2000 Uniform Regional Scab Nursery for Spring Wheat Parents

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The assistance of **Gary Linkert** and **Leanne Matthiesen** are gratefully acknowledged .

The Uniform Regional Scab Nursery was grown for the sixth time in 2000 at 7 locations including St. Paul and Crookston, MN; Langdon and Prosper, ND; Brookings, SD; Ames, IA; and Glenlea, Manitoba. All nurseries used were misted and inoculated with Fusarium to obtain infection in the entries except the nursery in Ames, IA. This nursery depended upon natural rainfall and inoculum for infection.

A total of 43 entries were tested including 5 checks (three with resistance 2375, BacUp, and ND2710, two susceptible Oslo and Wheaton) and 25 parental spring wheat lines, 5 germplasm lines entered from South Dakotas Germplasm Screening Nursery (designated with * in tables) and including 8 durums. Most entries have a Chinese source of resistance in their pedigrees except for the durums and germplasm lines.

All entries were planted in single rows or hill-planted with 2 to 4 replicates in each location. Inoculation was conducted by scattering infected kernels and/or by spraying the spikes with macroconidia spore suspension during anthesis (2×10^4 to 10×10^4 spores/ml). A misting system was used for enhancing the disease infection and spread.

Visual head symptoms of scab infection and post-harvested visual scabby kernel rating (or % Tombstone) based on a standard set were assessed. DON analyses were also conducted at four locations. Each location's data are presented separately and entry means were used for the combined location's analysis.

Level of disease varied with locations. Location means for Disease Index or FHB index ranged from 1.8% at Langdon to 59% at Prosper, ND. Percent tombstone ranged from 11% at Langdon to 47% at Prosper. Entry performance varied with locations. Heading date was not correlated with any scab resistance trait measure at the locations that recorded heading.

Correlations among the trait means over locations are given in Table 10. The data indicated that DON, % Tombstone, Disease Index and Yield were highly correlated with the lowest association between DON and Yield. Severity and Incidence were also highly correlated as well. Selection for Disease Index , Tombstone, or DON appear to be providing similar information for resistance in the scab nurseries in 2000.

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Table 1. Pedigree/resistance source and origin of 2000 Uniform Regional Scab Nursery for Spring Wheat

Entry no.	Entry name	Pedigree or resistance source	Origin
1	2375	CHECK	ND
2	WHEATON	CHECK	MN
3	BACUP	CHECK	MN
4	OSLO	CHECK	AGRIP
5	ND2710	CHECK	ND
6	SD3523	SD3116/2375//FAN1/SD3116	SD
7	SD3524	SD3116/2375//VERDE	SD
8	SD3561	SD3247/SD3165	SD
9	SD3562	SD3247/SD3165	SD
10	SD3588	SUMAI3/DALEN//KEENE	SD
11	ND712-12	Sumai 3 source	ND
12	ND2928	NING7840/ND706	ND
13	ND2955	Wangshuibai source	ND
14	ND2959	Sumai 3 source	ND
15	ND3006	Sumai 3 source	ND
16	N99-0010	N94-0243//SUMAI3/DALEN	AGRIP
17	N99-0011	HAMER//SUMAI3/DALEN	AGRIP
18	N99-0085	N93-0211//SUMAI3/DALEN	AGRIP
19	N99-0107	N94-0157//SUMAI3/DALEN	AGRIP
20	N99-0157	N92-0176//SUMAI3/DALEN	AGRIP
21	MN97039	SBF0222/MN92197	MN
22	MN97561	SBJ0949-132/KULM	MN
23	MN98037	MN88170/BACUP	MN
24	MN98092	MN93434/2375	MN
25	MN98208	MN2540/MN92006	MN
26	MN98389	OXEN/MCVEY	MN
27	FA-998-743	LARS/SHARPSHOOTER	WPB
28	FA-998-781	RUGBY/DESERT LAX #1 (durum)	WPB
29	FA-998-782	RUGBY/DESERT LAX #1 (durum)	WPB
30	FA-998-783	RUGBY/DESERT LAX #1 (durum)	WPB
31	DH98069	DURUM	ND
32	D96596	DURUM	ND
33	D96622	DURUM	ND
34	D95565	DURUM	ND
35	HY 644	A16//A*4/BGBSR/3/SCEPTRE/NING8331	MANT
36	RL4970	RL4763*2/93FHB#37(94B15-D9D5)	MANT
37	RL4972	AC Cora*2/93FHB#37(94B16-S14A5)	MANT
38	RL 4927	93B42-AD5A AC Domain*2/Sumai 3	MANT
39	CI14371*	8475-59 BRAZIL	SD
40	PI382167*	16-52-9 BRAZIL	SD
41	PI382161*	TOKAI 66 BRAZIL	SD
42	PI182561*	SIN CHUNAGA JAPAN	SD
43	PI81791*	Sapporo Haru Komugi Jugo JAPAN	SD

