

Report of the 2018 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 23rd year in 2018. Four locations (Brookings, SD, St. Paul, MN, Prosper, ND, and Morden, Canada) reported results.

A total of 17 entries was included in the 2018 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 four university 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 \cong tombstone) and grain deoxynivalenol content were provided from three 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 2018 Uniform Regional Scab Nursery for Spring Wheat Parents.

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	Check				
8	MN15008-7	Prosper/Rollag	HRS	2018	J. Anderson	UMN
9	MN15029-8	MN06075-4/MN08106-6//Norden	HRS	2018	J. Anderson	UMN
10	MN15089-2	Prosper/Rollag	HRS	2018	J. Anderson	UMN
11	MN15219-2	MN06075-4/MN07199-6//Norden	HRS	2018	J. Anderson	UMN
12	MN15501-4	MN06216-6-2-4/MN06075-4	HRS	2018	J. Anderson	UMN
13	SD4756	SD4396/BRICK	HRS	2018	K. Glover	SDSU
14	SD4758	SD4427/PREVAIL	HRS	2018	K. Glover	SDSU
15	SD4787	SDW0045/SD4243	HRS	2018	K. Glover	SDSU
16	SD4819	SD4243/SD4479	HRS	2018	K. Glover	SDSU
17	SD4822	FOCUS/PREVAIL	HRS	2018	K. Glover	SDSU
18	NDHRS16-14-12	SD3942/FALLER//GLENN	HRS	2018	A. Green	NDSU
19	NDHRS16-14-91	CLTR15162/2*ALSEN	HRS	2018	A. Green	NDSU
20	NDHRS16-13-97	ND709-9/ND711-25	HRS	2018	A. Green	NDSU
21	NDHRS16-13-89	ND819'S'/ND744'S'	HRS	2018	A. Green	NDSU
22	NDHRS16-13-13	WALWORTH/REEDER//ND721/3/ ALSEN	HRS	2018	A. Green	NDSU
23	MT 1621	MT1148/MT1133	HRS	2018	L. Talbert	MSU
24	MT 1673	Duclair x McNeal/Glupro	HRS	2018	L. Talbert	MSU

Table 2. 2018 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	98	32	32	16.0	4.5	29.3	20.3	10.4
Wheaton	100	86	86	77.5	4.3	33.0	8.8	8.7
Bacup	57	12	7	11.0	1.9	26.0	18.2	11.1
Oslo	100	73	73	67.5	5.9	28.0	9.6	9.2
ND2710	53	8	4	7.0	2.4	28.0	25.8	11.2
Norm	68	20	14	20.0	11.0	34.3	8.9	8.9
N10	100	49	49	15.0	2.9	33.0	9.0	9.2
MN15008-7	68	15	10	7.0	1.5	28.0	14.8	10.8
MN15029-8	100	36	36	9.0	2.1	32.0	14.5	10.2
MN15089-2	82	13	11	7.0	1.9	30.7	23.8	11.5
MN15219-2	97	25	24	10.0	1.5	30.7	14.9	11.3
MN15501-4	97	32	31	7.0	1.9	34.0	15.3	11.3
SD4756	75	13	10	8.0	0.6	25.0	22.0	11.2
SD4758	95	76	72	20.0	3.1	32.0	15.1	9.9
SD4787	72	11	9	12.5	1.1	25.0	18.9	10.4
SD4819	72	12	10	9.0	1.3	28.0	20.5	10.6
SD4822	80	21	19	8.0	3.0	27.0	21.3	11.3
NDHRS16-14-12	90	25	23	10.0	3.0	32.0	18.5	10.7
NDHRS16-14-91	87	14	13	10.0	2.0	29.3	15.5	10.7
NDHRS16-13-97	82	15	12	25.0	5.8	28.0	15.2	10.6
NDHRS16-13-89	82	10	8	11.0	1.7	25.0	18.2	11.3
NDHRS16-13-13	97	24	24	9.0	2.6	32.0	17.3	10.6
MT 1621	95	32	30	13.5	4.1	28.0	14.2	10.6
MT 1673	100	35	35	18.5	5.3	28.0	14.0	9.4
Alsen	88	14	12	8.0	1.5	28.0	12.3	10.9
Roblin	100	41	41	72.5	3.6	25.0	14.5	9.8
Rollag	90	21	19	8.0	1.6	29.3	17.1	10.9
MN00269	100	59	59	20.0	4.1	34.0	13.4	9.4
Mean	86.5	29.4	27.6	18.5	3.1	29.4	16.1	10.4
LSD	19.6	15.6	16.2	5.9	–	2.1	9.2	1.1
CV	13.8	32.3	35.7	15.6	–	4.3	27.8	5.4

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

Table 3. 2018 Uniform Regional Scab Nursery for Spring Wheat Parents, Brookings, SD.

