2009

NORTH AMERICAN BARLEY SCAB EVALUATION NURSERY (NABSEN) REPORT

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INTRODUCTION

The 2009 North American Barley Scab Evaluation Nursery (NABSEN) was grown at Fargo, Langdon, and Casselton, ND; St. Paul and Crookston MN, and Brandon, Manitoba. Nurseries were either misted or unmisted (dryland). Dryland nurseries provide conditions similar to those found in commercial fields. Disease in misted fields is more severe than growers would observe in most years and entries with only moderate FHB resistance may have higher disease levels. Only entries with higher levels of resistance similar to Chevron or CIho 4196 are scored as resistant in the misted 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 to middle dough stage by determining the ratio of infected kernels to total kernels on 10-20 spikes per entry, and then multiplying by 100.

Disease levels in 2009 were relatively low in Fargo and Casselton locations (table 1.) due to low temperatures and less rainfall (table 6.) in July which led to lower Relative Humidly. Disease levels were highest at Langdon and Brandon Manitoba. DON levels were high at Langdon and Brandon (table 4).
Site details are as follows;

FARGO, ND – Patrick Gross

- Misted
- 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
- Day to heading counted from date planted to 50% of heads emerged 50%

LANGDON, ND – Patrick Gross

- Misted
- 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
- Day to heading counted from date planted to 50% of heads emerged 50%

Casselton, ND – Richard Horsley

- Dryland
- 3 Replicates
- DON content (ppm) measured by GC/ECD by P. Schwarz, NDSU on a composite sample of 3 replicates

Casselton, ND – Jolanta Menert

- Dryland
- 1 replicate
- Inoculated by grain spawn method
- DON content (ppm) measured by GC/ECD by P. Schwarz, NDSU on a composite sample of 1 replicate

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

- Misted
- No data

CROOKSTON, MN – Kevin Smith and Ruth Dill-Macky

- Separate Misted and Dryland trails
- Inoculated by spore spray method
- 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

BRANDON, MANITOBA - Bill Legge and James Tucker

- Misted
- 4 replicates RCB design
- Disease severity - percentage of infected kernels
- Disease incidence - percentage of infected heads
- DON content (ppm) measured by ELISA technique at ECORC, Ottawa on a composite sample of 4 replicates

Table 1. Mean FHB severity of entries grown in the 2009 NABSEN Nursery at four locations.

Label	Langdon	Fargo	Crookston misted	Brandon	Mean
ND20448	13.6	1.6	2.8	3.2	**5.3**
ND22421	17.2	13.0	7.5	13.4	**12.8**
ND23422	16.6	1.6	5.4	6.8	**7.6**
ND23497	13.2	0.9	3.5	9.2	**6.7**
ND24906	13.4	3.6	4.1	9.7	**7.7**
ND25160	22.4	4.4	6.0	9.6	**10.6**
ND25161	19.1	3.7	9.1	5.6	**9.4**
ND23898	9.9	1.3	3.6	6.9	**5.4**
2ND21867	10.7	1.6	3.7	18.3	**8.5**
2ND24238	18.8	3.0	3.0	11.2	**9.0**
2ND24263	19.2	0.7	3.5	10.9	**8.6**
2ND24388	21.5	1.8	4.2	9.4	**9.2**
2ND25272	33.2	4.2	11.7	17.5	**16.6**
2ND25276	29.2	4.0	4.3	18.4	**14.0**
2ND25361	25.6	1.7	5.8	8.7	**10.5**
2ND25567	18.6	4.5	13.0	18.8	**13.7**
M138 (FEG153-25)	8.3	1.4	1.8	4.3	**3.9**
M139 (FEG153-58)	11.9	1.5	2.0	5.6	**5.2**
M140 (FEG154-47)	11.7	2.5	4.6	5.0	**6.0**
M141 (FEG175-57)	13.0	1.2	4.2	4.3	**5.7**
FEG175-59	10.6	3.2	4.3	5.3	**5.9**
FEG181-09	16.5	1.7	2.7	4.3	**6.3**
FEG183-52	15.3	1.8	4.5	4.0	**6.4**
FEG184-11	9.8	1.8	2.7	2.9	**4.3**
SH060036	13.7	2.3	3.7	5.1	**6.2**
SM060669	16.3	2.5	3.5	8.5	**7.7**
SSP060408	19.8	2.4	3.0	5.2	**7.6**
SM071454	14.1	3.6	2.7	8.5	**7.2**

Table 1.cont. Mean FHB severity of entries grown in the 2009 NABSEN Nursery at four locations.