AGRIP=AgriPro WPB=Western Plant Breeders

MANT=Agriculture and Agrifood Canada, Manitoba

* Possible new sources of resistance from introductions by Yue Jin, SD

Table 2. 2000 Uniform Regional Scab Nursery for Spring Wheat, Ames. IA

Entry no.	Entry name	Incidence %	Severity %	Disease %	100 k wt g	DON ppm
1	2375	45	16.8	1.56	2.04	23.5
2	WHEATON	66	17.7	2.44	1.68	17.0
3	BACUP	46	7.1	0.56	2.20	20.5
4	OSLO	78	17.2	1.67	1.60	12.6
5	ND2710	30	3.3	0.42	2.45	6.1
6	SD3523	46	6.3	0.67	2.34	4.7
7	SD3524	47	10.8	1.25	2.10	6.9
8	SD3561	47	14.5	0.67	2.22	7.3
9	SD3562	51	7.2	0.78	2.09	11.3
10	SD3588	53	9.9	1.33	2.05	7.0
11	ND712-12	47	7.1	1.00	1.89	10.3
12	ND2928	35	3.7	0.44	1.92	22.0
13	ND2955	35	5.4	3.78	1.80	8.9
14	ND2959	31	3.2	1.00	1.99	7.3
15	ND3006	46	5.0	1.17	2.06	13.5
16	N99-0010	59	10.2	2.00	1.76	9.1
17	N99-0011	60	8.1	0.75	1.60	11.5
18	N99-0085	34	24.6	1.56	1.63	18.5
19	N99-0107	48	15.6	0.89	1.88	7.1
20	N99-0157	39	3.9	0.33	2.00	2.5
21	MN97039	75	14.4	1.11	1.80	8.6
22	MN97561	60	13.5	0.89	1.72	15.7
23	MN98037	55	9.5	1.17	2.38	11.0
24	MN98092	67	19.5	2.58	1.94	11.4
25	MN98208	46	7.2	1.33	2.20	12.9
26	MN98389	32	2.4	1.08	2.20	3.8
27	FA-998-743	58	10.7	0.83	2.16	6.7
28	FA-998-781	34	18.5	0.67	1.68	12.9
29	FA-998-782	34	27.9	1.11	3.86	23.9
30	FA-998-783	90	25.6	0.67	1.77	25.6
31	DH98069	34	25.4	2.78	2.02	12.9
32	D96596	34	25.3	0.78	1.65	7.5
33	D96622	34	12.6	0.33	1.89	8.7
34	D95565	25	29.0	2.00	2.07	14.0
35	HY 644	69	11.5	1.67	1.81	9.9
36	94B15-D9D5	49	10.5	0.33	1.44	6.0
37	94B16-S14A5	59	10.4	2.33	1.73	7.9
38	RL 4927	66	10.7	0.75	2.03	6.2
39	CI14371*	100	28.3	2.33	1.47	13.4
40	PI382167*	62	10.2	0.78	1.83	8.9
41	PI382161	61	10.1	0.92	1.58	19.6
42	PI182561*	31	4.4	0.22	1.03	5.5
43	PI81791*	96	6.2	0.67	1.63	8.9
	Mean	45	17.00	1.6	1.93	11.40

* Possible new sources of resistance from introductions by Yue Jin, SD

Natural inoculum, rainfed conditions.

Table 3. 2000 Uniform Regional Scab Nursery for Spring Wheat Parents, Prosper, ND.

