

2011

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

December 2011

Robert Brueggeman

***Patrick Gross**

Dept Plant Pathology North Dakota State University

***address all enquiries regarding this report to Patrick Gross, 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.edu</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>Robert Brueggeman Associate Professor Department of Plant Pathology NDSU Dept 7660 P.O. Box 6050 Fargo, ND 58108 Phone: (701)231-8778 Fax: (701)231-7851 Email: Robert.Brueggeman@ndsu.edu</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>Patrick Gross Research Specialist Department of Plant Pathology NDSU Dept 7660 P.O. Box 6050 Fargo, ND 58108 Phone: (701)231-8771 Email: Patrick.Gross@ndsu.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@umn.edu</p>
<p>Jolanta Menert, Ph.D. Cereal Pathology Manager Busch Agricultural Resources, Inc. 3515 East County Road 52 Fort Collins, CO 80524 Phone: (970) 472-2335 Fax: (970) 472-2334 Email: Jolanta.Menert@anheuser-busch.com</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 Emil : ruthdm@umn.edu</p>

INTRODUCTION

The 2011 North American Barley Scab Evaluation Nursery (NABSEN) was grown at Fargo, Langdon, Carrington 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. 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 Chevron, Quest and ND 20493(resistant six-row checks), Robust and Stander (susceptible six-row checks), 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 2011 were very low at Crookston dryland nursery and Casselton locations thus no FHB incidence or severity data was taken from these nurseries. Carrington location had moderate to heavy hail in late July and no data was taken and plants were not harvested. Disease levels were highest at Langdon and Brandon Manitoba locations Fargo levels were moderate. DON levels were highest at Crookston on misted plots and moderate in Fargo, Langdon, St. Paul and Brandon, Manitoba (table 4). DON levels were lower in 2011 at Langdon and Brandon, Manitoba compared to Crookston misted trial. Temperatures were above average (table 6) and precipitation below the 30 year average in August (table 7).

Site details are as follows;

FARGO, ND – Robert Brueggeman and 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 – Robert Brueggeman and 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%

Carrington, ND – Richard Horsley

- Dryland
- 3 Replicates
- Hail storm in July destroyed the trial.

Casselton, ND – Jolanta Menert

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

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

- Misted
- Inoculated by grain spawn 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
- Day to heading counted from date planted to 50% of heads emerged 50%

CROOKSTON, MN – Kevin Smith and Ruth Dill-Macky

- Separate Misted and Dryland trails
- 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

BRANDON, MANITOBA - Bill Legge and James Tucker

- Misted
- 4 replicates RCB design
- Disease severity - percentage of infected kernels
- Disease incidence - percentage of infected heads
- Day to heading counted from date planted to 50% of heads emerged 50%
- 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 2011 NABSEN Nursery at five locations.....	6-7
Table 2. Mean disease incidence of entries grown in the 2011 NABSEN Nursery at three locations.....	8-9
Table 3. Mean days to heading after planting of entries grown in 2011 NABSEN Nursery at five locations.....	10-11
Table 4. Mean for DON (ppm) entries grown in 2011 NABSEN Nursery at seven locations.....	12-13
Table 5. Average means of heading date, FHB incidence, FHB severity and DON content.....	14-15
Table 6. Temperature (°F) compared to the 30-year average.....	16
Table 7. Rainfall (in.) compared to the 30-year average.....	16
Table 8. Correlation among locations for DON content.....	17
Table 9. Pedigree and source of breeding lines tested for FHB resistance in 2011.....	18-19

Table 1. Mean FHB severity of entries grown in the 2011 NABSEN Nursery at five locations.

