2019

NORTH AMERICAN BARLEY SCAB EVALUATION NURSERY (NABSEN) REPORT

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INTRODUCTION

The 2019 North American Barley Scab Evaluation Nursery (NABSEN) was grown at Fargo, Langdon, and Casselton, ND; St. Paul and Crookston MN, and Brandon, Manitoba. Nurseries either were misted or non-misted (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 ND20493 (resistant six-row checks), Robust and Stander (susceptible six-row checks), and Conlon (resistant two-row check). At all locations percent severity of FHB was determined around the middle dough stage by determining the ratio of infected kernels to total kernels on 10-20 spikes per entry, and then multiplying by 100.

RESULTS

There was no FHB disease severity taken at Casselton and Osnabrock dryland nurseries. FHB disease severity levels were high at Fargo, Langdon, St. Paul and moderate at Brandon and Crookston 2019. DON levels were highest in Fargo, Brandon and St.Paul and moderate at Langdon. DON levels were high and Casselton and very low at Osnabrock the two-dryland locations (Table 4). 2ND35693, 2ND34962, TR19651 and TR19653 the lowest DON levels in the misted trials.

Temperatures were below the 30-year average (Table. 6), for May and August at all locations. St. Paul was the only location below the 30 year average in June and July.

Precipitation were below the 30-year average at all locations May except for St. Paul which was 2.0 in. above normal. June precipitation was below average at all locations except for Casselton, ND. All locations were had near normal precipitation or were above for July and August (Table 7).

Site details are as follows:

Fargo, & 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%

Osnabrock, ND – Richard Horsley

- Dryland
- 3 Replicates
- Disease incidence or severity – none taken
- DON content (ppm) measured by GC/ECD by P. Schwarz, NDSU on a composite sample of 3 replicates

Casselton, ND – Marie Timmerman and Austin Case

- Dryland
- 3 replicates
- Disease incidence or severity – none taken
- 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 (Crookston and St. Paul))
- 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 (no DON data for St. Paul)
- Day to heading counted from date planted to 50% of heads emerged 50%

BRANDON, MANITOBA – Ana Badea 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 2019 NABSEN Nursery at five locations.

LINE	Fargo	Langdon	Brandon	Crookston	St. Paul	**Mean**
2ND34634	20.6	27.2	7.4	6.83	29.3	**18.3**
2ND34697	26.6	27.5	6.0	19.50	24.2	**20.7**
2ND34954	34.6	28.3	9.5	11.33	31.8	**23.1**
2ND34962	37.0	28.8	8.4	13.00	41.8	**25.8**
2ND35415	49.1	28.1	17.9	33.83	36.2	**33.0**
2ND35530	41.4	29.0	10.3	19.33	24.3	**24.9**
2ND35645	39.2	32.3	4.7	20.50	35.5	**26.4**
2ND35693	40.8	33.6	6.3	10.00	31.5	**24.4**
S2M177	33.3	40.3	9.3	30.00	39.0	**30.4**
S2M178	41.1	27.8	25.6	17.33	26.0	**27.6**
S2M179	24.2	25.0	6.8	11.33	44.0	**22.3**
S2M180	32.3	29.3	9.3	6.17	34.8	**22.4**
S2M181	41.1	28.5	10.8	35.67	31.0	**29.4**
S2M182	37.0	31.2	14.0	25.67	28.7	**27.3**
S2M183	39.9	31.5	16.2	15.17	28.8	**26.3**
TM15.162-11	37.4	26.8	11.6	20.00	29.8	**25.1**
2IK14-8413	32.5	29.4	8.7	12.83	45.7	**25.8**
2IK15-9744	31.5	24.9	9.7	15.67	48.8	**26.1**
2IK15-9700	39.8	26.9	8.0	13.83	31.3	**24.0**
2IK15-9655	39.0	28.9	11.3	15.17	41.0	**27.1**
2IK15-9694	32.6	28.4	11.8	11.70	50.7	**27.0**

Table 1. cont.: Mean FHB severity of entries grown in the 2019 NABSEN Nursery at five locations.