Entry no.	Entry name	Incidence %	Severity %	Disease %	Tombstone %	DON ppm
1	2375	95	58	55	40	36
2	WHEATON	100	89	89	82	64
3	BACUP	93	51	47	26	18
4	OSLO	100	86	86	83	72
5	ND2710	80	22	18	38	21
6	SD3523	90	49	44	35	21
7	SD3524	85	44	37	25	21
8	SD3561	96	58	56	38	34
9	SD3562	99	55	54	41	26
10	SD3588	91	48	44	40	25
11	ND712-12	99	60	59	46	35
12	ND2928	89	30	27	26	7
13	ND2955	92	54	50	37	12
14	ND2959	97	44	43	27	29
15	ND3006	98	60	59	56	46
16	N99-0010	99	77	76	52	35
17	N99-0011	100	63	63	53	33
18	N99-0085	100	75	75	55	47
19	N99-0107	100	71	71	44	38
20	N99-0157	100	70	70	38	23
21	MN97039	93	52	48	46	2
22	MN97561	93	48	45	57	32
23	MN98037	94	52	49	34	33
24	MN98092	100	57	57	41	39
25	MN98208	92	54	50	41	25
26	MN98389	100	60	60	44	27
27	FA-998-743	100	78	78	58	36
28	FA-998-781	98	58	57	49	27
29	FA-998-782	94	82	77	41	35
30	FA-998-783	100	80	80	47	28
31	DH98069	97	67	65	56	23
32	D96596	99	58	57	54	24
33	D96622	100	65	65	61	20
34	D95565	97	57	55	55	36
35	HY 644	98	52	51	51	22
36	94B15-D9D5	95	57	64	33	11
37	94B16-S14A5	100	59	59	56	19
38	RL 4927	99	60	59	41	24
39	CI14371*	100	81	81	49	28
40	PI382167*	96	46	44	38	5
41	PI382161*	97	66	64	39	9
42	PI182561*	100	95	95	96	18
43	PI81791*	96	56	54	35	3
	Mean	96	61	59	47	28
	LSD 5%	14	22	ns	14	14

Table 4. 2000 Uniform Regional Scab Nursery for Spring Wheat Parents, Brookings, SD

Entry no.	Entry name	Incidence %	Severity %	Disease %	Tombstone %	Yield g/plot	Anthesis date
1	2375	95.0	30.3	29.0	35.0	41.2	7/10/00
2	WHEATON	92.5	37.5	35.0	55.0	20.8	7/11/00
3	BACUP	92.5	35.9	33.5	27.5	37.0	7/5/00
4	OSLO	100.0	42.8	43.0	75.0	17.7	7/5/00
5	ND2710	50.0	14.5	7.5	20.0	52.4	7/7/00
6	SD3523	77.5	27.8	21.5	25.0	42.2	7/8/00
7	SD3524	90.0	28.3	26.0	17.5	47.1	7/7/00
8	SD3561	95.0	37.9	36.5	40.0	34.0	7/8/00
9	SD3562	92.5	23.2	22.0	27.5	51.8	7/6/00
10	SD3588	92.5	34.1	32.5	32.5	35.2	7/7/00
11	ND712-12	85.0	27.1	23.5	35.0	28.1	7/10/00
12	ND2928	72.5	21.1	15.0	20.0	45.9	7/10/00
13	ND2955	90.0	22.7	20.5	20.0	29.1	7/11/00
14	ND2959	90.0	26.5	24.0	22.5	35.7	7/10/00
15	ND3006	87.5	30.9	27.5	25.0	23.1	7/10/00
16	N99-0010	97.5	36.6	36.0	37.5	25.3	7/7/00
17	N99-0011	100.0	30.5	31.0	25.0	23.9	7/11/00
18	N99-0085	100.0	36.8	37.0	40.0	25.4	7/10/00
19	N99-0107	100.0	31.5	31.5	20.0	26.7	7/10/00
20	N99-0157	95.0	23.3	22.5	20.0	31.9	7/8/00
21	MN97039	100.0	34.3	34.5	32.5	33.3	7/10/00
22	MN97561	95.0	39.2	37.5	40.0	26.7	7/8/00
23	MN98037	92.5	39.1	36.5	45.0	35.8	7/8/00
24	MN98092	90.0	42.9	39.0	35.0	28.1	7/8/00
25	MN98208	85.0	23.2	20.0	22.5	41.7	7/8/00
26	MN98389	85.0	29.7	26.0	47.5	37.4	7/8/00
27	FA-998-743	95.0	32.7	31.0	32.5	44.8	7/8/00
28	FA-998-781	100.0	22.2	22.0	55.0	19.3	7/13/00
29	FA-998-782	100.0	55.0	55.0	67.5	21.8	7/15/00
30	FA-998-783	100.0	44.0	44.0	72.5	17.6	7/13/00
31	DH98069	97.5	29.8	29.5	62.5	26.9	7/13/00
32	D96596	100.0	39.5	39.5	90.0	24.3	7/17/00
33	D96622	97.5	30.6	30.0	57.5	31.2	7/11/00
34	D95565	100.0	42.8	43.0	60.0	24.6	7/13/00
35	HY 644	95.0	24.0	23.0	30.0	29.8	7/10/00
36	94B15-D9D5	95.0	30.3	29.0	25.0	37.3	7/10/00
37	94B16-S14A	97.5	33.2	33.0	45.0	28.5	7/11/00
38	RL 4927	95.0	35.6	34.0	42.5	31.4	7/10/00
39	CI14371*	92.5	25.8	24.0	30.0	32.6	7/11/00
40	PI382167*	97.5	28.1	28.0	7.5	42.6	7/15/00
41	PI382161*	60.0	12.0	7.5	20.0	41.3	7/7/00
42	PI182561*	97.5	34.5	34.0	22.5	21.6	7/13/00
43	PI81791*	97.5	29.7	29.5	10.0	54.4	7/13/00
	Mean	92.1	31.5	29.9	36.6	32.7	
	CV%	7.8	19.3	22.6	27.8	26.4	
	LSD (.05)	14.6	12.3	13.6	20.6	17.5	

