



CORN SEED PRODUCT RESPONSE TO HIGH PH SOILS - DEKALB®

TRIAL OVERVIEW

- High pH soil is generally classified as having a pH of 7.6 or higher and may be caused by several different factors including excess lime, high soluble salt concentration, and high nitrate-nitrogen concentration.
- In Western Kansas and Eastern Colorado, excess lime from high calcium carbonate concentration in the soil parent material is the factor contributing to high pH soils which are found on eroded sidehills and cut areas in fields.
- Corn seed products often respond differently in high pH soils as some products are more tolerant to these conditions while others may be susceptible.
- Crops growing in high pH soils may express iron deficiency chlorosis (IDC). IDC symptoms include overall pale-yellow color, leaf interveinal chlorosis, and stunted growth.¹ Also, the availability of key nutrients to the crop may be reduced in high pH soil conditions.

RESEARCH OBJECTIVE

- The objective of the trial was to evaluate the visual response of corn products planted in neutral pH (5.8 to 7.5) soils and high pH (7.6+) soil conditions. Improved product characterization allows for better product placement to help maximize yield potential.

Location	Soil	Previous Crop	Tillage Type	Planting Date	Harvest Date	Potential Yield/Acre	Planting Rate/Acre
Bethune, CO	Silt loam	Soybean	Strip-till	05/06/2017	11/04/2017	220 bu/acre	34,000 seeds/acre
Burlington, CO	Silt loam	Corn	Strip-till	05/07/2017	11/05/2017	220 bu/acre	34,000 seeds/acre
Bethune CO	Silt loam	Corn	Strip-till	05/07/2017	11/04/2017	220 bu/acre	34,000 seeds/acre

SITE NOTES:

- Nine DEKALB® corn brand blend seed products were planted in two separate blocks in the same field at each location.
- One block had a neutral pH soil (5.8 – 7.5 pH) and one block had a high pH soil (7.6+). Soil pH was determined by collecting 28 soil samples on a grid pattern for each soil pH block at each location.
- Soil pH range for the Bethune, Colorado site planted after soybean was 6.0 to 8.7. Soil pH range for the Burlington, Colorado site was 7.5 to 8.3. Soil pH range for the Bethune, Colorado site planted after corn was 5.8 to 8.4.
- Each block contained two replications of the set of corn brand blend seed products.
- A visual color rating was taken at the V8 (8 visible leaf collars) growth stage. The color scale ranged from a very dark green which was rated 2 to a pale-yellow color that was rated 8. These ratings were then broken into three separate seed product placement recommendations: **Highly Recommended**, **Recommended in Most Situations**, and **Use with Appropriate Management** for high pH soil field conditions.

UNDERSTANDING THE RESULTS

DEKALB® brand blend	Neutral pH Average Yield (bu/acre)	High pH Average Yield (bu/acre)
DKC50-08RIB	208.2	191.3
DKC55-84RIB	242.8	194.9
DKC58-06RIB	207.4	189.4
DKC60-87RIB	223.4	200.5
DKC61-54RIB	224.5	191.9
DKC62-52RIB	232.9	193.7
DKC63-21RIB	215.9	199.2
DKC64-34RIB	237.2	221.3
DKC66-74RIB	236.4	225.4

Use with Appropriate Management	Highly Recommended



Figure 1. DEKALB® corn brand blend yields and recommendations for neutral pH soil and high pH soil conditions.



Figure 2. IDC symptoms (left) and IDC tolerant products (right) in high pH soil conditions.

- All brand blend products did not exhibit any visual IDC symptoms when planted in neutral pH soil conditions.
- DKC50-08RIB, DKC61-54RIB, DKC62-52RIB, DKC63-21RIB, and DKC66-74RIB brand blends all handled high pH soil conditions very well; maintaining a dark-green, healthy plant color.
- DKC58-06RIB, DKC60-87RIB, and DKC64-34RIB brand blends all handled the high pH soil conditions reasonably well but were slightly paler in color compared to being planted in neutral pH soils.
- DKC55-84RIB brand blend should be used with caution when planting in high pH soils.
- High pH soils at the demonstration sites had issues with eroded top soil, topography, and irrigation runoff which also impacted yield potential. These additional factors make a true “1 to 1” yield comparison only based on soil pH levels difficult to achieve.

WHAT DOES THIS MEAN FOR YOUR FARM?

- High pH soils are typically found in areas with eroded top soil and topography changes that make a direct yield comparison of how various seed products perform under high pH soils versus neutral pH soil conditions difficult to achieve. Producers may want to keep this in mind when making product comparisons on their farm.
- The importance of selecting a corn seed product that can tolerate high pH soil conditions can vary due to the proportion of acres in each field that have high pH soils. For example, a field that is primarily comprised of high pH soils, selection of an IDC tolerant product will be key, whereas in a field comprised of only 1% high pH soils, seed product selection for IDC tolerance is less important.
- Corn seed product IDC tolerance by visual color rating is impacted by soil pH but can also be influenced by other factors such as soil temperature, nutrient availability, and nutrient uptake. Producers should assess all potential causes when assessing product performance under high pH soil conditions.

SOURCES

1 White, D.G. 1999. Compendium of corn diseases, third edition. 1999. The American Phytopathological Society, APS Press.
 2 Kaiser, D.E., Lamb, J.A., and Bloom, P.R. 2011. Managing iron deficiency in soybean. AG-FO-08672-A. University of Minnesota Extension. <http://www.extension.umn.edu/>. Web sources verified 11/29/17. 171026102202. 112917DLB

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