Label	Fargo	Langdon	Brandon	<u>Misted</u>		Mean
				Crookston	St. Paul	
TR11220	7.2	5.7	10.4	33.7	7.8	13.0
TR11221	6.4	7.5	10.9	34.8	7.8	13.5
A472-14	13.9	10.2	14.7	39.8	6.3	17.0
H267-12	7.3	11.5	2.4	39.3	11.7	14.4
SM092052	10.5	15.8	10.8	44.8	2.6	16.9
SM080861	4.5	3.3	11.1	62.7	6.3	17.6
SB080701	7.9	2.0	8.2	14.8	9.2	8.4
SB080190	11.0	8.5	11.5	37.5	8.2	15.3
TR11695	3.1	7.3	10.7	43.8	3.7	13.7
TR11696	12.1	9.2	14.2	51.7	7.2	18.9
TR11697	6.7	6.8	4.3	28.7	13.3	11.9
TR11698	11.2	5.9	7.2	59.0	11.8	19.0
6B08-3179	15.4	9.2	10.6	38.0	4.5	15.5
6B08-3210	9.3	12.9	9.1	37.3	5.0	14.7
6B08-3223	17.7	16.0	16.5	40.8	3.3	18.9
6B08-3409	15.3	17.2	22.0	48.8	9.5	22.6
6B08-3428	17.4	16.0	7.2	47.3	6.2	18.8
6B08-3468	13.9	18.6	13.5	49.5	7.0	20.5
6B08-3483	14.1	18.3	10.2	46.8	4.1	18.7
6B08-3485	14.8	13.1	14.0	41.5	2.0	17.1
M146	19.2	10.8	8.2	31.0	2.9	14.4
M147	9.9	7.7	3.9	27.5	2.5	10.3
M148	15.0	10.2	11.2	33.2	4.5	14.8
M149	11.2	12.2	12.1	31.0	3.7	14.1
M150	6.8	7.3	7.4	34.2	2.4	11.6
FEG201-38	6.9	9.4	5.9	31.0	2.6	11.1

Table 1. cont: Mean FHB severity of entries grown in the 2011 NABSEN Nursery at five locations.

Label	Fargo	Langdon	Brandon	<u>Misted</u>		Mean
				Crookston	St. Paul	
FEG212-09	10.3	8.4	15.0	45.8	3.9	16.7
FEG214-32	4.1	3.9	6.5	40.2	3.6	11.6
ND25160	14.2	16.1	15.4	52.3	3.8	20.4
ND26036	11.8	8.7	14.6	44.5	1.3	16.2
ND27177	16.6	11.7	21.5	23.5	5.4	15.7
ND27245	7.9	7.0	4.3	23.8	1.3	8.9
ND28303	13.3	14.2	15.2	33.0	3.4	15.8
ND28539	13.5	13.4	16.3	48.7	6.9	19.8
ND28628	13.7	22.1	12.7	41.2	2.3	18.4
ND28629	10.4	20.2	18.1	38.2	5.5	18.5
2ND25276	11.7	10.4	11.3	44.3	30.5	21.7
2ND27421	12.7	17.9	25.9	53.2	20.7	26.1
2ND27678	10.7	4.3	6.5	45.2	19.7	17.3
2ND27705	7.8	1.5	5.2	30.5	9.3	10.9
2ND27921	6.6	4.4	7.4	40.0	14.0	14.5
2ND28065	6.8	3.7	6.8	49.0	10.5	15.4
2ND28086	9.2	5.6	14.9	56.8	17.2	20.7
2ND28131	15.3	10.2	5.2	57.8	5.7	18.8
QUEST	5.6	5.7	3.2	20.3	1.7	7.3
Conlon	13.2	14.7	8.2	46.0	3.3	17.1
ND 20493	10.0	17.3	26.3	39.0	4.3	19.4
Robust	19.1	10.0	11.3	42.8	4.1	17.5
Chevron	4.4	2.2	2.0	9.2	6.1	4.8
Stander	21.6	16.5	21.8	40.2	14.1	22.8

Table 2. Mean disease incidence of entries grown in the 2011NABSEN Nursery at three locations.

Label	Fargo	Langdon	Brandon	Mean
TR11220	73.3	56.7	92.5	74.2
TR11221	73.3	73.3	86.7	77.8
A472-14	86.7	83.3	90.0	86.7
H267-12	76.7	93.3	45.0	71.7
SM092052	90.0	93.3	80.0	87.8
SM080861	56.7	46.7	66.7	56.7
SB080701	76.7	33.3	62.5	57.5
SB080190	80.0	63.3	86.7	76.7
TR11695	53.3	80.0	80.0	71.1
TR11696	90.0	76.7	90.0	85.6
TR11697	73.3	70.0	76.7	73.3
TR11698	93.3	80.0	65.0	79.4
6B08-3179	100.0	86.7	87.5	91.4
6B08-3210	90.0	90.0	97.5	92.5
6B08-3223	93.3	96.7	92.5	94.2
6B08-3409	96.7	96.7	100.0	97.8
6B08-3428	96.7	93.3	80.0	90.0
6B08-3468	100.0	90.0	96.7	95.6
6B08-3483	93.3	100.0	85.0	92.8
6B08-3485	96.7	100.0	92.5	96.4
M146	100.0	86.7	95.0	93.9
M147	100.0	76.7	62.5	79.7
M148	100.0	73.3	82.5	85.3
M149	90.0	90.0	90.0	90.0
M150	76.7	60.0	82.5	73.1
FEG201-38	83.3	80.0	70.0	77.8

