2012

NORTH AMERICAN BARLEY SCAB EVALUATION NURSERY (NABSEN) REPORT

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INTRODUCTION

The 2012 North American Barley Scab Evaluation Nursery (NABSEN) was grown at Fargo, Langdon, Osnabrock 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 was 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 2012 were very low at Crookston (non-misted) and Casselton nursery locations thus no FHB incidence or severity data were taken from these nurseries. FHB disease levels were highest at Langdon, Brandon and Crookston misted locations; Fargo and St. Paul levels were moderate. DON levels were highest at Langdon (table. 4) and the other locations were all moderate. Temperatures were above average (table. 6) and precipitation below the 30 year average in August (table. 7). Temperatures were some of the highest in recent years and precipitation the lowest.

Site details are as follows;

Fargo, & 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%

Osnabrock, ND – Richard Horsley

- Dryland
- 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

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 & CROOKSTON, 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%
- No DON data for Crookston dryland

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 80% of heads emerged 50%
- DON content (ppm) measured by ELISA technique at ECORC, Ottawa on a composite sample of 4 replicates

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Table 1. Mean FHB severity of entries grown in the 2012 NABSEN Nursery at six locations.

Line	Fargo	Langdon	Brandon	Crookston misted	St. Paul	Mean	Osnabrock
TR12225	4.4	30.8	15.9	7.2	4.9	11.7	2.4
TR12226	4.0	29.6	6.0	4.0	6.1	8.7	3.0
TR12228	2.6	25.1	11.5	4.3	6.1	8.7	2.4
HB129	5.1	34.7	13.3	4.0	6.2	11.4	1.0
SB090163	4.7	28.3	14.3	5.3	5.7	10.5	6.3
SM090108	3.0	20.9	8.0	2.0	5.6	6.8	1.9
SM090503	4.1	36.3	7.3	4.2	4.5	10.4	0.5
SM095253	4.4	37.9	2.6	4.3	5.0	9.9	1.6
TR12602	3.9	24.6	9.7	5.3	6.3	8.7	1.2
TR12603	4.8	22.0	13.7	11.8	1.4	10.5	2.8
TR12604	3.2	30.2	10.3	10.8	7.7	10.9	1.3
TR12605	4.6	41.7	13.1	4.3	5.3	12.7	1.4
M151	1.2	45.0	10.8	7.5	0.9	12.9	2.2
M152	5.1	37.5	14.7	10.5	1.8	13.6	1.5
M153	1.5	34.9	13.6	11.6	3.2	12.3	1.4
M154	4.9	41.3	11.7	9.6	2.8	13.5	2.2
FEG223-04	3.3	34.5	13.1	14.4	1.7	13.1	2.3
FEG226-31	7.3	51.9	15.8	14.9	1.8	18.0	1.9
FEG227-17	2.2	40.7	11.9	7.5	0.4	12.5	1.7
FEG228-13	6.4	55.4	15.6	7.9	2.1	17.1	1.7
ND26891	10.3	52.9	12.3	13.3	1.5	17.8	1.7
ND27177	6.3	46.3	18.7	11.1	3.3	16.5	1.9
ND27245	7.4	57.0	13.9	3.8	1.4	16.5	1.5
ND28993	10.0	64.1	24.7	20.2	1.6	23.8	2.8
ND29134	5.4	62.0	25.7	13.1	1.7	21.2	3.3
ND29144	10.1	68.6	25.5	9.6	5.0	22.8	2.5

Table 1. cont: Mean FHB severity of entries grown in the 2012 NABSEN Nursery at six locations.

