Report of the 2017 Uniform Regional Scab Nursery for Spring Wheat Parents

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The Uniform Regional Scab Nursery for Spring Wheat Parents (URSN) was grown for the 22nd year in 2017. Six locations (Brookings, SD, St. Paul and Crookston, MN, Prosper and Langdon, ND, and Morden, Canada) reported results.

A total of 20 entries was included in the 2017 URSN, in addition to the resistant checks 2375, BacUp, and ND2710, the susceptible checks Wheaton , Oslo, and Norm, and N10, a Norm near-isoline containing the resistance gene *Fhb1*. The entries were contributed by three university and one industry wheat breeding programs.

The core set of traits evaluated at the nursery locations varied, but included Fusarium head blight (FHB) incidence, FHB severity, and disease index (incidence x severity). In addition, visual scabby kernel ratings (VSK ≅ tombstone) and grain deoxynivalenol content were provided from two or more locations. Additional agronomic trait data are presented in individual location summary tables for locations where they were measured. Molecular marker genotypes for a set of FHB resistance QTLs and other traits are provided for entries. Adult plant leaf and stem rust reactions, as well as seedling stem rust reactions, are also presented.

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Table 1. Entries for the Uniform Regional Scab Nursery for Spring Wheat Parents, 2017.

No.	Entry	Pedigree	Market Class	First Year in URSN	Submitter	Organization
1	2375		Check			
2	Wheaton		Check			
3	Bacup		Check			
4	Oslo		Check			
5	ND2710		Check			
6	Norm		Check			
7	N10	Norm BC4 NIL with Fhb1	Check			
8	MN13304-5	Sabin//MN00187-3-1/MN07338	HRS	2017	J. Anderson	UMN
9	MN14138-4	Sabin/MN07067-2	HRS	2017	J. Anderson	UMN
10	MN14164-4	Sabin/MN07067-2//Norden	HRS	2017	J. Anderson	UMN
11	MN14470-5	Faller//Norden/MN07098-6	HRS	2017	J. Anderson	UMN
12	MN14669-1	Linkert/MN07098-6//Faller	HRS	2017	J. Anderson	UMN
13	SD4691	SD4338/SD4181	HRS	2017	K.Glover	SDSU
14	SD4705	MN08032-8/SD4338	HRS	2017	K.Glover	SDSU
15	SD4710	SD4023/BRICK	HRS	2017	K.Glover	SDSU
16	SD4724	GLENN/SD4389	HRS	2017	K.Glover	SDSU
17	SD4741	SD4181/SD4243	HRS	2017	K.Glover	SDSU
18	ND833	Buck Pronto/Glenn	HRS	2017	A. Green	NDSU
19	NDHRS16-12-19	Barlow/Steele-ND	HRS	2017	A. Green	NDSU
20	ND830	ND744/ND721//Faller'S'	HRS	2017	A. Green	NDSU
21	NDHRS16-12-31	W9207/Grandin//Alsen/3/ND752	HRS	2017	A. Green	NDSU
22	NDHRS16-12-52	Kadett/Bobwhitesib//Grandin/3/ND706/4/ND752	HRS	2017	A. Green	NDSU
23	LNR15-0025	Jenna / Sinuelo 'sib'	HRS	2017	B. Cooper	Limagrain
24	LNR15-0026	Jenna / Sinuelo 'sib'	HRS	2017	B. Cooper	Limagrain
25	LNR15-1990		HRS		B. Cooper	Limagrain
26	LNR15-0747		HRS		B. Cooper	Limagrain
27	LNR15-1802	LNR10-0181/LNR10-0556	HRS	2017	B. Cooper	Limagrain

Table 2. 2017 Uniform Regional Scab Nursery for Spring Wheat Parents, Crookston, MN.

