

Residue Complete

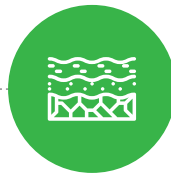
A comprehensive biological soil amendment and biofertilizer liquid formulation featuring a unique blend of naturally-occurring, nutrient-cycling fungal and bacterial microorganisms that **accelerates the breakdown of residues**; especially tough organic residues.



- Accelerated breakdown of residue allows more carbon to be captured and recycled to **help build soils**.
- **Captures nutrient value** that would otherwise volatilize; conventional practices that utilize nitrogen sources to break down residues lose value from volatilization.
- Soil building is accelerated, and increased soil aggregates are formed, leading to **enhanced nutrient uptake and improved soil health**.



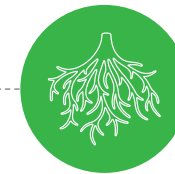
Crop Residue Breakdown



Improved soil Health



Enhance nutrients Availability



Enhanced Microbial activity



Convert carbon into nutrients

Residue Complete[®]

What are the active ingredients & why is it special?

Targeted residue breakdown & CFU improvement: By adding an **eight species bio-consortia** we significantly improve ability to break down cellulose and lignin as well as improved nutrient availability. Colony Forming Unit (CFU) count of 567 billion per acre

| | |
|------------------------------------|---|
| <i>Phanerochaete chrysosporium</i> | Fungi selected for its ability to degrade lignin in dead plant residue. Releases extracellular enzymes to break-up the complex three-dimensional structure of lignin into components that can be utilized by plants and beneficial microbes. |
| Bacillus spp. (6 species) | Spore forming bacterial consortia which produces phosphatases and phytase, which mobilize Phosphorous from unavailable residue and soil sources, solubilizes mineral potash, and enhances plant vigor and productivity. Produces enzymes that help breakdown plant cellulose. |
| <i>Trichoderma harzianum</i> | Fungal microorganism selected for its ability to enhance crop residue degradation through the abundant production of cellulase enzymes which decompose the primary buildingblock of plant cell walls, cellulose. |



Selected (gram positive) bacterial spores in the formulation are **highly resistant** to breakdown as formulated in the product, but will activate when placed in the field and on plant residue.

Bacterial spores have other key agronomic benefits, including **naturally chelating** key nutrients such as P and K making more available to the plant, forming a film on plant roots that allow for improved plant vigor, plant hormone production and at times improved disease protection.