Line	Fargo	Langdon	Brandon	Crookston misted	St. Paul	Mean	Osnabrock
ND29157	9.1	71.3	28.8	28.2	6.3	27.5	2.5
ND29193	4.4	56.6	21.4	12.0	3.9	18.9	3.3
2ND27421	5.2	40.3	9.9	18.3	0.9	14.7	3.4
2ND27440	2.9	36.0	10.7	4.2	4.9	10.8	1.2
2ND28065	2.1	33.5	6.6	2.5	1.9	8.9	0.8
2ND28131	3.3	36.4	6.4	30.5	1.6	15.3	2.7
2ND29827	2.8	19.2	6.1	2.3	0.2	6.1	1.3
2ND29863	3.8	26.0	4.4	2.5	4.8	7.3	3.9
2ND30002	3.2	30.4	7.8	10.5	3.7	10.4	2.1
2ND30010	6.1	38.9	20.2	17.0	3.9	16.4	10.3
2B05-0811	4.3	38.7	14.6	3.5	4.7	12.2	0.5
2B09-3408	9.2	51.5	18.1	8.5	7.1	17.5	2.1
2B09-3422	7.5	54.5	10.4	3.0	4.8	15.1	2.8
2B09-3425	3.3	39.0	12.0	4.5	3.3	11.8	1.8
6B08-3210	4.6	48.8	15.4	7.7	1.6	15.3	1.7
6B09-3531	7.0	63.5	20.4	16.6	4.6	21.5	3.5
6B09-3655	5.3	72.2	10.2	12.5	2.3	20.0	3.3
6B09-4235	6.5	71.4	17.9	27.6	4.4	24.7	2.3
QUEST	2.7	41.0	7.7	7.0	0.7	11.7	1.1
Conlon	1.4	25.7	12.1	8.5	1.1	9.5	3.5
ND 20493	3.0	12.1	26.1	7.7	2.5	9.8	2.3
Robust	7.2	77.5	17.0	6.4	3.4	21.6	3.3
Chevron	0.3	16.5	3.4	2.8	9.2	4.6	0.1
Stander	6.9	68.5	25.6	10.3	12.7	22.3	1.6

Table 2. Mean disease incidence of entries grown in the 2012 NABSEN Nursery at four locations.

Line	Fargo	Langdon	Brandon	Mean	Osnabrock
TR12225	53.3	100.0	95.0	82.8	23.3
TR12226	50.0	100.0	62.5	70.8	33.3
TR12228	36.7	100.0	77.5	71.4	26.7
HB129	56.7	100.0	92.5	83.1	23.3
SB090163	46.7	100.0	92.5	79.7	43.3
SM090108	40.0	83.3	75.0	66.1	20.0
SM090503	40.0	100.0	75.0	71.7	10.0
SM095253	56.7	100.0	52.5	69.7	20.0
TR12602	43.3	100.0	90.0	77.8	20.0
TR12603	50.0	96.7	87.5	78.1	36.7
TR12604	40.0	100.0	85.0	75.0	20.0
TR12605	46.7	100.0	82.5	76.4	33.3
M151	30.0	100.0	87.5	72.5	46.7
M152	73.3	100.0	95.0	89.4	30.0
M153	33.3	100.0	97.5	76.9	43.3
M154	70.0	100.0	100.0	90.0	46.7
FEG223-04	70.0	100.0	95.0	88.3	53.3
FEG226-31	93.3	100.0	97.5	96.9	40.0
FEG227-17	46.7	100.0	90.0	78.9	43.3
FEG228-13	76.7	100.0	97.5	91.4	46.7
ND26891	86.7	100.0	97.5	94.7	40.0
ND27177	80.0	100.0	100.0	93.3	46.7
ND27245	86.7	100.0	90.0	92.2	46.7
ND28993	90.0	100.0	100.0	96.7	66.7
ND29134	76.7	100.0	100.0	92.2	63.3
ND29144	93.3	100.0	100.0	97.8	50.0

Table 2. cont: Mean disease incidence of entries grown in the 2012 NABSEN Nursery at four locations.