Line	Incidence %	Severity %	Disease Index	VSK %	DON ppm	Heading d from 6-1	30 SSW[1] g	micro TWT[2] g
2375	100	27	27	10.0	17.0	39.3	27.1	11.0
Wheaton	100	59	59	60.0	40.8	40.7	10.0	7.8
Bacup	98	15	15	13.5	14.1	35.0	13.6	10.7
Oslo	100	80	80	62.5	37.5	37.0	8.8	7.9
ND2710	93	10	10	8.0	8.2	39.0	30.2	11.2
Norm	100	36	36	67.5	62.3	42.3	12.1	8.3
N10	98	31	30	18.5	16.9	42.0	12.1	9.7
MN13304-5	100	25	25	12.0	15.9	40.0	20.4	10.9
MN14138-4	95	14	13	6.0	9.0	36.7	22.4	11.9
MN14164-4	100	20	20	9.0	11.2	37.0	19.9	12.2
MN14470-5	100	20	20	9.0	15.5	40.0	16.5	11.4
MN14669-1	100	12	12	7.0	8.4	42.0	23.7	11.5
SD4691	93	10	9	6.0	8.8	36.3	23.8	11.4
SD4705	88	13	12	7.0	9.4	36.0	19.1	11.6
SD4710	73	13	12	11.0	15.2	34.0	23.2	11.2
SD4724	90	21	18	9.0	12.6	36.3	15.8	11.5
SD4741	100	21	21	9.0	12.5	37.0	22.6	11.1
ND833	100	25	25	11.0	17.6	37.7	18.3	11.2
NDHRS16-12-19	100	40	40	9.0	25.4	39.0	18.4	9.8
ND830	100	20	20	11.0	18.0	37.0	16.5	10.6
NDHRS16-12-31	100	16	16	10.0	17.2	37.3	17.4	11.3
NDHRS16-12-52	90	19	17	11.0	19.0	40.0	27.3	11.2
LNR15-0025	98	29	28	11.5	13.8	41.3	16.6	10.1
LNR15-0026	98	24	23	8.0	9.5	41.3	15.9	10.4
LNR14-0747	95	14	13	8.0	7.8	39.0	18.0	10.6
LNR15-1990	98	19	19	6.0	7.7	37.0	20.9	11.2
LNR15-1802	100	20	20	9.0	16.8	40.3	20.6	10.7
Alsen*	100	17	17	10.0	19.8	39.0	13.8	10.9
MN00269*	100	69	69	30.0	30.8	44.0	5.8	-
Roblin*	100	74	74	55.0	24.5	36.3	12.6	9.2
Rollag*	98	34	33	9.0	17.4	39.0	16.9	11.2
Mean	96.8	27.3	26.9	16.9	18.1	38.7	18.1	10.6
LSD	17.5	14.6	15.1	9.4	–	2.6	5.8	0.9
CV	8.9	26.2	27.5	27.2	–	3.2	15.7	4.3

[1] 30 SSW = 30 spike seed weight. This is the sample used to determine VSK.

[2] Weight of the VSK sample that fits in a 15.7 mL copper vessel 20 mm in diameter and 50 mm in height.

* Extra entries

Table 3. 2017 Uniform Regional Scab Nursery for Spring Wheat Parents, St. Paul, MN.

Line	Incidence %	Severity %	Disease Index	VSK %	DON ppm	Heading d from 6-1	30 SSW[1] g	micro TWT[2] g
2375	62	30	18	14.5	4.1	29.0	30.9	11.2
Wheaton	92	64	59	77.5	9.5	30.3	21.5	9.2
Bacup	32	23	6	3.0	0.6	25.0	23.0	12.1
Oslo	77	34	26	18.5	4.2	28.0	21.4	10.0
ND2710	27	8	3	4.0	0.6	29.0	35.5	12.5
Norm	80	51	44	77.5	14.1	34.0	17.6	9.3
N10	63	25	16	47.5	8.6	31.7	30.8	10.2
MN13304-5	58	15	9	15.0	3.9	29.0	30.3	11.3
MN14138-4	33	9	3	4.0	0.6	28.0	29.9	12.2
MN14164-4	47	18	8	5.0	2.2	23.0	28.0	12.6
MN14470-5	75	25	22	9.0	4.1	27.0	25.5	11.8
MN14669-1	33	10	4	5.0	0.6	30.3	32.8	12.3
SD4691	43	15	6	10.0	3.0	23.0	27.3	11.4
SD4705	42	10	4	6.0	1.9	23.0	25.2	11.6
SD4710	35	10	4	8.0	1.8	23.0	27.6	11.6
SD4724	18	10	2	3.0	1.1	26.0	23.9	12.4
SD4741	50	11	6	4.0	1.0	24.0	30.7	11.8
ND833	43	13	5	6.0	1.1	26.0	30.0	12.2
NDHRS16-12-19	63	23	17	15.5	4.5	27.0	23.2	11.4
ND830	55	22	12	10.0	3.2	25.0	25.0	11.9
NDHRS16-12-31	40	10	4	8.0	2.7	25.0	28.8	12.1
NDHRS16-12-52	28	10	3	3.0	0.6	30.3	31.4	11.9
LNR15-0025	43	19	8	8.0	0.8	33.0	32.5	11.0
LNR15-0026	72	23	18	17.5	5.0	31.7	23.9	10.6
LNR14-0747	37	13	5	6.0	1.4	28.0	30.1	11.5
LNR15-1990	38	14	5	6.0	0.8	24.0	28.8	12.0
LNR15-1802	40	12	5	6.0	2.3	33.0	36.2	11.5
Alsen*	30	11	3	4.0	1.2	27.0	25.3	12.2
MN00269*	82	47	38	77.5	24.7	33.0	14.2	8.2
Roblin*	97	38	36	45.0	4.3	23.0	17.0	10.1
Rollag*	80	15	12	9.0	5.1	27.0	24.4	11.7
Mean	52.1	20.6	13.3	17.2	3.9	27.6	26.8	11.3
LSD	33.8	19.2	19.9	17.0	–	3.2	7.3	1.1
CV	31.8	45.7	73.4	48.5	–	5.6	13.3	4.6

