



The Chem Gro Crop Watch, Issue #1, 2/4/10

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Have you smelled your dirt lately? Yeah, I know, this is a question that you probably don't get asked very often, or not at all. However, the smell of your dirt (soil) can indicate the general overall health and activity that is taking place. I can remember back in the day when I was a teenager, moldboard plowing with an open cab International 986. The combination of the intoxicating and aromatic smells of fresh tilled soil and diesel exhaust was addictive, and I craved any chance that I got to do it (although the choice was an easy one, I could either stare at the rear-ends of 90 Holstein milk cows for 2.5 hours every evening, or jump on the tractor and enjoy my aromatic ecstasy).

This fall, we gave it the ole college try as we did our best to custom-apply anhydrous ammonia. Conditions were far from perfect, but we made the best that we could. Almost every field had one thing in common. The freshly tilled dirt from the tool bar smelled of a mild combination of pond scum and dead fish. The smell was far from my teenage aromatic ecstasies to say the least! Our soils are filled with billions and billions of beneficial (good-guys) and anti-beneficial (bad-guys) forms of bacteria, fungus, micro-organisms, nematodes, earthworms, etc. In a healthy aerobic (well oxygenated) soil, the good guys outnumber the bad guy organisms. A pleasant smelling soil is a good way of indicating that the beneficial good guys are in high numbers and are contributing to the overall health of your soil.

Fishy, pond scum, rotten egg/sulfur smelling soils is an indication that the bad guys have outnumbered the good guys due to anaerobic conditions (low oxygen levels). Since about March of 2009, our soils in Western Illinois have not hardly dried out even up to today. Anaerobic soils can present a host of problems and challenges when it comes to production agriculture. I will key you in on a few key points as how this might impact you in soybean production for 2010, and follow up with an additional letter for corn production in 2010.

Soybean production: Soybeans seem to be the most susceptible to wet, anaerobic prone soils in comparison to corn for several reasons:

- **Seedling emergence:** I would guess that approximately 70-80% of the soybean seed that is planted is not treated with a fungicide, unlike corn that is 100% fungicide treated. In most cases, this is fine since soybeans are typically planted after corn planting is done. **Usually,** the soils are warmer and drier which inhibit seedling damping off diseases such as pythium and phytophthora (as shown in the picture to the right). However, several years of yield data from Iowa State University and University of Illinois are showing a trend line that higher soybean yields are being achieved from earlier planting dates. This has driven many farmers to start planting soybeans earlier which has left their untreated soybean seed vulnerable to seedling diseases and early infection of Sudden Death Syndrome. (Sudden Death Syndrome does not express itself until early pod fill, nor has any consistent data shown that seed treatments prevent SDS). ***If we continue to have wet and cold soils into this coming planting season, I would expect a high mortality rate of untreated soybean seed due to***



the fact that our soils have not hardly dried out for about 1 full year. This serves as an excellent breeding ground for seedling damping off diseases. Fungicide treated seed should pay big dividends in this type of environment.

- *Soybeans use more nitrogen per bushel compared to corn.* If I told you that a 55 bushel/acre soybean crop uses more nitrogen than a 200 bushel/acre corn crop, you would probably think that I was either drunk, stoned, or delirious. Wellí ., it is true, and I am not referring to the drunk, stoned, or delirious part. Soybeans on the average need about 5.5 lbs of nitrogen to make 1 bushel of grain, while corn uses typically .8 ó 1.2 lbs of nitrogen to make 1 bushel of grain. This equates to a 55 bushel/acre soybean crop needing 300lbs of nitrogen/acre! As we all know, nobody applies commercial nitrogen to ground being planted to soybeans, so then where is the 300lbs of nitrogen/acre coming from? Soybean nodules.

- *Soybean root nodules and Rhizobia bacteria:* If there is ever a perfect working relationship, this is it. Rhizobia bacteria are a very specific species of beneficial ògood-guyö bacteria that actually infect and live in the soybean roots. A soybean root nodule is basically the house that thousands of Rhizobia bacteria live in. Here is where the perfect working relationship comes in. The soybean plant provides the Rhizobia bacteria room and boarding. In exchange, the bacteria are able to extract nitrogen that is in the air in the soil (our air that we breathe is approximately 78% nitrogen and 21% oxygen), and feed the nitrogen back to the soybean plant. This nitrogen is then ultimately used to produce soybean grain.

However, since this a direct working relationship between the soybean plant and the Rhizobia bacteria, if something negative happens to one, the other is also directly affected.



- *The need to breathe.* Rhizobia bacteria are aerobic (meaning they require good levels of air to survive). When soils remain saturated with water, there is a shift in the soil of aerobic organisms to anaerobic organisms (as I mentioned earlier when the soil begins to stink). When this change happens, the ògood-guysö die off in high numbers, including the Rhizobia bacteria. With less Rhizobia bacteria alive, there are less potential nodules that can be formed on a soybeanø root system, therefore less nitrogen is extracted from the air in the soil, = ultimately less soybean yield potential. ***If your fields experienced these anaerobic conditions for a long period of time, I would highly suggest inoculating your soybean seed just prior to planting to make sure there will be adequate populations of these Rhizobia bacteria to create nitrogen for your soybean crop.***
- *Rotating long term corn on corn to soybeans.* The Rhizobia bacteria are very specific to soybean plants, and will not survive on corn roots. After a period of 3 years or longer, the bacteria will eventually die off in the soil if they do not have soybeans as a host plant to survive from. ***If your field has not been planted to soybeans for 3 years or longer, I would highly suggest inoculating your soybean seed just prior to planting.***
- *Low soil pH.* Rhizobia bacteria need a soil pH greater than 6.0 to adequately survive from year to year. *This is the reason why we like to maintain soil pH around 6.6 in a corn/soybean rotation.* Soil pH values below 5.9 will eventually kill off the Rhizobia bacteria, and their numbers will be reduced. ***If your soil test pH values have dropped below 5.9 pH, I would highly suggest inoculating your soybean seed just prior to planting.***

That's my 2 cents worthö ..the choice and decision is always yours.

Lonne