One-meter rows, 3 reps. Mist-irrigated with spray and grain spawn inoculum.
Incidence, Severity, and Disease assessment from 20 spikes/rep.
Grain yield and Tombstone kernels estimated from entire row.

Table 5. 2000 Uniform Regional Scab Nursery for Spring Wheat Parents, Langdon, ND.

Entry no.	Entry name	Date Headed	Incidence %	Severity %	Disease %	Tombstone %	Test Wt lb/bu	Necrosis Flag %	Spiklets Head no.	Head Length cm	Head */spiklet cm
1	2375	28	53.8	13.3	7.4	13.8	55.0	67.5	13.8	7.5	1.1
2	Wheaton	31	70.0	15.5	11.6	34.4	52.6	33.8	14.0	6.9	1.0
3	BacUp	28	50.0	3.8	2.0	4.0	58.7	67.5	13.5	8.5	1.3
4	Oslo	31	55.0	11.0	7.2	35.8	52.1	12.5	14.0	8.0	1.1
5	ND2710	28	17.5	1.3	0.4	5.0	58.9	30.0	12.5	7.3	1.2
6	SD3523	30	25.0	2.3	0.7	4.8	59.8	16.3	16.0	9.3	1.2
7	SD3524	29	18.8	2.3	0.5	3.6	59.5	40.0	15.8	8.9	1.1
8	SD3561	28	28.8	4.4	1.3	10.3	57.7	47.5	15.8	7.4	0.9
9	SD3562	29	36.3	4.3	1.7	8.8	59.0	56.3	14.0	6.5	0.9
10	SD3588	28	31.3	3.5	1.4	9.5	58.9	13.8	12.0	6.6	1.1
11	ND712-12	31	20.0	2.5	0.8	6.8	58.7	23.8	13.3	8.1	1.2
12	ND2928	31	5.0	0.3	0.0	7.0	58.5	28.8	15.0	7.0	0.9
13	ND2955	33	8.8	0.7	0.1	2.1	57.4	20.0	13.8	8.8	1.3
14	ND2959	30	11.3	1.0	0.2	5.4	58.9	13.8	13.0	7.9	1.2
15	ND3006	30	8.8	0.7	0.1	5.3	58.3	25.0	14.0	8.1	1.2
16	N99-0010	28	32.5	3.0	1.0	7.8	58.5	20.0	13.5	7.1	1.1
17	N99-0011	29	15.0	1.3	0.2	7.4	56.9	25.0	15.8	7.5	1.0
18	N99-0085	31	43.8	5.0	2.6	13.6	57.3	13.8	13.8	7.4	1.1
19	N99-0107	29	27.5	3.6	1.0	6.0	57.2	25.0	13.8	7.8	1.1
20	N99-0157	27	31.3	3.9	2.0	7.4	58.7	42.5	11.3	6.8	1.2
21	MN97039	28	26.3	3.3	1.2	7.6	56.5	27.5	15.5	7.5	1.0
22	MN97561	27	40.0	7.8	3.4	12.1	57.3	20.0	13.8	6.1	0.9
23	MN98037	28	26.3	2.8	0.9	4.8	57.7	20.0	16.5	9.3	1.1
24	MN98092	30	31.3	5.2	2.3	13.5	55.9	40.0	12.8	7.3	1.1
25	MN98208	29	37.5	5.3	2.4	10.8	58.0	32.5	14.8	6.8	0.9
26	MN98389	27	46.3	5.9	2.9	10.0	56.6	32.5	11.0	5.6	1.0
27	FA-998-743	28	43.8	5.7	3.0	11.5	58.1	12.5	14.3	7.1	1.0
28	FA-998-781	31	33.8	4.0	1.7	19.0	55.6	12.5	13.8	6.9	1.0
29	FA-998-782	29	55.0	7.6	4.8	21.1	55.7	10.0	13.8	7.4	1.1
30	FA-998-783	31	33.8	4.3	2.0	18.0	56.0	23.8	13.0	6.5	1.0
31	DH98069	31	36.3	4.7	1.9	22.1	55.9	23.8	13.5	6.4	1.0
33	D96622	31	37.5	3.8	1.7	17.8	54.9	15.0	16.5	7.8	0.9
34	D96596	32	42.5	3.3	1.3	28.9	54.4	11.3	15.5	6.9	0.9
34	D95565	33	32.5	4.5	1.6	16.0	56.3	15.0	15.0	7.3	1.0
35	HY644	32	20.0	1.8	0.5	14.5	55.4	15.0	15.3	9.5	1.3
36	RL4970	32	7.5	0.4	0.1	4.1	58.2	16.3	13.8	6.9	1.0
37	RL4972	28	22.5	2.6	0.7	8.5	57.4	30.0	11.8	5.5	0.9
38	RL4927	29	15.0	1.7	0.4	5.9	58.3	40.0	15.8	7.8	1.0
39	CI14371*	32	41.3	6.4	3.0	16.0	56.3	12.5	14.8	7.4	1.0
40	PI1382167*	37	3.8	0.3	0.0	8.0	55.4	6.3	15.8	9.1	1.2
41	PI1382161*	29	11.3	0.9	0.2	2.5	59.0	16.3	14.5	8.1	1.1
42	PI182561*	31	23.8	2.9	1.1	5.5	55.0	13.8	14.3	6.0	0.9
43	PI81791*	38	1.3	0.1	0.0	4.8	55.1	12.5	19.0	10.6	1.1
	MEAN	30	29.3	3.9	1.8	11.2	57.0	25.1	14.2	7.5	1.1
	LSD 5%	1.9	18.5	3.9	3.0	5.7	1.7	21.0	1.8	1.6	0.2
	C.V. %	4.6	45.2	70.3	116.1	36.5	2.2	59.5	8.8	15.1	12.8

