

**2000 MINNDAK UNIFORM FUSARIUM HEAD
BLIGHT NURSERY – FINAL REPORT**

JULY 2001

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INTRODUCTION

This report contains information from the 2000 MinnDak Uniform Barley Fusarium head blight (FHB) nurseries grown at St. Paul and Crookston, MN, and Fargo, Langdon, Osnabrock, and Park River, ND. Two nurseries were grown at Crookston. One of the nurseries at Crookston, and the nurseries at St. Paul, Fargo, and Langdon were irrigated. One nursery at Crookston, and the nurseries at Osnabrock and Park River were not irrigated and are referred to as “dryland” nurseries. Dryland nurseries were added in 2000 to provide conditions that growers would observe in their fields. Conditions in the irrigated field generally are more severe than growers would observe in most years and result in entries with moderate FHB resistance being overwhelmed and appearing susceptible. Only entries with levels of resistance similar to Chevron or CIho 4196 are scored as resistant in the irrigated nurseries. Dryland nurseries are needed to identify entries with moderate levels of FHB resistance. The nurseries at Crookston, Fargo, Langdon, and Park River were inoculated with *Fusarium graminearum* using the grain spawn method. The nursery at St. Paul was inoculated with macroconidia. All entries in the nurseries were replicated a minimum of three times.

Drs. Kevin Smith and Don Rasmusson, and staff on their project oversaw the nurseries in Minnesota. Dr. Brian Steffenson and staff on his project oversaw nurseries in Fargo and Langdon; Dr. Linnea Skoglund and her staff oversaw the nursery at Park River; and Dr. Rich Horsley and his staff oversaw the nursery at Osnabrock, ND.

Each nursery included a set of common checks. The checks were CIho 4196 (resistant two-row check), Chevron (resistant six-row check), Robust and Stander (susceptible six-row checks), MNBrite (moderately resistant six-row check), and Conlon (moderately resistant two-row check). Percent severity of FHB was determined at the soft dough stage by determining the ratio of infected kernels to total kernels on 10-20 spikes per entry, and then multiplying by 100. Severity data were collected at St. Paul and Crookston (irrigated), MN, and all North Dakota locations. Percent FHB incidence was determined at the soft dough stage by determining the ratio of infected spikes to total spikes on 10-30 spikes per entry, and then multiplying by 100. Incidence data were collected in the dryland Crookston nursery, and at Fargo, Park River, and Osnabrock, ND.

A series of correlation tables were added to this year’s report that indicate the magnitude of relationships in readings between the different nursery locations. In general, the correlations between irrigated nurseries tended to be stronger than those between dryland nurseries or dryland and irrigated nurseries. This can be explained by the fact that infection is more uniform and consistent in the irrigated nurseries. Infection of entries grown in dryland nurseries is dependent on natural conditions; thus, one would expect results from these nurseries to be more variable. Also, the correlation values for the DON data tended to be greater than those for FHB incidence or FHB severity. The weakest correlations were found for FHB severity data from dryland nurseries and the strongest correlations were found for DON data from irrigated nurseries.

I would like to acknowledge the assistance of Mr. Ken Lamb in preparing the tables for this report.

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Table 1. Mean Fusarium head blight severity of entries grown in the 2000 MinnDak Nursery at three dryland and four irrigated upper Midwest locations.