		Incidence	Severity	Disease	Tombstone
	Line	%	%	%	%
1	2375	99.2	31.3	31	35
2	Wheaton	100	42	42	60
3	Bacup	99.2	19.5	19.4	23.3
4	Oslo	100	27	27	57.5
5	ND2710	95	15.8	15.1	23.3
6	Norm	100	30.2	30.2	48.3
7	N10	100	21.7	21.7	50
8	MN15008-7	100	22.9	22.9	19.2
9	MN15029-8	98.3	20.1	19.8	22.5
10	MN15089-2	99.2	18.3	18.1	13.3
11	MN15219-2	99.2	19.3	19.1	20
12	MN15501-4	100	19.1	19.1	15
13	SD4756	99.2	21.7	21.5	34.2
14	SD4758	96.7	19.7	19.2	29.2
15	SD4787	95.8	17.4	16.9	20
16	SD4819	93.3	17.3	16.3	25.8
17	SD4822	100	23.9	23.9	28.3
18	NDHRS16-14-12	96.7	17.6	17.1	25
19	NDHRS16-14-91	98.3	20.3	20	35.8
20	NDHRS16-13-97	100	19.1	19.1	35
21	NDHRS16-13-89	97.5	21	20.6	30
22	NDHRS16-13-13	99.2	19.1	19	25.8
23	MT 1621	100	30	30	35.8
24	MT 1673	99.2	26.6	26.4	37.5
MEAN		98.58	22.54	22.31	31.24
LSD (0.05)		3.3	3.6	3.76	7.12
CV %		1.86	26.62	27.47	39.91

Table 4. 2018 Uniform Regional Scab Nursery for Spring Wheat Parents, Prosper, ND.

	Line	Severity %	FDK %	DON ppm
1	2375	56.9	45	16.4
2	Wheaton	52.1	40	13.7
3	Bacup	34.2	15	5.7
4	Oslo	31.1	15	5.4
5	ND2710	15.3	10	3.0
6	Norm	79.1	60	21.5
7	N10	54.9	15	12.4
8	MN15008-7	24.3	10	4.7
9	MN15029-8	25.0	15	7.4
10	MN15089-2	26.6	15	5.3
11	MN15219-2	25.0	15	5.4
12	MN15501-4	26.1	20	10.6
13	SD4756	34.9	10	2.5
14	SD4758	43.2	50	18.0
15	SD4787	49.0	10	3.1
16	SD4819	28.7	10	1.6
17	SD4822	41.7	25	7.6
18	NDHRS16-14-12	24.5	35	6.2
19	NDHRS16-14-91	26.5	15	6.3
20	NDHRS16-13-97	25.4	15	5.8
21	NDHRS16-13-89	27.4	10	3.6
22	NDHRS16-13-13	23.1	35	9.2
23	MT 1621	41.6	30	13.0
24	MT 1673	36.6	40	12.5
	Maximum	79.1	60	21.5
	Minimum	15.3	10	1.6
	Average	35.5	23.3	8.4
	CV	17.07		
	LSD 0.05	9.97		

Table 5. 2018 Uniform Regional Scab Nursery for Spring Wheat Parents, Morden, Canada.

Line	Incidence	Severity	Disease Index	DON ppm
2375	3.5	4.5	15.8	4.1
Wheaton	5.5	5	27.5	10.5
Bacup	0.5	2.2	1.1	1.3
Oslo	4.8	5.3	25.8	13.2
ND2710	0.5	1	0.5	2.3
Norm	2.2	4.2	9	18.8
N10	7.3	3.3	24.4	15.7
MN15008-7	0.8	1.3	1.1	2.3
MN15029-8	1.3	0.8	1.1	2.5
MN15089-2	1.7	0.8	1.4	1.5
MN15219-2	0.8	2.7	2.2	2.8
MN15501-4	1.8	1.2	2.1	1.6
SD4756	not evaluated			
SD4758	not evaluated			
SD4787	not evaluated			
SD4819	not evaluated			
SD4822	not evaluated			
NDHRS16-14-12	0.8	2.8	2.4	2.3
NDHRS16-14-91	0.8	1	0.8	3.2
NDHRS16-13-97	2.8	1.7	4.7	4.8
NDHRS16-13-89	0.8	1.5	1.3	1.8
NDHRS16-13-13	2.7	2	5.3	3.4
MT 1621	5.8	3.2	18.5	11.6
MT 1673	2.8	3.2	9	5.5
Mean	2.5	2.5	8.1	5.8
LSD	1.8	1.5	6.3	6.6
CV	44	36	46.5	69.7

