

2006

**NORTH AMERICAN BARLEY SCAB EVALUATION
NURSERY (NABSEN) INTERIM REPORT**

December 2006

Stephen Neate* and Patrick Gross

Dept Plant Pathology North Dakota State University

***address all enquiries regarding this report to Stephen Neate, address enclosed**

Collaborating Scientists

<p>Richard D. Horsley Professor & Barley Breeder Department of Plant Sciences North Dakota State University P.O. Box 5051 Fargo, ND 58105-5051, U.S.A. Phone: (701) 231-8142 Fax: (701) 231-8474 Email: Richard.Horsley@ndsu.nodak.edu</p>	<p>Flavio Capettini Head, Barley Breeding, ICARDA/CIMMYT Latin Am. Program Apartado Postal 6-641 06600 Mexico D.F., Mexico Phone: + 52 595 952-1900, + 52 55 5804-2004 Fax: +52 595 952-1983/84 Phone via USA (IVDN): + 1 650 833-6655 Email: f.capettini@cgiar.org</p>
<p>Stephen Neate Associate Professor Department of Plant Pathology North Dakota State University P.O. Box 5012 Fargo ND 58105-5012 Phone: 1 701 231-7078 Fax: 1 701 231-7851</p>	<p>James Tucker Agriculture & Agri-Food Canada Research Centre P.O. Box 1000A, R.R. #3 Brandon, Manitoba R7A 5Y3 Canada Phone: (204)726-7650 Fax: (204)728-3858 Email: JTucker@AGR.GC.CA</p>
<p>Bill Legge Agriculture & Agri-Food Canada Research Centre P.O. Box 1000A, R.R. #3 Brandon, Manitoba R7A 5Y3 Canada Phone: (204)726-7650 Fax: (204)728-3858 Email: blegge@em.agr.ca</p>	<p>Ruth Dill-Macky Associate Professor Department of Plant Pathology University of Minnesota St Paul MN 55108 Phone: 612-625-2227 Fax: 612-625-9728 Email: ruthdm@umn.edu</p>
<p>Kevin P. Smith Assistant Professor Department of Agronomy and Plant Genetics University of Minnesota St. Paul, MN 55108 phone 612-624-1211 fax 612-625-1268 email: smith376@tc.umn.edu</p>	<p>Linnea G. Skoglund Cereal Pathology Manager Busch Agricultural Resources, Inc. 3515 East County Road 52 Fort Collins, CO 80524 Phone: (970) 472-2332 Fax: (970) 472-2334 Email: Linnea.Skoglund@anheuser-busch.com</p>
<p>Blake Cooper Sr. Manager North American Barley Research Busch-Agricultural Resources Inc. (BARI) 3515 E. County Rd. 52 Ft. Collins, CO 80524 Phone: (970) 472-2327 Fax: (970) 472-2334 email: blake.cooper@anheuser-busch.com</p>	

INTRODUCTION

The 2006 North American Barley Scab Evaluation Nursery (NABSEN) was grown at Fargo, Langdon, Osnabrock and Bottineau, ND; St. Paul and Crookston MN, Brandon, Manitoba and El Batán, Mexico. Nurseries were either irrigated or unirrigated (dryland). Dryland nurseries provide conditions similar to those found in commercial fields. Disease in irrigated fields are more severe than growers would observe in most years and entries with only moderate FHB resistance have high disease levels. Only entries with higher levels of resistance similar to Chevron or CIho 4196 are scored as resistant in the irrigated nurseries. Dryland nurseries allow discrimination of entries with moderate to low levels of FHB resistance. 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). At all locations 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.

Site details are as follows;

FARGO, ND – Stephen Neate, Patrick Gross and Sun Yongliang

- Irrigated
- Inoculated by grain spawn method
- 3 Replicates
- Disease severity - percentage of infected kernels
- Disease incidence - percentage of infected heads
- DON content (ppm) measured by GC/ECD by P Schwarz, NDSU on a composite sample of 3 replicates

LANGDON, ND - - Stephen Neate, Patrick Gross and Sun Yongliang

- Irrigated
- Inoculated by grain spawn method
- 3 Replicates
- Disease severity - percentage of infected kernels
- Disease incidence - percentage of infected heads
- DON content (ppm) measured by GC/ECD by P Schwarz, NDSU on a composite sample of 3 replicates