Entry	Nursery Location						Average		Overall
	Park River, ND	Osnabrock, ND	Fargo, ND	Langdon, ND	St. Paul, MN	Crookston, MN	Dryland	Irrigated	
	Dryland	Dryland	Irrigated	Irrigated	Irrigated	Irrigated	Dryland	Irrigated	
	----- % Severity -----								
Chevron	0.5	1.2	4.6	2.6	1.6	8.2	0.9	4.3	3.1
CI4196	2.0	0.5	4.3	3.0	10.3	2.0	1.3	4.9	3.7
MNBrite	2.8	3.3	10.1	60.7	6.0	16.3	3.1	23.3	16.5
Conlon	10.3	3.3	6.0	46.9	11.9	21.8	6.8	21.7	16.7
Robust	2.0	4.1	5.8	61.9	9.8	26.7	3.1	26.0	18.4
Stander	3.3	4.0	9.9	62.3	16.9	32.8	3.7	30.5	21.5
FEG2-26	2.0	5.9	10.2	54.5	7.6	21.5	4.0	23.5	17.0
FEG4-66	2.0	3.1	4.8	51.5	7.6	20.8	2.6	21.2	15.0
FEG5-109	3.0	2.5	2.1	62.3	6.9	30.5	2.8	25.4	17.9
FEG10-09	3.0	3.9	9.6	69.5	5.5	34.0	3.5	29.6	20.9
FEG10-16	2.3	4.4	10.2	51.4	3.7	31.8	3.4	24.3	17.3
Drummond	3.3	3.9	2.6	83.2	8.2	37.2	3.6	32.8	23.1
ND15422	2.0	3.2	5.4	77.7	6.7	23.7	2.6	28.4	19.8
ND17079	6.3	3.5	2.8	76.8	5.2	33.2	4.9	29.5	21.3
ND17082	2.0	2.7	10.1	75.7	7.4	25.2	2.4	29.6	20.5
ND17245	3.3	7.0	5.1	82.0	4.6	24.5	5.2	29.1	21.1
Legacy	2.5	2.9	8.6	58.1	14.7	22.2	2.7	25.9	18.2
6B95-2482	4.8	3.4	3.8	83.2	15.7	38.0	4.1	35.2	24.8
6B97-2063	3.0	4.2	9.1	75.3	9.7	42.7	3.6	34.2	24.0
6B97-2232	3.3	2.9	6.3	74.0	10.8	31.2	3.1	30.6	21.4
6B97-2601	3.0	4.0	12.1	76.3	9.8	38.7	3.5	34.2	24.0
2ND16461	9.3	2.5	4.2	38.5	3.0	28.8	5.9	18.6	14.4
2ND17274	6.3	2.5	4.1	37.1	5.0	24.2	4.4	17.6	13.2
2ND18076	9.5	4.5	5.9	47.0	5.8	28.8	7.0	21.9	16.9
2ND18172	5.3	4.3	5.2	28.1	3.5	12.0	4.8	12.2	9.7
2ND18366	6.5	5.1	5.6	33.3	4.2	14.8	5.8	14.5	11.6
Average	4.0	3.6	6.5	56.7	7.8	25.8	3.8	24.2	17.4
Std. Dev.	2.6	1.3	2.8	22.5	3.9	9.7	1.5	8.3	5.6
Minimum	0.5	0.5	2.1	2.6	1.6	2.0	0.9	4.3	3.1
Maximum	10.3	7.0	12.1	83.2	16.9	42.7	7.0	35.2	24.8

Table 2. Mean Fusarium head blight of entries grown in the 2000 MinnDak Nursery at three dryland and four irrigated upper Midwest locations expressed as percent of Robust.