Label	Langdon	Fargo	Crookston misted	Brandon	**Mean**
BM0270D-152	16.8	0.3	3.0	5.2	**6.3**
BM0270D-192-0	23.8	1.4	3.2	2.8	**7.8**
BMO270DCB-18-0	13.0	0.6	3.3	4.2	**5.3**
BM0331D-5	9.3	3.4	2.7	10.4	**6.4**
H97006017	18.6	1.4	2.2	8.6	**7.7**
H97008004	22.9	2.0	4.2	6.6	**8.9**
H97042002	20.9	0.9	5.3	8.8	**9.0**
H97054003	13.9	2.3	3.8	7.4	**6.8**
6B06-1132	17.3	2.4	9.0	5.1	**8.5**
6B06-1206	18.3	0.8	6.7	6.0	**7.9**
6B06-1429	21.3	2.1	4.3	9.9	**9.4**
6B06-1543	15.7	1.8	7.1	14.0	**9.7**
6B07-1809	9.0	1.5	5.8	4.7	**5.3**
6B07-1825	13.1	1.1	7.2	8.3	**7.5**
6B07-1933	8.2	1.5	2.8	7.4	**5.0**
6B07-2081	11.4	5.4	5.0	11.4	**8.3**
MnBrite	11.3	0.8	3.5	5.4	**5.2**
Conlon	27.9	1.9	6.7	11.4	**12.0**
Robust	14.6	3.7	4.4	9.7	**8.1**
CIHO 4196	1.0	0.4	1.8	7.7	**2.7**
Chevron	1.8	0.0	0.6	1.0	**0.9**
Stander	19.0	3.2	4.8	10.7	**9.4**

Table 2. Mean disease incidence of entries grown in the 2009 NABSEN Nursery at three locations.

Label	Langdon	Fargo	Brandon	**Mean**
ND20448	90.0	66.7	72.5	**76.4**
ND22421	90.0	66.7	87.5	**81.4**
ND23422	100.0	63.3	97.5	**86.9**
ND23497	100.0	33.3	100.0	**77.8**
ND24906	100.0	60.0	90.0	**83.3**
ND25160	100.0	66.7	95.0	**87.2**
ND25161	100.0	50.0	92.5	**80.8**
ND23898	86.7	46.7	95.0	**76.1**
2ND21867	86.7	53.3	100.0	**80.0**
2ND24238	100.0	43.3	87.5	**76.9**
2ND24263	86.7	43.3	80.0	**70.0**
2ND24388	96.7	63.3	80.0	**80.0**
2ND25272	93.3	53.3	100.0	**82.2**
2ND25276	80.0	60.0	100.0	**80.0**
2ND25361	100.0	60.0	80.0	**80.0**
2ND25567	86.7	43.3	97.5	**75.8**
M138 (FEG153-25)	93.3	46.7	80.0	**73.3**
M139 (FEG153-58)	83.3	20.0	77.5	**60.3**
M140 (FEG154-47)	100.0	33.3	82.5	**71.9**
M141 (FEG175-57)	96.7	33.3	75.0	**68.3**
FEG175-59	93.3	30.0	82.5	**68.6**
FEG181-09	100.0	20.0	80.0	**66.7**
FEG183-52	100.0	26.7	67.5	**64.7**
FEG184-11	100.0	6.7	67.5	**58.1**
SH060036	80.0	53.3	70.0	**67.8**
SM060669	90.0	43.3	77.5	**70.3**
SSP060408	93.3	26.7	75.0	**65.0**
SM071454	100.0	20.0	90.0	**70.0**

Table 2. cont. Mean disease incidence of entries grown in the 2009 NABSEN Nursery at three locations.