[1] 30 SSW = 30 spike seed weight. This is the sample used to determine VSK.

[2] Weight of the VSK sample that fits in a 15.7 mL copper vessel 20 mm in diameter and 50 mm in height.

* Extra entries

Table 4. 2017 Uniform Regional Scab Nursery for Spring Wheat Parents, Brookings, SD.

Line	Incidence %	Severity %	Disease %	Tombstone %
2375	93.3	26.6	25.6	48.3
Wheaton	98.3	31.7	31.5	73.3
Bacup	95.8	22.6	21.8	51.7
Oslo	87.5	17.0	15.7	58.3
ND2710	94.2	16.2	15.5	28.3
Norm	91.7	30.3	29.2	76.7
N10	93.3	23.9	23.3	48.3
MN13304-5	94.2	19.3	18.6	33.3
MN14138-4	90.0	15.8	14.7	21.7
MN14164-4	88.3	17.8	16.4	16.7
MN14470-5	94.2	20.9	20.0	28.3
MN14669-1	93.3	23.9	23.2	30.0
SD4691	86.7	16.0	14.2	25.0
SD4705	80.0	13.8	11.4	20.0
SD4710	87.5	15.3	13.7	25.0
SD4724	87.5	15.5	14.0	40.0
SD4741	85.8	14.3	12.3	13.3
ND833	92.5	17.1	16.2	28.3
NDHRS16-12-19	97.5	20.5	20.1	40.0
ND830	88.3	15.8	14.2	35.0
NDHRS16-12-31	90.8	16.7	15.3	31.7
NDHRS16-12-52	95.0	18.6	18.0	41.7
LNR15-0025	91.7	17.6	16.5	28.3
LNR15-0026	94.2	22.3	21.6	31.7
LNR15-1990	92.5	18.5	17.3	30.0
LNR14-0747	95.0	20.3	19.7	28.3
LNR15-1802	95.0	20.3	19.6	31.7
MEAN	91.6	19.6	18.5	35.7
LSD (0.05)	8.7	4.7	5.5	11.2
CV %	4.5	23.5	26.7	43.1

Table 5. 2017 Uniform Regional Scab Nursery for Spring Wheat Parents, Prosper, ND.

Line	FHB Index	DON	Test Weight
2375	18.7	2.46	57.0
Wheaton	58.7	3.96	51.5
Bacup	31.7	0.72	58.8
Oslo	30.3	0.73	57.5
ND2710	12.8	0.85	57.5
Norm	67.3	6.45	52.0
N10	43.7	3.07	55.5
MN13304-5	41.7	0.89	56.0
MN14138-4	47.7	3.84	58.3
MN14164-4	13.0	0.69	60.3
MN14470-5	8.7	1.53	59.5
MN14669-1	54.7	0.73	58.3
SD4691	16.7	0.22	59.8
SD4705	14.7	0.59	58.5
SD4710	27.0	0.71	58.5
SD4724	10.7	0.44	59.3
SD4741	19.0	0.39	56.5
ND833	15.7	1.40	59.0
NDHRS16-12-19	36.0	0.94	58.0
ND830	23.7	2.01	57.8
NDHRS16-12-31	10.0	0.69	58.8
NDHRS16-12-52	38.0	0.67	58.0
LNR15-0025	56.0	1.99	52.5
LNR15-0026	54.0	1.92	53.5
LNR15-0763	9.7	0.14	56.3
LNR15-1445	50.0	1.14	54.3
LNR15-1802	47.7	1.55	57.0
2398*	51.8	4.27	56.0
Maximum	67.3	6.45	60.3
Minimum	8.7	0.14	51.5
Average	32.0	1.7	57.0
CV	30.35	84.42	2.04
LSD 0.05			2.39

