

EFFECT OF FOLIAR FUNGICIDE APPLICATIONS ON FUSARIUM HEAD BLIGHT, DON, AND LEAF RUST

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OBJECTIVE:

To compare fungicide treatments applied at early flowering for effectiveness in managing Fusarium Head Blight (FHB), deoxynivalenol (DON) accumulation in harvested grain, and leaf rust.

INTRODUCTION:

FHB is periodically a very serious problem in Kentucky. The disease can substantially reduce yields and negatively impact seed quality. In addition, DON, a mycotoxin frequently associated with FHB, can contaminate grain and result in reduced price at sale or even rejection, depending on the level of DON. Leaf rust is a serious foliar fungal disease and reduces yield in susceptible varieties about four out of five years.

Fungicides are commonly deployed in Kentucky to manage a variety of foliar and head diseases. However, fungicide applications targeted at managing FHB and DON in production fields have not been deployed until recently. In 2004, EPA granted Kentucky the use of Folicur (tebuconazole) for managing FHB and DON; approximately 17,000 acres were treated. In addition, other products, such as Headline (pyraclostrobin), were used by some producers in an attempt to manage FHB/DON. All available data indicate that modern fungicides, such as Folicur, suppress, but do not control FHB and DON. Conversely, foliar fungicides have been successfully used to control leaf rust for many years.

MATERIALS AND METHODS:

The study was conducted at the UK Research and Education Center in Caldwell County, Kentucky. The soft red winter wheat variety Sisson was planted in 7-in rows on October 28, 2003. Wheat was planted into twice-disked corn stubble; plots were 6-rows wide and 12-ft long. Plots were separated by a 3-ft alley. The seeding rate and nitrogen fertility were aimed at producing high-yielding wheat. Split nitrogen applications (ammonium nitrate, 34-0-0) were made on 17 Feb 2004 (37 lbs N) and 23 Mar 2004 (74 lbs N) for a total of 111 lbs actual N/A. No herbicides or insecticides were applied.

Four foliar fungicide treatments and a non-treated check, were established following a randomized complete-block design with six replications. Fungicide treatments were applied at early flowering (Feeke's 10.51; 3 May). Fungicide treatments were applied in 20 gallons of water/A at 40 psi. Treatments were applied using a hand-held, CO²-powered backpack sprayer; the spray boom was equipped with forward and rear facing XR TeeJet 8001 flat-fan nozzles. The plots were sprayed late afternoon and the conditions at the time of application were calm and 71°F. There were no symptoms of

any disease at the time the treatments were applied. At the mid-dough stage (28 May), 100 heads were arbitrarily collected from each plot and visually rated for percent surface area showing FHB symptoms. These ratings were the basis of % incidence, % severity, and % index (incidence x severity/100) estimates.

Leaf rust ratings were based on visual estimates of % flag leaf area diseased in each plot. Ratings were made at the soft dough stage. Entire plots were harvested with a Hege small plot combine on 11 Jun. Yields were calculated based on 13.5% moisture and 60 lbs/bu test weight. Percentage visually scabby kernels (VSK) were determined by examining 200 seed per plot twice (average used) for kernel health (i.e., healthy and plump vs. diseased and shriveled). DON levels (parts per million) associated with plots were determined by the DON Testing Laboratory at Michigan State University, based on 200-g samples from each plot.

RESULTS AND DISCUSSION:

FHB was severe/moderate in the test, and DON and leaf rust were moderate. Folicur was the only treatment to result in significantly less disease (as measured by disease index) compared to the check. VSK and DON were unaffected by treatments. All fungicides provided very good control of late-season leaf rust. Yields were significantly higher than the check for treatments involving Tilt, Headline, and Folicur. Clearly, yields were more impacted by leaf rust than by FHB.

Overall, Folicur suppressed FHB by about as much as expected, based on previous tests and experience. It is somewhat surprising that Folicur did not have a significant impact on DON, and that no other treatments had a significant impact on FHB/DON. Leaf rust was adequately controlled by all fungicides, indicating that all modern fungicides have the ability to control leaf rust when properly applied.

CONCLUSION:

Differences in results among fungicide active ingredients suggest that this is an important consideration when making fungicide use decisions for FHB/DON suppression and leaf rust control.

Table 1. 2004 Fungicide Test Princeton, KY

Treatment Fungicide and Rate/A	Fusarium Head Blight*				DON (ppm)	Leaf Rust (% Flag leaf)	Yield (bu/A)	Test Wt. (lbs/bu)
	% Inc.	% Sev.	% Index	% VSK				
Non-treated	77.2	22.7	17.6	33.5	4.5	31.7	50.5	50.7
Tilt 4.0 fl oz	67.8	16.9	11.8	32.6	4.3	9.7**	60.1**	51.8
Quilt 14.0 fl oz	72.8	19.7	14.4	36.3	5.0	3.2**	57.0	51.3

Headline 6.0 fl oz	76.6	22.2	17.0	32.5	5.5	2.3**	59.9*	51.2
Folicur 4.0 fl oz	60.4**	17.7	10.8**	29.7	4.2	4.7**	59.8**	51.7

*Inc = incidence, Sev = severity, Index is inc x sev/100, VSK = visually scabby kernels, DON is deoxynivalenol.

**Means significantly different from check, Student-Newman-Keuls, $P=0.05$.