LINE	Fargo	Langdon	Brandon	Crookston	St. Paul	**Mean**
2B11-4949	47.7	30.5	14.4	9.17	55.3	**31.4**
2IM14-8212	26.9	30.1	12.4	22.83	51.7	**28.8**
TR19176	33.2	25.8	10.4	5.83	40.8	**23.2**
TR19177	19.3	25.7	4.0	4.83	31.3	**17.0**
TR19178	37.2	27.7	8.0	15.83	28.0	**23.3**
TR19179	25.3	26.0	6.7	6.17	26.7	**18.2**
TR18262	28.6	25.7	4.6	8.67	44.0	**22.3**
TR19264	36.9	35.9	5.2	15.83	26.0	**23.9**
TR19266	29.0	26.5	6.7	10.67	33.2	**21.2**
TR19268	18.5	32.0	6.1	7.00	43.8	**21.5**
TR19651	21.7	26.0	4.0	8.50	30.8	**18.2**
TR19653	16.0	23.7	4.7	6.17	33.2	**16.8**
SR19546	37.5	37.1	12.8	47.67	45.2	**36.1**
SR18524	47.7	51.0	29.8	43.83	41.6	**42.8**
QUEST	32.4	32.5	6.8	19.83	19.2	**22.1**
Conlon	34.4	29.4	5.3	41.00	42.0	**30.4**
ND20493	35.3	36.7	3.1	58.33	29.5	**32.6**
Robust	42.5	34.3	13.2	33.83	35.0	**31.8**
Chevron	18.6	22.2	1.9	3.37	15.8	**12.4**
Stander	57.7	41.3	16.5	50.33	43.7	**41.9**

Table 2. Mean disease incidence of entries grown in the 2019 NABSEN Nursery at three locations.

LINE	Fargo	Langdon	Brandon	**Mean**
2ND34634	90.0	76.7	65.0	**77.2**
2ND34697	96.7	80.0	67.5	**81.4**
2ND34954	100.0	80.0	77.5	**85.8**
2ND34962	96.7	83.3	72.5	**84.2**
2ND35415	100.0	86.7	92.5	**93.1**
2ND35530	100.0	83.3	82.5	**88.6**
2ND35645	100.0	86.7	62.5	**83.1**
2ND35693	100.0	100.0	70.0	**90.0**
S2M177	100.0	80.0	77.5	**85.8**
S2M178	100.0	80.0	97.5	**92.5**
S2M179	96.7	70.0	65.0	**77.2**
S2M180	100.0	83.3	85.0	**89.4**
S2M181	100.0	83.3	85.0	**89.4**
S2M182	100.0	90.0	85.0	**91.7**
S2M183	100.0	93.3	90.0	**94.4**
TM15.162-11	100.0	73.3	95.0	**89.4**
2IK14-8413	100.0	76.7	77.5	**84.7**
2IK15-9744	96.7	70.0	82.5	**83.1**
2IK15-9700	100.0	73.3	80.0	**84.4**
2IK15-9655	100.0	80.0	87.5	**89.2**
2IK15-9694	100.0	76.7	92.5	**89.7**

Table 2. cont.: Mean disease incidence of entries grown in the 2019 NABSEN Nursery at three locations.

LINE	Fargo	Langdon	Brandon	**Mean**
2B11-4949	100.0	80.0	97.5	**92.5**
2IM14-8212	100.0	83.3	100.0	**94.4**
TR19176	96.7	76.7	82.5	**85.3**
TR19177	86.7	76.7	62.5	**75.3**
TR19178	96.7	80.0	85.0	**87.2**
TR19179	93.3	66.7	80.0	**80.0**
TR18262	96.7	70.0	65.0	**77.2**
TR19264	100.0	90.0	70.0	**86.7**
TR19266	100.0	76.7	85.0	**87.2**
TR19268	80.0	93.3	77.5	**83.6**
TR19651	100.0	76.7	75.0	**83.9**
TR19653	83.3	60.0	72.5	**71.9**
SR19546	100.0	100.0	92.5	**97.5**
SR18524	100.0	100.0	100.0	**100.0**
QUEST	100.0	96.7	80.0	**92.2**
Conlon	96.7	76.7	70.0	**81.1**
ND20493	100.0	96.7	65.0	**87.2**
Robust	96.7	100.0	100.0	**98.9**
Chevron	93.3	50.0	67.5	**70.3**
Stander	100.0	100.0	95.0	**98.3**

Table 3. Mean days to heading after planting of entries grown in 2019 NABSEN Nursery at four locations.

