CROPLAN By WINFIELD UNITED

MidWeek Review

Managing IDC in 2018



Key reminders for Iron Deficiency Chlorosis (IDC): IDC is not caused by a lack of iron in the soil (there is way more iron in the soil than the soybean needs). The problem is that the iron isn't in a soluble form that soybeans can take up. Iron is found in many different types. Most often, we deal with iron as Fe^{2+} (ferrous) or Fe^{3+} (ferric). Iron can exist in the soil as Fe^{3+}, which is extremely insoluble. Soybeans exude a compound from their roots to help reduce Fe^{3+} to Fe^{2+}, which is a trillion times more soluble (Fe^{2+} is the same type of iron you would find naturally in groundwater).
pH, calcium carbonates and soil salinity all impact the severity of IDC. However, pH is not the sole factor that leads to IDC, since not all acres that have a pH above 7.4 show IDC. As pH rises above 7.0, so does the presence of the insoluble iron form, but the level of calcium carbonates plays a big role. High calcium carbonates in the soil can dissolve into bicarbonate. Bicarbonate slow the ability of the exudates to reduce Fe^{3+} by counteracting the pH adjustment of the exuded compounds and decreases/neutralizes the acidity of the soybean root exudates that try to reduce the soil oxidized iron to reduced iron. The more bicarbonate in the soil, the more the soybean tries to reduce the pH around the root zone by excreting more exudates, and uses up a lot more energy when the energy is already low from a low iron use efficiency. High soil salinity also puts additional stress on the soybean plant, and exacerbates the IDC symptoms. Nitrates, compaction and soil wetness also play a big role in IDC severity. Here's a few things to consider on what makes IDC worse or better than previous years:

- Rapid drying conditions leads to salts getting pulled up from the soil water, and leaving more salt near the surface.
- Heavy rains allow a buildup of carbon dioxide in the soil, and bicarbonate levels increase with increasing amounts of carbon dioxide.
- High levels of residual N can exacerbate IDC symptoms. Research is a little up in the air on the exact cause, but IDC can be flared when roots take up nitrate and then release bicarbonate, and over time can increase the levels of bicarbonate. Nitrate can also create a mess within the plant cells, rendering iron in the cells unavailable.
- Compaction can be good or bad (to a point). Sometimes compaction in wheel tracks is good for IDC. A decreased pore size in the wheel tracks means decreased aeration, leading to an increase in denitrification (less nitrates). Compacted areas usually shed water better and have less total water than less-compacted soil. This decreases bicarbonate solubility when soils are wet, especially in the wheel tracks and helps them stay green. However, compaction can increase IDC symptoms when root growth is restricted and the soybean has additional stresses on it.

When it comes to IDC, an ounce of prevention is worth a pound of cure. The best defense against IDC is still (besides planting corn or another crop…):
1. Using an IDC tolerant soybean. Keep in mind, just because it is tolerant, doesn't mean it still won't turn slightly yellow!
2. Use an in-furrow iron chelate product at planting, like Iron-Force that is a high quality FeEDDHA product!
3. Consider variable rate planting soybean populations, and pushing the IDC spots 25%+ higher in the worst

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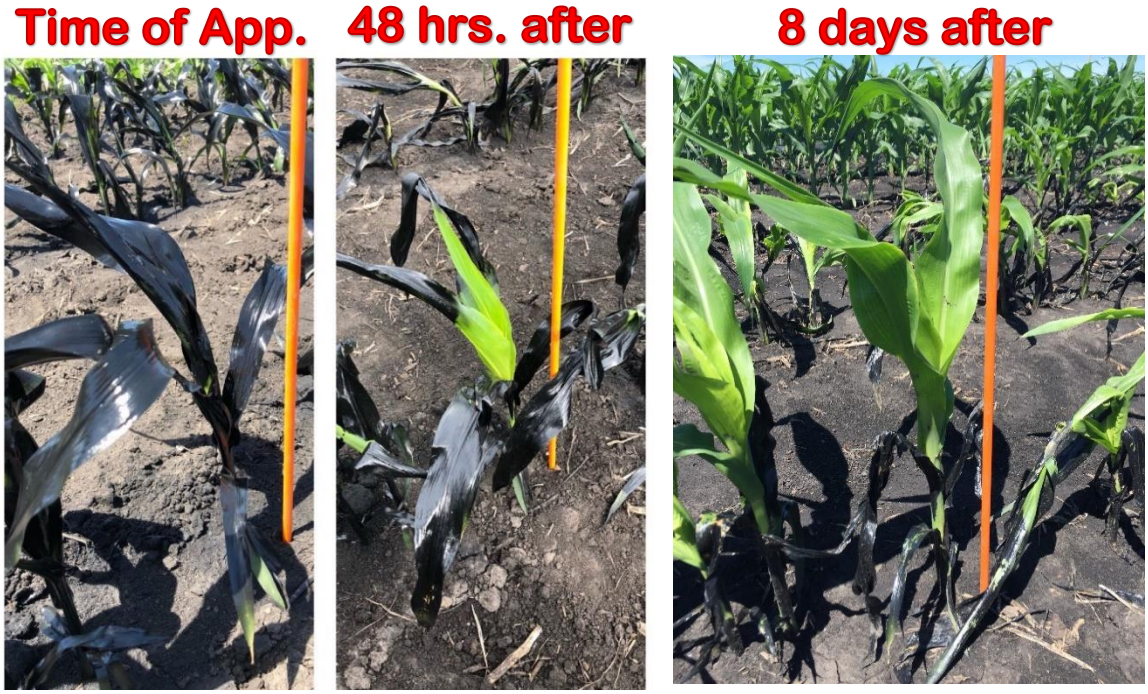
2018 Murdock AnswerPlot IDC Demo: Even with the use of a soybean with a high IDC tolerance, increasing population and adding EDDHA iron in-furrow had a drastic impact!

How fast can corn grow in 48 hours? How about in 8 days? Last week, Jon Zuk and I started preparing stress demos at the LeSueur AnswerPlot. We spray-painted corn to understand how photosynthesis affects plant growth and development, and are following it up with different PGR treatments. The images show the difference in growth after 2 days and 8 days!



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