OSNABROCK, ND – Richard Horsley

- Dryland
- Inoculated by grain spawn method
- 3 Replicates

BOTTINEAU, ND - Linnea Skoglund

- Dryland
- **Wireworm damage no data**

ST. PAUL, MN– Kevin Smith and Ruth Dill-Macky

- Irrigated
- Inoculated by spore spray method
- Disease severity - percentage of infected kernels
- DON content (ppm) measured by GC/ECD by P Schwarz, NDSU on a composite sample of 3 replicates

CROOKSTON, MN – Kevin Smith and Ruth Dill-Macky

- Separate Irrigated and Dryland trails
- Inoculated by spore spray method
- Disease severity - percentage of infected kernels (**NO DATA Dryland**)
- DON content (ppm) measured by GC/ECD by P Schwarz, NDSU on a composite sample of 3 replicates

BRANDON, MANITOBA - Bill Legge and James Tucker

- Irrigated
- 4 replicates RCB design
- Disease measurement: Percentage of infected seed per head
- DON content (ppm) measured by ELISA technique at ECORC, Ottawa on a composite sample of 4 replicates

El Batán, MEXICO – Flavio Capettini

- Irrigated
- 2 replicates
- Inoculated
- Disease measurement: Percentage of infected seed per head
- Disease measurement - Spread in the head
- DON content (ppm) to be measured by ELISA technique at CIMMYT

Table 1. Mean FHB severity of entries grown in the 2006 NABSEN Nursery at six locations.

Label	Fargo	Langdon	Brandon	St. Paul	Crookston		Type I		Type II	
					irrigated	El Batán	Avg	El Batán		
6B99-6774	2.5	9.7	19.4	1.3	8.3	4.2	8.6	18.2		
6B01-2157	3.7	6.5	12.7	3.3	4.3	3.0	6.0	10.4		
6B02-3306	1.8	10.5	9.5	2.2	6.1	3.9	6.5	8.9		
6B02-3316	1.7	9.6	8.8	1.7	4.0	3.9	5.6	18.1		
6B02-3338	2.2	5.8	8.1	2.0	1.5	3.9	4.2	7.0		
6B02-3496	2.5	8.2	8.0	2.7	5.3	4.7	5.8	7.9		
6B03-4105	1.4	10.6	7.8	1.3	3.5	5.0	5.6	2.7		
6B03-4371	0.7	6.5	15.6	1.6	3.9	10.8	7.7	21.7		
M122 (FEG65-02)	1.5	8.6	2.5	0.5	2.3	9.4	4.6	10.1		
M123 (FEG73-13)	2.4	13.0	5.8	2.0	4.3	5.8	6.2	5.2		
M127 (FEG86-51)	2.6	8.9	4.3	1.5	6.1	8.3	5.8	10.2		
M128 (FEG90-31)	1.6	9.1	2.9	1.7	3.6	2.3	3.9	11.3		
M129 (FEG96-55)	2.3	7.0	7.5	0.9	6.7	11.8	6.8	8.8		
FEG100-44	1.4	9.2	6.5	1.9	3.6	2.2	4.7	11.9		
FEG100-47	1.9	8.8	11.2	2.2	7.3	2.2	6.3	7.0		
FEG104-63	1.6	7.8	8.9	2.0	4.2	3.3	5.3	15.5		
Shenmai 3	2.2	3.5	3.6	1.8	6.5	12.5	5.6	8.3		
2ND21863-2	1.2	9.2	8.6	5.0	6.2	5.5	6.9	12.0		
2ND21867	3.8	10.0	4.1	3.5	4.5	15.7	7.6	10.4		
2ND22895	1.7	5.0	6.7	2.6	2.8	9.3	5.3	14.1		
2ND22927	1.6	5.4	5.8	1.9	9.0	7.1	5.9	14.3		
2ND22996	3.7	5.4	5.7	3.9	2.0	4.1	4.2	20.0		
2ND24186	2.0	5.9	12.3	4.4	8.2	12.8	8.7	16.7		
2ND224506	3.1	27.2	17.0	2.4	4.3	10.5	12.3	19.2		
SM04175	6.0	10.0	14.0	4.9	5.6	5.7	8.0	9.5		
SB041066	3.0	15.4	8.6	2.4	2.7	8.1	7.5	26.4		
SB040207	2.9	6.7	7.1	1.6	1.2	6.7	4.6	22.9		
CDC Kendall	1.2	4.8	7.0	1.3	6.2	4.2	4.7	12.7		
TR05915	1.4	5.5	11.7	2.3	6.0	5.1	6.1	22.1		

Table 1. cont. Mean FHB severity of entries grown in the 2006 NABSEN Nursery at six locations.

