Evaluation of Disease Management Systems in Soybean – White Mold

Trial Objective

- White mold (also called Sclerotinia stem rot) is a significant problem in the U.S. North Central soybean production region and in Canada. Caused by the fungus *Sclerotinia sclerotiorum* that overwinters in the soil, white mold is often recognized by fluffy, white growth on soybean stems. White mold development is favored by cool, cloudy, wet, and humid weather at first flowering. The disease tends to be more prevalent in soybeans in high-yield environments where high plant populations, narrow row spacing, and an early-closing canopy are commonly used.
- The objective of this study was to evaluate a system-based approach for white mold disease management supported by genetic resistance of germplasm and foliar fungicide.
- Select soybean products with varying levels of resistance to white mold were evaluated under different fungicide management options.

Research Site Details

- Fields with a history of white mold were selected for this study.
- Plots were planted in a split-plot design with fungicide treatment as the main plot and soybean product as the sub-plot.
- Fungicide treatments included:
  - » Untreated
  - » Fungicide applied at R1 growth stage
  - » Fungicide applied at R1 and R3 growth stages
- The fungicide products used in 2019 and 2020 were Delaro® 325 SC fungicide (Group 3 + Group 11) at 8 oz/acre tank-mixed with Luna® Privilege Fungicide (Group 7) at 2 oz/acre at R1 growth stage. Delaro® Complete Fungicide (Group 3 + Group 7 + Group 11) was used at 8 oz/acre in 2021.
- Soybean products used were classified as susceptible (S), moderately susceptible (MS), moderately resistant/moderately susceptible (MR/MS), moderately resistant (MR), or resistant (R) to white mold.
  - » Resistant soybean products were left out of most yield data analyses because they were not planted in 5 out of the 18 locations.
- Plots were randomized within the trial.
- White mold disease ratings were taken at the R6 growth stage.
- 69 trial locations from 2019-2021 were planted for this study. Of these, 18 locations (26%) were included in the analysis below because they had moderate to high white mold pressure.
  - » Note: Moderate to high white mold pressure locations were categorized as such if the most susceptible untreated soybean product at that location had a white mold rating of 3 or higher at the R6 growth stage.

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Understanding the Results

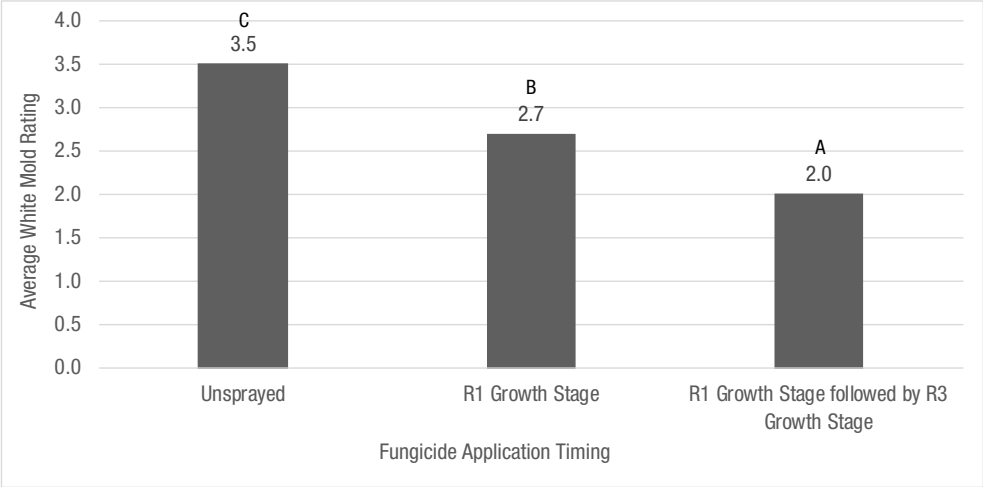

Figure 1. Average white mold disease index rating for each fungicide treatment of Delaro® fungicide tank-mixed with Luna® Privilege Fungicide (2019-2020) or Delaro® Complete Fungicide (2021). White mold disease index: 1 = no disease, 9 = severe disease. Mean separation letters (a, b, c) denote statistically significant differences at an alpha = 0.1.

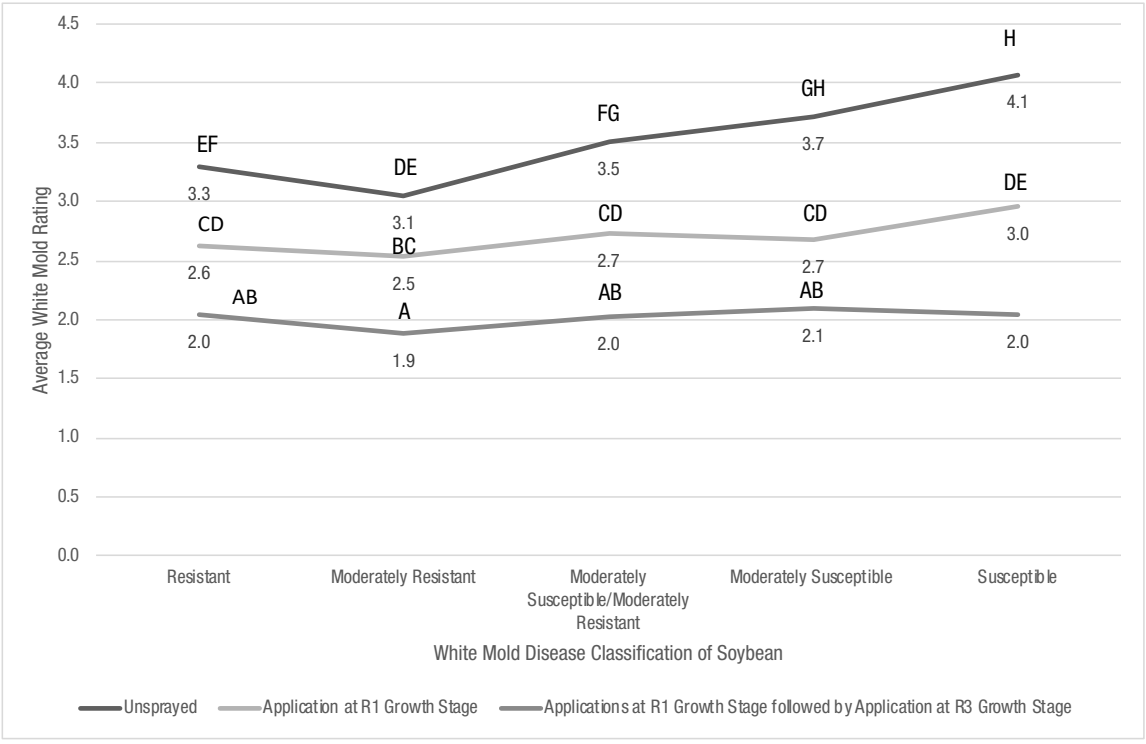

Figure 2. Average white mold disease index rating by fungicide spray treatment and white mold disease classification of soybean products. Fungicides: Delaro® 325 SC fungicide tank-mixed with Luna® Privilege fungicide (2019-2020) or Delaro® Complete Fungicide (2021). WM disease index: 1 = no disease, 9 = severe disease. Mean separation letters (a through h) denote statistically significant differences at an alpha = 0.1.

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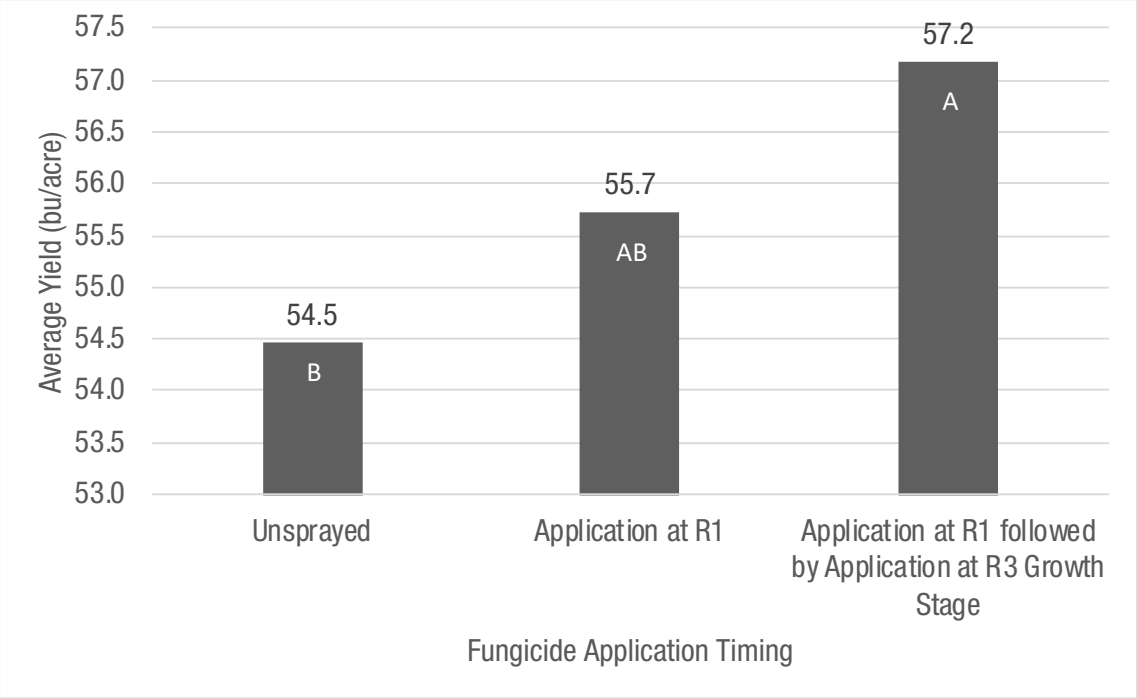