Moving from Anecdotes to Scientific Results

Upper Midwest Residue Complete Trials



Check
7-25-22



Residue™
7-25-22

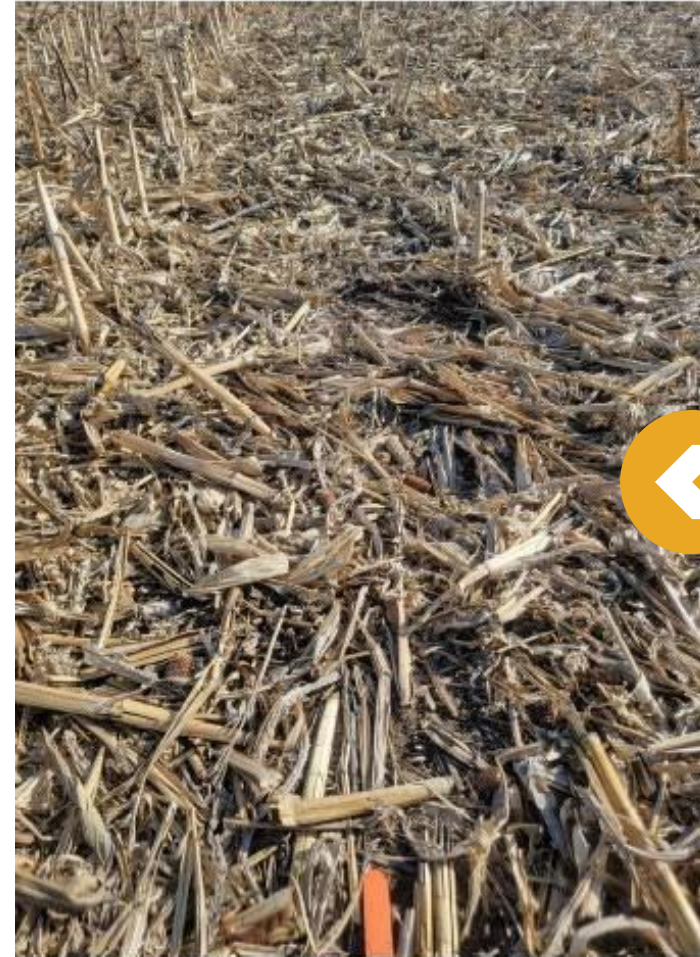
Innovating Around the Core

2021-22 Residue Study

Untreated
Check



Residue



Note: For more information, visit: www.dphbio.com

April 11 drone flight – sample of single side-by-side treatment photos



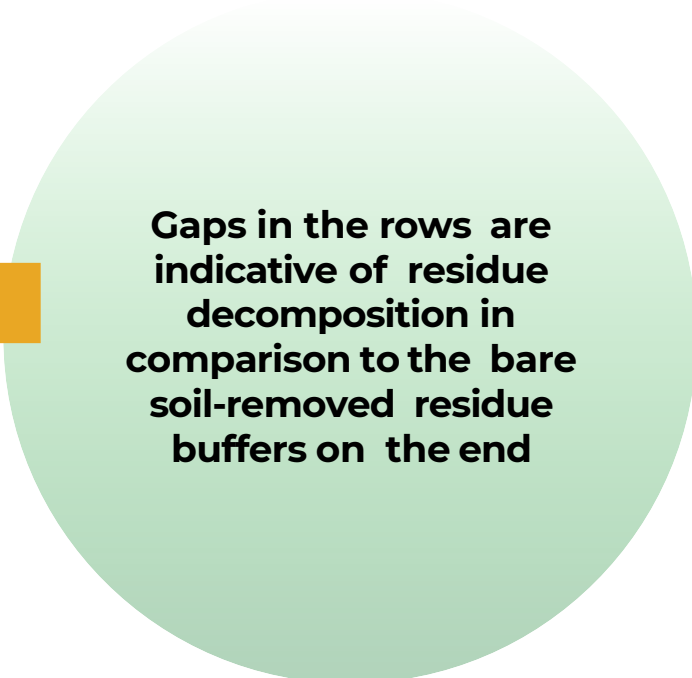
Removed Residue



Untreated Check



Residue



Gaps in the rows are indicative of residue decomposition in comparison to the bare soil-removed residue buffers on the end

Note: For more information, visit: www.dphbio.com

Residue Complete NPK Return

Using the numbers below if we assume that we accelerated Residue degradation by 11% over the untreated (17% (Res) - 6% (Control) = +11%).

Assuming a 200 bushel crop per the Michigan State Study copied below that would suggest we “released” 11 lbs N, 5.5lbs of P, and 23lbs of K in just a 3-4 month period.

| Line Transect Method | | |
|----------------------|--------------------------|---------------------|
| Description | Post harvest in Oct. (%) | Spring in April (%) |
| Buffer | 6 | 6.8 |
| Check | 94.9 ns | 88.9 a |
| Residue | 93.5 ns | 77.2 b |

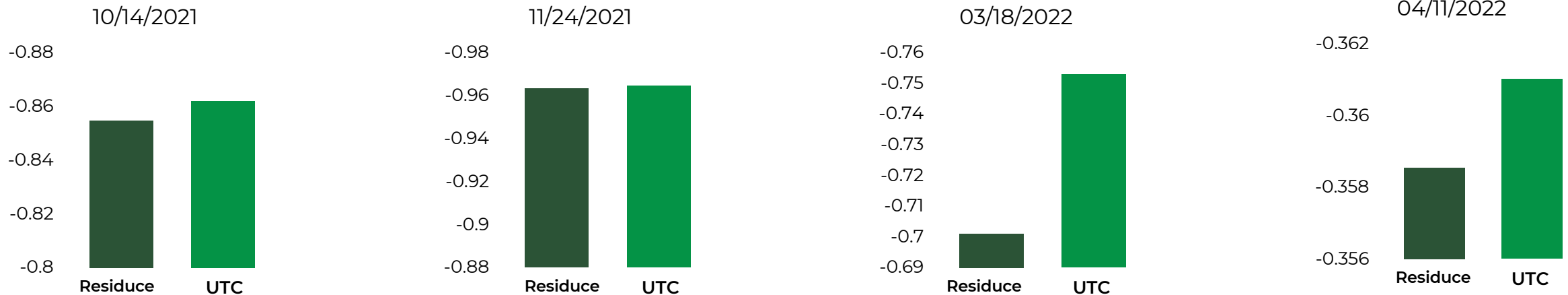
Source: 2021-22 Agrithority study, Central Nebraska

Mean Response by Treatment

Gdiff index Residue Digester Study 2021-2022

Main response observed

- The Residue treatment started to separate from the **UTC at 150 DAA**, and kept the pattern in the **170 DAA image**