Label	Fargo	Langdon	Brandon	St. Paul	Crookston		Type I		Type II	
					irrigated	El Batán	Avg	El Batán		
TR05285	2.1	1.2	3.6	0.8	3.8	8.9	3.7	23.7		
TR05286	1.1	4.8	5.3	0.8	1.9	8.5	4.2	24.8		
TR05288	1.5	9.6	2.8	1.3	1.8	4.7	4.1	17.4		
ND20493	2.0	2.5	3.7	2.6	1.4	4.3	2.9	4.5		
ND20614	1.1	4.6	7.0	1.8	0.6	4.0	3.6	14.0		
ND23409	1.0	7.5	8.0	1.1	2.8	2.3	4.3	14.3		
ND23591	0.9	9.6	9.4	1.3	3.2	3.4	5.4	18.3		
ND23607	0.6	8.2	3.4	0.9	3.9	2.5	3.8	22.2		
ND23611	1.2	6.1	17.5	0.8	3.7	1.9	6.0	23.5		
ND23652	1.3	8.5	6.9	3.3	4.0	10.1	6.6	6.8		
ND23657	0.8	3.8	3.0	1.2	1.2	20.0	5.8	19.2		
(06IC-1)	1.6	8.5	12.2	1.8	11.0	5.5	7.8	16.3		
(06IC-2)	2.7	6.4	10.4	9.7	4.3	16.5	9.5	7.5		
(06IC-3)	5.1	37.0	14.3	4.7	12.7	10.0	15.7	12.3		
06IC-4)	1.1	11.3	21.3	1.6	28.7	35.9	19.8	17.1		
(06IC-5)	4.2	15.5	17.1	14.4	5.8	19.4	14.4	11.5		
(06IC-6)	1.9	10.4	12.1	3.8	12.3	11.8	10.1	15.2		
(06IC-7)	2.2	13.7	42.4	5.2	11.6	29.6	20.5	18.8		
(06IC-8)	4.8	37.8	27.2	2.5	30.7	1.3	19.9	6.9		
MnBrite	2.2	9.9	8.1	1.4	1.1	2.2	4.5	7.7		
Conlon	1.7	8.6	1.9	3.4	2.7	21.1	7.5	19.4		
Robust	1.9	10.2	7.0	2.4	10.2	4.2	6.8	12.8		
CIHO 4196	0.4	2.0	9.6	0.3	0.5	6.0	3.7	-		
Chevron	0.3	5.4	3.1	0.3	1.5	4.0	2.9	17.5		
Stander	2.5	28.3	11.8	6.7	7.8	2.5	11.4	16.8		

Table 2. Mean disease incidence of entries grown in the 2006 NABSEN Nursery at four locations.

Label	Fargo	Langdon	Brandon	Type I		Type II
				El Batán	Avg	El Batán
6B99-6774	51.9	93.3	97.5	77.8	80.1	100
6B01-2157	77.8	96.7	87.5	68.8	82.7	100
6B02-3306	48.2	93.3	87.5	52.1	70.3	100
6B02-3316	63	96.7	87.5	54.0	75.3	95
6B02-3338	51.9	90	77.5	100.0	79.9	100
6B02-3496	70.4	100	85.0	95.0	87.6	100
6B03-4105	48.2	83.3	85.0	50.0	66.6	100
6B03-4371	33.3	93.3	92.5	100.0	79.8	100
M122 (FEG65-02)	55.6	96.7	57.5	100.0	77.5	100
M123 (FEG73-13)	63	96.7	82.5	100.0	85.6	100
M127 (FEG86-51)	59	90	72.5	100.0	80.4	100
M128 (FEG90-31)	66.7	86.7	60.0	75.0	72.1	100
M129 (FEG96-55)	74.1	96.7	82.5	94.4	86.9	100
FEG100-44	51.9	100	85.0	62.2	74.8	100
FEG100-47	66.7	90	93.3	75.0	81.3	100
FEG104-63	44.4	93.3	77.5	50.0	66.3	100
Shenmai 3	51.9	63.3	50.0	100.0	66.3	100
2ND21863-2	37	90	77.5	72.8	69.3	100
2ND21867	55.6	93.3	60.0	100.0	77.2	100
2ND22895	33.3	73.3	72.5	83.3	65.6	100
2ND22927	22.2	63.3	65.0	100.0	62.6	100
2ND22996	55.6	86.7	70.0	31.7	61.0	100
2ND24186	37	83.3	87.5	100.0	77.0	100
2ND224506	48.2	90	92.5	90.0	80.2	100
SM04175	92.6	100	87.5	95.0	93.8	100
SB041066	63	73.3	80.0	78.9	73.8	100
SB040207	48.2	66.7	80.0	100.0	73.7	100
CDC Kendall	18.5	80	57.5	78.9	58.7	100

Table 2. cont. Mean disease incidence of entries grown in the 2006 NABSEN Nursery at four locations.

