

Bob

1995 UNIFORM REGIONAL SCAB NURSERY FOR SPRING WHEAT PARENTS

The Uniform Regional Scab Nursery was grown for the first time in 1995. The nursery was grown in North Dakota, South Dakota, Minnesota and Manitoba. Five of the six locations used had irrigation or misting available for enhanced disease infection. Inoculation was conducted by several including spraying the heads, using infected seed, and some hand inoculation. Greenhouse screening was conducted at South Dakota as well as field.

Visual head symptoms of scab infection and spread were evaluated at all six locations. Kernel damage evaluations were taken at Morris and St. Paul, MN and at Langdon, ND. Late heading problems were encountered with MN94390, MN90382, Frontana, Katepwa, and D87-240, a durum entry at several locations, so the data set is not complete across all locations.

Entries were evaluated using RCBD with three replicates. Single row plots were evaluated. Head evaluated per plot were as follows, Morris (30), St. Paul (50), Manitoba (20), Langdon (10), and Brookings (20).

Each location's data are in separate tables. A combined table of head symptoms from all locations, and the combined kernel evaluations from three locations are also presented.

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1995 UNIFORM SCAB NURSERY FOR SPRING WHEAT PARENTS

Entry No.	Entry	Pedigree	Source
1	2375	Check	
2	Wheaton	Check	
3	Frontana		MN
4	MT9354	MT7810//SU73/Lew	MT
5	MT9360	Lew/Pondera	MT
6	ND2603	Sumai#3/Wheaton	ND
7	ND2604	Sumai#3/Wheaton	ND
8	ND2713	Stoa//Sumai#3/Wheaton	ND
9	ND2729	Sumai#3/Wheaton//Gus	ND
10	ND2731	Sumai#3/Stoa	ND
11	SD3195	KS80100X-38/SD3014//SD3047	SD
12	SD3219	SD3078/Grandin	SD
13	SD3236	SD3100/SD8061	SD
14	SD3247	SD3056/SD3101	SD
15	SD3249	SD3080/Dalen	SD
16	ACDomian		Manitoba
17	93FHB#21		Manitoba
18	93FHB#37		Manitoba
19	94FHB#9		Manitoba
20	94FHB#28		Manitoba
21	MN2514	SBE303-23	MN
22	MN2538	Nyu Bay/2375//Marshall	MN
23	MN94382	PAR CIMMYT	MN
24	MN94390	PAR CIMMYT	MN
25	B92-0058	VTI/K450082//BJY	AGRIPRO
26	N92-0248	N87-0135/HS84-0793	AGRIPRO
27	N92-2031	CN Random Mating	AGRIPRO
28	N93-0305	B85-1516/N86-0370	AGRIPRO
29	N93-0351	B87-10175/Krona	AGRIPRO
30	Katepwa	Check	Canada
31	N93-0214	N86-1076/Dalen	AGRIPRO
32	D87-240	D7798/DT367	ND (durum)

Table 1. Uniform Regional Scab Nursery
1995 Brookings, SD

Entry	Name	-----Greenhouse-----					-----Field-----		
		Flowering Days	Prevalence %	Severity %	Disease %	KWT mg	Score	TW lbs/bu	KWT mg
1	2375	177	53	31	16.4	22.2	1.33	53.7	25.9
2	WHEATON	187	100	79	79.0	23.0	3.43	51.9	24.7
3	FRONTANA	205	-	-	-	-	-	-	-
4	MT9354	190	100	70	70.0	17.7	3.18	46.7	23.7
5	MT9360	183	50	22	11.0	18.3	2.23	51.8	21.8
6	ND2603	181	67	24	16.2	26.7	0.28	55.3	26.8
7	ND2604	198	85	16	13.2	29.4	1.60	51.2	23.0
8	ND2713	191	47	20	9.5	22.3	0.78	51.2	23.9
9	ND2729	184	60	20	12.0	24.2	0.68	55.0	24.7
10	ND2731	177	35	16	5.5	21.4	0.73	52.2	23.3
11	SD3195	184	60	15	9.2	26.0	0.75	56.2	27.0
12	SD3219	185	73	43	31.8	18.6	0.33	58.9	27.9
13	SD3236	179	90	24	21.2	18.0	0.30	57.0	27.1
14	SD3247	177	97	47	45.1	21.1	1.10	56.7	25.0
15	SD3249	180	55	23	12.8	20.9	0.75	58.5	25.2
16	ACDOMAIN	193	83	23	18.9	25.5	2.45	52.0	21.8
17	93FHB#21	180	37	16	5.7	22.1	1.95	51.7	27.5
18	93FNB#37	189	90	36	32.1	27.0	0.65	51.0	24.3
19	93FNB#9	173	100	24	23.5	24.8	0.33	52.8	23.8
20	93FNB#28	178	30	9	2.6	24.4	0.83	51.9	24.3
21	MN2514	194	43	14	6.1	14.5	1.03	50.1	20.1
22	MN2538	173	100	70	70.0	25.9	0.40	57.8	24.0
23	MN94382	204	-	-	-	-	0.30	55.9	25.8
24	MN94390	197	80	50	40.0	19.5	0.20	55.9	26.1
25	B92-0058	183	73	29	21.3	17.9	1.35	52.8	21.6
26	N92-0248	195	35	18	6.1	17.9	0.88	52.6	21.6
27	N92-2031	196	73	16	12.0	17.5	1.00	54.6	25.7
28	N93-0305	183	43	12	5.1	17.8	1.60	54.6	24.5
29	N93-0351	195	83	14	11.7	17.7	1.23	53.9	25.0
30	KATEPWA	203	-	-	-	-	2.60	49.6	22.4
31	N93-0214	177	80	37	29.9	19.6	1.35	51.8	22.9
32	D87240	208	-	-	-	-	-	-	-
33	BUTTE86	173	89	61	54.8	18.5	1.15	55.6	26.9
34	SHARP	174	100	59	58.7	19.5	2.18	53.8	25.2
35	MARSHALL	198	77	25	19.2	24.0	1.90	53.2	24.7
36	PROSPECT	183	93	44	41.4	21.3	2.30	51.4	23.0
37	2398	195	100	83	82.7	20.5	3.15	48.8	25.3
38	SUMAI3	198	47	12	5.4	19.3	0.30	47.2	24.5
39	SD8089	184	33	14	4.7	18.9	0.15	52.7	25.0
40	SD3164	177	80	37	29.3	22.9	0.90	55.0	25.6
Mean		187	64	29	23.3	19.2	1.19	50.6	23.3
LSD(.05)			34.8	19.5	22.9	6.0	0.60	3.9	2.5
C.V.(%)			35.4	44.8	62.1	21.3	29.46	4.3	6.1