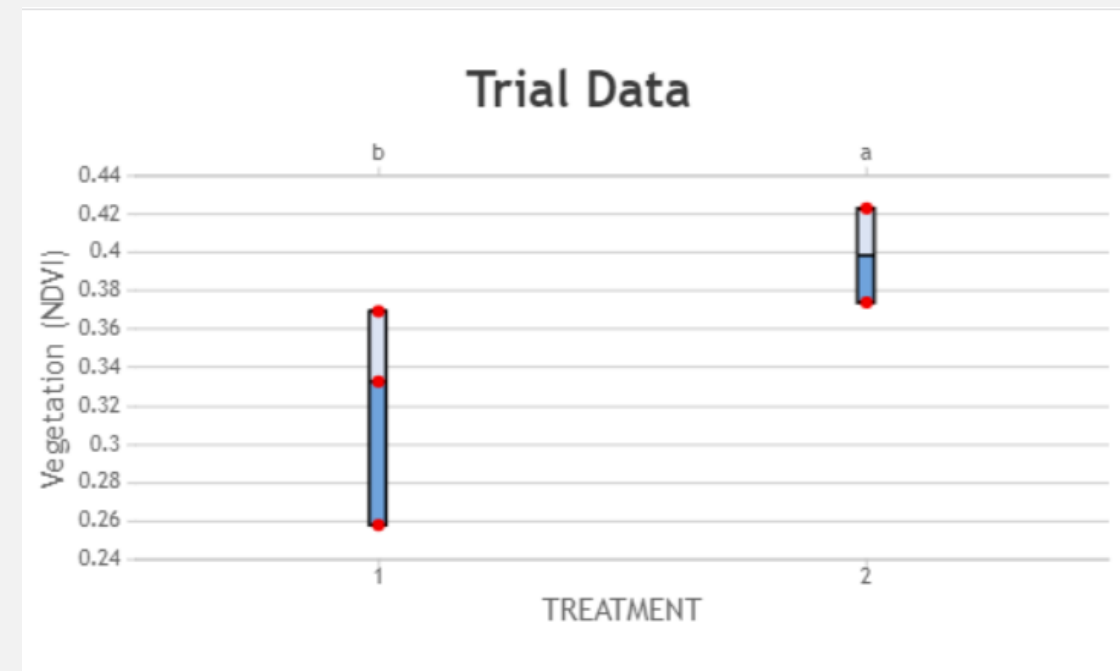


Trial Details – Fall Applied Residue Complete

| | | Treatment | Aerial NDVI Timecourse |
|---|---|-----------|---|
| <input checked="" type="checkbox"/> Check All | # | Name | <input checked="" type="checkbox"/> 4/13/2023 N/A |
| <input checked="" type="checkbox"/> | 1 | Residue | 0.32004 b |
| <input checked="" type="checkbox"/> | 2 | Untreated | 0.39855 a |
| Global Mean | | | 0.35144 |
| CV | | | 3.66985 |
| P-Value | | | 0.09476 |

Key Takeaways

- Residue Complete reduced the NDVI score by almost 20% which less crop residue was present.



- Tolono, IL location
- The field is 113 acres
- Corn stalks (not tilled)
- Applied rate was 12.8 fl oz/A Residue Complete
- Applied by United Prairie on November 23 in water at 15 GPA with 120' sprayer
- Plots are 480' wide by roughly 1200'
- Grower will be planting soybeans across the plots

aerial PLOT

automated analytics for agriculture

NDVI image pseudo colored. (below). The NDVI is lower in the Residue because bare soil has an NDVI of around 0-0.1, dried corn stalks have an NDVI of 0.4ish (lower value = closer to being bare soil).