* Extra entry

Table 6. 2017 Uniform Regional Scab Nursery for Spring Wheat Parents, Langdon ND.

Line	FHB (1-9 Scale)
2375	6.0
Wheaton	8.0
Bacup	4.7
Oslo	7.0
ND2710	3.3
Norm	7.7
N10	5.7
MN13304-5	4.3
MN14138-4	3.3
MN14164-4	7.3
MN14470-5	4.0
MN14669-1	2.7
SD4691	3.3
SD4705	4.7
SD4710	5.0
SD4724	4.3
SD4741	6.7
ND833	6.7
NDHRS16-12-19	5.0
ND830	6.3
NDHRS16-12-31	5.0
NDHRS16-12-52	4.0
LNR15-0025	4.7
LNR15-0026	6.0
LNR15-0763	2.7
LNR15-1445	3.3
LNR15-1802	4.0
2398*	8.3
Maximum	8.3
Minimum	2.7
Average	5.1
CV	28.3

* Extra entry

Table 7. 2017 Uniform Regional Scab Nursery for Spring Wheat Parents, Morden, Canada.

Line	Anthesis	Incidence %	Severity %	Disease Index
2375	-	-	-	-
Wheaton	-	-	-	-
Bacup	-	-	-	-
Oslo	-	-	-	-
ND2710	-	-	-	-
Norm	-	-	-	-
N10	-	-	-	-
MN13304-5	11-Jul	8	2.5	20.0
MN14138-4	8-Jul	8	3	24.0
MN14164-4	8-Jul	9	5.5	49.5
MN14470-5	8-Jul	8.5	5	42.5
MN14669-1	11-Jul	1	0.5	0.5
SD4691	-	-	-	-
SD4705	-	-	-	-
SD4710	-	-	-	-
SD4724	-	-	-	-
SD4741	-	-	-	-
ND833	8-Jul	8	4.5	36.0
NDHRS16-12-19	11-Jul	8.5	4.5	38.3
ND830	-	-	-	-
NDHRS16-12-31	11-Jul	8.5	4.5	38.3
NDHRS16-12-52	11-Jul	8	2	16.0
LNR15-0025	15-Jul	7.5	4.5	33.8
LNR15-0026	8-Jul	8	2.5	20.0
LNR15-1990	-	-	-	-
LNR15-0747	-	-	-	-
LNR15-1802	14-Jul	8	3.5	28.0

Incidence and severity based on a 0-10 rating scale.

Table 8. 2017 Uniform Regional Scab Nursery for Spring Wheat Parents, St. Paul, MN. Adult plant leaf and stem rust reactions (J. Kolmer and Yue Jin USDA-ARS).

Line	Leaf Rust	Stem Rust
2375	50MS	25RMR
Wheaton	20MR	20RMR
Bacup	30MS	20RMR
Oslo	30MR	35MSMR
ND2710	20MS	15RMR
Norm	50MRMS	20RMR
N10	40MRMS	20RMR
MN13304-5	TR	20RMR
MN14138-4	TR	15RMR
MN14164-4	30MRMS	35MSMR
MN14470-5	10MRMS	15RMR
MN14669-1	TR	25RMR
SD4691	30MRMS	25MRR
SD4705	5MS	20RMR
SD4710	TR	35MRR
SD4724	5MS	20RMRMS
SD4741	5R	25RMR
ND833	TR	25RMR
NDHRS16-12-19	20S	20RMR
ND830	40S	20RMR
NDHRS16-12-31	30-40MS	20RMR
NDHRS16-12-52	TR	20RMR
LNR15-0025	TR	25MR
LNR15-0026	TR	25RMR
LNR14-0747	TR	15RMR
LNR15-1990	10R	40MRMS
LNR15-1802	10MS	25MRR

Data from inoculated trials using a mixture of races.