Figure 3. Average yield for each fungicide treatment across all soybean products and locations. Fungicides: Delaro® 325 SC fungicide tank-mixed with Luna® Privilege Fungicide (2019-2020) or Delaro® Complete Fungicide (2021). Mean separation letters (a, b) denote statistically significant differences at an alpha = 0.1.

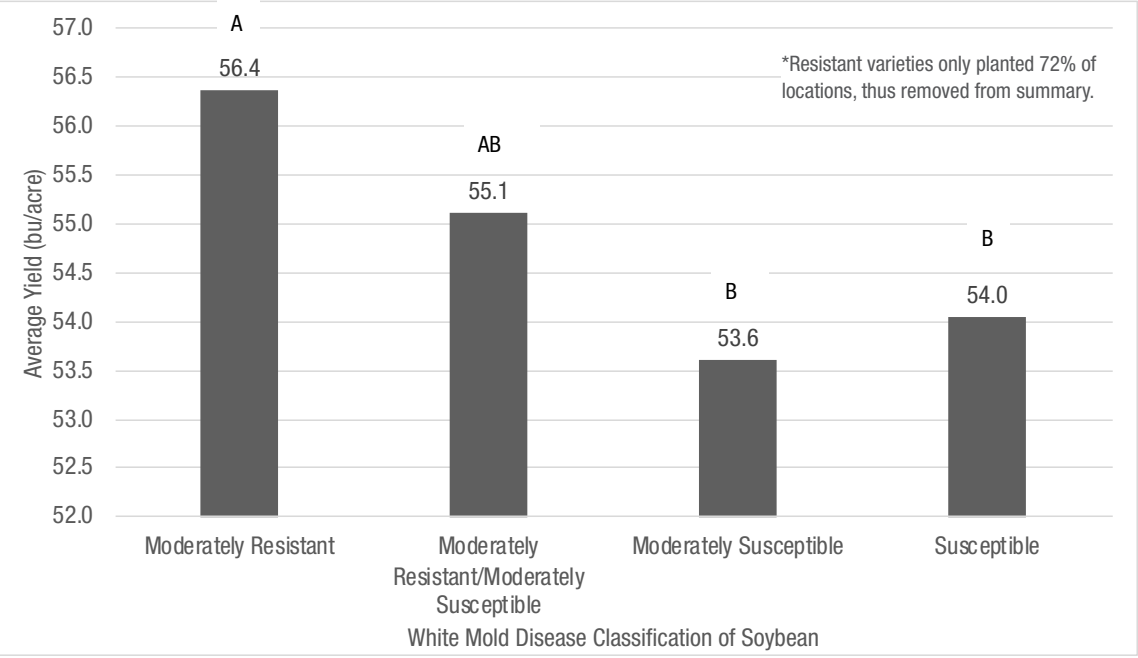

Figure 4. Average yield of treatments for each white mold disease classification of soybean products. Mean separation letters (a) denote statistically significant differences at an alpha = 0.1.