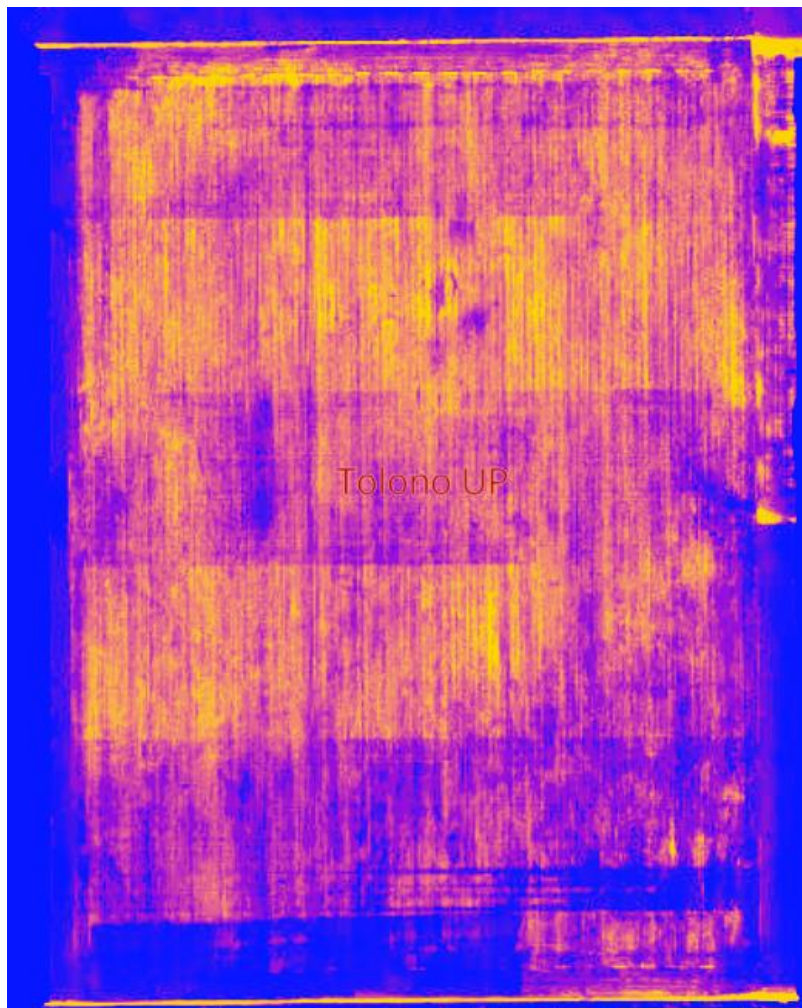
RGB Image (no filter). The darker areas in the rgb is more corn stalks left out in the field



Untreated



Untreated



Trial Details – Fall Applied Residue Complete

Michigan State NPK Stover Calculator

Studies show that corn residue contains 100lbs. of N, 50 lbs. of P₂₀₅ & 210 lbs. of K₂₀ an acre on a 200-busel corn crop. Residue helped sink nutrients into the soil making them available for uptake. Farmers can expect a 3:1 ROI with Residue®



Tolono Trial Results

Given the 19.7% accelerated degradation of stover, here is what Residue is delivering in this particular study

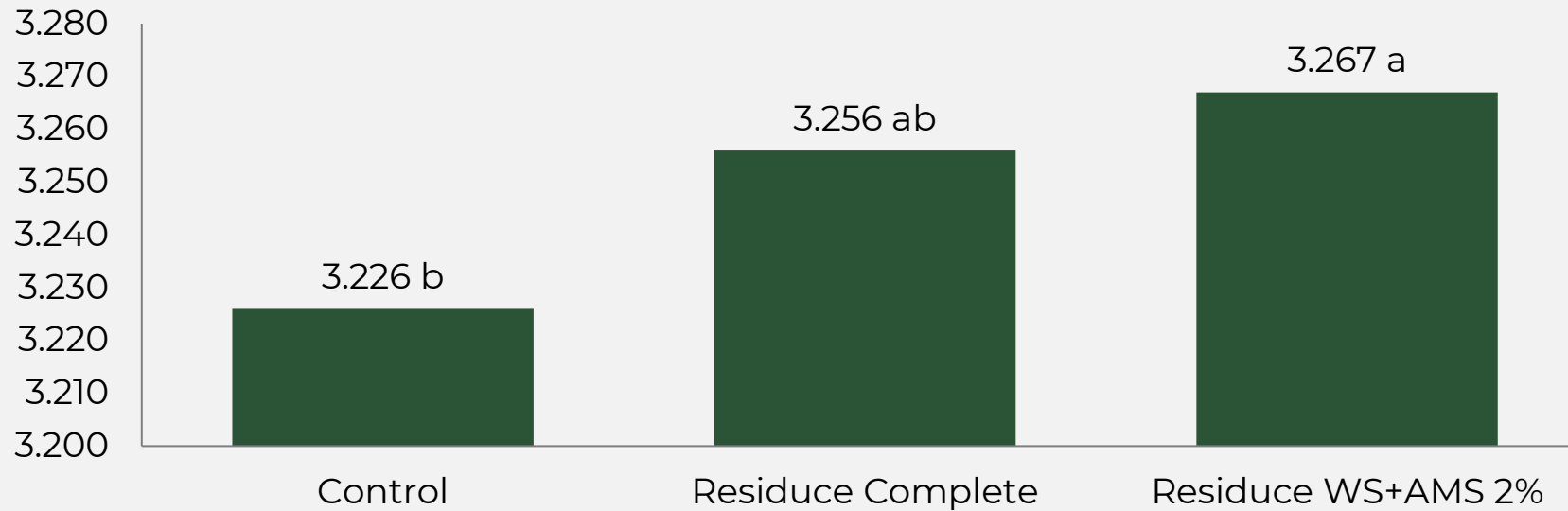
- 19.7 units of N released
- 9.85 units of P released (3x more available than non-organic P)
- 41.37 units of K released



