Producer Favors Manure Master™ Mechanical Defoamer

Anyone who's ever agitated a swine manure pit knows what a menace foam can be. Infusing air into the slurry creates foam that can rise from a few inches to a foot. Those air bubbles take up lots of space in manure tanks and drag lines. This means you waste time and lose money hauling more loads to get the manure applied, whether you get paid by the gallon or the load.

While some applicators use diesel to knock down foam, Iowa pork producer Trae Thomas doesn't recommend it. "Diesel will kill your pit," says Thomas, a rural mail carrier who also operates a 4,400-head swine finishing site southeast of Rockwell City in West Central Iowa. "It harms the beneficial microbes you want, both in the pit and in the soil when you apply the manure."



Trae Thomas
Rockwell City, IA

It's also not legal. From a regulatory perspective, a permit is needed to dispose of pollutants by land application, notes the Iowa Department of Natural Resources (DNR). Even if you have an approved manure management plan to apply manure, the DNR doesn't approve the land application of diesel fuel.

Less air, more manure

There's a much better way, says Thomas, who uses an eco-friendly alternative called **Manure Master Mechanical Defoamer™** from ProfitProAG.

He tried the product a few years ago after seeing good results from ProfitProAG's Manure Master Plus-PA, which he uses in his pits to reduce odors, flies and solids. "Defoamer has provided us with a consistent manure flow through the drag line to the nozzle up to 2.5 miles from the barns," Thomas said.

Made of a mixture of natural plant-based oils and a surfactant, Defoamer works fast by breaking the surface tension between manure and air bubbles. This quick mode of action means more than instant gratification. Breaking the bubbles helps you get full tank loads faster. This saves you time, labor and fuel costs, making your business more profitable.

"With Defoamer, you haul more manure and less air," said Chris Chodur, manure and livestock specialist with ProfitProAG. "We typically hear that clients get up to 30% more hauling capacity per tank fill."

Thomas has had so much success with Manure Master Mechanical Defoamer that he's now a dealer for ProfitProAG. "Manure is filled with living organisms, so you need to manage manure properly for best results. In my experience, plants can take up nutrients from the manure more effectively when you use the Defoamer."

Defoamer pays you back

A small amount of Manure Master Mechanical Defoamer goes a long way. Simply add the product to the pit when it's time to agitate the manure. Defoamer can also be mixed into manure tankers. "It only takes 2 to 3 ounces per 10,000 gallons," Thomas said. "It 'slicks' the manure to keep the foam from building up."

Continued on the next page...

Defoamer costs less than \$44 per gallon, and 1 gallon will treat up to 300,000 gallons of manure. How does this compare to diesel? “It’s not uncommon to use 15 to 30 gallons of diesel to knock down foam in a swine finishing pit,” Chodur said. “Let’s say you use 25 gallons of farm diesel at \$2.50 a gallon. It may take you \$50 of diesel to treat the same amount of manure a gallon of Defoamer can handle.”

Not only does Defoamer offer a more affordable option, but it’s environmentally-friendly and helps build soil health and plant health. Thomas’ customers typically purchase a jug of Defoamer just to try it, and then they call him back before long to order more. “It’s an awesome product that’s a win-win for the farmer and the applicator,” Thomas said.

Manure Master Mechanical Defoamer offers a proven solution for all pork, dairy and beef manure haulers. Visit manuremaster.com to find your nearest dealer, or call us at 507-373-2550 for more information.

Let’s Talk Yield

Intrigued by some of the ideas
you’ve seen here?

Want to know more about how to put
the *Farming the Controllables*
“Recipe for Success”

to work on your acres? We welcome
your questions to start the conversation.

Thank you and God bless.

507-373-2550



Farm Insight Contributing Writers:

Dr. Jim Ladlie
Dennis Klockenga
Chris Chodur
Darcy Maulsby
Annelisa Brown

Layout Design:
Annelisa Brown

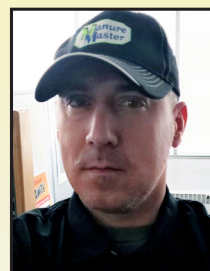
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Dr. Jim Ladlie
Owner
507-383-1325 (cell)
507-373-2550 (office)
jladlie@profitproag.com



Dennis Klockenga, CCA
Agronomist
320-333-1608 (cell)
320-352-0417 (office)
dklockenga@profitproag.com



Chris Chodur
Livestock/Manure Consultant
507-402-4195 (cell)
507-373-2550 (office)
cchodur@profitproag.com