Table 6. 2000 Uniform Regional Spring Wheat Nursery for Spring Wheat Parents, Crookston, MN.

Entry no.	Entry	Incidence %	Severity %	Disease %	Yield g/plot	Test wt lb/bu	Tomb. %	DON ppm	Heading days 6-1
1	2375	100	33	33	178	55.6	19	12.5	24.7
2	WHEATON	100	47.3	47.3	99	44.3	50	40.7	28
3	BACUP	91.7	21.6	19.8	140	59.5	8	5.2	22.3
4	OSLO	100	52.8	52.8	104	47.9	43.3	22.5	24
5	ND2710	86.7	19.6	16.7	152	60.1	5.3	1.6	24.7
6	SD3523	86.7	15.7	13.7	245	61.8	10	5.9	24.3
7	SD3524	91.7	25.8	24.2	222	60.3	8.7	2.7	25.3
8	SD3561	100	47.3	47.3	151	54.4	25	11.7	22
9	SD3562	93.3	25.4	24.2	171	57.2	15	6.2	24
10	SD3588	88.3	17.1	15.2	193	59.5	6	5.6	22.7
11	ND712-12	90	16.7	15	177	60.1	10	4.8	25
12	ND2928	51.7	11.4	6.2	169	58.7	1.7	1.7	28.3
13	ND2955	93.3	17.4	16.3	170	58.1	6	2.7	28
14	ND2959	81.7	16.9	13.8	214	59.8	8.7	5.7	27.7
15	ND3006	96.7	18.6	18	154	57	10	6.4	26.3
16	N99-0010	100	32.2	32.2	138	55.3	20.7	8.3	23.3
17	N99-0011	95	23.4	22.2	193	57.2	12.3	4.1	23.3
18	N99-0085	100	41.8	41.8	105	52.7	28.3	18.3	26
19	N99-0107	96.7	27.7	26.7	174	56.4	14.7	7.6	23.3
20	N99-0157	80	19	15.3	158	59.8	7.3	3.9	22.7
21	MN97039	100	25.3	25.3	169	54.7	15.7	7.4	25.7
22	MN97561	96.7	27.5	26.7	169	57	14	7.6	23.7
23	MN98037	88.3	20.5	17.5	183	59.5	8.7	5.1	23.7
24	MN98092	96.7	27.5	26.8	189	57.2	14	6.3	24
25	MN98208	100	34.5	34.5	113	55.8	19	20.2	24
26	MN98389	86.7	19.9	17.3	194	57.5	11	4.5	22.7
27	FA-998-743	98.3	29.1	28.7	158	58.1	16.3	9.4	23.7
28	FA-998-781	100	39.5	39.5	100	51.3	16.3	20.2	26.3
29	FA-998-782	96.7	30.3	29.5	125	51.9	15	14.6	27
30	FA-998-783	96.7	33	31.7	112	52.2	15	12.1	26.7
31	DH98069	98.3	46.2	45.5	106	51.9	16.7	12.7	24.7
32	D96596	100	62.8	62.8	57	49.6	28.3	24.2	28.7
33	D96622	96.7	42.5	41.2	124	50.5	16.7	17.1	26.3
34	D95565	100	40.5	40.5	109	51	20.7	21.3	26
35	HY 644	86.7	17.7	15.3	176	56.1	7.3	8.0	28.7
36	RL 4970	85	17.2	14.8	213	58.9	3.9	2.3	26.3
37	RL 4972	98.3	25.7	25.3	153	55.3	7.3	5.3	23.7
38	RL 4927	91.7	22.7	20.8	188	58.4	7.3	4.3	24.7
39	CI14371*	100	47.8	47.8	112	53.9	13.3	9.6	27
40	PI382167*	56.7	13.9	8	215	52.7	6.9	6.7	32
41	PI382161*	51.7	11.2	5.8	216	60.9	2.7	1.7	25.3
42	PI182561*	61.7	12.7	7.8	174	54.7	9.3	3.5	26
43	PI81791*	70	16.1	11.3	223	53.6	5.9	8.4	32.7
	MEAN	90.2	27.8	26.2	160	55.8	14	9.5	25.5
	LSD 5%	13.9	9.7	10	32.1		5.9		1.9
	CV %	5.5	12.4	13.5	7.1		15		2.7