Line	Fargo	Langdon	Brandon	Mean	Osnabrock
ND29157	93.3	100.0	97.5	96.9	60.0
ND29193	73.3	100.0	100.0	91.1	46.7
2ND27421	60.0	100.0	75.0	78.3	43.3
2ND27440	46.7	100.0	82.5	76.4	23.3
2ND28065	36.7	100.0	75.0	70.6	20.0
2ND28131	36.7	100.0	65.0	67.2	40.0
2ND29827	46.7	96.7	77.5	73.6	23.3
2ND29863	46.7	100.0	65.0	70.6	43.3
2ND30002	33.3	93.3	82.5	69.7	40.0
2ND30010	60.0	100.0	85.0	81.7	86.7
2B05-0811	43.3	100.0	95.0	79.4	10.0
2B09-3408	73.3	100.0	95.0	89.4	33.3
2B09-3422	70.0	100.0	87.5	85.8	40.0
2B09-3425	43.3	100.0	85.0	76.1	23.3
6B08-3210	60.0	100.0	97.5	85.8	40.0
6B09-3531	83.3	100.0	100.0	94.4	70.0
6B09-3655	60.0	100.0	85.0	81.7	66.7
6B09-4235	76.7	100.0	90.0	88.9	66.7
QUEST	66.7	100.0	77.5	81.4	20.0
Conlon	23.3	96.7	90.0	70.0	43.3
ND 20493	66.7	100.0	100.0	88.9	66.7
Robust	80.0	100.0	97.5	92.5	50.0
Chevron	16.7	100.0	82.5	66.4	6.7
Stander	90.0	100.0	100.0	96.7	53.3

Table 3. Mean days to heading after planting of entries grown in 2012 NABSEN Nursery at five locations.

Line	Fargo	Langdon	Brandon	Crookston	St. Paul	Mean
TR12225	60	55	53	43	56	53
TR12226	60	57	51	36	56	52
TR12228	59	56	53	44	56	54
HB129	61	57	51	29	57	51
SB090163	58	55	50	34	53	50
SM090108	62	57	56	37	57	54
SM090503	63	58	57	47	No Data	56
SM095253	59	56	51	43	55	53
TR12602	61	58	53	46	57	55
TR12603	57	54	49	40	51	50
TR12604	63	57	52	45	No Data	54
TR12605	63	58	60	47	No Data	57
M151	56	54	49	40	51	50
M152	54	54	49	39	51	49
M153	54	54	51	39	52	50
M154	57	54	50	40	52	50
FEG223-04	57	54	51	40	51	51
FEG226-31	57	55	49	34	52	49
FEG227-17	59	54	50	40	52	51
FEG228-13	57	54	51	34	52	50
ND26891	58	54	50	41	52	51
ND27177	60	54	49	39	53	51
ND27245	62	54	50	40	53	52
ND28993	56	54	49	33	52	49
ND29134	58	53	48	37	50	49
ND29144	61	54	48	34	51	49

Table 3. cont: Mean days to heading after planting of entries grown in 2012 NABSEN Nursery at five locations.

Line	Fargo	Langdon	Brandon	Crookston	St. Paul	Mean
ND29157	61	54	50	40	51	51
ND29193	58	54	49	39	51	50
2ND27421	56	54	50	37	50	49
2ND27440	64	55	53	45	56	55
2ND28065	59	55	51	34	52	50
2ND28131	58	54	49	33	49	49
2ND29827	57	54	49	38	49	49
2ND29863	62	55	51	41	55	53
2ND30002	59	54	49	33	50	49
2ND30010	56	55	50	38	50	50
2B05-0811	64	57	51	43	57	54
2B09-3408	68	57	51	45	55	55
2B09-3422	63	56	51	45	54	54
2B09-3425	63	56	51	35	55	52
6B08-3210	66	55	53	35	52	52
6B09-3531	58	54	49	39	51	50
6B09-3655	57	54	48	39	51	50
6B09-4235	62	54	49	39	53	51
QUEST	56	54	50	40	51	50
Conlon	59	55	47	37	49	49
ND 20493	58	53	48	32	51	48
Robust	55	54	50	35	53	50
Chevron	66	58	51	46	57	56
Stander	59	55	51	43	56	53

Table 4. Mean for DON (ppm) entries grown in 2012 NABSEN Nursery at seven locations.