Table 2. cont: Mean disease incidence of entries grown in the 2011 NABSEN Nursery at three locations.

Label	Fargo	Langdon	Brandon	Mean
FEG212-09	93.3	80.0	87.5	86.9
FEG214-32	60.0	56.7	72.5	63.1
ND25160	96.7	100.0	95.0	97.2
ND26036	93.3	76.7	80.0	83.3
ND27177	93.3	90.0	100.0	94.4
ND27245	90.0	76.7	72.5	79.7
ND28303	93.3	73.3	80.0	82.2
ND28539	96.7	93.3	100.0	96.7
ND28628	100.0	96.7	80.0	92.2
ND28629	86.7	90.0	90.0	88.9
2ND25276	86.7	73.3	92.5	84.2
2ND27421	90.0	93.3	97.5	93.6
2ND27678	86.7	50.0	65.0	67.2
2ND27705	73.3	23.3	67.5	54.7
2ND27921	70.0	53.3	72.5	65.3
2ND28065	70.0	46.7	72.5	63.1
2ND28086	76.7	60.0	82.5	73.1
2ND28131	96.7	86.7	70.0	84.4
QUEST	63.3	73.3	47.5	61.4
Conlon	93.3	80.0	70.0	81.1
ND 20493	90.0	90.0	100.0	93.3
Robust	100.0	83.3	92.5	91.9
Chevron	76.7	56.7	72.5	68.6
Stander	100.0	93.3	90.0	94.4

Table 3. Mean days to heading after planting of entries grown in 2011 NABSEN Nursery at five locations.

Label	Fargo	Langdon	Brandon	St. Paul	Dryland	Mean
					Crookston	
TR11220	58.0	53.7	63.0	64.3	54.0	58.6
TR11221	58.0	54.3	63.0	64.3	54.3	58.8
A472-14	54.0	53.0	59.3	60.0	51.3	55.5
H267-12	55.0	52.3	60.0	62.7	51.3	56.3
SM092052	55.0	53.0	57.0	59.7	50.7	55.1
SM080861	56.0	55.0	63.0	68.0	55.0	59.4
SB080701	53.0	55.7	64.3	66.3	54.7	58.8
SB080190	52.0	54.0	58.0	63.3	54.0	56.3
TR11695	56.0	55.7	63.0	69.7	55.3	59.9
TR11696	57.0	53.7	63.0	63.7	51.3	57.7
TR11697	52.0	53.0	57.0	62.3	53.0	55.5
TR11698	56.0	55.3	63.0	68.0	54.7	59.4
6B08-3179	55.0	54.0	59.3	60.7	51.3	56.1
6B08-3210	56.0	54.7	61.5	61.3	53.3	57.4
6B08-3223	55.0	54.3	60.8	60.7	52.3	56.6
6B08-3409	54.0	53.3	57.0	60.7	51.7	55.3
6B08-3428	52.0	53.7	57.0	59.0	50.7	54.5
6B08-3468	53.0	53.0	58.5	58.7	50.3	54.7
6B08-3483	54.0	53.7	57.8	59.7	50.7	55.2
6B08-3485	56.0	53.3	58.5	59.3	51.0	55.6
M146	53.0	53.7	58.5	59.7	50.3	55.0
M147	55.0	54.0	59.3	59.7	52.0	56.0
M148	55.0	53.7	60.8	61.0	51.3	56.4
M149	54.0	53.7	58.5	59.3	50.7	55.2
M150	54.0	53.0	56.3	59.7	51.7	54.9
FEG201-38	54.0	53.0	59.3	59.0	53.0	55.7

Table 3. cont: Mean days to heading after planting of entries grown in 2011 NABSEN Nursery at five locations.