Entry	Nursery Location							Average		
	Park River, ND	Osnabrock, ND	Fargo, ND	Langdon, ND	St. Paul, MN	Crookston, MN	Dryland	Irrigated	Overall	
	Dryland	Dryland	Irrigated	Irrigated	Irrigated	Irrigated				
	----- % of Robust -----									
Chevron	25.0	29.3	79.3	4.2	16.7	30.8	27.1	23.7	30.9	
CI4196	100.0	12.2	74.1	4.8	105.4	7.5	56.1	56.5	50.7	
MNBrite	140.0	80.5	174.1	98.1	61.2	61.1	110.2	61.2	102.5	
Conlon	515.0	80.5	103.4	75.8	121.1	81.9	297.7	101.5	162.9	
Robust	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
Stander	165.0	97.6	170.7	100.6	172.1	123.1	131.3	147.6	138.2	
FEG2-26	100.0	143.9	175.9	88.0	77.9	80.6	122.0	79.3	111.1	
FEG4-66	100.0	75.6	82.8	83.2	77.6	78.1	87.8	77.8	82.9	
FEG5-109	150.0	61.0	36.2	100.6	70.1	114.4	105.5	92.2	88.7	
FEG10-09	150.0	95.1	165.5	112.3	55.8	127.5	122.6	91.6	117.7	
FEG10-16	115.0	107.3	175.9	83.0	37.4	119.4	111.2	78.4	106.3	
Drummond	165.0	95.1	44.8	134.4	83.7	139.4	130.1	111.5	110.4	
ND15422	100.0	78.0	93.1	125.5	68.7	88.8	89.0	78.7	92.4	
ND17079	315.0	85.4	48.3	124.1	52.7	124.5	200.2	88.6	125.0	
ND17082	100.0	65.9	174.1	122.3	75.9	94.4	82.9	85.1	105.4	
ND17245	165.0	170.7	87.9	132.5	47.3	91.9	167.9	69.6	115.9	
Legacy	125.0	70.7	148.3	93.9	150.3	83.1	97.9	116.7	111.9	
6B95-2482	240.0	82.9	65.5	134.4	160.5	142.5	161.5	151.5	137.6	
6B97-2063	150.0	102.4	156.9	121.6	99.3	160.0	126.2	129.7	131.7	
6B97-2232	165.0	70.7	108.6	119.5	109.9	116.9	117.9	113.4	115.1	
6B97-2601	150.0	97.6	208.6	123.3	100.3	145.1	123.8	122.7	137.5	
2ND16461	465.0	61.0	72.4	62.2	30.6	108.1	263.0	69.4	133.2	
2ND17274	315.0	61.0	70.7	59.9	51.0	90.6	188.0	70.8	108.0	
2ND18076	475.0	109.8	101.7	75.9	59.5	108.1	292.4	83.8	155.0	
2ND18172	265.0	104.9	89.7	45.4	35.7	45.0	184.9	40.4	97.6	
2ND18366	325.0	124.4	96.6	53.8	42.5	55.6	224.7	49.1	116.3	
Average	199.2	87.1	111.7	91.5	79.4	96.9	143.1	88.1	111.0	
Std. Dev.	128.8	32.2	49.0	36.4	40.1	36.5	68.0	30.9	28.4	
Minimum	25.0	12.2	36.2	4.2	16.7	7.5	27.1	23.7	30.9	
Maximum	515.0	170.7	208.6	134.4	172.1	160.0	297.7	151.5	162.9	

Table 3. Mean Fusarium head blight incidence of entries grown in the 2000 MinnDak Nursery at three dryland and one irrigated upper Midwest locations.

Entry	Nursery Location				Average	
	Park River, ND Dryland	Osnabrock, ND Dryland	Crookston, MN Dryland	Fargo, ND Irrigated	Dryland	Overall
	----- % FHB Incidence -----					
Chevron	5.0	25.0	1.0	2.5	10.3	8.4
CI4196	22.5	13.3	0.7	3.9	12.2	10.1
MNBrite	27.5	48.3	5.7	60.6	27.2	35.5
Conlon	60.0	43.3	10.0	46.9	37.8	40.1
Robust	35.0	50.0	12.3	61.9	32.4	39.8
Stander	32.5	48.3	13.0	62.3	31.3	39.0
FEG2-26	37.5	58.3	6.3	54.5	34.0	39.2
FEG4-66	22.5	31.7	3.0	51.4	19.1	27.2
FEG10-09	35.0	46.7	7.3	69.4	29.7	39.6
FEG10-16	27.5	48.3	3.3	51.4	26.4	32.6
Drummond	17.5	51.7	9.0	83.2	26.1	40.3
ND15422	37.5	43.3	4.7	77.6	28.5	40.8
ND17079	55.0	45.0	13.3	76.8	37.8	47.5
ND17082	37.5	50.0	6.7	75.7	31.4	42.5
ND17245	52.5	58.3	9.3	82.0	40.0	50.5
Legacy	32.5	48.3	9.0	58.1	29.9	37.0
6B95-2482	30.0	41.7	2.3	83.1	24.7	39.3
6B97-2063	45.0	55.0	7.7	75.3	35.9	45.7
6B97-2232	30.0	40.0	6.3	73.9	25.4	37.6
6B97-2601	30.0	50.0	5.0	76.3	28.3	40.3
2ND16461	47.5	31.7	3.7	38.5	27.6	30.3
2ND17274	25.0	36.7	5.3	37.1	22.3	26.0
2ND18076	52.5	48.3	10.3	47.0	37.0	39.5
2ND18172	42.5	58.3	3.3	27.9	34.7	33.0
2ND18366	35.0	58.3	4.7	33.3	32.7	32.8
FEG5-109	27.5	40.0	--	62.3	--	--
Average ¹	35.0	45.2	6.5	56.4	28.9	35.8
Std. Dev. ¹	12.6	10.9	3.6	22.9	7.4	9.8
Minimum	5.0	13.3	0.7	2.5	10.3	8.4
Maximum	60.0	58.3	13.3	83.2	40.0	50.5