						Misted			Dryland
Line	Fargo*	Langdon	Brandon	Crookston	St. Paul	mean	Osnabrock	Casselton	mean
TR12225	1.4	29.9	3.2	2.5	3.0	8.0	2.4	0.06	1.2
TR12226	2.0	36.3	1.0	1.2	2.4	8.6	1.6	0.07	0.8
TR12228	2.6	36.9	0.9	1.3	5.1	9.4	1.5	0.04	0.8
HB129	0.1	49.2	3.2	1.0	4.8	11.7	1.1	0.00	0.6
SB090163	2.2	34.8	2.7	1.5	2.3	8.7	1.4	0.03	0.7
SM090108	2.6	39.8	1.3	3.1	3.9	10.1	1.2	0.01	0.6
SM090503	3.5	58.1	1.6	2.8	5.9	14.4	0.5	0.01	0.3
SM095253	9.7	45.6	2.2	2.0	4.3	12.8	1.5	0.00	0.8
TR12602	0.9	39.8	1.6	1.3	7.9	10.3	0.7	0.00	0.4
TR12603	5.6	26.1	1.3	4.3	5.2	8.5	1.0	0.00	0.5
TR12604	12.1	46.6	3.0	4.6	4.4	14.2	0.8	0.20	0.5
TR12605	7.4	47.5	1.4	1.7	13.1	14.2	0.6	0.00	0.3
M151	3.6	23.9	4.6	5.3	4.4	8.3	2.6	0.04	1.3
M152	1.8	18.8	3.0	5.8	4.3	6.7	1.9	0.09	1.0
M153	4.0	26.1	2.7	10.3	8.2	10.3	1.2	0.01	0.6
M154	8.0	34.5	2.3	7.9	5.5	11.6	1.4	0.01	0.7
FEG223-04	3.0	23.6	3.7	11.1	5.5	9.4	2.3	0.03	1.2
FEG226-31	6.5	22.8	2.7	7.0	7.3	9.2	1.8	0.10	0.9
FEG227-17	5.2	20.1	3.1	6.1	2.8	7.5	1.8	0.01	0.9
FEG228-13	9.6	23.3	7.5	5.9	6.2	10.5	1.7	0.02	0.8
ND26891	8.0	37.3	7.6	6.5	14.1	14.7	2.5	0.02	1.2
ND27177	9.8	37.5	4.9	7.4	13.0	14.5	2.7	0.14	1.4
ND27245	5.7	37.8	7.7	2.9	7.0	12.2	1.9	0.00	0.9
ND28993	4.6	39.5	9.5	6.5	13.2	14.6	3.2	0.11	1.6
ND29134	9.2	22.7	4.3	5.2	5.5	9.4	2.2	0.01	1.1
ND29144	12.9	42.9	2.6	9.9	12.6	16.2	3.6	0.01	1.8

*only rep 1 used

Table 4. cont: Mean for DON (ppm) entries grown in 2012 NABSEN Nursery at seven locations.