Label	Fargo	Langdon	Brandon	St. Paul	Dryland	Mean
					Crookston	
FEG212-09	53.0	53.0	58.5	58.7	51.0	54.8
FEG214-32	51.0	53.3	58.5	59.3	50.7	54.6
ND25160	52.0	52.7	56.3	59.7	50.3	54.2
ND26036	51.0	53.0	57.8	58.3	50.3	54.1
ND27177	53.0	53.3	56.3	58.3	50.7	54.3
ND27245	56.0	54.7	59.3	61.0	52.3	56.7
ND28303	53.0	52.7	57.8	58.0	50.7	54.4
ND28539	54.0	52.7	57.0	61.7	51.7	55.4
ND28628	52.0	53.0	58.5	59.3	50.3	54.6
ND28629	51.0	51.7	57.8	57.0	49.3	53.4
2ND25276	53.0	54.3	60.8	62.7	51.7	56.5
2ND27421	52.0	50.7	60.0	61.0	49.7	54.7
2ND27678	53.0	53.3	61.5	63.0	53.7	56.9
2ND27705	54.0	54.3	63.0	66.0	55.7	58.6
2ND27921	55.0	54.0	62.3	64.3	53.0	57.7
2ND28065	52.0	53.0	62.3	62.3	52.0	56.3
2ND28086	54.0	53.3	62.3	63.0	52.7	57.1
2ND28131	50.0	53.0	57.0	59.7	51.0	54.1
QUEST	54.0	53.0	58.5	59.0	52.3	55.4
Conlon	49.0	48.7	57.0	59.0	49.0	52.5
ND 20493	51.0	51.3	54.0	58.7	50.0	53.0
Robust	55.0	53.7	57.8	60.3	52.3	55.8
Chevron	59.0	58.0	62.5	66.3	55.0	60.2
Stander	55.0	53.3	60.0	61.3	51.3	56.2

Table 4. Mean for DON (ppm) entries grown in 2011 NABSEN Nursery at seven locations.

Name	Fargo	Langdon	Brandon	St. Paul	Misted		Dryland		Misted	Dryland
					Crookston	Crookston	Casselton	Avg	Avg	
TR11220	2.9	2.8	3.8	10.1	28.4	0.2	0.5	9.6	0.3	
TR11221	4.9	3.4	2.2	8.7	20.6	1.0	0.1	7.9	0.5	
A472-14	6.9	12.8	8.3	6.2	39.9	0.9	1.3	14.8	1.1	
H267-12	2.1	8.5	2.1	9.3	19.5	0.1	0.4	8.3	0.3	
SM092052	9.1	17.1	9.9	7.0	37.1	0.4	1.7	16.0	1.1	
SM080861	2.8	5.7	2.1	21.8	39.2	1.6	0.7	14.3	1.2	
SB080701	3.6	2.0	1.5	15.6	23.1	0.6	0.6	9.2	0.6	
SB080190	4.4	2.1	5.9	7.1	26.3	0.9	0.3	9.1	0.6	
TR11695	6.4	5.2	1.6	4.3	36.8	0.3	0.4	10.8	0.3	
TR11696	2.8	7.7	2.2	5.9	37.3	0.5	0.5	11.2	0.5	
TR11697	5.1	8.9	5.6	21.4	35.1	0.5	0.2	15.2	0.4	
TR11698	13.5	10.1	2.6	26.6	53.6	0.8	1.6	21.3	1.2	
6B08-3179	18.5	23.6	3.3	8.9	56.5	1.6	1.0	22.1	1.3	
6B08-3210	12.5	17.6	10.7	7.1	43.3	1.1	2.0	18.2	1.6	
6B08-3223	16.9	22.1	5.0	15.3	42.6	1.2	1.6	20.4	1.4	
6B08-3409	12.2	26.9	7.8	15.4	52.1	1.8	2.2	22.9	2.0	
6B08-3428	11.1	27.3	9.6	14.5	46.1	1.8	1.4	21.7	1.6	
6B08-3468	9.9	14.4	7.6	11.1	34.1	0.9	0.9	15.4	0.9	
6B08-3483	6.4	22.0	4.6	6.0	43.8	1.6	1.4	16.5	1.5	
6B08-3485	12.2	15.3	5.8	3.0	36.9	0.5	1.1	14.6	0.8	
M146	6.6	14.6	8.4	3.6	36.3	0.9	0.7	13.9	0.8	
M147	9.5	10.0	5.6	4.3	31.8	1.5	0.8	12.3	1.2	
M148	12.1	11.7	5.9	9.0	39.0	0.2	1.6	15.5	0.9	
M149	6.7	9.5	7.4	5.0	28.1	0.8	1.2	11.3	1.0	
M150	5.3	7.6	3.8	3.2	34.1	1.4	0.7	10.8	1.1	
FEG201-38	5.9	8.1	4.6	1.8	30.6	0.3	0.7	10.2	0.5	

Table 4. cont: Mean for DON (ppm) entries grown in 2011 NABSEN Nursery at seven locations.