Label	Langdon	Fargo	Brandon	**Mean**
BM0270D-152	86.7	13.3	55.0	**51.7**
BM0270D-192-0	100.0	16.7	52.5	**56.4**
BMO270DCB-18-0	90.0	43.3	65.0	**66.1**
BM0331D-5	76.7	33.3	85.0	**65.0**
H97006017	86.7	10.0	90.0	**62.2**
H97008004	93.3	40.0	72.5	**68.6**
H97042002	93.3	76.7	77.5	**82.5**
H97054003	93.3	63.3	85.0	**80.6**
6B06-1132	83.3	66.7	82.5	**77.5**
6B06-1206	96.7	36.7	92.5	**75.3**
6B06-1429	100.0	80.0	100.0	**93.3**
6B06-1543	93.3	43.3	100.0	**78.9**
6B07-1809	90.0	83.3	80.0	**84.4**
6B07-1825	93.3	33.3	92.5	**73.1**
6B07-1933	86.7	43.3	90.0	**73.3**
6B07-2081	96.7	50.0	100.0	**82.2**
MnBrite	93.3	66.7	87.5	**82.5**
Conlon	100.0	80.0	85.0	**88.3**
Robust	80.0	43.3	97.5	**73.6**
CIHO 4196	33.3	66.7	75.0	**58.3**
Chevron	73.3	53.3	37.5	**54.7**
Stander	100.0	73.3	100.0	**91.1**

Table 3. Mean days to heading after planting of entries grown in 2009 NABSEN Nursery at four locations.

Label	Langdon	Fargo	Crookston misted	Brandon	**Mean**
ND20448	62	58	52.0	48.8	**55.2**
ND22421	61	56	52.3	49.3	**54.6**
ND23422	63	60	53.0	50.3	**56.6**
ND23497	62	59	52.7	48.8	**55.6**
ND24906	62	58	51.7	48.8	**55.1**
ND25160	61	58	52.3	49.0	**55.1**
ND25161	64	58	52.3	48.8	**55.8**
ND23898	64	59	53.0	48.8	**56.2**
2ND21867	62	59	52.7	50.0	**55.9**
2ND24238	61	60	52.0	50.3	**55.8**
2ND24263	60	61	52.0	51.8	**56.2**
2ND24388	59	63	51.3	50.0	**55.8**
2ND25272	59	58	52.0	51.0	**55.0**
2ND25276	61	55	53.0	50.3	**54.8**
2ND25361	60	58	52.3	49.5	**55.0**
2ND25567	59	56	50.3	48.8	**53.5**
M138 (FEG153-25)	60	57	53.3	49.8	**55.0**
M139 (FEG153-58)	60	61	52.3	49.8	**55.8**
M140 (FEG154-47)	61	62	52.7	49.3	**56.2**
M141 (FEG175-57)	60	58	52.3	50.3	**55.1**
FEG175-59	60	58	52.3	48.8	**54.8**
FEG181-09	59	57	53.0	49.5	**54.6**
FEG183-52	60	60	53.3	49.5	**55.7**
FEG184-11	59	62	52.3	50.5	**56.0**
SH060036	60	57	52.0	50.5	**54.9**
SM060669	61	59	54.0	51.8	**56.4**
SSP060408	62	62	54.0	50.5	**57.1**
SM071454	60	59	52.7	49.8	**55.4**

Table 3. cont. Mean days to heading after planting of entries grown in 2009 NABSEN Nursery at four locations.

Label	Langdon	Fargo	Crookston misted	Brandon	**Mean**
BM0270D-152	62	58	54.7	54.8	**57.4**
BM0270D-192-0	62	58	54.0	54.3	**57.1**
BMO270DCB-18-0	63	59	54.3	54.5	**57.7**
BM0331D-5	59	56	52.3	49.5	**54.2**
H97006017	61	58	55.0	52.8	**56.7**
H97008004	61	59	54.3	52.5	**56.7**
H97042002	62	60	53.7	52.5	**57.0**
H97054003	61	59	54.7	52.3	**56.7**
6B06-1132	60	62	53.0	48.5	**55.9**
6B06-1206	60	57	52.3	49.5	**54.7**
6B06-1429	61	59	53.7	50.8	**56.1**
6B06-1543	60	62	53.3	49.0	**56.1**
6B07-1809	61	58	53.0	49.5	**55.4**
6B07-1825	61	56	53.7	49.5	**55.0**
6B07-1933	60	58	52.7	50.0	**55.2**
6B07-2081	59	58	53.3	49.0	**54.8**
MnBrite	62	57	52.7	52.8	**56.1**
Conlon	59	56	51.0	49.0	**53.8**
Robust	61	57	53.0	49.3	**55.1**
CIHO 4196	65	60	55.0	55.5	**58.9**
Chevron	64	61	55.7	55.0	**58.9**
Stander	61	58	53.0	50.8	**55.7**

Table 4. Mean for DON (ppm) entries grown in 2009 NABSEN Nursery at seven locations.