						Misted			Dryland
Line	Fargo*	Langdon	Brandon	Crookston	St. Paul	mean	Osnabrock	Casselton	mean
ND29157	21.4	34.2	5.9	12.7	14.7	17.8	3.9	0.01	2.0
ND29193	13.6	43.1	7.6	10.1	15.1	17.9	4.1	0.13	2.1
2ND27421	4.6	16.9	2.7	3.1	4.4	6.3	2.0	0.01	1.0
2ND27440	3.9	23.3	3.2	2.6	1.9	7.0	0.5	0.02	0.3
2ND28065	4.2	31.3	2.2	0.7	2.7	8.2	0.5	0.05	0.3
2ND28131	8.9	24.2	2.2	7.4	6.2	9.8	2.1	0.01	1.0
2ND29827	3.1	8.4	1.1	2.8	3.1	3.7	1.7	0.03	0.9
2ND29863	7.4	19.6	2.2	1.2	1.1	6.3	0.6	0.01	0.3
2ND30002	7.1	28.1	3.6	5.4	3.5	9.6	1.2	0.04	0.6
2ND30010	5.6	19.7	1.4	3.0	4.2	6.8	1.6	0.00	0.8
2B05-0811	6.6	36.1	2.0	4.4	4.1	10.7	0.7	0.00	0.4
2B09-3408	12.4	95.4	8.8	6.1	6.1	25.8	0.5	0.00	0.3
2B09-3422	19.3	41.1	4.0	2.7	6.0	14.6	1.4	0.10	0.8
2B09-3425	6.2	55.7	3.6	3.8	2.6	14.4	1.2	0.03	0.6
6B08-3210	16.0	38.8	9.1	8.9	10.1	16.6	2.6	0.06	1.3
6B09-3531	6.1	17.4	4.7	5.3	8.3	8.4	3.2	0.06	1.6
6B09-3655	1.2	41.1	8.7	6.8	10.2	13.6	2.5	0.04	1.3
6B09-4235	2.1	46.4	10.7	11.5	15.8	17.3	3.9	0.13	2.0
QUEST	5.4	31.7	3.0	5.9	4.7	10.1	1.7	0.06	0.9
Conlon	2.8	11.3	0.7	3.6	3.3	4.3	1.3	0.05	0.7
ND 20493	0.7	12.9	1.0	3.9	5.0	4.7	2.4	0.00	1.2
Robust	8.3	45.9	2.9	7.9	5.5	14.1	2.4	0.13	1.3
Chevron	0.8	30.3	1.3	1.1	2.4	7.2	0.8	0.00	0.4
Stander	11.5	48.8	7.3	17.1	16.4	20.2	3.1	0.05	1.6

* only 1 rep used

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

	Days to [1]	FHB [2] incidence		FHB[3] severity		DON ppm[4]	
Label	head	misted	dryland	misted	dryland	misted	dryland
TR12225	53	83	23.3	12	2.4	8.0	1.2
TR12226	52	71	33.3	9	3.0	8.6	0.8
TR12228	54	71	26.7	9	2.4	9.4	0.8
HB129	51	83	23.3	11	1.0	11.7	0.6
SB090163	50	80	43.3	11	6.3	8.7	0.7
SM090108	54	66	20.0	7	1.9	10.1	0.6
SM090503	56	72	10.0	10	0.5	14.4	0.3
SM095253	53	70	20.0	10	1.6	12.8	0.8
TR12602	55	78	20.0	9	1.2	10.3	0.4
TR12603	50	78	36.7	10	2.8	8.5	0.5
TR12604	54	75	20.0	11	1.3	14.2	0.5
TR12605	57	76	33.3	13	1.4	14.2	0.3
M151	50	73	46.7	13	2.2	8.3	1.3
M152	49	89	30.0	14	1.5	6.7	1.0
M153	50	77	43.3	12	1.4	10.3	0.6
M154	50	90	46.7	14	2.2	11.6	0.7
FEG223-04	51	88	53.3	13	2.3	9.4	1.2
FEG226-31	49	97	40.0	18	1.9	9.2	0.9
FEG227-17	51	79	43.3	12	1.7	7.5	0.9
FEG228-13	50	91	46.7	17	1.7	10.5	0.8
ND26891	51	95	40.0	18	1.7	14.7	1.2
ND27177	51	93	46.7	16	1.9	14.5	1.4
ND27245	52	92	46.7	16	1.5	12.2	0.9
ND28993	49	97	66.7	24	2.8	14.6	1.6
ND29134	49	92	63.3	21	3.3	9.4	1.1
ND29144	49	98	50.0	23	2.5	16.2	1.8

[1]Date from planting to 50% of heads 50% emerged at seven locations, except for Brandon, MN had 80% heads 50% emerged.
[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.