Label	Fargo	Langdon	Brandon	Type I		Type II
				El Batán	Avg	El Batán
TR05915	33.3	80	82.5	55.6	62.8	100
TR05285	37	60	65.0	100.0	65.5	100
TR05286	22.2	60	67.5	95.0	61.2	100
TR05288	40.7	80	45.0	72.2	59.5	100
ND20493	40.7	86.7	65.0	72.2	66.2	87.5
ND20614	37	90	80.0	57.5	66.1	100
ND23409	37	86.7	92.5	90.0	76.6	94.4
ND23591	33.3	100	85.0	87.5	76.5	100
ND23607	33.3	100	70.0	39.6	60.7	100
ND23611	44.4	100	95.0	60.0	74.9	100
ND23652	40.7	96.7	90.0	93.8	80.3	100
ND23657	25.9	83.3	55.0	100.0	66.1	100
(06IC-1)	59	86.7	100.0	81.3	81.7	100
(06IC-2)	48.2	86.7	85.0	78.6	74.6	95
(06IC-3)	66.7	83.3	90.0	95.0	83.8	100
06IC-4)	40.7	86.7	92.5	100.0	80.0	100
(06IC-5)	70.4	100	82.5	100.0	88.2	100
(06IC-6)	40.7	90	87.5	100.0	79.6	100
(06IC-7)	51.9	100	100.0	100.0	88.0	100
(06IC-8)	44.4	93.3	100.0	32.2	67.5	100
MnBrite	55.6	93.3	85.0	83.3	79.3	100
Conlon	29.6	83.3	32.5	100.0	61.4	100
Robust	63	100	85.0	56.3	76.1	100
CIHO 4196	11.1	36.7	90.0	100.0	59.5	-----
Chevron	11.1	53.3	52.5	90.0	51.7	100
Stander	66.7	100	90.0	66.7	80.8	100

Table 3. Mean days to heading after planting of entries grown in 2006 NABSEN Nursery at five locations.

Label	Fargo	Langdon	Brandon	St. Paul	Crookston	
					irrigated	Avg.
6B99-6774	57.0	54.3	54.0	55.3	49.0	53.9
6B01-2157	56.0	53.3	52.8	53.0	47.0	52.4
6B02-3306	55.0	53.7	53.0	52.7	46.7	52.2
6B02-3316	57.0	55.0	53.0	52.7	46.7	52.9
6B02-3338	53.7	53.0	51.8	53.0	46.3	51.6
6B02-3496	57.3	54.0	55.0	54.0	48.0	53.7
6B03-4105	54.7	51.3	51.0	53.0	45.7	51.1
6B03-4371	57.3	53.0	52.0	53.0	45.7	52.2
M122 (FEG65-02)	54.0	55.3	52.5	53.0	46.3	52.2
M123 (FEG73-13)	55.3	52.0	51.0	52.7	46.3	51.5
M127 (FEG86-51)	56.0	53.3	52.0	52.3	46.3	52.0
M128 (FEG90-31)	56.0	55.7	53.3	53.7	47.3	53.2
M129 (FEG96-55)	55.3	54.3	53.0	53.0	46.7	52.5
FEG100-44	56.0	53.3	53.3	53.3	47.3	52.7
FEG100-47	56.7	55.3	54.3	53.0	47.7	53.4
FEG104-63	57.3	56.7	52.8	52.7	47.3	53.4
Shenmai 3	49.0	48.0	42.8	50.0	45.3	47.0
2ND21863-2	57.0	53.0	54.0	53.3	48.0	53.1
2ND21867	54.0	51.7	53.5	52.3	45.3	51.4
2ND22895	54.7	53.0	54.8	53.0	45.7	52.2
2ND22927	54.7	52.7	54.0	53.0	48.0	52.5
2ND22996	56.0	52.0	52.8	54.0	47.7	52.5
2ND24186	52.7	51.0	51.3	52.3	45.7	50.6
2ND224506	60.0	57.0	53.8	54.3	50.0	55.0
SM04175	54.3	54.0	51.3	52.7	47.3	51.9
SB041066	54.0	54.0	52.5	54.0	49.7	52.8
SB040207	54.7	54.0	56.3	54.3	48.3	53.5
CDC Kendall	60.3	57.0	53.5	59.0	50.0	56.0

Table 3. cont. Mean days to heading after planting of entries grown in 2006 NABSEN Nursery at five locations.