- anthesis date of entry was too late for reliable data.

Greenhouse: Hill plots, 4 replications. Spray inoculated and misted.

Field: 1 row plots, 2 replications. Score = Average of 20 spikes (0 = no disease, 1 < 25%, 2 = 25-50%, 3 = 50-75%, 4 = 75-100%). Natural infection.

Table 2. 1995 UNIFORM FUSARIUM HEAD BLIGHT (FHB) NURSERY FOR
SPRING WHEAT PARENTS - N.D.S.U. PROSPER, ND SITE

Entry†	FHB incidence %	Infected spike severity %	Total severity‡ %	Quick Severity‡ %	Spread‡ %
2375	81	52	42	43	94
Wheaton	82	36	29	23	88
Frontana	--	--	--	--	--
MT9354	96	63	61	64	94
MT9360	95	56	53	58	87
ND2603	91	42	39	43	88
ND2604	91	34	32	32	89
ND2713	75	14	11	2	51
ND2729	82	36	30	29	75
ND2731	72	27	20	18	72
SD3195	70	19	14	3	62
SD3219	89	38	34	39	79
SD3236	87	41	36	38	83
SD3247	84	40	33	35	88
SD3249	84	45	38	42	83
AC Domain	70	43	29	31	86
93FHB#21	76	32	24	20	83
93FHB#37	68	26	18	12	75
94FHB#9	94	42	40	48	89
94FHB#28	88	22	20	12	76
MN2514	92	32	30	23	88
MN2538	83	36	30	30	84
MN94382	--	--	--	--	--
MN94390	--	--	--	--	--
B92-0058	84	37	32	34	83
N92-0248	89	37	34	32	83
N92-2031	73	25	18	10	76
N93-0305	79	28	22	20	71
N93-0351	100	39	39	40	89
Katepwa	75	21	16	13	60
N93-0214	89	62	55	64	94
D87-240	--	--	--	--	--

†Data missing-very late heading Frontana, MN94382, MN94390; herbicide damage D87-240.
‡Total severity=FHB incidence X infected spike severity; quick severity=spikes severely ($\geq 50\%$) blighted; spread=spikes with evidence of pathogen spread.

Planting date-May 30, 1995, RCB with 3 replicates, hill plots.
Inoculation dates-July 18, July 24, and July 31 - each plot inoculated once, anthesis or slightly later. Inoculation procedure (see attached description). Misting system and temporary windscreen were used to enhance infection. FHB data recorded 3 weeks after each inoculation date (attached visual scale). Data analysis for each trait - attached five ANOVA and mean tables.

