

October 13, 2010

TO: Nebraska Wheat Board

FROM: Stephen Wegulo, Department of Plant Pathology

TOPIC: 2009-2010 Annual Report - Developing Strategies to Manage Fusarium Head Blight in Winter Wheat

Accomplishments:

Evaluation of winter wheat cultivars to Fusarium head blight (FHB). Fourteen cultivars were evaluated for resistance to Fusarium head blight at the University of Nebraska Research and Development Center (ARDC) near Mead. Data analysis is in progress.

Effect of combining cultivar resistance and fungicide application on FHB/DON. The fungicide Prosaro was applied or not applied to six winter wheat cultivars inoculated with spores of the FHB fungus at the ARDC near Mead to determine the effect of the interaction between cultivar resistance and fungicide application on FHB and the associated mycotoxin deoxynivalenol (DON). Results are presented in Tables 1-3 below.

Relationship between FHB severity and DON concentration and the effect of cultivar on this relationship. We found a positive linear relationship between FHB severity and DON concentration. We also found that the relationship between FHB severity and DON concentration is affected by cultivar. That is, DON accumulation per unit of FHB severity is greater in some cultivars than in others.

Fact sheet on FHB/DON. A fact sheet on FHB/DON will be prepared by the beginning of the 2011 growing season.

Refereed publications. Two refereed journal manuscripts on Fusarium head blight were submitted from work that was directly or indirectly funded by the Wheat Board. One has been accepted and the other is in review.

1. Hernandez Nopsa, J. F., Baenziger, P. S., Eskridge, K. M., Dowell, F. E., Harris, S. D., and Wegulo, S. N. 2010. Effect of cultivar on the relationship between Fusarium head blight severity and deoxynivalenol concentration in winter wheat. Plant Dis. (submitted).
2. Wegulo, S. N., Bockus, W. W., Hernandez Nopsa, J., De Wolf, E. D., and Eskridge, K. M. 2011. Effects of integrating cultivar resistance and fungicide application on Fusarium head blight and deoxynivalenol in winter wheat. Plant Dis. (accepted).

Table 1. Fusarium head blight index (FHB), yield, *Fusarium*-damaged kernels (FDK), and deoxynivalenol (DON) concentration in six cultivars (averaged over all fungicide treatments) from a field experiment conducted to determine the effect of integrating cultivar resistance with fungicide application on FHB, 2010

Cultivar	Index (%)	Yield (bu/acre)	FDK (%)	DON (ppm)
Camelot	3.3	61.5	5.5	0.43
Harry	5.0	59.7	8.9	0.55
Jagalene	2.2	41.2	10.8	0.10
NE01481	1.7	57.6	4.7	0.00
Overland	3.0	62.3	6.7	0.06
2137	1.9	59.4	6.0	0.00
LSD(0.05) ^a	1.0	7.9	3.0	0.22

^aLeast significant difference at $P = 0.05$.

Table 2. Fusarium head blight index (FHB), yield, *Fusarium*-damaged kernels (FDK), and deoxynivalenol (DON) concentration in two fungicide treatments (averaged over all cultivars) from a field experiment conducted to determine the effect of integrating cultivar resistance with fungicide application on FHB, 2010

Fungicide	Index (%)	Yield (bu/acre)	FDK (%)	DON (ppm)
Prosaro	1.1	60.8	6.3	0.12
Check	4.6	53.1	7.9	0.26
LSD(0.05) ^a	0.4	2.6	2.7	0.14

^aLeast significant difference at $P = 0.05$.

Table 3. Fungicide treatment means at the same cultivar level for Fusarium head blight index (FHB), yield, *Fusarium*-damaged kernels (FDK), and deoxynivalenol (DON) concentration from a field experiment conducted to determine the effect of integrating cultivar resistance with fungicide application on FHB, 2010

Cultivar	Fungicide	Index (%)	Yield (bu/acre)	FDK (%)	DON (ppm)
Camelot	Prosaro	1.3	63.6	6.0	0.27
Camelot	Check	5.3	59.5	5.0	0.60
Harry	Prosaro	2.3	61.9	7.6	0.47
Harry	Check	7.6	57.5	10.2	0.63
Jagalene	Prosaro	0.5	47.2	9.6	0.00
Jagalene	Check	4.0	35.2	12.0	0.20
NE01481	Prosaro	0.3	63.2	3.8	0.00
NE01481	Check	3.0	52.0	5.5	0.00
Overland	Prosaro	1.0	64.1	6.1	0.00
Overland	Check	5.0	60.6	7.3	0.12
2137	Prosaro	1.1	64.7	4.6	0.00
2137	Check	2.8	54.1	7.4	0.00
LSD(0.05) ^a		1.1	6.4	6.6	0.34

^aLeast significant difference at $P = 0.05$.