	Days to [1]	FHB [2] incidence		FHB[3] severity		DON ppm[4]	
Label	head	misted	dryland	misted	dryland	misted	dryland
ND29157	51	97	60.0	27	2.5	17.8	2.0
ND29193	50	91	46.7	19	3.3	17.9	2.1
2ND27421	49	78	43.3	15	3.4	6.3	1.0
2ND27440	55	76	23.3	11	1.2	7.0	0.3
2ND28065	50	71	20.0	9	0.8	8.2	0.3
2ND28131	49	67	40.0	15	2.7	9.8	1.0
2ND29827	49	74	23.3	6	1.3	3.7	0.9
2ND29863	53	71	43.3	7	3.9	6.3	0.3
2ND30002	49	70	40.0	10	2.1	9.6	0.6
2ND30010	50	82	86.7	16	10.3	6.8	0.8
2B05-0811	54	79	10.0	12	0.5	10.7	0.4
2B09-3408	55	89	33.3	17	2.1	25.8	0.3
2B09-3422	54	86	40.0	15	2.8	14.6	0.8
2B09-3425	52	76	23.3	12	1.8	14.4	0.6
6B08-3210	52	86	40.0	15	1.7	16.6	1.3
6B09-3531	50	94	70.0	22	3.5	8.4	1.6
6B09-3655	50	82	66.7	20	3.3	13.6	1.3
6B09-4235	51	89	66.7	25	2.3	17.3	2.0
QUEST	50	81	20.0	12	1.1	10.1	0.9
Conlon	49	70	43.3	10	3.5	4.3	0.7
ND 20493	48	89	66.7	10	2.3	4.7	1.2
Robust	50	93	50.0	22	3.3	14.1	1.3
Chevron	56	66	6.7	5	0.1	7.2	0.4
Stander	53	97	53.3	22	1.6	20.2	1.6

[1] Date from planting to 50% of heads 50% emerged at seven locations except for Brandon, MN had 80% heads 50% emerged.
[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	3.8	4	5.7	-1
Langdon,ND	1.5	1.2	4.5	0.3
Prosper,ND*	4	3	5	0
St. Paul,MN	4.6	3.5	1.1	2
Crookston, MN	3	1	5	-1
Brandon,MA	n/a	2.5	5.8	4.1

*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	-0.9	-1.27	-1.7	-0.98
Langdon,ND	-0.9	-1.86	0.24	-0.4
Prosper,ND*	-1.3	-1.3	-2.82	-1.72
St. Paul,MN	5.98	-0.66	0.86	-2.92
Crookston, MN	-1.68	-0.89	0.69	-1.44
Brandon,MA	n/a	-1.24	-0.95	-1.96

*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	Osnabrock	Casselton
Fargo	1.0	*0.29	*0.35	**0.45	**0.43	*0.3	0.2
Langdon	*0.29	1.0	**0.38	0.12	*0.31	-0.09	0.10
Brandon	*0.35	**0.38	1.0	**0.55	**0.64	**0.56	*0.30
St. Paul	**0.45	0.12	**0.55	1.0	**0.69	**0.69	0.26
Crookston-misted	**0.43	*0.31	**0.64	**0.69	1.0	**0.69	0.27
Osnabrock	*0.30	-0.09	**0.56	**0.69	**0.69	1.0	*0.36
Casselton	0.20	0.10	*0.30	0.26	0.27	*0.36	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 2012