Table 9. 2017 Uniform Regional Scab Nursery Seedling Stem Rust Scores, St. Paul, MN. (Yue Jin, USDA-ARS)

	Race														
Line	QFCSC	QTHJC	MCCFC	RCRSC	RKQQC	TPMKC	TTTTF	GFMNC	QCCSM	TTKSK	TRTTF	TKTTF	TKTTF	TTKTT	TKKTP
2375	;1-	2-	;1	;1-	2/2-	11-	;1	0;	13-	3+	3+	0;	4	3+	3
Wheaton	0;	2-	0;	0;	;1-/1-	2-	;1	0;	0;	3+	3+	0	2-;	3	;1
Bacup	;1	2	;1-	1	2	1-1;	4	;1-/1-;	1-;	3+	3+	3+	3+/2-;	3+	3
Oslo	;1-	22+	1-;	2-;	;	2-	4	2-	;	3	22+	2-	2+	3+	2;
ND2710	;1-	2-	;	0;	2-;	2-/2	;1	;	;	3	-	-	2-	3+	2-
Norm	0;1-	2-	0;	0	;2-	2-	-	0;	0;	3	3+	0	-	3+	;
N10	0;	-	0;	-	-	2-	23-	0;/;	-	3	3	0;	1		
MN13304-5	0;	2-;	0;	;	2-	;1-	;11+	;	;	3	2	;1	3+		
MN14138-4	0;	2-	;	;	;2-	2-	;	;	;	3+	3	0;	2-		
MN14164-4	;	2N	;	;	2-;	1-;	23;	;	;	3	3+	2-	2-		
MN14470-5	0;	2	0;	0;/;	2	;2-	0	0;	;	3	3+	;1	3-		
MN14669-1	;	2	;1-	;1-	2	2-	11+;	;	;2-	3	3	;1	3		
SD4691	2-;	2N	2-;	1-;	2	2-	;1	0;/2-]	2-;	3	3+	;1	3		
SD4705	;1-	2N	2-;	1-;	2	2/;2-	11+;	;	2-;	3+	3	;1	3+		
SD4710	;1-	2	2-/;1-	;	2	2	1;	;1-	;2-	3	3+	0	3+		
SD4724	;1-	2-	;1-/1-	;1-	2	2/2-	;1	0;	;2-	3	2+	0	3		
SD4741	;1-	2	2-;/;1-	;1-	2	2/;2-	23-	;2-	2-	3	3	1;	3+		
ND833	;/2-;	2	1-;	;1-/1-;	2	2-	11+;	0;1-	2-	3	3	;1	3		
NDHRS16-12-19	;1-	2	;1-	;/;1	2	2-	11+;	;1-	2-;	3+	3+	;1/3	3		
ND830	0/;	2-	;	;	;2-	2-	11+;	;	;	3+	3+	0	1;		
NDHRS16-12-31	0;	2-	;1-	;1	2	2-	;11+	0;	2-;/;	3	3	0	2+		
NDHRS16-12-52	;1-	2-	;1-	0;1-	2-/2-;	2-	;1-	;1-	;	3+	2-	0;	;1	3+	2-
LNR15-0025	1-;	2-	1-;/;1-	2-	2-	2-	2-	2-	2-/3	0;	0;	0;	0;	2+3	3+
LNR15-0026	2-;	2-	1-;	2-	2-LIF	2-	2-	-	3/2-	0;	0;	0;	0	3+	2+3
LNR15-1990	0;/;2-	2-	;	0;1-	2	1-;	;1	0;	;1-	3	3+	0;/3+	3		
LNR14-0747	2-;/;	2-	1-	-	2	2-	-	;2-	2-;	3	3	;1/2+	3+		
LNR15-1802	2-;	2-	2-;	2-	2	2	2-	2-	2-	2-	2-	;1-	;1	3	2+
LMPG-6*	4	4	4	4	4	4	3+	4	4	3+	3+	3+	3+		

* Susceptible check

Table 10. Marker Alleles Associated With Select Traits/Genes (S. Chao, USDA-ARS).