Label	Crookston					Avg.
	Fargo	Langdon	Brandon	St. Paul	irrigated	
TR05915	59.7	57.0	55.0	58.0	51.0	56.1
TR05285	58.3	56.3	55.0	57.7	50.3	55.5
TR05286	60.0	59.7	56.3	59.3	51.7	57.4
TR05288	60.3	58.3	53.8	58.7	51.3	56.5
ND20493	52.0	50.7	46.0	51.3	44.0	48.8
ND20614	55.7	54.0	52.8	53.0	46.7	52.4
ND23409	53.7	54.3	49.8	55.0	47.0	52.0
ND23591	59.3	55.3	54.0	57.3	49.7	55.1
ND23607	59.3	56.3	55.0	57.7	50.7	55.8
ND23611	59.0	55.3	52.0	57.3	49.7	54.7
ND23652	53.7	55.0	49.5	52.3	44.3	51.0
ND23657	52.7	53.7	47.5	51.3	43.3	49.7
(06IC-1)	59.3	58.3	56.3	61.0	51.0	57.2
(06IC-2)	58.7	55.0	52.5	54.3	50.0	54.1
(06IC-3)	59.7	57.0	54.0	60.0	52.0	56.5
(06IC-4)	59.7	56.3	52.5	57.7	50.0	55.2
(06IC-5)	57.3	56.0	54.0	54.7	48.0	54.0
(06IC-6)	58.3	57.0	53.3	56.7	49.0	54.9
(06IC-7)	57.7	54.3	54.0	53.0	52.0	54.2
(06IC-8)	59.3	59.3	55.7	57.0	51.0	56.5
MnBrite	58.7	56.0	54.5	53.0	47.3	53.9
Conlon	51.0	49.0	43.0	51.7	44.3	47.8
Robust	57.7	54.3	55.3	53.0	46.7	53.4
CIHO 4196	62.3	59.7	58.3	61.0	57.3	59.7
Chevron	59.3	57.0	55.5	59.0	50.7	56.3
Stander	57.3	54.7	54.0	52.3	46.3	52.9

Table 4. Mean for DON entries grown in 2006 NABSEN Nursery at five locations.

Label	Fargo	Langdon	Brandon	St. Paul	Crookston	Avg.
					irrigated	
6B99-6774	5.7	51.7	13.4	3.1	26.4	20.1
6B01-2157	5.5	48.0	10.1	3.7	17.3	16.9
6B02-3306	2.1	30.0	8.6	2.8	11.8	11.1
6B02-3316	4.2	39.2	5.1	2.9	9.6	12.2
6B02-3338	1.5	40.4	6.9	2.5	7.3	11.7
6B02-3496	6.5	39.1	8.2	2.6	10.3	13.4
6B03-4105	2.6	45.0	5.1	2.7	6.3	12.3
6B03-4371	1.4	43.9	8.6	3.8	11.9	13.9
M122 (FEG65-02)	1.9	34.5	5.8	2.2	8.5	10.6
M123 (FEG73-13)	3.1	53.5	5.1	3.1	10.5	15.1
M127 (FEG86-51)	7.3	68.1	9.4	4.1	9.9	19.8
M128 (FEG90-31)	2.6	45.1	5.3	2.6	6.5	12.4
M129 (FEG96-55)	6.4	32.0	6.2	4.9	9.2	11.7
FEG100-44	3.8	45.7	8.2	3.0	7.9	13.7
FEG100-47	4.3	45.5	10.9	4.9	11.7	15.5
FEG104-63	3.5	48.4	5.9	3.4	13.7	15.0
Shenmai 3	3.1	22.2	3.6	3.6	11.7	8.8
2ND21863-2	3.7	33.5	5.8	2.8	7.0	10.6
2ND21867	3.1	31.2	4.8	1.8	6.9	9.6
2ND22895	3.9	33.2	3.5	2.9	8.3	10.4
2ND22927	4.4	23.0	4.6	2.5	6.0	8.1
2ND22996	6.3	34.8	4.7	1.6	4.6	10.4
2ND24186	4.6	46.1	6.4	4.8	6.9	13.8
2ND224506	3.9	49.8	8.9	1.1	5.7	13.9
SM04175	4.6	59.4	12.1	6.0	13.9	19.2
SB041066	2.9	42.7	6.2	2.1	3.4	11.4
SB040207	4.1	23.7	4.2	0.8	3.7	7.3
CDC Kendall	4.2	41.8	6.5	0.3	6.4	11.8

Table 4. cont. Mean for DON entries grown in 2006 NABSEN Nursery at five locations.