Name	Fargo	Langdon	Brandon	St. Paul	Misted	Dryland		Misted	Dryland
					Crookston	Crookston	Casselton	Avg	Avg
FEG212-09	9.8	13.1	4.9	5.1	33.4	1.1	1.8	13.3	1.4
FEG214-32	5.6	6.9	5.7	3.9	34.5	1.0	0.5	11.3	0.7
ND25160	4.5	10.5	14.8	3.8	31.4	0.7	0.7	13.0	0.7
ND26036	9.0	10.4	10.7	3.2	51.3	0.4	1.2	16.9	0.8
ND27177	6.4	17.7	12.8	9.2	50.6	1.0	0.9	19.3	0.9
ND27245	5.3	10.4	3.6	2.3	48.2	0.7	1.0	14.0	0.8
ND28303	10.9	17.3	8.1	3.6	47.3	1.9	0.9	17.4	1.4
ND28539	14.5	26.3	14.3	7.7	47.7	1.9	2.4	22.1	2.1
ND28628	7.2	19.6	7.8	4.4	44.0	1.6	0.7	16.6	1.1
ND28629	8.8	18.2	12.1	8.2	38.6	1.2	0.7	17.2	1.0
2ND25276	7.9	4.6	6.6	15.5	45.7	1.7	1.2	16.1	1.5
2ND27421	1.6	5.4	4.7	6.8	21.2	0.3	0.3	8.0	0.3
2ND27678	11.9	4.8	3.7	9.3	30.6	0.9	0.7	12.1	0.8
2ND27705	6.0	4.2	4.4	9.5	21.3	0.6	0.6	9.1	0.6
2ND27921	9.1	3.0	2.0	11.9	32.3	1.7	0.6	11.6	1.2
2ND28065	4.6	4.2	4.2	5.7	21.6	0.5	0.5	8.1	0.5
2ND28086	9.8	5.9	4.2	16.9	51.4	2.6	1.0	17.7	1.8
2ND28131	4.9	5.7	6.2	2.4	37.6	1.2	0.5	11.4	0.9
QUEST	3.6	11.6	4.0	3.2	31.1	0.5	1.1	10.7	0.8
Conlon	3.5	1.9	2.9	3.4	23.6	0.6	0.3	7.1	0.4
ND 20493	7.0	8.3	8.6	2.2	23.9	0.6	0.6	10.0	0.6
Robust	9.9	20.3	12.8	2.8	53.1	1.2	1.2	19.8	1.2
Chevron	10.1	3.5	1.1	7.5	51.2	0.4	1.6	14.7	1.0
Stander	12.6	23.7	13.6	16.3	53.3	2.9	2.5	23.9	2.7

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

Label	<u>Days to</u> ¹	<u>FHB</u> ²	<u>FHB</u> ³	<u>DON ppm</u> ⁴	
	head	incidence	severity	misted	dryland
TR11220	58.6	74.17	13.0	9.6	0.3
TR11221	58.8	77.78	13.5	7.9	0.5
A472-14	55.5	86.67	17.0	14.8	1.1
H267-12	56.3	71.67	14.4	8.3	0.3
SM092052	55.1	87.78	16.9	16.0	1.1
SM080861	59.4	56.67	17.6	14.3	1.2
SB080701	58.8	57.50	8.4	9.2	0.6
SB080190	56.3	76.67	15.3	9.1	0.6
TR11695	59.9	71.11	13.7	10.8	0.3
TR11696	57.7	85.56	18.9	11.2	0.5
TR11697	55.5	73.33	11.9	15.2	0.4
TR11698	59.4	79.44	19.0	21.3	1.2
6B08-3179	56.1	91.39	15.5	22.1	1.3
6B08-3210	57.4	92.50	14.7	18.2	1.6
6B08-3223	56.6	94.17	18.9	20.4	1.4
6B08-3409	55.3	97.78	22.6	22.9	2.0
6B08-3428	54.5	90.00	18.8	21.7	1.6
6B08-3468	54.7	95.56	20.5	15.4	0.9
6B08-3483	55.2	92.78	18.7	16.5	1.5
6B08-3485	55.6	96.39	17.1	14.6	0.8
M146	55.0	93.89	14.4	13.9	0.8
M147	56.0	79.72	10.3	12.3	1.2
M148	56.4	85.28	14.8	15.5	0.9
M149	55.2	90.00	14.1	11.3	1.0
M150	54.9	73.06	11.6	10.8	1.1
FEG201-38	55.7	77.78	11.1	10.2	0.5