LINE	Fargo	Langdon	Brandon[1]	St. Paul	**Mean**
2ND34634	60.0	53.7	51.8	50.0	**53.9**
2ND34697	59.0	53.7	54.5	49.3	**54.1**
2ND34954	59.0	53.0	54.3	51.0	**54.3**
2ND34962	57.3	53.0	53.3	50.3	**53.5**
2ND35415	58.0	52.7	54.3	48.7	**53.4**
2ND35530	58.0	52.7	55.0	51.7	**54.3**
2ND35645	58.3	53.0	51.8	50.0	**53.3**
2ND35693	57.7	53.7	55.0	50.0	**54.1**
S2M177	58.7	55.0	54.3	51.3	**54.8**
S2M178	62.0	56.3	55.0	55.0	**57.1**
S2M179	60.7	54.7	55.0	51.0	**55.3**
S2M180	59.3	54.0	55.3	50.3	**54.7**
S2M181	59.0	53.7	51.0	49.7	**53.3**
S2M182	59.3	55.0	55.0	50.0	**54.8**
S2M183	60.3	55.0	55.0	50.7	**55.3**
TM15.162-11	59.0	54.7	55.0	50.0	**54.7**
2IK14-8413	61.0	55.0	55.0	53.0	**56.0**
2IK15-9744	61.7	55.3	55.0	50.7	**55.7**
2IK15-9700	60.7	55.3	54.3	50.7	**55.2**
2IK15-9655	61.0	55.7	54.0	50.3	**55.3**
2IK15-9694	61.0	57.0	55.0	52.0	**56.3**

[1]Day to heading counted from date planted to 80% of heads emerged 50%; other locations 50% heads emerged 50%

Table 3. cont.: Mean days to heading after planting of entries grown in 2019 NABSEN Nursery at four locations.

LINE	Fargo	Langdon	Brandon[1]	St. Paul	**Mean**
2B11-4949	58.3	56.3	55.0	53.3	**55.8**
2IM14-8212	59.0	56.0	55.0	51.3	**55.3**
TR19176	63.7	57.3	55.0	54.3	**57.6**
TR19177	63.3	58.0	58.5	52.3	**58.0**
TR19178	61.0	55.3	55.0	51.7	**55.8**
TR19179	63.7	57.7	57.0	54.7	**58.3**
TR18262	62.3	55.7	55.0	53.0	**56.5**
TR19264	59.3	54.3	52.8	52.7	**54.8**
TR19266	62.0	55.7	55.0	52.0	**56.2**
TR19268	63.3	56.0	55.5	53.7	**57.1**
TR19651	63.3	57.0	55.3	54.0	**57.4**
TR19653	63.7	54.0	55.0	52.7	**56.3**
SR19546	61.0	54.7	54.3	51.0	**55.2**
SR18524	58.7	54.0	55.0	50.3	**54.5**
QUEST	59.7	53.7	54.0	50.0	**54.3**
Conlon	55.7	52.3	50.0	49.3	**51.8**
ND20493	57.3	52.7	50.0	48.7	**52.2**
Robust	59.3	56.3	55.0	50.3	**55.3**
Chevron	64.0	59.7	58.5	55.0	**59.3**
Stander	59.7	56.3	54.5	49.0	**54.9**

[1]Day to heading counted from date planted to 80% of heads emerged 50%; other locations 50% heads emerged 50%

Table 4. Mean for DON (ppm) entries grown in 2019 NABSEN Nursery at seven locations.