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

**Table 6. 2018 Uniform Regional Scab Nursery for Spring Wheat Parents, St. Paul, MN.
Adult plant leaf and stem rust reactions (J. Kolmer and Y. Jin, USDA-ARS).**

Line	Leaf Rust	Stem Rust
2375	30MRMS	5MR
Wheaton	20MRMS	0
Bacup	20MRMS	0
Oslo	60S	0
ND2710	20MRMS	0
Norm	20MRMS	0
N10	30MRMS	0
MN15008-7	10MR	0
MN15029-8	40MRMS	0
MN15089-2	20MRMS	0
MN15219-2	1R	0
MN15501-4	1R	0
SD4756	30MRMS	5MR
SD4758	20MRMS	0/40S
SD4787	5MR	5MR
SD4819	20MRMS	60MS-S
SD4822	20MRMS	50S/0
NDHRS16-14-12	10MR	0
NDHRS16-14-91	10MR	0
NDHRS16-13-97	1R	0
NDHRS16-13-89	40MS	0
NDHRS16-13-13	1R	0
MT 1621	20MRMS	0
MT 1673	30MRMS	0

**Table 7. 2018 Uniform Regional Scab Nursery for Spring Wheat Parents, St. Paul, MN.
Seedling stem rust reactions (Y. Jin, USDA-ARS).**

Line	Race												2018 Field #
	QFCSC	QTHJC	MCCFC	RCRSC	RKRQC	TPMKC	TTTTF	GFMNC	QCCSM	TTKSK	TTKTT	TKTTF	
2375	0	1	0;	0;	2-	0;1-	;1	0;	;1-	3	3+	;1	5MR
Wheaton	0;	2-	0;	0;	;1-/1-;	2-	;1	0;	0;	3	3	0	0
Bacup	0;	1	0;	1-	2	;	1+1	0;	0;	3+	3	3+/1;	10MR
Oslo	;	1	1-;	1-	;	2-	3	;1-	0;	3+	3+	2-	5MR
ND2710	0;	1-	;	0;	1-;	1-/1-	0;1	0	0;	3	3	0	0
Norm	0;	1-	-	0	;	1-	0;	0	0;	3	3	0	0
N10	0	1-	0;/	0;/	;1-/1-	2-	0;1	0	0;/	-	-	-	0
MN15008-7	0	1-	;1-	0;	12-	1-	0;	;	;1-	3	3+	;1	0
MN15029-8	0;	0;1-	0;	-	2-2	2-	;1	0;	0;	1+3-	11+;	0;	0
MN15089-2	0;	1-	;1-	0;1-	1	1-	0;	0;	0;	3	3	;1	0
MN15219-2	0;	;1-	0;	0;	1-;	1-;	0;	0;	0;	2-	2	0	0
MN15501-4	0	1-	0;	0;	;1-	1-	0;	0;	0;	3	3+	0	0
SD4756	0	1-	0;	0;	;1-	1-	1/0;	0;	0	3	3	0/2-	10MR/50S
SD4758	;	12	;	0;	1+3-/1	1-;	1 LIF	0;	;1-	3	3	;1	50S/20MR
SD4787	0;	1-1;	0;	0;	11+	1-	0;	0;	0;	3	2+3-	;1-	20MR
SD4819	;	1+1/1	1-	;1	3-3	2	0;1	0;/1-	1-	3	3+	11+;	70MS-S
SD4822	;	11+/2	0;/1-	0;1-	3	;1-	0;1	0;;	;	3+	3+	0;	20MR/70S
NDHRS16-14-12	;	2-	;1-	0;	2	1-	1 LIF	;	;1-	3	3	;2+	0
NDHRS16-14-91	0;/	1-	0;	0;1-	11+	1-	1;	0;	;1-	3	3+	1	0
NDHRS16-13-97	0;	1-;	0;	0;	;	2-	0;	0;	0;	;3	3	0	0
NDHRS16-13-89	0;	11-	0;	0;1-	;1-/2	2-	;1-	0;	0;	3+	3+	0;	0
NDHRS16-13-13	0	1-	0;	0	;	2-	;1-	0	0;	3+	3+	0	0
MT 1621	;	2-	;1-	2	2-	2-	3	2-/2-;	1-	3+	3+	3	5MR
MT 1673	;1-	11+	1-	0;	1;	1	;1	;1-	1-;	3+	3+	;1	0
Line E	4	4	4	4	4	4	4	4	4	4	4	3+	100S
LMPG-6*	33+	3	33+	3	3	33+	3	3+	3	3+	4	3+	80S
NA101/MqSr7a	11+;	3/3+	3+	1;	;1	33+	;1	13;	1;	3+	3+	11+;/3	50MS-S

* susceptible check

different field evaluation than results in the adult rust table

Table 8. 2018 Uniform Regional Scab Nursery for Spring Wheat Parents, Marker Genotypes.