Table 7. 2000 Uniform Regional Scab Nursery for Spring Wheat Parents, St. Paul, MN

Entry no.	Entry name	Incidence %	Severity %	Disease %	Yield g/plot	Test Wt. lb/bu	Tomb %	DON ppm	Heading days 6-1
1	2375	90	29.1	27	177	53.6	16.3	5.2	21.3
2	WHEATON	100	82.5	82.5	63	36.7	50	43.6	23.7
3	BACUP	91.7	25.1	23.3	124	55	11.7	3.9	17
4	OSLO	98.3	53.3	52.5	59	39.2	40	8.5	21.3
5	ND2710	28.3	10	2.8	153	58.4	4	1.2	21.7
6	SD3523	73.3	15.9	12	187	57	8	3.7	22
7	SD3524	38.3	12.1	5.5	215	58.7	6	1.6	20.7
8	SD3561	68.3	25.1	18.8	210	55.6	10	2.0	19
9	SD3562	53.3	14.2	8	195	57.5	7.3	1.7	20
10	SD3588	51.7	18.4	9.5	180	56.4	6	1.8	18.3
11	ND712-12	91.7	28.6	26.3	137	52.5	16.7	5.4	23.7
12	ND2928	56.7	12.9	7.8	135	54.1	7.3	2	24.7
13	ND2955	88.3	20	17.5	98	51.9	10.3	3.3	25.7
14	ND2959	81.7	15.2	12.5	177	55	12.3	2.2	25.3
15	ND3006	83.3	17.7	14.8	167	55.3	11.3	4.2	23.7
16	N99-0010	98.3	27.9	27.5	107	53.3	11	3.5	22
17	N99-0011	90	28.2	25.7	107	51.3	14	2.7	22.3
18	N99-0085	96.7	41.9	40.3	71	48.2	21.7	11.1	25.7
19	N99-0107	66.7	23.3	17.2	212	53.6	11	5.5	21.3
20	N99-0157	75	21.6	16.5	191	57.5	7.3	3.9	20.3
21	MN97039	88.3	20.2	17.8	137	52.5	10	3.3	22
22	MN97561	75	21.6	17	123	52.5	15.7	4.4	20.7
23	MN98037	71.7	18.8	14.2	186	55.3	8.7	3.8	20.7
24	MN98092	70	25.7	18	162	55	11.3	4.1	23
25	MN98208	63.3	17.6	11.7	135	57.2	9.3	4.6	19.7
26	MN98389	68.3	15.9	11.8	222	54.7	6.7	1.6	21.3
27	FA-998-743	88.3	19.5	17.7	202	57	7.3	3.1	21
28	FA-998-781	98.3	44.7	44	57	47.9	28.3	12.9	28
29	FA-998-782	93.3	35.6	32.8	108	51	19	15.2	26.3
30	FA-998-783	100	56.7	56.7	63	45.7	28.3	24.6	27
31	DH98069	93.3	42.9	39.7	80	50.5	20.7	13.7	26.7
32	D96596	100	55.8	55.8	72	46.5	22.3	27.6	29
33	D96622	100	48.5	48.5	111	49.6	25	19.3	27
34	D95565	98.3	46.3	45.5	100	50.8	25	21.3	28.3
35	HY 644	63.3	12.8	8.5	153	52.7	8	2.6	25
36	RL 4970	83.3	26.9	23.3	104	52.5	7.3	3.6	25.3
37	RL 4972	100	32.3	32.3	154	53.6	10	5.1	23.3
38	RL 4927	88.3	25.2	23	155	53.6	11.3	6.1	22
39	CI14371*	90	39.4	35.5	89	51	10.7	10.8	25.7
40	PI382167*	76.7	20.5	17.5	101	55	8.7	6.6	31.7
41	PI382161*	73.3	32	20.7	115	53.9	4.7	3.1	21.3
42	PI182561*	56.7	14.4	8.3	85	47.7	23.3	3.6	25
43	PI81791*	68.3	21.6	14.8	54	44.6	13.7	8.7	32
	MEAN	79.8	28.3	24.7	133	52.4	14.4	7.6	23.5
	LSD 5%	27.3	13.1	14.2	56		7.7		1.4
	CV %	12.2	16.4	20.4	15		19		2.1