	Misted						Non-misted		
LINE	Fargo	Langdon	Brandon	Crookston	St. Paul	**Mean**	Casselton	Osnabrock	**Mean**
2ND34634	37.8	3.6	10.4	22.0	12.2	**17.2**	4.3	0.0	**2.2**
2ND34697	50.0	5.0	10.5	28.4	8.1	**20.4**	4.3	0.1	**2.2**
2ND34954	33.5	4.0	9.2	10.6	6.9	**12.8**	3.8	0.0	**1.9**
2ND34962	26.0	3.1	8.3	6.9	9.0	**10.7**	2.3	0.1	**1.2**
2ND35415	42.3	2.3	11.4	43.4	9.1	**21.7**	4.1	0.0	**2.1**
2ND35530	46.7	4.4	8.7	17.1	3.4	**16.1**	4.3	0.0	**2.2**
2ND35645	29.9	4.1	6.3	19.5	10.6	**14.1**	3.8	0.0	**1.9**
2ND35693	29.3	4.1	4.8	10.7	9.7	**11.7**	3.2	0.0	**1.6**
S2M177	44.5	2.7	12.0	18.2	18.9	**19.3**	6.7	0.6	**3.7**
S2M178	36.5	4.7	12.2	3.0	5.4	**12.4**	4.2	0.0	**2.1**
S2M179	21.4	3.0	7.8	14.5	22.1	**13.8**	4.1	0.0	**2.0**
S2M180	25.9	4.7	4.4	37.4	6.2	**15.7**	3.5	0.0	**1.8**
S2M181	25.6	3.6	14.9	38.2	6.2	**17.7**	7.4	0.0	**3.7**
S2M182	40.2	10.8	9.3	12.5	16.8	**17.9**	5.0	0.1	**2.6**
S2M183	30.5	4.4	12.1	14.9	14.5	**15.3**	4.6	0.1	**2.4**
TM15.162-11	33.5	3.9	11.4	17.5	12.1	**15.7**	4.2	0.0	**2.1**
2IK14-8413	35.8	8.7	7.4	19.1	16.7	**17.5**	5.2	0.0	**2.6**
2IK15-9744	15.7	2.7	4.0	19.1	25.2	**13.3**	2.3	0.0	**1.1**
2IK15-9700	32.3	5.6	4.4	40.9	11.3	**18.9**	2.3	0.0	**1.1**
2IK15-9655	33.3	3.4	8.0	22.0	7.0	**14.7**	0.9	0.0	**0.5**
2IK15-9694	24.2	5.0	7.8	35.4	33.0	**21.1**	2.5	0.0	**1.2**

Table 4. cont.: Mean for DON (ppm) entries grown in 2019 NABSEN Nursery at seven locations.

	Misted						Non-misted		
Line	Fargo	Langdon	Brandon	Crookston	St. Paul	**Mean**	Casselton	Osnabrock	**Mean**
2B11-4949	47.3	6.4	14.0	10.3	18.4	**19.3**	1.4	0.0	**0.7**
2IM14-8212	48.2	5.7	15.4	7.1	39.5	**23.2**	2.5	0.0	**1.3**
TR19176	28.3	3.6	7.0	22.5	14.7	**15.2**	2.7	0.0	**1.4**
TR19177	19.7	4.3	1.7	25.0	31.2	**16.4**	1.6	0.2	**0.9**
TR19178	25.8	3.9	4.7	43.1	22.3	**19.9**	2.3	0.0	**1.2**
TR19179	34.9	3.5	3.9	20.2	9.8	**14.5**	2.8	0.0	**1.4**
TR18262	25.5	3.9	3.6	11.0	26.0	**14.0**	3.4	0.0	**1.7**
TR19264	36.3	7.0	12.1	48.6	8.3	**22.5**	2.7	0.0	**1.4**
TR19266	40.4	6.9	7.3	22.8	10.0	**17.5**	5.6	0.0	**2.8**
TR19268	35.3	8.8	4.7	15.0	24.7	**17.7**	3.8	0.0	**1.9**
TR19651	17.0	3.5	3.2	11.2	6.5	**8.3**	5.3	0.0	**2.6**
TR19653	14.5	2.3	4.0	10.6	14.3	**9.1**	3.1	0.1	**1.6**
SR19546	64.3	11.5	19.1	39.8	21.3	**31.2**	10.9	0.1	**5.5**
SR18524	48.2	10.1	20.3	36.3	43.1	**31.6**	9.9	0.0	**4.9**
QUEST	36.5	7.9	6.0	11.3	4.9	**13.3**	3.3	0.0	**1.7**
Conlon	27.3	4.5	7.3	13.0	2.3	**10.9**	2.2	0.2	**1.2**
ND20493	40.7	3.6	7.7	4.5	7.5	**12.8**	7.0	0.0	**3.5**
Robust	68.9	14.7	11.3	42.1	21.3	**31.6**	7.1	0.0	**3.6**
Chevron	16.4	1.8	4.0	4.1	11.0	**7.5**	0.6	0.3	**0.5**
Stander	71.1	16.0	20.7	54.0	42.7	**40.9**	18.0	0.0	**9.0**