				Crookston	NDSU	Bari*	Crookston	All loc	Misted	Dryland
Line	Langdon	Fargo	Brandon	misted	Casselton	Casselton	dryland	mean	mean	mean
ND20448	25.3	0.8	11.3	9.5	0.5	0.4	0.4	**6.9**	**11.7**	**0.4**
ND22421	27.7	4.6	14.7	12.3	0.8	2.1	0.6	**9.0**	**14.9**	**1.2**
ND23422	47.9	1.1	22.8	14.0	0.8	2.9	0.6	**12.9**	**21.5**	**1.4**
ND23497	33.4	0.5	24.3	7.6	0.2	1.1	0.2	**9.6**	**16.5**	**0.5**
ND24906	37.6	1.3	18.7	14.0	0.6	0.6	0.5	**10.5**	**17.9**	**0.6**
ND25160	43.4	2.2	21.6	9.1	0.5	5.7	0.2	**11.8**	**19.1**	**2.1**
ND25161	43.9	1.8	21.9	13.9	0.5	2.7	0.8	**12.2**	**20.3**	**1.3**
ND23898	34.2	1.6	34.7	19.1	0.5	1.7	0.4	**13.2**	**22.4**	**0.9**
2ND21867	26.7	0.6	19.5	7.1	0.3	2.3	0.2	**8.1**	**13.5**	**0.9**
2ND24238	35.5	0.8	15.1	7.5	1.5	0.5	0.2	**8.7**	**14.7**	**0.7**
2ND24263	25.0	0.3	9.8	6.3	0.4	0.9	0.2	**6.1**	**10.3**	**0.5**
2ND24388	26.7	1.7	17.0	13.1	0.0	1.0	0.4	**8.6**	**14.6**	**0.5**
2ND25272	34.8	1.0	20.9	8.5	0.8	1.2	0.2	**9.6**	**16.3**	**0.7**
2ND25276	35.9	1.0	21.7	8.2	2.4	1.7	0.3	**10.2**	**16.7**	**1.5**
2ND25361	42.7	1.2	21.7	13.6	1.4	3.8	0.3	**12.1**	**19.8**	**1.8**
2ND25567	23.5	0.8	20.0	4.8	3.1	2.5	0.3	**7.9**	**12.3**	**2.0**
M138 (FEG153-25)	31.6	1.4	15.0	8.5	0.0	0.5	0.1	**8.2**	**14.1**	**0.2**
M139 (FEG153-58)	26.6	0.8	19.1	7.5	0.3	0.1	0.1	**7.8**	**13.5**	**0.2**
M140 (FEG154-47)	31.9	1.6	11.5	10.2	0.6	1.1	0.2	**8.2**	**13.8**	**0.6**
M141 (FEG175-57)	28.2	0.9	8.8	6.7	0.1	0.6	0.1	**6.5**	**11.2**	**0.3**
FEG175-59	29.1	3.1	20.1	8.6	0.2	1.4	0.2	**9.0**	**15.2**	**0.6**
FEG181-09	25.8	1.1	7.2	9.5	0.3	0.6	0.3	**6.4**	**10.9**	**0.4**
FEG183-52	22.7	1.4	12.3	7.3	0.2	0.5	0.3	**6.4**	**10.9**	**0.3**
FEG184-11	23.9	0.6	11.3	9.8	0.8	0.5	0.1	**6.7**	**11.4**	**0.5**
SH060036	12.5	0.2	7.7	6.5	0.6	5.1	0.1	**4.7**	**6.7**	**1.9**
SM060669	51.3	0.6	13.4	9.1	0.9	2.6	0.3	**11.2**	**18.6**	**1.2**
SSP060408	33.3	0.7	14.8	15.4	0.4	4.8	0.3	**10.0**	**16.1**	**1.8**
SM071454	49.6	2.6	21.0	8.1	0.9	1.9	0.1	**12.0**	**20.3**	**0.9**

Table 4. cont. Mean for DON (ppm) entries grown in 2009 NABSEN Nursery at seven locations.