Line	Glutenins 1A umn19	Glutenins 1D GluD1	Grain Protein GPC	Fhb 3B Fhb	Fhb 5A barc180	Fhb 5A barc186	Leaf Rust 1D Lr21	Leaf Rust 7D Lr34	Tan Spot 5B Tsn	Photoperiod PpdD1	Dwarfing RhtB1	Dwarfing RhtD1	Stem Rust 7D Sr25			Stem Rust 3B Sr2
2375	341	NA	A	C	G	NA	T	A/T	G	T/C	C	C	183		206	211	C
Wheaton	341	C	A	C	G	C	T	T	G	C	C	A	183		206	211	C
Bacup	359	C	A	C	A	A	NA	A/T	G	NA	C	C	183	200	206		C
Oslo	359	G	A	C	G	C	T	A	G	C	T	C	183		206	211	--
ND2710	359	C	A	T	A	NA	T	A/T	G	T	C	C	183		206	211	C
Norm	341	C	A	C	G	C	T	T	G	T	C	A	183		206	211	C
N10	359	G	A	T	G	C	T	T	--	T	C	A	183		206	211	--
MN13304-5	359	C	A	T	G	C	T	A/T	G	C	C	C	183		206	211	--
MN14138-4	341	C	A	T	G	C	T	A	G	T	T	C	183		206	211	--
MN14164-4	341/359	C	A	T	G	C	T	A	G	T/C	T	C	183	200	206		C
MN14470-5	341	C	A	T	A	A	T	T	G	T	T	C	183		206	211	--
MN14669-1	341	C	A	T	A	A	T	T	G	T	T	C	183		206	211	--
SD4691	341	C	A	T	G	C	T	A	G	T	C	C	183		206	211	--
SD4705	341	C	A	NA	G	C	T	A	G	T	C/T	C	183		206	211	--
SD4710	341	C	A	T	G	C	T	T	G	C	C	C	183		206	211	C
SD4724	341	C	A	C	G	C	C	T	G	T	C	C	183		206	211	C
SD4741	341/359	C	A	T	G	C	T	A/T	G	T	C	C	183		206	211	--
ND833	341	C	A	C	G	C	C	A	G	T	C/T	C	183		206	211	C
NDHRS16-12-19	341	C	A	C	G	C	C	A	G	T	T	C	183		206	211	--
ND830	341	C	A	C	G	C	C	A	G	T	T	C	183		206	211	--
NDHRS16-12-31	341	C	A	C	A	A	C	A	--	T	T	C	183		206	211	C
NDHRS16-12-52	341	C	A	NA	G	C	C	A	G	T	T	C	183		206	211	--
LNR15-0025	359	C	A	T	G	C	T	T	--	C	T	C	183		206	211	C
LNR15-0026	359	C	A	T	G	C	T	T	G	C	T	C	183		206	211	C
LNR14-0747	341	C	A	T	G	C	T	T	G	T	T	C	183	200	206		C
LNR15-1990	359	C	A	T	G	C	T	T	G	C	C	C	183		206	211	--
LNR15-1802	359	C	A	C/T	G	C	T	A	G	T	T	C	183	200	206		C

Please see the next page for details on marker allele/gene/trait associations.

Table 10. Continued. Key to Marker/Trait Data.

Trait	Marker	Gene	Chromosome	Size (base)
HMW Glutenins	umn19	Glu-1A	1A	Ax2*=341, Ax1=359
HMW Glutenins	Glu-1D	Glu-1D	1D	G=Poor, C=Good
Grain protein content	Gpc-B1	GPC	6B	T=High, A=Low
Scab	Fhb1	Fhb1	3B	T=Resistance, C=Susceptible
Scab	barc186	Fhb 5A	5A	C = Susceptible, A = Resistant
Scab	barc180	Fhb 5A	5A	G = Susceptible, A= Resistant
Leaf rust	Lr21	Lr21	1D	T=Susceptible, C=Resistance
Leaf rust	I4	Lr34	7D	T=Resistance, A=Susceptible
Tan Spot	tsn1	tsn1	5B	G=Susceptible, -- =Resistance
Photoperiod	Ppd	PpdD1_D2	2D	T=Sensitive, C=Insensitive
Plant height	Rht-B1	Rht-B1	4B	C=wild type, T=dwarf
Plant height	Rht-D1	Rht-D1	4D	C=wild type, A=dwarf
Stem rust	Sr25	Sr25	7D	200=Resistance
Stem rust	Sr2	Sr2	3B	C=Susceptible, T=Resistance (Hope allele)