Label	Fargo	Langdon	Brandon	St. Paul	Crookston	Avg.
					irrigated	
TR05915	7.3	39.5	5.3	0.1	5.5	11.5
TR05285	2.2	25.3	4.5	0.2	4.1	7.2
TR05286	2.1	15.8	4.9	0.3	4.5	5.5
TR05288	4.3	27.2	6.6	0.2	5.5	8.8
ND20493	2.4	33.5	2.2	3.4	6.2	9.5
ND20614	1.7	48.4	6.4	2.5	7.0	13.2
ND23409	1.7	47.6	7.0	2.4	10.0	13.7
ND23591	3.0	48.7	7.3	1.0	14.9	15.0
ND23607	7.3	40.8	16.6	0.6	11.7	15.4
ND23611	6.8	58.0	10.1	0.5	13.3	17.8
ND23652	1.6	42.4	5.3	2.8	12.5	12.9
ND23657	0.6	35.9	3.5	2.7	6.0	9.7
(06IC-1)	2.5	23.0	13.5	0.3	4.9	8.8
(06IC-2)	2.6	38.1	6.6	3.9	5.3	11.3
(06IC-3)	7.5	79.7	15.8	1.5	23.0	25.5
(06IC-4)	1.9	64.9	18.9	0.9	27.7	22.9
(06IC-5)	4.5	73.0	12.6	2.5	7.7	20.0
(06IC-6)	3.6	43.1	9.1	0.4	7.8	12.8
(06IC-7)	5.2	57.9	9.1	3.1	22.6	19.6
(06IC-8)	3.3	33.5	7.0	0.3	10.4	10.9
MnBrite	3.7	47.1	12.9	1.9	9.1	14.9
Conlon	1.8	42.1	1.2	1.0	3.7	10.0
Robust	3.4	43.5	11.2	3.8	8.9	14.1
CIHO 4196	5.8	27.7	10.1	0.1	4.6	9.7
Chevron	0.2	15.2	1.8	0.0	1.9	3.8
Stander	7.1	67.9	15.3	7.5	16.5	22.9

Table 5. Average means of Heading date, FHB Incidence, FHB severity and DON content.

Label	Days to Head Avg.	FHB Incidence Avg	FHB % Avg	Don (ppm) Avg.
6B99-6774	53.9	80.1	8.6	20.1
6B01-2157	52.4	82.7	6.0	16.9
6B02-3306	52.2	70.3	6.5	11.1
6B02-3316	52.9	75.3	5.6	12.2
6B02-3338	51.6	79.9	4.2	11.7
6B02-3496	53.7	87.6	5.8	13.4
6B03-4105	51.1	66.6	5.6	12.3
6B03-4371	52.2	79.8	7.7	13.9
M122 (FEG65-02)	52.2	77.5	4.6	10.6
M123 (FEG73-13)	51.5	85.6	6.2	15.1
M127 (FEG86-51)	52.0	80.4	5.8	19.8
M128 (FEG90-31)	53.2	72.1	3.9	12.4
M129 (FEG96-55)	52.5	86.9	6.8	11.7
FEG100-44	52.7	74.8	4.7	13.7
FEG100-47	53.4	81.3	6.3	15.5
FEG104-63	53.4	66.3	5.3	15.0
Shenmai 3	47.0	66.3	5.6	8.8
2ND21863-2	53.1	69.3	6.9	10.6
2ND21867	51.4	77.2	7.6	9.6
2ND22895	52.2	65.6	5.3	10.4
2ND22927	52.5	62.6	5.9	8.1
2ND22996	52.5	61.0	4.2	10.4
2ND24186	50.6	77.0	8.7	13.8
2ND224506	55.0	80.2	12.3	13.9
SM04175	51.9	93.8	8.0	19.2
SB041066	52.8	73.8	7.5	11.4
SB040207	53.5	73.7	4.6	7.3
CDC Kendall	56.0	58.7	4.7	11.8

Table 5. cont. Average means of Heading date, FHB Incidence, FHB severity and DON content.

