

Report: 2012 Uniform Tests of Biological Control Agents for Management of FHB and DON

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INTRODUCTION

Biological agents have been tested for a number of years as part of the USWBSI's uniform biological agent testing protocol. In 2012, a uniform set of eight biological or biological plus fungicide treatments were compared to an untreated check for evaluation of control of Fusarium Head blight (FHB) and DON (deoxynivalenol) in three classes of wheat.

MATERIALS AND METHODS

Taegro (bacterium *Bacillus subtilis* var. *amyloliquefacians* strain FZB24 containing 5.0×10^{10} cfu/g, Novozymes Biologicals Inc.) was the test biological agent, applied either alone at five to seven days after Feekes growth stage 10.5.1 (early flowering in wheat), or following application of a triazole fungicide at Feekes growth stage 10.5.1, and with or without canola oil as an adjuvant. Test fungicides included Prosaro (prothioconazole + tebuconazole, Bayer CropScience) and tebuconazole (various manufacturers). A non-ionic surfactant generally was applied to fungicide treatments at 0.125% v/v. Two tests, with Taegro applied 5-7 days after the fungicide treatment, also contained 1% v/v of commercially available canola oil. Treatments were applied to soft red winter wheat (Aurora, NY), hard red winter wheat (Lincoln and Mead, NE), and hard red spring wheat (Volga, SD). Each site had inoculum applied - as natural inoculum, as infested grain spawn, or as sprayed inoculum. Treatments were generally applied with small plot application equipment, and delivered in 20 gal water/acre.

RESULTS

FHB, FDK, and DON: Disease levels were low at the four test sites in 2012, because of the occurrence of high temperatures and drought. FHB Index (% field severity = [incidence x head severity]/100) values were determined at three of the four sites, and were non-significant among treatments at the two NE sites, and generally not significantly different than the untreated check at the SD site. Fusarium damaged kernels (FDK) values were determined at three of the four sites, and were not different among treatments. DON levels were below detectable levels at the two NE sites (data not reported), and less than one ppm for all treatments at the NY and SD sites. Results in NY and SD indicated that DON levels generally were significantly reduced with the triazole fungicide treatments or with Taegro if applied in combination with a triazole fungicide.

Yields and Test Weights: Yields varied considerably among locations, with highest yield reported in soft red winter wheat in NY (96+ bu/acre). Yields were converted to percent of check at each site; differences were non-significant at three locations. At the SD site, yield was lowest in the untreated check, and significantly improved with several fungicide or Taegro plus fungicide treatments, but Taegro alone or in combination with canola oil did not improve yield in SD, nor did Prosaro treatments followed by Taegro. Test weights in SD were slightly improved with two treatments containing Prosaro.