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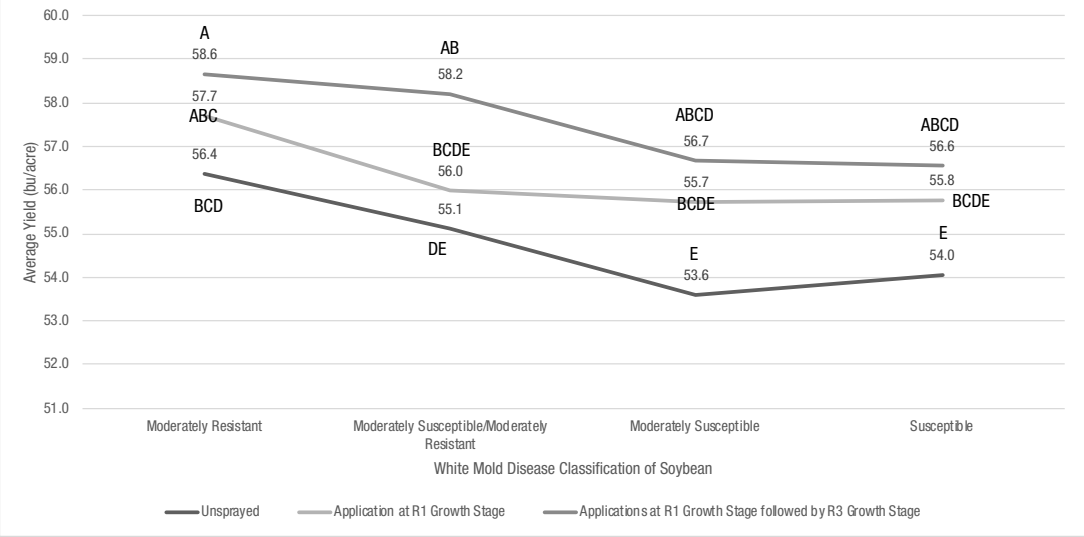

Figure 5. Average yield by fungicide treatment and white mold disease classification of soybean products. Fungicides: Delaro® fungicide tank-mixed with Luna® Privilege Fungicide (2019-2020) or Delaro® Complete Fungicide (2021).