Line	Trait	Glutenins 1A		Stem Rust 7D		Leaf Rust 1D		Leaf Rust 7D		Glutenins 1D		Fhb 3B		Grain Protein		Stem Rust 3B		Tan Spot 5B		Fhb 5A		Fhb 5A		Photoperiod		Dwarfing		Dwarfing	
		umh19		Sr25		Lr21	Lr34	GluD1	Fhb1	GPC	Sr2	Tsn	barc180	barc186	PpdD1	RhtB1	RhtD1												
1	2375	341	183	206	211	T	A/T	C	G	A	C	G	A	C	G	G	A	C	C	C	C	C	C	C	C	C	C	C	
2	Wheaton	341	183	206	211	T	T	C	G	A	C	--	G	C	C	C	C	C	C	C	C	C	C	C	C	C	C	A	
3	Bacup		359 183 200	206		T	A/T	C	G	A	C	G	A	C	G	A	A	C	C	C	C	C	C	C	C	C	C	C	
4	Oslo		359 183	206	211	T	A	G	G	A	C	--	G	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
5	ND2710		359 183	206	211	T	A/T	C	Unknown	A	C	G	A	A/C	T	C	C	C	C	C	C	C	C	C	C	C	C	C	
6	Norm	341	183	206	211	T	T	C	G	A	C	--	G	C	T	C	C	A	A	A	A	A	A	A	A	A	A	A	
7	N10	341				T	T	G	A	A	C	--	G	C	T	C	C	A	A	A	A	A	A	A	A	A	A	A	
8	MN15008-7	341	183 200	206	211	C	A/T	C	A	A	C	--	G	A	T	T	C	C	C	C	C	C	C	C	C	C	C	C	
9	MN15029-8	341		206	211	231	T/C	A/T	C	A	C	--	G	C	T	C	A	A	A	A	A	A	A	A	A	A	A	A	
10	MN15089-2	341	183 200	206		C	A/T	C	A	Unknown	--	G	G	A	T	T	C	C	C	C	C	C	C	C	C	C	C	C	
11	MN15219-2		359 183	206	211	T	A	C	G	A	C	G	G	C	T	T	C	C	C	C	C	C	C	C	C	C	C	C	
12	MN15501-4	341	183	206	211	T	A/T	C	A	A	C	--	G	G	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
13	SD4756	341	183	206	211	C	T	C	A	A	--	G	G	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
14	SD4758	341	183 200	206	211	T	T	C	A/G	A	C	G	G	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
15	SD4787		359 183	206	211	C	T	C	A	A	C	G	G	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
16	SD4819		359 183 200	206	211	T	T	C	A	A	C	G	G	C	T	C	C	C	C	C	C	C	C	C	C	C	C	C	
17	SD4822	341		206	211	231	T	T	C	Unknown	A/T	--	G	G	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
18	NDHRS16-14-12	341	183	206	211	T	A/T	C	G	A	--	G	G	C	T	C	C	C	C	C	C	C	C	C	C	C	C	C	
19	NDHRS16-14-91	341	183	206	211	T	A	C	G	A	--	G	G	C	T	T	C	C	C	C	C	C	C	C	C	C	C	C	
20	NDHRS16-13-97	341	183	206	211	T	A/T	C	A	A	--	G	A	A	T	T	C	C	C	C	C	C	C	C	C	C	C	C	
21	NDHRS16-13-89	341	183	206	211	C	A	C	A	A	--	G	G	C	T	T	C	C	C	C	C	C	C	C	C	C	C	C	
22	NDHRS16-13-13	341	183	206	211	T	A/T	C	G	A	--	G	A	A	T	T	C	C	C	C	C	C	C	C	C	C	C	C	
23	MT 1621	341	183	206	211	T	A	C	G	A	--	--	G	C	T	T	C	C	C	C	C	C	C	C	C	C	C	C	
24	MT 1673		359 183	206		C	A	C	G	T	C	--	G	C	T	T	C	C	C	C	C	C	C	C	C	C	C	C	

Key to Marker/Trait Data

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