¹Date from planting to 50% of heads 50% emerged at five locations.

² FHB incidence means at three locations.

³ FHB severity means at five locations.

⁴ DON content means at seven locations.

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

Label	<u>Days to</u> ¹	<u>FHB</u> ²	<u>FHB</u> ³	<u>DON ppm</u> ⁴	
	head	incidence	severity	misted	dryland
FEG212-09	54.8	86.94	16.7	13.3	1.4
FEG214-32	54.6	63.06	11.6	11.3	0.7
ND25160	54.2	97.22	20.4	13.0	0.7
ND26036	54.1	83.33	16.2	16.9	0.8
ND27177	54.3	94.44	15.7	19.3	0.9
ND27245	56.7	79.72	8.9	14.0	0.8
ND28303	54.4	82.22	15.8	17.4	1.4
ND28539	55.4	96.67	19.8	22.1	2.1
ND28628	54.6	92.22	18.4	16.6	1.1
ND28629	53.4	88.89	18.5	17.2	1.0
2ND25276	56.5	84.17	21.7	16.1	1.5
2ND27421	54.7	93.61	26.1	8.0	0.3
2ND27678	56.9	67.22	17.3	12.1	0.8
2ND27705	58.6	54.72	10.9	9.1	0.6
2ND27921	57.7	65.28	14.5	11.6	1.2
2ND28065	56.3	63.06	15.4	8.1	0.5
2ND28086	57.1	73.06	20.7	17.7	1.8
2ND28131	54.1	84.44	18.8	11.4	0.9
QUEST	55.4	61.39	7.3	10.7	0.8
Conlon	52.5	81.11	17.1	7.1	0.4
ND 20493	53.0	93.33	19.4	10.0	0.6
Robust	55.8	91.94	17.5	19.8	1.2
Chevron	60.2	68.61	4.8	14.7	1.0
Stander	56.2	94.44	22.8	23.9	2.7

¹ Date from planting to 50% of heads 50% emerged at five locations.

² FHB incidence means at three locations.

³ FHB severity means at five locations.

⁴ DON content means at seven locations.

Table 6. Temperature (°F) compared to the 30-year average.

Location	May	June	July	August
Fargo,ND	-2	0.5	4	2.1
Langdon,ND	-2.7	0.4	3.2	2.1
Prosper,ND*	-2.7	0.8	3.8	1.8
St. Paul,MN	-2.8	-1.3	3.9	0.9
Crookston, MN	-2.8	-1.9	2.2	1.6
Brandon,MA	n/a	-0.4	4.3	5.4

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

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

Location	May	June	July	August
Fargo,ND	1.7	0.5	1.2	0.3
Langdon,ND	-0.2	-0.6	-0.8	-2.1
Prosper,ND*	0.5	1.6	2.7	0.8
St. Paul,MN	0.7	-0.7	6	1.2
Crookston, MN	-0.2	-0.8	-0.3	-0.05
Brandon,MA	n/a	3.2	-0.4	-2.5

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

Table 8. Correlation among locations for DON content.