ENTRY	Name	Pedigree	Type	Institution
1	TR12225	TR04282/BM9831D-229	2-row	Agriculture and Agri-Food Canada (Legge)
2	TR12226	TR04282/BM9831D-229	2-row	Agriculture and Agri-Food Canada (Legge)
3	TR12228	TR04282/TR03277	2-row	Agriculture and Agri-Food Canada (Legge)
4	HB129	Millhouse//Millhouse/HB808	2-row	Agriculture and Agri-Food Canada (Badea)
5	SB090163	Vodohray/TR05387	2-row	CDC-University of Saskatchewan
6	SM090108	SM04394/TR05288	2-row	CDC-University of Saskatchewan
7	SM090503	TR05286/SM04450	2-row	CDC-University of Saskatchewan
8	SM095253	SM04767s/TR06293	2-row	CDC-University of Saskatchewan
9	TR12602	TR653/H92020115X	2-row	FCDC-Alberta Agriculture
10	TR12603	CDC DOLLY/TR645	2-row	FCDC-Alberta Agriculture
11	TR12604	H94061072Z/H93125008	2-row	FCDC-Alberta Agriculture
12	TR12605	I92124/TR238//SEEBE	2-row	FCDC-Alberta Agriculture
13	M151	Quest / M129	6-row	University of Minnestoa
14	M152	FEG175-48 / M135	6-row	University of Minnestoa
15	M153	FEG167-01 / FEG175-48	6-row	University of Minnestoa
16	M154	M143 / M137	6-row	University of Minnestoa
17	FEG223-04	M04-40 / Quest	6-row	University of Minnestoa
18	FEG226-31	FEG160-03 / M137	6-row	University of Minnestoa
19	FEG227-17	FEG167-25 / M141	6-row	University of Minnestoa
20	FEG228-13	FEG169-04 / M136	6-row	University of Minnestoa
21	ND26891	ND21376/ND20299	6-row	North Dakota State University
22	ND27177	Stellar-ND/ND23530	6-row	North Dakota State University
23	ND27245	Quest/ND23497	6-row	North Dakota State University
24	ND28993	ND22466/ND22783	6-row	North Dakota State University
25	ND29134	ND24833/6B01-2218	6-row	North Dakota State University
26	ND29144	ND24867/6B01-2218	6-row	North Dakota State University

Table 9. cont: Pedigree and source of breeding lines tested for FHB resistance in 2012

ENTRY	Name	Pedigree	Type	Institution
27	ND29157	ND20299/ND24706	6-row	North Dakota State University
28	ND29193	ND20299/ND21786	6-row	North Dakota State University
29	2ND27421	2ND24253/2ND24519	2-row	North Dakota State University
30	2ND27440	2ND24190/2ND22895	2-row	North Dakota State University
31	2ND28065	2ND21867/2ND24238	2-row	North Dakota State University
32	2ND28131	2ND24238/2ND24341	2-row	North Dakota State University
33	2ND29827	2ND22927/2ND24263	2-row	North Dakota State University
34	2ND29863	2ND22927/2ND25265	2-row	North Dakota State University
35	2ND30002	2ND24388/2ND24527	2-row	North Dakota State University
36	2ND30010	2ND24388/2ND25265	2-row	North Dakota State University
37	2B05-0811	2B99-2763/2B00-0719	2-row	BAR - LLC
38	2B09-3408	MERIT 57/2B03-3719	2-row	BAR - LLC
39	2B09-3422	2B99-2763-10/2B03-3681	2-row	BAR - LLC
40	2B09-3425	2B05-0550/2B99-2763-10	2-row	BAR - LLC
41	6B08-3210	6B03-4452 / CDC YORKTON	6-row	BAR - LLC
42	6B09-3531	6B98-9558 / 6B04-0096 // 6B01-2205 / SM03720	6-row	BAR - LLC
43	6B09-3655	6B04-0012 / 6B04-0421	6-row	BAR - LLC
44	6B09-4235	6B04-0007 / 6B04-0421	6-row	BAR - LLC
45	QUEST	FEG18-20 / M110	6-row	Check
46	Conlon	BOWMAN*2/DWS1008/ND10232	2-row	Check
47	ND 20493	ND16918*2/CIho 6611	6-row	Check
48	Robust	MOREX/MANKER	6-row	Check
49	Chevron	UNKNOWN	6-row	Check
50	Stander	ROBUST*2/3/CREE/BONANZA//MANKER/4/ROBUST/BUMBER	6-row	Check