				Crookston	NDSU	Bari*	Crookston	All loc	Misted	Dryland
Line	Langdon	Fargo	Brandon	misted	Casselton	Casselton	dryland	mean	mean	mean
BM0270D-152	46.7	0.7	14.2	10.2	0.9	1.0	0.4	**10.6**	**18.0**	**0.8**
BM0270D-192-0	44.0	0.3	12.6	10.9	0.3	5.6	0.1	**10.5**	**16.9**	**2.0**
BMO270DCB-18-0	39.5	0.6	21.9	17.3	1.5	0.4	0.2	**11.6**	**19.8**	**0.7**
BM0331D-5	38.5	0.9	20.0	8.9	0.6	2.9	0.2	**10.3**	**17.1**	**1.3**
H97006017	52.1	0.7	38.0	9.7	1.4	1.4	0.3	**14.8**	**25.1**	**1.0**
H97008004	45.3	0.7	18.0	12.4	0.1	1.1	0.5	**11.2**	**19.1**	**0.6**
H97042002	38.1	0.5	11.3	8.6	0.2	3.6	0.3	**9.0**	**14.6**	**1.4**
H97054003	32.3	0.3	15.0	6.9	0.6	3.1	0.2	**8.3**	**13.6**	**1.3**
6B06-1132	25.5	3.5	19.1	11.3	0.3	1.2	0.2	**8.7**	**14.9**	**0.6**
6B06-1206	36.3	2.7	28.6	10.4	0.7	1.4	0.2	**11.5**	**19.5**	**0.8**
6B06-1429	39.3	3.1	19.5	14.1	0.6	2.0	0.3	**11.3**	**19.0**	**1.0**
6B06-1543	27.4	1.8	17.5	15.4	0.2	1.0	0.2	**9.0**	**15.5**	**0.4**
6B07-1809	26.2	1.4	14.1	14.7	2.3	0.7	0.1	**8.5**	**14.1**	**1.0**
6B07-1825	33.5	1.8	17.6	17.4	0.5	1.8	0.4	**10.4**	**17.6**	**0.9**
6B07-1933	30.9	2.4	18.4	10.6	0.5	2.8	0.4	**9.4**	**15.6**	**1.2**
6B07-2081	41.0	2.2	19.9	12.4	0.7	missing	0.3	**12.7**	**18.9**	**0.5**
MnBrite	51.3	1.1	15.5	12.1	1.8	0.9	0.1	**11.8**	**20.0**	**0.9**
Conlon	30.6	0.7	7.7	11.3	0.2	missing	0.1	**8.4**	**12.6**	**0.2**
Robust	31.2	1.9	12.9	12.7	0.2	1.0	0.3	**8.6**	**14.7**	**0.5**
CIHO 4196	12.6	0.0	22.6	9.2	3.5	0.5	0.3	**7.0**	**11.1**	**1.4**
Chevron	27.1	0.2	13.2	8.9	0.6	2.4	0.0	**7.5**	**12.3**	**1.0**
Stander	52.6	2.6	17.3	21.1	0.7	1.8	0.6	**13.8**	**23.4**	**1.1**

* Only one replication and was inoculated but not misted

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

Label	Days to [1] head	FHB [2] incidence	FHB[3] severity	DON ppm[4] misted	DON ppm[4] dryland
ND20448	55.2	76.4	5.3	11.7	0.4
ND22421	54.6	81.4	12.8	14.9	1.2
ND23422	56.6	86.9	7.6	21.5	1.4
ND23497	55.6	77.8	6.7	16.5	0.5
ND24906	55.1	83.3	7.7	17.9	0.6
ND25160	55.1	87.2	10.6	19.1	2.1
ND25161	55.8	80.8	9.4	20.3	1.3
ND23898	56.2	76.1	5.4	22.4	0.9
2ND21867	55.9	80.0	8.5	13.5	0.9
2ND24238	55.8	76.9	9.0	14.7	0.7
2ND24263	56.2	70.0	8.6	10.3	0.5
2ND24388	55.8	80.0	9.2	14.6	0.5
2ND25272	55.0	82.2	16.6	16.3	0.7
2ND25276	54.8	80.0	14.0	16.7	1.5
2ND25361	55.0	80.0	10.5	19.8	1.8
2ND25567	53.5	75.8	13.7	12.3	2.0
M138 (FEG153-25)	55.0	73.3	3.9	14.1	0.2
M139 (FEG153-58)	55.8	60.3	5.2	13.5	0.2
M140 (FEG154-47)	56.2	71.9	6.0	13.8	0.6
M141 (FEG175-57)	55.1	68.3	5.7	11.2	0.3
FEG175-59	54.8	68.6	5.9	15.2	0.6
FEG181-09	54.6	66.7	6.3	10.9	0.4
FEG183-52	55.7	64.7	6.4	10.9	0.3
FEG184-11	56.0	58.1	4.3	11.4	0.5
SH060036	54.9	67.8	6.2	6.7	1.9
SM060669	56.4	70.3	7.7	18.6	1.2
SSP060408	57.1	65.0	7.6	16.1	1.8
SM071454	55.4	70.0	7.2	20.3	0.9

