

Evaluation of FHB Profiles of Advanced Wheat Breeding Lines Treated with a Fungicide

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ABSTRACT

In evaluating FHB resistance of wheat breeding lines, breeders strive to estimate, as accurately as possible, the genetic component of resistance. The possible benefits of management tools, e.g., fungicides, are often ignored by the breeder. The purpose of this study was to evaluate the FHB profile of a set of advanced breeding lines in the presence and absence of the fungicide Prosaro. The study was conducted at Princeton and Lexington, KY. The Princeton location was non-irrigated and inoculated with a single application of scabby corn at Feeke's growth stage 9 and two conidial sprays (1×10^6 spores ml⁻¹) at flowering and one week later. The Lexington location was irrigated and inoculated with scabby corn at Feeke's growth stage 9. Rainfall across Kentucky was inadequate for FHB development, but measurable levels of disease were achieved in both nurseries. Diseases other than FHB were present in Lexington, but at very low levels.

A factorial design with 3 replications was used at each location. At Princeton the experimental unit was a conventional 6 row yield plot, 15 ft. long; at Lexington the experimental unit was a 4 row plot, 4 ft long, planted with a headrow planter. Plots at each location were treated at flowering with a tank mix of Prosaro fungicide (6.5 fl. oz. acre⁻¹) with Induce (0.125% w/v). Three replicates were left untreated for comparison. FHB symptoms were evaluated 21 days after flowering using a 5 point visual rating scale that encompasses both severity and incidence. After harvest, percentage Fusarium damaged kernels (FDK), deoxynivalenol concentration (DON), yield and test weight were measured.

In Princeton, where rain was a limiting factor, there was no significant difference between fungicide-treated and control plots for rating, FDK, DON, and test weight. There was a significant difference in yield, with the average yield of the control plots 11.5 % less than the average yield of the treated plots. In the irrigated Lexington nursery, FHB rating, FDK and DON were all significantly lower in treated than in controls. Yield and test weight were significantly higher for the treated plots than for the control plots. Particularly interesting was the DON level reduction in Lexington. Fungicide x genotype interaction was apparent. For instance, in the control plots, KY99C-1205-06-1 had the lowest DON with 15.4 ppm, but it was third lowest in the treated plots with 13.2 ppm, a 2.2 ppm reduction. In KY98C-1324-01-3 the reduction was 21.4 ppm. The study suggests that advanced breeding lines should routinely be screened with a fungicide as part of the candidate variety evaluation process.

This material is based upon work supported by the U.S. Department of Agriculture, under Agreement No. (59-0790-6-056). This is a cooperative project with the U.S. Wheat & Barley Scab Initiative. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture.