Optical Sorter-Based Line Selection Lowers Deoxynivalenol in Soft Red Winter Wheat

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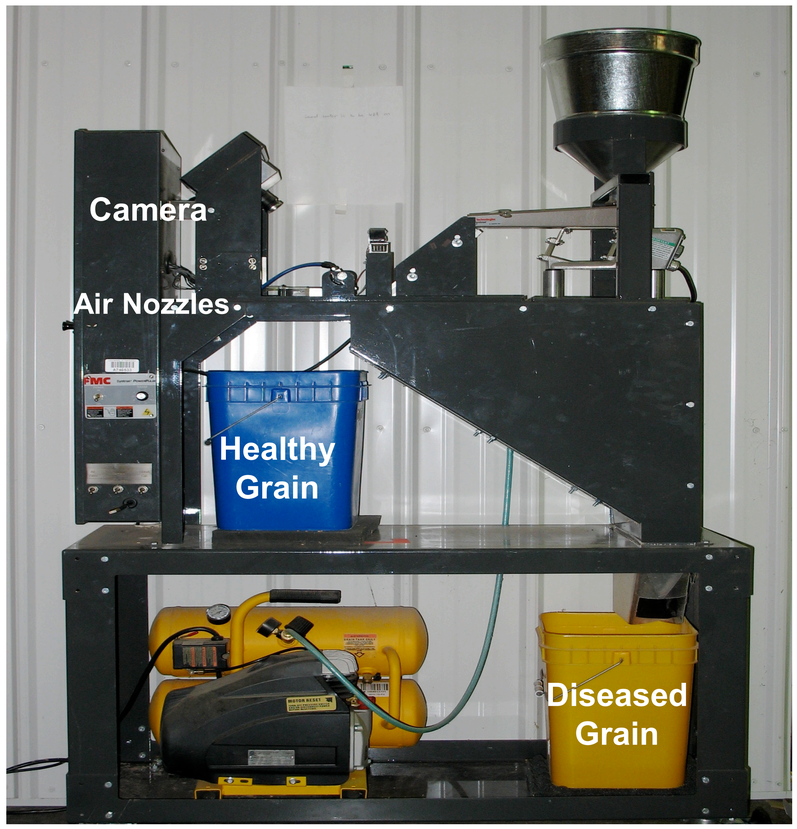
Introduction

- Fusarium head blight (FHB) or head scab, caused by *Fusarium graminearum*, results in discolored grain often contaminated with deoxynivalenol (DON).
- Optically sorting grain harvested from an FHB-infected plant can quickly separate diseased from healthy grain.
- Sorting also provides an estimate of fusarium damaged kernels (%FDK = Diseased Grain (g)/Total Grain (g)*100).
- Hypothesis: Selection based on %FDK obtained with the optical sorter will enable identification of FHB resistant breeding lines and lower DON accumulation.

Materials and Methods

- 300 F_4 derived breeding lines and a resistant check
- A mist irrigated nursery inoculated with *F. graminearum* with 1-meter rows spaced 30 cm apart arranged in a 2 rep RCBD
- USDA/ARS and National Manufacturing Seed Sorter System
- Grain from each line was harvested, sorted, and lines with %FDK lower than the resistant check were continued.

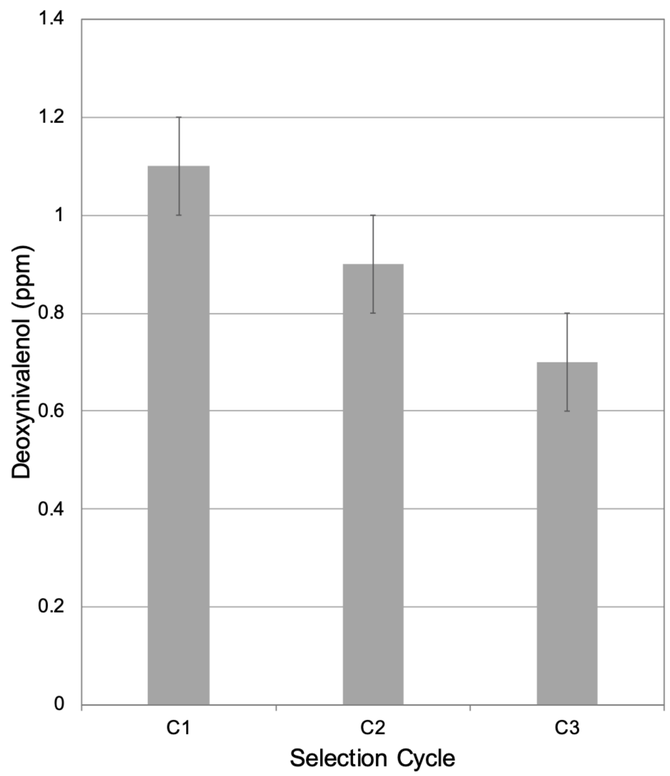
Optical Seed Sorter



Healthy vs. Diseased Grain

Results

Average DON Accumulation for 3 Cycles of Optical Sorter-Based Line Selection



Conclusions

- Deoxynivalenol (DON) accumulation in ppm was lowered with each additional cycle of optical sorter-based among line selection.
- These results give us cautious optimism about the usefulness of the optical sorter and its future role in our fight to manage this very difficult disease.