¹Averages and standard deviations calculated for those entries in which data were available in all environments.

Table 4. Mean Fusarium head blight incidence of entries grown in the 2000 MinnDak Nursery at three dryland and one irrigated upper Midwest locations expressed as a percent of Robust.

Entry	Nursery Location				Average	
	Park River, ND	Osnabrock, ND	Crookston, MN	Fargo, ND	Dryland	Overall
	Dryland	Dryland	Dryland	Irrigated	Dryland	Overall
	----- % of Robust -----					
Chevron	14.3	50.0	8.1	4.0	24.1	19.1
CI4196	64.3	26.6	5.4	6.3	32.1	25.7
MNBrite	78.6	96.6	45.9	98.0	73.7	79.8
Conlon	171.4	86.6	81.1	75.8	113.0	103.7
Robust	100.0	100.0	100.0	100.0	100.0	100.0
Stander	92.9	96.6	105.4	100.6	98.3	98.9
FEG2-26	107.1	116.6	51.4	88.1	91.7	90.8
FEG4-66	64.3	63.4	24.3	83.2	50.7	58.8
FEG10-09	100.0	93.4	59.5	112.2	84.3	91.3
FEG10-16	78.6	96.6	27.0	83.2	67.4	71.3
Drummond	50.0	103.4	73.0	134.5	75.5	90.2
ND15422	107.1	86.6	37.8	125.5	77.2	89.3
ND17079	157.1	90.0	108.1	124.1	118.4	119.8
ND17082	107.1	100.0	54.1	122.4	87.1	95.9
ND17245	150.0	116.6	75.7	132.5	114.1	118.7
Legacy	92.9	96.6	73.0	93.9	87.5	89.1
6B95-2482	85.7	83.4	18.9	134.4	62.7	80.6
6B97-2063	128.6	110.0	62.2	121.7	100.2	105.6
6B97-2232	85.7	80.0	51.4	119.5	72.4	84.1
6B97-2601	85.7	100.0	40.5	123.4	75.4	87.4
2ND16461	135.7	63.4	29.7	62.2	76.3	72.8
2ND17274	71.4	73.4	43.2	59.9	62.7	62.0
2ND18076	150.0	96.6	83.8	76.0	110.1	101.6
2ND18172	121.4	116.6	27.0	45.2	88.4	77.6
2ND18366	100.0	116.6	37.8	53.8	84.8	77.1
FEG5-109	78.6	80.0	--	100.7	--	--
Average ¹	100.0	90.4	53.0	91.2	81.1	83.6
Std. Dev. ¹	35.9	21.8	28.9	37.0	23.5	23.8
Minimum	14.3	26.6	5.4	4.0	24.1	19.1
Maximum	171.4	116.6	108.1	134.5	118.4	119.8

¹Averages and standard deviations calculated for those entries in which data were available in all environments.

Table 5. Mean deoxynivalenol concentration of entries grown in the 2000 MinnDak Nursery at three dryland and four irrigated upper Midwest locations.