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

LINE	Day to Head[1]	FHB[2]	FHB[3]	DON Misted[4]	DON Non-misted[4]
2ND34634	53.9	77.2	18.3	17.2	2.2
2ND34697	54.1	81.4	20.7	20.4	2.2
2ND34954	54.3	85.8	23.1	12.8	1.9
2ND34962	53.5	84.2	25.8	10.7	1.2
2ND35415	53.4	93.1	33.0	21.7	2.1
2ND35530	54.3	88.6	24.9	16.1	2.2
2ND35645	53.3	83.1	26.4	14.1	1.9
2ND35693	54.1	90.0	24.4	11.7	1.6
S2M177	54.8	85.8	30.4	19.3	3.7
S2M178	57.1	92.5	27.6	12.4	2.1
S2M179	55.3	77.2	22.3	13.8	2.0
S2M180	54.7	89.4	22.4	15.7	1.8
S2M181	53.3	89.4	29.4	17.7	3.7
S2M182	54.8	91.7	27.3	17.9	2.6
S2M183	55.3	94.4	26.3	15.3	2.4
TM15.162-11	54.7	89.4	25.1	15.7	2.1
2IK14-8413	56.0	84.7	25.8	17.5	2.6
2IK15-9744	55.7	83.1	26.1	13.3	1.1
2IK15-9700	55.2	84.4	24.0	18.9	1.1
2IK15-9655	55.3	89.2	27.1	14.7	0.5
2IK15-9694	56.3	89.7	27.0	21.1	1.2

[1]Date from planting when 50% of heads 50% emerged at three locations.
[2]FHB incidence means at three locations.
[3]FHB severity incidence at five locations.
[4]DON content means at five locations for misted and two for dryland.

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

LINE	Day to Head[1]	FHB[2]	FHB[3]	DON Misted[4]	DON Non-misted[4]
2B11-4949	55.8	92.5	31.4	19.3	0.7
2IM14-8212	55.3	94.4	28.8	23.2	1.3
TR19176	57.6	85.3	23.2	15.2	1.4
TR19177	58.0	75.3	17.0	16.4	0.9
TR19178	55.8	87.2	23.3	19.9	1.2
TR19179	58.3	80.0	18.2	14.5	1.4
TR18262	56.5	77.2	22.3	14.0	1.7
TR19264	54.8	86.7	23.9	22.5	1.4
TR19266	56.2	87.2	21.2	17.5	2.8
TR19268	57.1	83.6	21.5	17.7	1.9
TR19651	57.4	83.9	18.2	8.3	2.6
TR19653	56.3	71.9	16.8	9.1	1.6
SR19546	55.2	97.5	36.1	31.2	5.5
SR18524	54.5	100.0	42.8	31.6	4.9
QUEST	54.3	92.2	22.1	13.3	1.7
Conlon	51.8	81.1	30.4	10.9	1.2
ND20493	52.2	87.2	32.6	12.8	3.5
Robust	55.3	98.9	31.8	31.6	3.6
Chevron	59.3	70.3	12.4	7.5	0.5
Stander	54.9	98.3	41.9	40.9	9.0

[1]Date from planting when 50% of heads 50% emerged at three locations.
[2]FHB incidence means at three locations.
[3]FHB severity means at five locations.
[4]DON content means at five locations for misted and two for dryland.

Table 6. Temperature (°F) compared to the 30-year average 2019

Location	May	June	July	August
Fargo, ND	-3	+1	+1	-2
Langdon, ND	-3	+2	+1	-2
Casselton, ND	-5	0	+3	-4
St. Paul, MN	-4	-1.4	-.5	-1.5
Crookston, MN	-5	+1.6	+1.8	-1.3

Table 7. Rainfall (in.) compared to the 30-year average 2019.

Location	May	June	July	August
Fargo, ND	0	-.6	+2	+1
Langdon, ND	-1	-.75	-.5	+.5
Casselton, ND	-.6	+1	+2.7	+1.4
St. Paul, MN	+2.0	-.7	+1.1	+.7
Crookston, MN	-1.5	-2.5	+.3	+1.4

Table 8. Correlation among location for DON levels content in 2019.