Positive Season Long Plant Growth Effects



SUM NDVI- Plot Centered Sub samples



**Intensive Replicated
Trial
Walnut, ILL –
Drone Imaging NDVI**

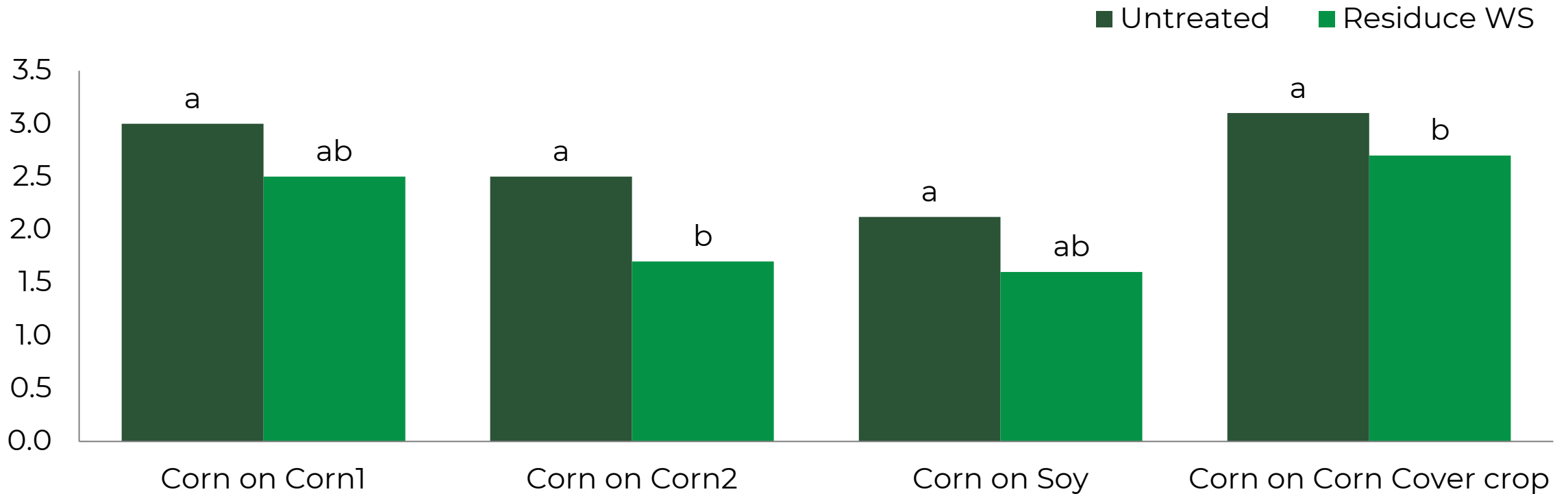
Season long positive influence on Plant NDVI (Vigor/ vegetation) Statistically significant improvement in leaf chlorophyll & leaf nitrogen¹ Less Runts, Less Skips, More Consistent Growth Stage

1. Data not shown
Note: For more information, visit: www.dphbio.com



Residue WS + AMS Corn Stalk Lodging – Average 22% Reduction

Residue WS Corn Stalk Lodging-2022



White/Hines rating scale 0-5 with 0 no stalk lodging and 5 stalks lodged, LSD P=0, 10

Residue Complete 2023 development overview

Residue Trials with Univ of Ill

- Cover crop (cereal rye) in corn stalks
- Double crop soybeans
- Fall applied on corn stalks

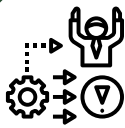
CRO Residue Trials

- Mix of Fall 2022 and Spring 2023 Apps
- Mix of Corn and Soybean

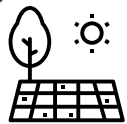
Conclusions



Corn crop residue represents a significant challenge and opportunity for many growers across the corn belt



Residue Complete is a new solution that accelerates crop residue degradation when applied either in the fall or the spring



Residue Complete applications have shown

- Accelerated crop residue degradation
- Increases in leaf and soil macronutrients
- Increases in crop vigor of subsequently planted crop
- Reduction in stalk lodging caused by Fusarium stalk rot