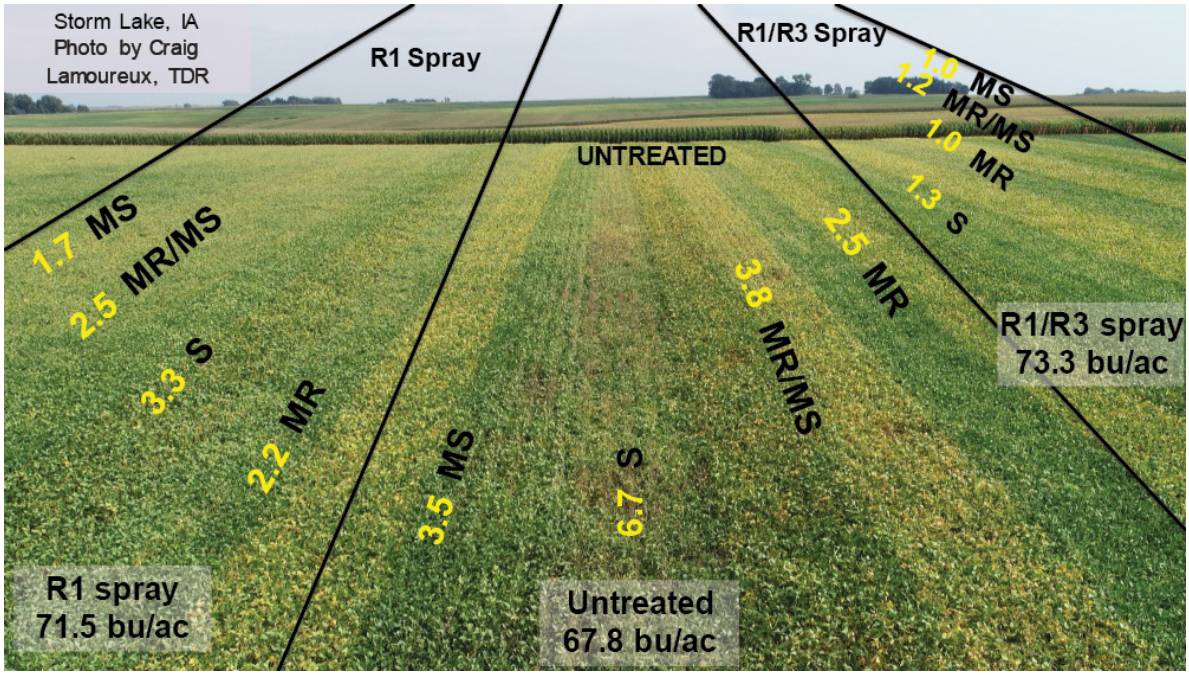

Figure 6. Aerial imagery from 2019 showing visual differences of white mold disease severity for each of the fungicide spray treatments and white mold disease classification of products. Soybean products sprayed at R1 growth stage then followed by an application at R3 growth stage yielded the highest and had the lowest white mold disease index recorded in a location with relatively high white mold incidence and severity (white mold index numbers in yellow. White mold disease index: 1 = no disease, 9 = severe disease). Fungicides: Delaro® fungicide tank-mixed with Luna® Privilege Fungicide. Soybean susceptibility: S= susceptible; MS = moderately susceptible; MR=moderately resistant.

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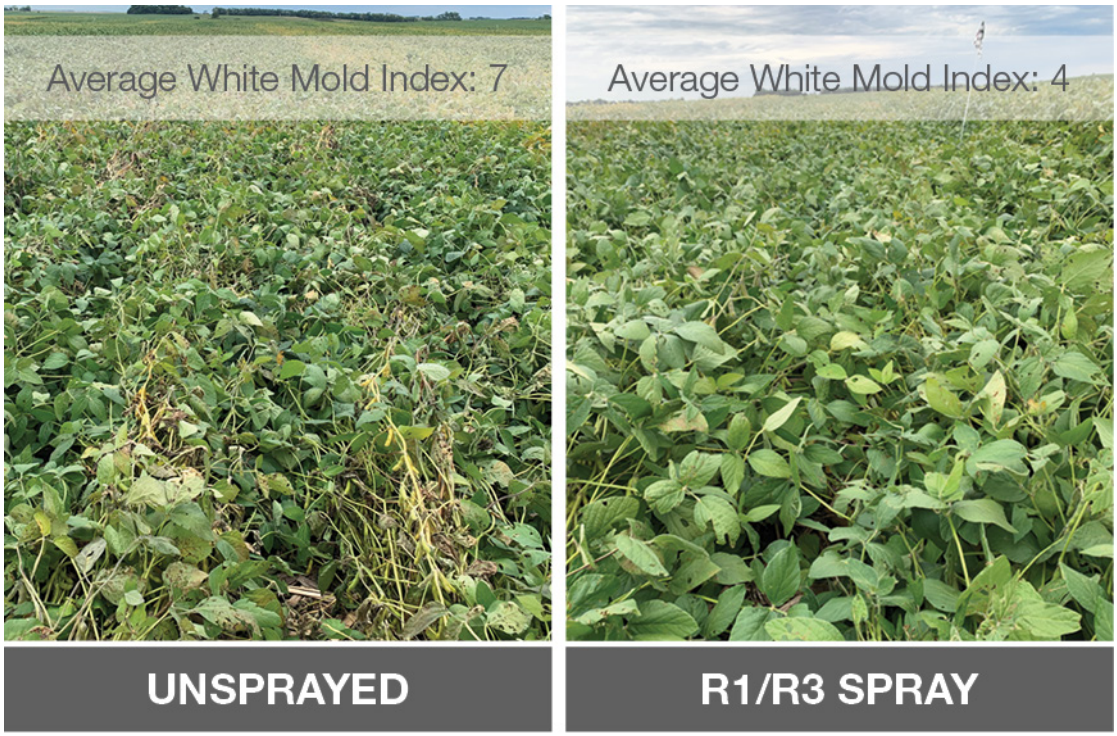

Figure 7. Side-by-side comparison of a soybean product susceptible to white mold showcasing the effect of fungicide applications (R1 and R3 growth stages) on white mold disease management and plant health. Fungicides: Delaro® fungicide tank-mixed with Luna® Privilege Fungicide. White mold disease index: 1 = no disease, 9 = severe disease.

Key Learnings

- Within the three years of data, there was strong white mold disease suppression in response to fungicide applications at R1 growth stage followed by application at R3 growth stage, resulting in a significant advantage of more than 2.7 bu/acre over the unsprayed treatment.
- Moderately Resistant soybean products had a 2.8 and 2.4 bu/acre advantage over Moderately Susceptible and Susceptible varieties, respectively.
- Delaro® Complete fungicide is a management option to help manage white mold and protect yield potential. This fungicide paired with the right soybean product should be considered to reach yield potential goals.

Legal Statements