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

Label	Days to [1] head	FHB [2] incidence	FHB[3] severity	DON ppm[4] misted	DON ppm[4] dryland
BM0270D-152	57.4	51.7	6.3	18.0	0.8
BM0270D-192-0	57.1	56.4	7.8	16.9	2.0
BMO270DCB-18-0	57.7	66.1	5.3	19.8	0.7
BM0331D-5	54.2	65.0	6.4	17.1	1.3
H97006017	56.7	62.2	7.7	25.1	1.0
H97008004	56.7	68.6	8.9	19.1	0.6
H97042002	57.0	82.5	9.0	14.6	1.4
H97054003	56.7	80.6	6.8	13.6	1.3
6B06-1132	55.9	77.5	8.5	14.9	0.6
6B06-1206	54.7	75.3	7.9	19.5	0.8
6B06-1429	56.1	93.3	9.4	19.0	1.0
6B06-1543	56.1	78.9	9.7	15.5	0.4
6B07-1809	55.4	84.4	5.3	14.1	1.0
6B07-1825	55.0	73.1	7.5	17.6	0.9
6B07-1933	55.2	73.3	5.0	15.6	1.2
6B07-2081	54.8	82.2	8.3	18.9	0.5
MnBrite	56.1	82.5	5.2	20.0	0.9
Conlon	53.8	88.3	12.0	12.6	0.2
Robust	55.1	73.6	8.1	14.7	0.5
CIHO 4196	58.9	58.3	2.7	11.1	1.4
Chevron	58.9	54.7	0.9	12.3	1.0
Stander	55.7	91.1	9.4	23.4	1.1

[1] Date from planting to 50% of heads 50% emerged at four locations.
[2] FHB incidence means at three locations.
[3] FHB severity means at four locations.
[4] DON content means at seven locations.

Table 6. Temperature (^{o}F) compared to the 30-year average.

Location	May	June	July	August
Fargo	-3	-2	-4	-3
Langdon	-5	-1	-1	-2
Prosper,ND*	-3	-3	-5	-4
Crookston,MN	-6.2	-3	-5.1	-3.6
Brandon, Manitoba	-5.1	-2.3	-4.3	-1.8

Table 7. Rainfall (in.) compared to the 30-year average.

Location	May	June	July	August
Fargo	-0.87	-0.29	-2.25	-0.68
Langdon	-0.04	0.79	0.31	-1.64
Prosper, ND*	-1.76	-0.98	-2.27	0.45
Crookston,MN	-0.03	1.54	0.32	0.4
Brandon, Manitoba	-0.66	-1.56	0.26	0.11

*Prosper is closest recording NDawn weather station to Casselton, ND

Table 8. Correlation among locations for FHB DON (ppm) in 2009

	Langdon	Fargo	Brandon	Crookston misted	NDSU Casselton	Bari Casselton	Crookston dryland
Langdon	1	0.1	0.35*	0.34*	-0.05	0.19	0.32*
Fargo	0.1	1	-0.3*	0.11	0.8**	-0.15	0.2
Brandon	0.35*	-0.3*	1	0.22	-0.19	0.02	0.2
Crookston-misted	0.34*	0.11	0.22	1	-0.02	-0.02	0.48**
NDSU-Casselton	-0.05	0.8**	-0.19	-0.02	1	-0.17	0.9
Bari-Casselton	0.19	-0.15	0.02	-0.02	-0.17	1	0.03
Crookston-dryland	0.32*	0.2	0.2	0.48**	0.09	0.03	1

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

Table 9. Pedigree and source of breeding lines tested for FHB resistance in 2009.