Entry	Nursery Location								Average		Overall
	Park River, ND	Osnabrock, ND	Crookston, MN	Fargo, ND	Langdon, ND	St. Paul, MN	Crookston, MN	Dryland	Irrigated		
	Dryland	Dryland	Dryland	Irrigated	Irrigated	Irrigated	Irrigated	Dryland	Irrigated		
	-----ppm-----										
Chevron	0.5	1.2	1.1	5.5	7.3	4.1	38.2	0.9	13.8	8.3	
CI4196	0.2	0.0	1.4	2.2	4.0	11.9	14.2	0.5	8.1	4.8	
MNBrite	0.8	1.0	2.0	33.1	92.3	15.5	51.5	1.3	48.1	28.0	
Conlon	0.1	2.6	1.6	8.9	47.2	12.6	30.9	1.4	24.9	14.9	
Robust	1.3	1.3	2.8	37.2	92.4	24.0	66.3	1.8	55.0	32.2	
Stander	0.9	1.0	4.3	41.9	98.0	34.2	68.1	2.1	60.6	35.5	
FEG2-26	0.2	1.1	1.4	28.1	82.8	10.1	56.0	0.9	44.3	25.7	
FEG4-66	0.5	0.9	1.5	24.6	80.3	14.4	69.7	1.0	47.3	27.4	
FEG5-109	0.4	1.1	1.3	23.4	75.0	11.7	41.8	0.9	38.0	22.1	
FEG10-09	0.6	1.7	3.0	28.6	92.8	21.0	62.7	1.8	51.3	30.1	
FEG10-16	0.7	4.2	2.3	26.2	76.0	21.1	56.4	2.4	44.9	26.7	
Drummond	0.7	2.9	2.6	37.8	156.5	37.7	85.8	2.1	79.5	46.3	
ND15422	1.1	3.1	2.6	38.5	128.3	41.7	69.7	2.3	69.5	40.7	
ND17079	0.8	2.3	1.2	28.8	138.9	19.5	52.7	1.4	60.0	34.9	
ND17082	0.9	1.2	2.4	31.7	79.8	30.5	44.1	1.5	46.5	27.2	
ND17245	0.9	2.9	3.8	30.3	167.8	25.5	70.4	2.5	73.5	43.1	
Legacy	0.6	1.4	1.7	27.6	71.8	27.6	58.3	1.2	46.3	27.0	
6B95-2482	0.7	1.7	1.9	28.5	142.0	31.5	57.1	1.4	64.8	37.6	
6B97-2063	0.7	2.3	2.6	33.0	132.3	28.5	59.6	1.9	63.3	37.0	
6B97-2232	0.7	3.6	3.1	34.3	98.1	23.8	60.2	2.5	54.1	32.0	
6B97-2601	1.0	1.9	3.3	41.5	160.1	20.1	55.4	2.1	69.3	40.5	
2ND16461	0.2	0.3	0.8	7.1	21.8	9.0	27.3	0.4	16.3	9.5	
2ND17274	0.3	1.7	0.9	8.3	29.4	8.9	32.3	1.0	19.7	11.7	
2ND18076	0.8	2.7	1.3	14.8	79.0	17.1	35.8	1.6	36.7	21.6	
2ND18172	0.7	1.7	1.0	15.3	33.0	12.5	35.5	1.1	24.1	14.2	
2ND18366	0.3	1.0	1.7	12.1	27.1	11.4	27.1	1.0	19.4	11.5	
Average	0.6	1.8	2.1	25.0	85.2	20.2	51.0	1.5	45.4	26.6	
Std. Dev.	0.3	1.0	0.9	11.9	47.3	9.8	17.1	0.6	20.0	11.6	
Minimum	0.1	0.0	0.8	2.2	4.0	4.1	14.2	0.4	8.1	4.8	
Maximum	1.3	4.2	4.3	41.9	167.8	41.7	85.8	2.5	79.5	46.3	

Table 6. Mean deoxynivalenol concentration of entries grown in the 2000 MinnDak Nursery at three dryland and four irrigated upper Midwest locations expressed as percent of Robust.

