

EVALUATION OF AZOSPIRILLUM ON STAND, FOLIAR AND HEAD DISEASE, AND YIELD OF SOFT RED WINTER WHEAT IN KENTUCKY

Don Hershman, Brenda Kennedy, and Terry Yielding
Plant Pathology Department
University of Kentucky, Princeton, KY 42445
PH: (270) 365-7541 Ext 215; Email: dhershma@uky.edu

Seed of the soft red winter wheat variety Agripro/Coker Cooper (90% germination) was treated with Azospirillum by Chemtura Corporation and planted into a conventionally-tilled field (previous crop was maize) on 16 Oct 07 at 35 seed/ft² (1.2 g) in six, 7-in rows on the Kevil Tract of the University of Kentucky Research and Education Center in Princeton, KY. Warrior insecticide was applied 3 fl oz/A in the fall on 16 Nov 07 and again at green-up on 17 Mar 08 to reduce the potential for barley yellow dwarf viral infections. Liquid nitrogen (29% N) was applied in a February/March split application at a rate of approximately 30/60 lbs/A on 14 Feb 08 and 26 Mar 08, respectively. Weeds were controlled by applying 0.5 fl oz/A Harmony Extra herbicide on 17 Mar 08. Plots were 4-ft wide x 15-ft long which were later trimmed to 10 ft by application of Round-up herbicide on 8 Apr 08. The experimental design was a randomized complete block with eight replications. Stand counts were made 14 and 27 days after planting (DAP) by counting the number of plants in three, 20.5-in lengths near the middle of the four center rows of each plot. Seedling height was measured 14 DAP by randomly measuring six plants per plot. Vigor ratings were taken 2 Apr 08. Head counts were made 16 May 08 by counting the number of

heads in two, 20.5-in lengths near the middle of rows three and four of each plot. Plots were rated for leaf blotch complex (*Septoria tritici*, *Stagonospora nodorum*) and FHB (*Fusarium graminearum*) at the late-milk stage (Feeke's 11.1) on 28 May 08. Ratings were made based on a visual estimation of the percentage of leaf surface area diseased. Plots were harvested on 17 Jun 08 using a Wintersteiger small plot combine. Yields were adjusted to 13.5% moisture and 60 lb/bu. Post harvest tiller counts were taken on 18 Jun 08 by counting the number of tillers in two, 20.5-in lengths from rows three and four. Percentage and count data were arcsine and square root transformed, respectively, prior to analysis using ANOVA and Student-Newman-Keuls test ($P \leq 0.05$). Although statistics provided are based on transformed data, arithmetic means are presented in order to provide a better indication of the level of disease control provided by each treatment, as well as the overall disease pressure in the trial.

An optimal planting date and non-hostile soil conditions in the fall 07 favored stand establishment of plots. Consequently, no seedling diseases were observed and there were no significant differences in seedling height or stand counts among treatments at either assessment date. Excellent growing

conditions during spring 08 favored wheat development and high yields, but not disease. Under these low disease conditions, leaf blotch complex levels were light and slightly numerically lower for the Azospirillum treatments relative to the non-treated control; however these differences were not significant at either growth stage. FHB incidence was extremely low and was evident throughout the test at about 0.01% incidence. There were significant differences between the treated and untreated plots for plant vigor; however, this did not impact later agronomic measurements for head count, post harvest tiller count, test weight or yield for which no significant differences were observed. No evidence of phytotoxicity was observed for any treatment.

Seed treatment	Stand count 14 DAP	Stand count 27 DAP	Seedling height 14 DAP	Vigor rating ^w	Head count	Post harvest tiller count	Leaf blotch complex ^x		Yield (bu/A)	Test weight (lb/bu)
	(n/ft ²)	(n/ft ²)	(mm)		(n/ft ²)	(n/ft ²)	(% flag)	(% F-1)		
Non-treated	42.58 NS ^y	42.67 NS	96.2 NS	1.13 a ^z	67.75 NS	91.19 NS	2.50 NS	22.50 NS	104.65 NS	59.35 NS
Azospirillum 650 ml/100 kg.....	39.83	42.83	96.1	1.75 b	67.13	95.63	2.25	21.25	100.58	59.69
F value ($P \leq 0.05$).....	0.0633	0.8779	0.9590	0.0492	0.8747	0.5172	0.6495	0.6179	0.2294	0.8260
CV.....	3.04	4.80	4.93	36.59	4.29	6.88	29.87	13.07	6.03	4.96

^wVigor rating 1-2 rating scale; 1 = vigorous, uniform, 2 = visually slightly less vigorous and uniform.

^xLeaf blotch complex; *Septoria tritici*, *Stagonospora nodorum*.

^yNS = no significant differences ($P \leq 0.05$).

^zColumn numbers followed by the same letter are not significantly different, Student-Newman-Keuls test ($P \leq 0.05$).