Label	Days to Head ¹ Avg.	FHB Incidence ² Avg	FHB % ³ Avg	Don (ppm) ⁴ Avg.
TR05915	56.1	62.8	6.1	11.5
TR05285	55.5	65.5	3.7	7.2
TR05286	57.4	61.2	4.2	5.5
TR05288	56.5	59.5	4.1	8.8
ND20493	48.8	66.2	2.9	9.5
ND20614	52.4	66.1	3.6	13.2
ND23409	52.0	76.6	4.3	13.7
ND23591	55.1	76.5	5.4	15.0
ND23607	55.8	60.7	3.8	15.4
ND23611	54.7	74.9	6.0	17.8
ND23652	51.0	80.3	6.6	12.9
ND23657	49.7	66.1	5.8	9.7
(06IC-1)	57.2	81.7	7.8	8.8
(06IC-2)	54.1	74.6	9.5	11.3
(06IC-3)	56.5	83.8	15.7	25.5
06IC-4)	55.2	80.0	19.8	22.9
(06IC-5)	54.0	88.2	14.4	20.0
(06IC-6)	54.9	79.6	10.1	12.8
(06IC-7)	54.2	88.0	20.5	19.6
(06IC-8)	56.5	67.5	19.9	10.9
MnBrite	53.9	79.3	4.5	14.9
Conlon	47.8	61.4	7.5	10.0
Robust	53.4	76.1	6.8	14.1
CIHO 4196	59.7	59.5	3.7	9.7
Chevron	56.3	51.7	2.9	3.8
Stander	52.9	80.8	11.4	22.9

¹ Heading data from date of planting to 50% of heads 50% emerged at five locations.

² FHB incidence means at four locations.

³ FHB severity means at six locations.

⁴ DON content means at five locations.

Table 6. Correlation among locations for FHB severity in 2006.

	Fargo	Langdon	Brandon	St. Paul	Crookston	
					irrigated	El Batán
Fargo	1	0.54**	0.30*	0.50**	0.28*	0.03
Langdon	0.54**	1	0.45*	0.35*	0.53**	-0.02
Brandon	0.30*	0.45*	1	0.31*	0.60**	0.35*
St. Paul	0.50**	0.35*	0.31	1	0.13	0.30*
Crookston-irrigated	0.28*	0.53**	0.60**	0.13	1	0.33*
El Batán	0.031**	-0.02	0.35*	0.29*	0.33*	1

*,** r-values significantly different from 0.0 at P<0.05 and P<0.01, respectively

Table 7. Correlation among locations for Don (ppm) in 2006.

	Fargo	Langdon	St. Paul	Crookston	
				irrigated	Brandon
Fargo	1	0.39*	0.15	0.30*	0.43*
Langdon	0.39*	1	0.37*	0.62**	0.61**
St. Paul	0.15	0.37*	1	0.28*	0.12
Crookston-irrigated	0.30*	0.62**	0.28*	1	0.64**
Brandon	0.44*	0.61**	0.12	0.64**	1.0

*,** r-values significantly different from 0.0 at P<0.05 and P<0.01, respectively

Table 8. Temperature compared to the 30-year average.

	May	June	July	August
Fargo	+1.1° F	+2.3° F	+4.4° F	+1.0° F
Langdon	+1.4° F	+3.0° F	+4.6° F	+2.4° F
Crookston	+0.6° F	+1.6° F	+3.4° F	+0.6° F
St. Paul	+2.0° F	+1.0° F	+4.8° F	+0.9° F
Brandon	na	+0.6° F	+2.8° F	+2.9° F

Table 9. Rainfall compared to the 30-year average.

	May	June	July	August
Fargo	-0.7 in.	-2.5 in.	-2.7 in.	0.0 in.
Langdon	-1.1 in.	-1.9 in.	-1.1 in.	0.9 in.
Crookston	0.1 in.	-2.5 in.	-2.0 in.	0.6 in.
St. Paul	-0.6 in.	-0.7 in.	-2.0 in.	4.2 in.
Brandon	na	0.4 in.	-2.2 in.	0.2 in.

Table 10. Pedigree and source of breeding lines tested for FHB resistance in 2006.