Entry	Nursery Location								Average		
	Park River, ND	Osnabrock, ND	Crookston, MN	Fargo, ND	Langdon, ND	St. Paul, MN	Crookston, MN	Dryland	Irrigated	Overall	
	Dryland	Dryland	Dryland	Irrigated	Irrigated	Irrigated	Irrigated				
-----% of Robust-----											
Chevron	36.1	92.3	39.3	79.3	4.2	17.1	57.7	55.9	39.6	46.6	
CI4196	15.0	0.0	50.0	74.1	4.8	49.5	21.4	21.7	37.5	30.7	
MNBrite	58.6	76.9	71.4	174.1	98.1	64.6	77.7	69.0	103.6	88.8	
Conlon	9.8	200.0	57.1	103.4	75.8	52.6	46.6	89.0	69.6	77.9	
Robust	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
Stander	66.2	76.9	153.6	170.7	100.6	142.3	102.8	98.9	129.1	116.2	
FEG2-26	15.0	84.6	50.0	175.9	88.0	42.0	84.6	49.9	97.6	77.2	
FEG4-66	33.8	69.2	53.6	82.8	83.2	60.1	105.1	52.2	82.8	69.7	
FEG5-109	26.3	84.6	46.4	36.2	100.6	48.7	63.1	52.5	62.2	58.0	
FEG10-09	41.4	130.8	107.1	165.5	112.3	87.4	94.7	93.1	115.0	105.6	
FEG10-16	54.9	323.1	82.1	175.9	83.0	87.7	85.1	153.4	107.9	127.4	
Drummond	48.9	223.1	92.9	44.8	134.4	157.0	129.4	121.6	116.4	118.6	
ND15422	78.9	238.5	92.9	93.1	125.5	173.5	105.1	136.8	124.3	129.6	
ND17079	58.6	176.9	42.9	48.3	124.1	81.1	79.5	92.8	83.2	87.3	
ND17082	69.9	92.3	85.7	174.1	122.3	127.0	66.5	82.6	122.5	105.4	
ND17245	66.2	223.1	135.7	87.9	132.5	106.1	106.2	141.7	108.2	122.5	
Legacy	45.1	107.7	60.7	148.3	93.9	114.8	88.0	71.2	111.3	94.1	
6B95-2482	48.9	130.8	67.9	65.5	134.4	131.2	86.1	82.5	104.3	95.0	
6B97-2063	48.9	176.9	92.9	156.9	121.6	118.6	89.9	106.2	121.8	115.1	
6B97-2232	54.9	276.9	110.7	108.6	119.5	99.0	90.8	147.5	104.5	122.9	
6B97-2601	71.4	146.2	117.9	208.6	123.3	83.8	83.6	111.8	124.8	119.2	
2ND16461	15.0	23.1	28.6	72.4	62.2	37.6	41.2	22.2	53.4	40.0	
2ND17274	22.6	130.8	32.1	70.7	59.9	37.2	48.7	61.8	54.1	57.4	
2ND18076	58.6	207.7	46.4	101.7	75.9	71.3	54.0	104.3	75.7	88.0	
2ND18172	51.1	130.8	35.7	89.7	45.4	51.9	53.5	72.5	60.1	65.4	
2ND18366	22.6	76.9	60.7	96.6	53.8	47.4	40.9	53.4	59.7	57.0	
Average	46.9	138.5	73.6	111.7	91.5	84.2	77.0	86.3	91.1	89.1	
Std. Dev	22.5	77.6	33.3	49.0	36.4	40.7	25.7	35.9	28.5	29.1	
Minimum	9.8	0.0	28.6	36.2	4.2	17.1	21.4	21.7	37.5	30.7	
Maximum	100.0	323.1	153.6	208.6	134.4	173.5	129.4	153.4	129.1	129.6	

Table 7. Correlation among all environments for Fusarium head blight severity.