	Fargo	Langdon	Brandon	St. Paul	Misted Crookston	Dryland Crookston	Casselton
Fargo	1.0	**0.64	*0.29	0.23	**0.64	**0.45	**0.69
Langdon	**0.64	1.0	**0.62	0.05	**0.62	**0.48	**0.68
Brandon	*0.29	**0.62	1.0	-0.16	*0.36	*0.3	**0.44
St. Paul	0.23	0.05	-0.16	1.0	*0.25	*0.31	0.21
Crookston-misted	**0.64	**0.62	*0.36	*0.25	1.0	**0.54	**0.64
Crookston-dryland	**0.45	**0.48	*0.3	*0.31	**0.54	1.0	**0.42
Casselton	**0.69	**0.68	**0.44	0.15	**0.64	**0.42	1.0

*,** 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 2011

ENTR	Name	Pedigree	Institution	Row-Type
1	TR11220	Conlon/Newdale	AAFC (Legge)	2
2	TR11221	Conlon/Newdale	AAFC (Legge)	2
3	A472-14	Tradition/ND20299	AAFC (Therrien)	6
4	H267-12	HB383/HB110/B1602/BT347/Argyle/Conquest/ND14196//Bacon	AAFC (Therrien)	6
5	SM092052	6B04-0441/CDC Clyde	CDC	6
6	SM080861	SM04589/TR05910	CDC	2
7	SB080701	TR02185/SB01465	CDC	2
8	SB080190	TR05384/Laural	CDC	2
9	TR11695	H92082138X/TR704	FCDC	2
10	TR11696	CDC Bold/I94259	FCDC	2
11	TR11697	Niobe/H93090002	FCDC	2
12	TR11698	Ponoka/H93102002	FCDC	2
13	6B08-3179	6B02-3496 / 6B00-1361	BAR - LLC	6
14	6B08-3210	6B03-4452 / CDC YORKTON	BAR - LLC	6
15	6B08-3223	6B98-9022 / 6B02-3394	BAR - LLC	6
16	6B08-3409	TRADITION / CDC CLYDE	BAR - LLC	6
17	6B08-3428	6B02-3295 / CDC CLYDE	BAR - LLC	6
18	6B08-3468	6B04-0075 / CDC CLYDE	BAR - LLC	6
19	6B08-3483	6B04-0075 / CDC CLYDE	BAR - LLC	6
20	6B08-3485	6B04-0075 / CDC CLYDE	BAR - LLC	6
21	M146	M132 / M123	Univerity of Minn	6
22	M147	FEG148-56 / Rasmusson	Univerity of Minn	6
23	M148	M128 / M132	Univerity of Minn	6
24	M149	ND23657 / M132	Univerity of Minn	6
25	M150	M01-65 / Quest	Univerity of Minn	6
26	FEG201-38	Quest / M129	Univerity of Minn	6

Table 9. cont. Pedigree and source of breeding lines tested for FHB resistance in 2011

ENTRY	Name	Pedigree	Institution	Row-Type
27	FEG212-09	FEG175-48 / M135	Univerity of Minn	6
28	FEG214-32	FEG167-01 / FEG175-48	Univerity of Minn	6
29	ND25160	ND19557/ND19491	North Dakota State University	6
30	ND26036	ND20448/ND20603	North Dakota State University	6
31	ND27177	Stellar-ND/ND23530	North Dakota State University	6
32	ND27245	M122/ND23497	North Dakota State University	6
33	ND28303	ND20999/ND23497	North Dakota State University	6
34	ND28539	ND22783/ND23497	North Dakota State University	6
35	ND28628	ND23711/ND23295	North Dakota State University	6
36	ND28629	ND23711/ND23295	North Dakota State University	6
37	2ND25276	ND20802/3/ND19922//ND19929/ND20177	North Dakota State University	2
38	2ND27421	2ND24253/2ND24519	North Dakota State University	2
39	2ND27678	2ND24175/TR05285	North Dakota State University	2
40	2ND27705	2ND24393/TR05285	North Dakota State University	2
41	2ND27921	2ND22927/2ND24238	North Dakota State University	2
42	2ND28065	2ND21867/2ND24238	North Dakota State University	2
43	2ND28086	2ND23146/2ND24238	North Dakota State University	2
44	2ND28131	2ND24238/2ND24341	North Dakota State University	2
45	QUEST	FEG18-20 / M110	Check	6
46	Conlon	BOWMAN*2/DWS1008/ND10232	Check	2
47	ND 20493	ND16918*2/CIho 6611	Check	6
48	Robust	MOREX/MANKER	Check	6
49	Chevron	UNKNOWN	Check	6
50	Stander	ROBUST*2/3/CREE/BONANZA//MANKER/4/ROBUST/BUMBER	Check	6