Entry	Label	Pedigree	Contributor
1	6B99-6774	LEGACY / 6B94-7862	Busch Ag.
2	6B01-2157	LEGACY / 6B94-7544	Busch Ag.
3	6B02-3306	6B95-2209 / 6B96-3733	Busch Ag.
4	6B02-3316	TRADITION // B8253 / 6B96-3753	Busch Ag.
5	6B02-3338	TRADITION // LEGACY / ND17234	Busch Ag.
6	6B02-3496	LEGACY // LEGACY / 6B95-2089	Busch Ag.
7	6B03-4105	6B97-2195 // LEGACY / 6B97-2311	Busch Ag.
8	6B03-4371	6B98-9032 / 6B97-2311	Busch Ag.
9	M122 (FEG65-02)	FEG18-20 / M110	University of Minnesota
10	M123 (FEG73-13)	FEG39-03 / Lacey	University of Minnesota
11	M127 (FEG86-51)	FEG39-66 / M97-16	University of Minnesota
12	M128 (FEG90-31)	FEG26-50 / FEG18-27	University of Minnesota
13	M129 (FEG96-55)	FEG59-09 / M110	University of Minnesota
14	FEG100-44	M96-203 / FEG55-14	University of Minnesota
15	FEG100-47	M96-203 / FEG55-14	University of Minnesota
16	FEG104-63	M116 / FEG55-04	University of Minnesota
17	Shenmai 3	Gobernadora/Humai 10	North Dak. State Univ./Franckowiak
18	2ND21863-2	ND18172/ND19130	North Dak. State Univ./Franckowiak
19	2ND21867	ND18172/ND19130	North Dak. State Univ./Franckowiak
20	2ND22895	ND18370/ND1919-1	North Dak. State Univ./Franckowiak
21	2ND22927	ND19119-1/ND19931	North Dak. State Univ./Franckowiak
22	2ND22996	ND19922/ND18172-1	North Dak. State Univ./Franckowiak
23	2ND24186	ND19130/ND19119-5	North Dak. State Univ./Franckowiak
24	2ND224506	ND19119-5//ND21059/ND19929-7	North Dak. State Univ./Franckowiak
25	SM04175	SM99748/SM99153	AAFC-Brandon
26	SB041066	KXN/TLN-154/TR357	AAFC-Brandon
27	SB040207	CDC Trey/Rivers	AAFC-Brandon
28	CDC Kendall	Manley/SM85221	AAFC-Brandon

Table 10. cont. Pedigree and source of breeding lines tested for FHB resistance in 2006.

Entry	Label	Pedigree	Contributor
29	TR05915	CDC Kendall Selection	AAFC-Brandon
30	TR05285	Harbin/TR253//TR253	AAFC-Brandon
31	TR05286	Harbin/TR253//TR253	AAFC-Brandon
32	TR05288	CDC Select/Newdale	AAFC-Brandon
33	ND20493	ND16918*2//CIHO6611	NDSU./Horsley
34	ND20614	Drummond/C98-3-47-1	NDSU./Horsley
35	ND23409	ND18546/ND20380	NDSU./Horsley
36	ND23591	ND18546/ND19277	NDSU./Horsley
37	ND23607	ND18546/ND20512	NDSU./Horsley
38	ND23611	ND18546/ND20525	NDSU./Horsley
39	ND23652	ND18546/ND20469	NDSU./Horsley
40	ND23657	ND18546/ND20493	NDSU./Horsley
41	(06IC-1)PENCO/CHEVRON		ICARDA/CIMMYT
42	(06IC-2)CBSS01Y00600T-A-0Y-2M-0M-1Y-0M	LEO-B//BOWMAN*6/TRIUMPH-BAR/3/AZAF	ICARDA/CIMMYT
43	(06IC-3)CBSS01Y00620T-C-0Y-7M-0M-1Y-0M	ZHEDAR#1//SHYRI//OLMO/3//CLDL/4//ATAH92//GOB	ICARDA/CIMMYT
44	(06IC-4)CBSS00M00539T-0TOPY-10M-1Y-1M-0M-0Y	CIRU/3//CHAMICO//TOCTE//CONGONA/4//PENCO/CHEVRON-BAR	ICARDA/CIMMYT
45	(06IC-5)CBSS00B00035S-9M-2Y-1M-0M-0Y	SHYRI//GRIT/3//CANELA//GOB/HUMAI10 MELUSINE/ALELI/3//MATICO/JET//SHYRI/4//CANELA/5//GOB96DH//GOB/HUMAI10	ICARDA/CIMMYT
46	(06IC-6)CBSS00B00127S-15M-1Y-1M-0M-0Y	/3//ALELI	ICARDA/CIMMYT
47	(06IC-7)CBSS00B00202S-85GH-2M-1Y-2FGR-7Y-0M	LEGACY//PENCO/CHEVRON-BAR	ICARDA/CIMMYT
48	(06IC-8)CBSS00B00201S-60GH-1M-2Y-1FGR-9Y-0M	LEGACY/4//TOCTE//GOB/HUMAI10/3//ATAH92//ALELI	ICARDA/CIMMYT
49	MnBrite	M90-89/M69	Check
50	Conlon	BOWMAN*2//DWS1008/ND10232	Check
51	Robust	MOREX/MANKER	Check
52	CIHO 4196	UNKNOWN	Check
53	Chevron	UNKNOWN	Check
54	Stander	ROBUST*2/3//CREE//BONANZA//MANKER/4//ROBUST//BUMBER	Check