Table 8. 2000 Uniform Regional Scab Nursery for Spring Wheat Parents, Manitoba, Canada

Entry no.	Entry name	Incidence %	Severity %	Disease %	Rank
1	2375	67.86	28.77	20.34	28
2	WHEATON	91.07	62.39	56.94	43
3	BACUP	53.38	24.31	12.35	11
4	OSLO	82.75	52.97	45.25	39
5	ND2710	32.90	13.41	4.68	1
6	SD3523	45.23	12.49	6.28	2
7	SD3524	71.57	21.91	17.67	24
8	SD3561	77.35	21.59	16.51	17
9	SD3562	46.19	18.61	8.10	3
10	SD3588	67.91	13.66	9.06	4
11	ND712-12	61.27	25.83	17.67	25
12	ND2928	54.49	15.67	10.39	7
13	ND2955	62.12	22.63	15.49	15
14	ND2959	51.80	16.63	10.07	6
15	ND3006	54.69	21.27	12.19	9
16	N99-0010	73.65	28.54	23.44	31
17	N99-0011	68.75	20.51	16.56	18
18	N99-0085	87.35	47.35	43.31	36
19	N99-0107	69.73	24.32	17.60	23
20	N99-0157	53.06	23.23	12.34	10
21	MN97039	78.33	29.10	24.25	32
22	MN97561	76.92	27.36	21.11	29
23	MN98037	64.35	22.59	16.95	20
24	MN98092	66.48	23.88	17.54	22
25	MN98208	58.11	22.87	16.39	16
26	MN98389	59.66	18.93	12.55	12
27	FA-998-743	48.92	16.19	9.36	5
28	FA-898-781	96.86	52.65	51.09	42
29	FA-898-782	92.64	48.04	44.72	38
30	FA-898-783	86.03	46.86	39.46	34
31	DH98069	94.70	45.91	43.83	37
32	D96596	100.00	42.68	42.68	35
33	D96622	97.64	46.81	45.88	40
34	D95565	96.56	52.25	50.62	41
35	HY 644	56.25	20.03	11.58	8
36	94B15-D9D5	70.56	30.77	22.86	30
37	94B16-S14A5	61.40	19.76	14.01	13
38	RL 4927	79.01	25.66	18.84	26
39	CI14371*	67.78	33.94	27.76	33
40	PI382167*	60.79	26.35	17.34	21
41	PI382161	62.85	19.80	14.76	14
42	PI182561*	55.54	21.16	16.56	19
43	PI81791*	68.92	29.41	20.62	27
	Mean	69.10	28.80	13.40	
	LSD 5%	24.80	13.70	13.40	

Table 9. 2000 Uniform Regional Scab Nursery for Spring Wheat Parents Combined Overall Locations