Entry	Line	Pedigree	Contributor	row-type
1	ND20448	ND16918/C98-10-155-3	North Dakota State Univ.	6-row
2	ND22421	ND18546/ND19656	North Dakota State Univ.	6-row
3	ND23422	ND18546/ND20380	North Dakota State Univ.	6-row
4	ND23497	Drummond/ND20414	North Dakota State Univ.	6-row
5	ND24906	ND20508/ND20492	North Dakota State Univ.	6-row
6	ND25160	ND19557/ND19491	North Dakota State Univ.	6-row
7	ND25161	ND19557/ND19491	North Dakota State Univ.	6-row
8	ND23898	Drummond/ND17643	North Dakota State Univ.	6-row
9	2ND21867	ND18172/ND19130	North Dakota State Univ.	2-row
10	2ND24238	ND19854//ND20028/ND19119-1	North Dakota State Univ.	2-row
11	2ND24263	ND19869/3/ND18998//ND16092/ND17268	North Dakota State Univ.	2-row
12	2ND24388	ND17274/ND19119//ND19854	North Dakota State Univ.	2-row
13	2ND25272	ND20802/3/ND19922//ND19929/ND20177	North Dakota State Univ.	2-row
14	2ND25276	ND20802/3/ND19922//ND19929/ND20177	North Dakota State Univ.	2-row
15	2ND25361	ND19845/ND19119-5//ND20801	North Dakota State Univ.	2-row
16	2ND25567	ND19854-8//ND22195/D19119-5	North Dakota State Univ.	2-row
17	M138 (FEG153-25)	M00-33 / M122 (FEG65-02)	University of Minnesota	6-row
18	M139 (FEG153-58)	M00-33 / M122 (FEG65-02)	University of Minnesota	6-row
19	M140 (FEG154-47)	M00-33 / FEG66-08	University of Minnesota	6-row
20	M141 (FEG175-57)	M122 / M123 MAS	University of Minnesota	6-row
21	FEG175-59	M122 / M123 MAS	University of Minnesota	6-row
22	FEG181-09	M129 / FEG100-41	University of Minnesota	6-row
23	FEG183-52	M132 (FEG100-44) / M123	University of Minnesota	6-row
24	FEG184-11	FEG109-44 / FEG100-41	University of Minnesota	6-row
25	SH060036	2ND16092/CDC McGwire	CDC, University of Saskatchewan	2-row
26	SM060669	SM01408/SM00393	CDC, University of Saskatchewan	2-row
27	SSP060408	SM02467s/SM02687	CDC, University of Saskatchewan	2-row
28	SM071454	SM02160/SM02747	CDC, University of Saskatchewan	6-row
29	BM0270D-152	TR04282/Newdale	AAFC-Brandon	2-row
30	BM0270D-192-0	TR04282/Newdale	AAFC-Brandon	2-row
31	BMO270DCB-18-0	TR04282/Newdale	AAFC-Brandon	2-row
32	BM0331D-5	Conlon/TR03273	AAFC-Brandon	2-row
33	H97006017	H96031/AC Metcalfe	FCDC, Alberta Agriculture and Food	2-row

34	H97008004	H96031/I95039	FCDC, Alberta Agriculture and Food	2-row
35	H97042002	H92020078/AC Metcalfe//I95039	FCDC, Alberta Agriculture and Food	2-row
36	H97054003	TR145/I95039	FCDC, Alberta Agriculture and Food	2-row
37	6B06-1132	6B97-2232 / LACEY	BAR - LLC	6-row
38	6B06-1206	LACEY / 6B98-9022	BAR - LLC	6-row
39	6B06-1429	6B00-1166 / 6B98-9558	BAR - LLC	6-row
40	6B06-1543	6B98-9786 // 6B99-6028 / 6B99-6559	BAR - LLC	6-row
41	6B07-1809	6B00-1499 / TRADITION	BAR - LLC	6-row
42	6B07-1825	6B01-2218 / TRADITION	BAR - LLC	6-row
43	6B07-1933	6B99-6774 / 6B00-0827	BAR - LLC	6-row
44	6B07-2081	FEG 44-12 / 6B98-9558	BAR - LLC	6-row
45	MnBrite	M90-89/M69	Check	6-row
46	Conlon	BOWMAN*2/DWS1008/ND10232	Check	2-row
47	Robust	MOREX/MANKER	Check	6-row
48	CIHO 4196	UNKNOWN	Check	2-row
49	Chevron	UNKNOWN	Check	6-row
50	Stander	ROBUST*2/3/CREE/BONANZA//MANKER/4/ROBUST/BUMBER	Check	6-row