

Management of Fusarium Head Blight in Spring Wheat

Purpose:

To introduce and assess a Fusarium Prediction Model for spring wheat in eastern Ontario and to evaluate the feasibility of using Folicur to manage Fusarium in spring wheat. The infection of fusarium head blight is very dependent on the weather conditions from 7 days prior to heading to 5 - 10 days after the wheat heads have emerged. The Fusarium Forecasting Model is to be used to predict the risk of fusarium infection during this period. The prediction is based on the weather forecast and updated with actual weather as the season progresses.

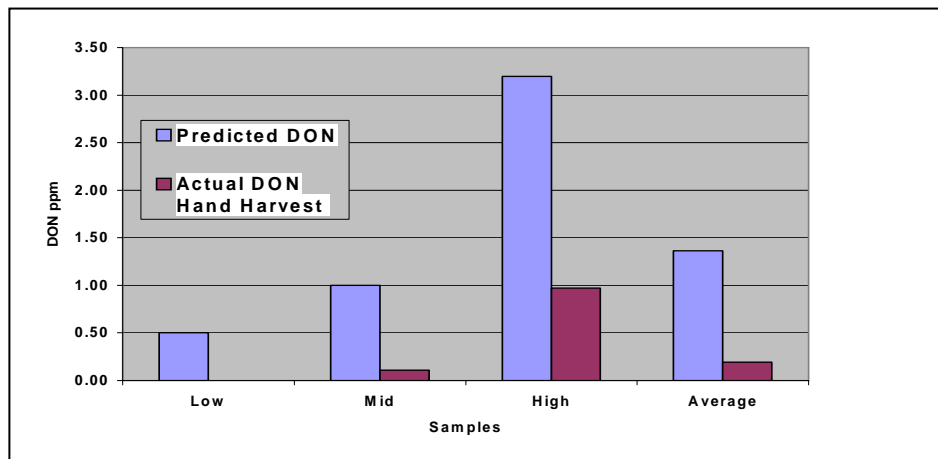
Methods:

The predicted risk information was presented as colour-coded maps. These maps forecast the amount of toxin (DON in ppm) that would accumulate if the wheat was at Zadok's Stage 59 (75% of the heads in a canopy completely emerged from the flag leaf) on the date of a map. The Fusarium Risk Prediction Model information was updated 3 times per week (Monday, Wednesday & Friday afternoons) from June 15th to July 15th. The colour-coded fusarium prediction maps were available to growers and crop scouts on the Ontario Weather Network (OWN) at Ridgeway College - Fusarium Information web site at: <http://www.ownweb.ca/models/public/fusarium/default.cfm?location=none>

The project ran in 2001 and 2002, and was completed in 2003. In each of the 3 years there were 25 to 30 side-by-side, on-farm comparisons of No Folicur (check strip) compared to a Folicur strip. Folicur was sprayed at approximately 2 to 3 days following Day 0 (75% Heads Emerged stage). Accessing each field to get the timing of application for Day 2 to Day 3 was a challenge as the sudden increase in daytime temperature shortened the time that the wheat plant was at the 75% Head Emerged to the Flowering stage.

Results:

Figure 1. DON ppm - Predicted vs Harvest Hand Samples Spring Wheat 2001 by category, as of day 0



It is worth noting that the highest percent fusarium damaged kernels (FDK) and DON level samples were from fields heading during periods of high rainfall and/or humidity. Only in 2003 were the weather conditions poor enough to result in high FDK and DON levels. It is also important to note the variety susceptibility, as was the case with the spring wheat variety 5700 PR, which is known to be more genetically susceptible to fusarium infection. The model prediction maps were able to provide an indication, but generally predicted higher than the actual DON levels in the samples.

3 Year Summary - Fusarium in Spring Wheat

Table1. Comparison of Folicur and Untreated Spring Wheat for Yield

Yield (bu/ac)	Check	Folicur	Difference	High	Low
2001	68.2	70.1	2.0	11.5	-10.2
2002	68.2	68.9	0.7	7.5	-10.5
2003	60.8	63.1	2.3	10.5	-4.9
		Average	1.7		

There was considerable field variability as shown by the negative yield response when comparing Folicur to the no Folicur check strips (Table 1). Yield was calculated excluding the sprayer tracks. As shown in the table, the average yield benefit to Folicur is only 1.7 bushels per acre, although some growers with heavy crops and/or disease pressure found 3 to 4 bushels per acres. The lack of yield response in 2002 can be attributed to the generally lower leaf disease pressure as compared to 2001 and 2003.

Table 2. Comparison of Folicur and Untreated Spring Wheat for Fusarium Levels

Fusarium %	Check	Folicur	Difference	High	Low
2001	0.014	0.009	-54.3%	0.1	-0.2
2002	0.055	0.036	-33.3%	0.4	-0.3
2003	8.596	5.843	-32.0%	9.3	-4.6
		Average	-39.9%		

Folicur reduced the percent fusarium levels by approximately 30 to 50% (Table 2). However, in 2001, the percent FDK in both strips was very low. In the first year, hand-samples collected before combining were compared to the samples taken from the combine showed that combining significantly reduced the number of FDK in the sample. This is important to producers because over 1% FDK results in Feed Grade and a \$30 to \$40 per tonne discount.

Table 3. Comparison of Folicur and Untreated Spring Wheat for DON Levels

DON ppm	Check	Folicur	Difference	High	Low
2001	0.831	0.767	-8.4%	0.4	-0.3
2002	0.700	0.500	-28.6%		
2003	0.831	0.767	-7.8%	1.59	-1.76
		Average	-14.9%		

DON toxin level is measured by the millers and depending on the intended usage, the acceptable level is 1 to 2 parts per million (ppm). In this project, the DON toxin levels were only reduced by about 15% on average (Table 3).

Summary:

The experience from this project would indicate that Folicur applied under the conditions of the last 3 years can be effective in reducing the percent fusarium to less the 1% FDK when the expected fusarium levels are moderate (ie. 1.3 to 1.5%). However, it did not sufficiently reduce the % FDK to make food grade wheat when the fusarium conditions are high as experienced in the later heading fields of 2003.

Overall, the project has further improved the understanding of how to manage fusarium head blight in spring wheat with the use of Folicur fungicide, the use of the Fusarium Prediction Model and other factors, such as variety selection and crop rotation.

Next Steps:

This study has now been completed.

Acknowledgements:

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