Entry no.	Entry	Incidence %	Severity %	Disease %	Tombstone %	DON ppm	Yield g/plot	Heading date
		7*	7	7	5	3	3	4
1	2375	78.1	29.9	24.8	22.8	17.9	132.0	21.1
2	WHEATON	88.6	50.2	46.4	54.3	49.4	61.0	23.4
3	BACUP	74.1	24.1	19.9	15.5	9.0	100.3	18.0
4	OSLO	87.7	45.2	41.2	55.4	34.3	60.3	20.2
5	ND2710	46.5	12.1	7.3	14.5	7.9	119.0	20.4
6	SD3523	63.5	18.5	14.2	16.6	10.2	158.0	21.0
7	SD3524	63.2	20.7	16.0	12.3	8.4	161.3	20.6
8	SD3561	73.2	29.8	25.4	24.7	15.9	131.7	19.2
9	SD3562	67.4	21.1	17.0	20.0	11.3	139.3	19.7
10	SD3588	68.0	20.6	16.2	18.9	10.8	136.0	19.0
11	ND712-12	70.6	24.0	20.5	22.9	15.1	114.0	22.3
12	ND2928	52.1	13.6	9.5	12.4	3.6	116.7	23.5
13	ND2955	67.1	20.5	17.7	15.1	6.0	99.0	24.3
14	ND2959	63.5	17.6	14.9	15.3	12.3	142.3	23.2
15	ND3006	67.9	22.0	19.0	21.5	18.9	114.7	22.6
16	N99-0010	80.1	30.8	28.3	25.9	15.6	90.0	20.1
17	N99-0011	75.5	25.1	22.8	22.3	13.3	108.0	21.5
18	N99-0085	80.3	38.9	34.5	31.7	25.5	67.0	23.1
19	N99-0107	72.7	28.2	23.8	19.1	17.0	137.7	20.9
20	N99-0157	67.6	23.5	19.9	16.0	10.3	127.0	19.6
21	MN97039	80.1	25.5	21.8	22.5	4.2	113.0	21.5
22	MN97561	76.7	26.4	21.7	27.8	14.7	106.3	19.9
23	MN98037	70.4	23.6	19.5	20.2	14.0	135.0	20.1
24	MN98092	74.5	28.8	23.3	23.0	16.5	126.3	21.1
25	MN98208	68.8	23.5	19.5	20.6	16.6	96.7	20.1
26	MN98389	68.3	21.9	18.8	23.9	11.0	151.0	19.8
27	FA-998-743	76.0	27.5	24.1	25.2	16.2	135.0	20.2
28	FA-998-781	80.1	34.2	30.9	33.5	20.0	58.7	24.6
29	FA-998-782	80.8	40.9	35.0	32.8	21.6	85.0	24.3
30	FA-998-783	86.6	41.5	36.4	36.3	21.6	64.3	24.4
31	DH98069	78.8	37.4	32.7	35.7	16.5	71.0	23.8
32	D96596	81.5	41.2	37.3	42.5	25.3	51.0	26.4
33	D96622	81.3	35.7	33.2	37.9	18.8	88.7	24.0
34	D95565	78.5	38.9	34.0	35.3	26.2	78.0	25.1
35	HY 644	69.8	20.0	15.9	22.2	10.9	119.7	24.0
36	RL 4970	69.3	24.7	22.1	14.7	5.6	118.0	23.4
37	RL 4972	77.0	26.1	23.8	25.4	9.8	111.7	21.5
38	RL 4927	76.3	26.0	22.4	21.7	11.5	124.7	21.3
39	CI14371*	84.6	37.5	31.6	23.8	16.1	78.0	23.9
40	PI382167*	64.9	20.8	16.5	13.9	6.1	119.7	28.9
41	PI382161*	59.6	21.7	16.3	13.8	4.6	124.0	20.7
42	PI182561*	61.0	26.5	23.3	31.4	8.4	93.7	23.6
43	PI81791*	64.1	22.8	18.8	13.9	6.7	110.3	28.9
	Mean	72.5	27.7	23.8	24.5	14.8	108.7	22.4
	LSD 5%	12.6	8.5	9.8	10.6	12.2	50	1.8

*=number of locations

Table 10 Correlations among trait means over locations for the Uniform Regional Scab Nursery grown in 2000 at ND, MN, SD, IA, and Canada.

	Incidence	**Severity**	**Disease**	**Tombstone**	**DON**
Severity	0.87				
Disease	0.89	0.99			
Tombstone	0.75	0.89	0.90		
DON	0.70	0.84	0.84	0.87	
Yield	**-0.77**	**-0.78**	**-0.79**	**-0.75**	**-0.66**

All r values are significant at P<0.01