	Misted					Dryland	
Location	Fargo	Langdon	Brandon	Crookston	St. Paul	Osnabrock	Casselton
Fargo	1.0	0.75**	0.73**	0.39*	0.27	-0.05	0.67**
Langdon	0.75**	1.0	0.53*	0.45*	0.45*	-.19	0.68**
Brandon	0.73**	0.53*	1.0	0.36*	0.36*	-0.01	0.68**
Crookston	0.39*	0.45*	0.36*	1.0	0.28	-0.18	0.44*
St. Paul	0.27	0.45*	0.36*	0.28	1.0	-0.002	0.39*
Osnabrock	-0.05	-0.19	-0.01	-0.18	-0.002	1.0	-0.02
Casselton	0.67**	0.68**	0.68**	0.44*	0.39*	-0.02	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 2019

ENTRY	LINE	PEDIGREE	Row type	Program
1	2ND34634	2ND28131/2ND27699	2	North Dakota State University
2	2ND34697	2ND26333/2ND27705	2	North Dakota State University
3	2ND34954	2ND29977/2ND29990	2	North Dakota State University
4	2ND34962	2ND29977/2ND29990	2	North Dakota State University
5	2ND35415	ND GENESIS/2ND29990	2	North Dakota State University
6	2ND35530	2ND28131/2ND29990	2	North Dakota State University
7	2ND35645	2ND29990/2ND30639	2	North Dakota State University
8	2ND35693	2ND29990/2ND30658	2	North Dakota State University
9	S2M177 (TM14.013-41)	ND21865-6/ND-Genesis	2	University of Minnesota
10	S2M178 (TM14.030-7)	ND-Genesis/ND24510	2	University of Minnesota
11	S2M179 (TM15.002-12)	ND11853//CMB85-533/ND13300/3/7*Bowman/4/ND-Genesis/5/ND23164	2	University of Minnesota
12	S2M180 (TM15.002-19)	ND11853//CMB85-533/ND13300/3/7*Bowman/4/ND-Genesis/5/ND23164	2	University of Minnesota
13	S2M181 (TM15.036-17)	ND-Genesis/ND24510//ND21865-6/ND-Genesis	2	University of Minnesota
14	S2M182 (TM15.162-27)	ND-Genesis/3/Bowman*7//Sen 'S'/ND10270/4/ND24388	2	University of Minnesota
15	S2M183 (TM16.001-07)	ND-Genesis/ND23146	2	University of Minnesota
16	TM15.162-11	ND-Genesis/3/Bowman*7//Sen 'S'/ND10270/4/ND24388	2	University of Minnesota
17	2IK14-8413	2B09-3778/2B09-3943	2	Anheuser-Busch InBev
18	2IK15-9744	2B08-2636/2B08-2637	2	Anheuser-Busch InBev
19	2IK15-9700	2B08-2636/2B08-2665	2	Anheuser-Busch InBev
20	2IK15-9655	2I08-3578/MERIT 57	2	Anheuser-Busch InBev
21	2IK15-9694	2B08-2847/2B10-4351	2	Anheuser-Busch InBev

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Table 9. cont.: Pedigree and source of breeding lines tested for FHB resistance in 2019

ENTRY	LINE	PEDIGREE	Row type	Program
22	2B11-4949	Merit57/MT050118	2	Anheuser-Busch InBev
23	2IM14-8212	2B09-3408/2B09-3944	2	Anheuser-Busch InBev
24	TR19176	AAC Synergy/CDC Fraser	2	CDC Univ. of SK
25	TR19177	SM110307/Claymore	2	CDC Univ. of SK
26	TR19178	TR10403/TR12133	2	CDC Univ. of SK
27	TR19179	CDC Bow/CDC Fraser	2	CDC Univ. of SK
28	TR18262	Cerveza/Xena	2	AAFC Brandon
29	TR19264	Grace/TR10214	2	AAFC Brandon
30	TR19266	AAC Synergy/2ND24263	2	AAFC Brandon
31	TR19268	AAC Synergy/TR09398	2	AAFC Brandon
32	TR19651	H97042002/BENTLEY	2	AAF FCDC
33	TR19653	J02039005/ BUSBY	2	AAF FCDC
34	SR19546	SUNDRE/VIVAR	6	AAF FCDC
35	SR18524	I09505/VIVAR	6	AAF FCDC
36	QUEST	FEG18-20 / M110	6	
37	Conlon	BOWMAN*2/DWS1008/ND10232	2	
38	ND20493	ND16918*2/CIho 6611	6	
39	Robust	MOREX/MANKER	6	
40	Chevron	UNKNOWN	6	
41	Stander	ROBUST*2/3/CREE/BONANZA// MANKER/4/ROBUST/BUMBER	6	