	Park River	Osnabrock	Fargo	Langdon	St. Paul	Crookston
Park River	1.00					
Osnabrock	0.11	1.00				
Fargo	-0.30	0.28	1.00			
Langdon	-0.12	0.46*	0.20	1.00		
St. Paul	-0.09	-0.08	0.21	0.35	1.00	
Crookston	0.10	0.33	0.18	0.79**	0.30	1.00

*,** r-values significantly different from 0 at P=0.05 and P=0.01, respectively.

Table 8. Correlation among dryland environments for Fusarium head blight severity.

	Park River	Osnabrock
Park River	1.00	
Osnabrock	0.11	1.00

*,** r-values significantly different from 0 at P=0.05 and P=0.01, respectively.

Table 9. Correlation among irrigated environments for Fusarium head blight severity.

	Fargo	Langdon	St. Paul	Crookston
Fargo	1.00			
Langdon	0.20	1.00		
St. Paul	0.21	0.35	1.00	
Crookston	0.18	0.79**	0.30	1.00

*,** r-values significantly different from 0 at P=0.05 and P=0.01, respectively.

Table 10. Correlation among mean Fusarium head blight severity at dryland vs. irrigated environments.

	Dryland	Irrigated
Dryland	1.00	
Irrigated	0.11	1.00

*,** r-values significantly different from 0 at P=0.05 and P=0.01, respectively.

Table 11. Correlation among all environments for Fusarium head blight incidence.

	Park River	Osnabrock	Crookston	Fargo
Park River	1.00			
Osnabrock	0.43*	1.00		
Crookston	0.53**	0.48*	1.00	
Fargo	0.29	0.54**	0.50*	1.00

*,** r-values significantly different from 0 at P=0.05 and P=0.01, respectively.

Table 12. Correlation among dryland environments for Fusarium head blight incidence.

	Park River	Osnabrock	Crookston
Park River	1.00		
Osnabrock	0.43*	1.00	
Crookston	0.53**	0.48*	1.00

*,** r-values significantly different from 0 at P=0.05 and P=0.01, respectively.

Table 13. Correlation among mean Fusarium head blight incidence at dryland vs. irrigated environments.

	Irrigated	Dryland
Irrigated	1.00	
Dryland	0.51*	1.00

*,** r-values significantly different from 0 at P=0.05 and P=0.01, respectively.

Table 14. Correlation among all environments for deoxynivalenol accumulation.

	Park River	Osnabrock	Crookston	Fargo	Langdon	St. Paul	Crookston
Park River	1.00						
Osnabrock	0.36	1.00					
Crookston	0.62**	0.34	1.00				
Fargo	0.74**	0.34	0.76**	1.00			
Langdon	0.60**	0.49*	0.64**	0.84**	1.00		
St. Paul	0.65**	0.43*	0.68**	0.77**	0.72**	1.00	
Crookston	0.58**	0.43*	0.66**	0.86**	0.80**	0.72**	1.00

*,** r-values significantly different from 0 at P=0.05 and P=0.01, respectively.

Table 15. Correlation among dryland environments for deoxynivalenol accumulation.

	Park River	Osnabrock	Crookston
Park River	1.00		
Osnabrock	0.36	1.00	
Crookston	0.62**	0.34	1.00

*,** r-values significantly different from 0 at P=0.05 and P=0.01, respectively.

Table 16. Correlation among irrigated environments for deoxynivalenol accumulation.

	Fargo	Langdon	St. Paul	Crookston
Fargo	1.00			
Langdon	0.84**	1.00		
St. Paul	0.77**	0.72**	1.00	
Crookston	0.86**	0.80**	0.72**	1.00

*,** r-values significantly different from 0 at P=0.05 and P=0.01, respectively.

Table 17. Correlation among mean deoxynivalenol accumulation between dryland vs irrigated environments.

	Dryland	Irrigated
Dryland	1.00	
Irrigated	0.76**	1.00

*,** r-values significantly different from 0 at P=0.05 and P=0.01, respectively.