Table 3. 1995 UNIFORM SCAB NURSERY Glenlea, Manitoba

Entry	% Infected Spikelets	% Infected Heads	FHB Index
Frontana	11.44 a	6.50 a	1.13 a
MN94382	13.75 a	21.50 ab	3.73 ab
ND2731	18.66 ab	23.02 abc	4.00 ab
MN94390	13.99 a	23.33 abc	4.11 ab
93 FHB21	30.81 cdefgh	16.67 a	4.86 ab
93 FHB37	31.74 cdefgh	46.33 bcd	8.43 abc
ND2603	20.42 abc	56.67 def	12.08 abcd
SD3195	23.44 abcd	51.73 cde	12.33 abcd
ND2713	19.31 ab	73.33 defgh	13.95 abcd
MN2514	21.28 abcd	60.27 defg	15.04 abcd
SD3236	23.75 abcd	73.80 defgh	17.64 abcde
94FHB28	21.54 abcd	75.00 defgh	18.16 abcde
94FHB9	22.21 abcd	78.50 efgh	19.25 abcde
N93-0305	26.67 abcde	72.27 defgh	21.15 abcde
ND2729	23.49 abcd	93.63 h	22.15 abcdef
SD3249	28.66 abcde	81.23 efgh	22.94 abcdef
SD3247	28.42 abcde	83.07 efgh	24.03 abcdef
SD3219	34.13 abcdef	82.30 efgh	27.67 bcdefg
ND2604	35.38 abcdef	81.97 efgh	29.91 cdefgh
MN2538	30.73 abcdef	96.67 h	29.93 cdefgh
D87-240	43.79 bcdefg	75.63 defgh	33.19 defgh
N92-2031	46.10 cdefgh	73.57 defgh	34.50 defgh
N92-0248	47.25 defgh	73.23 defgh	39.57 efghi
N94-0352	49.99 efghi	80.00 efgh	40.20 efghi
AC Domain	49.89 efghi	90.00 gh	45.67 fghij
Wheaton	54.72 fghi	85.00 fgh	51.10 ghijk
B92-0058	54.22 fghi	95.07 h	52.17 hijk
N93-0351	64.10 ghi	95.25 h	61.05 ijk
MT9354	65.71 ghi	88.33 fgh	61.89 ijk
2375	66.82 ghi	95.00 h	63.43 jk
N93-0214	70.16 hi	100.00 h	70.16 k
MT9360	74.27 i	96.67 h	72.21 k

Randomized Block

3 replications

No. of Heads analyzed per plot: 20 - 22 Collected 18 days after inoculation

Inoculation - at Anthesis - twice, 4 days apart

Fusarium graminearum - 3 - 4

Isolates: 100,000 conidia / mL

Spraying System: back pack sprayer

Table 56. 1995 UNIFORM FUSARIUM HEAD BLIGHT (FHB) NURSERY FOR
SPRING WHEAT PARENTS-ST. PAUL, MN

Entry	Name	-----FHB-----			-----Scab-----
		Infected Heads%	Infected Spikelets%	Index%	Kernel Density% ¹
1	2375	82.7	37.3	32.2	34
2	Wheaton	64.0	21.3	14.1	5
3	Frontana	73.0	13.3	9.8	21
4	MT9354	98.0	56.0	54.8	13
5	MT9360	92.7	42.3	39.3	19
6	ND2603	67.3	33.3	23.1	21
7	ND2604	27.3	12.7	3.6	30
8	ND2713	37.3	14.7	5.3	24
9	ND2729	31.3	17.7	5.6	14
10	ND2731	8.0	15.7	1.3	10
11	SD3195	7.3	9.3	0.7	32
12	SD3219	94.7	41.3	39.5	28
13	SD3236	76.7	36.0	28.5	13
14	SD3247	50.7	27.3	13.7	31
15	SD3249	44.7	19.7	8.9	39
16	AC Domain	98.7	42.0	40.4	7
17	93FHB#21	4.0	8.7	0.7	11
18	93FHB#37	14.7	14.7	2.1	16
19	94FHB#9	60.0	29.0	17.3	12
20	94FHB#28	40.0	19.0	8.4	15
21	MN2514	54.7	19.3	10.8	25
22	MN2538	25.3	13.3	3.6	45
23	MN94382	33.7	18.0	6.2	39
24	MN94390	19.0	15.0	3.1	44
25	B92-0058	92.7	30.3	28.5	20
26	N92-0248	97.3	21.7	21.0	38
27	N92-2031	30.0	21.7	6.9	33
28	N93-0305	100.0	44.7	44.6	28
29	N93-0351	52.0	19.3	9.9	27
30	Katepwa	77.3	23.3	18.8	6
31	N93-0214	100.0	53.0	52.9	11
32	D87240 ₂	31.0	10.0	3.2	5
	MEANS	56.6	25.5	17.9	23
	LSD	20.4	10.8	10.9	11.0
	CV	22.1	25.8	37.4	23.8

1. Percent of kernels that sink from 100g sample.

2. Durum entry received late--entered in St. Paul and greenhouse only.

Table 6. 1995 UNIFORM FUSARIUM HEAD BLIGHT (FHB) NURSERY FOR
SPRING WHEAT PARENTS-MORRIS, MN

Entry	Name	-----FHB-----			-----Scab-----
		Infected Heads%	Infected Spikelets%	Index%	Kernel Density% ¹
1	2375	59.0	20.0	12.3	42
2	Wheaton	83.3	41.7	39.6	10
3	Frontana	90.0	35.8	32.5	51
4	MT9354	90.0	42.5	38.8	0
5	MT9360	94.3	56.7	55.1	35
6	ND2603	46.3	16.7	10.6	28
7	ND2604	84.7	40.0	37.4	56
8	ND2713	94.3	35.8	34.1	73
9	ND2729	80.0	37.5	34.2	30
10	ND2731	89.0	43.3	41.4	51
11	SD3195	54.3	22.5	18.5	63
12	SD3219	66.7	29.2	22.3	50
13	SD3236	75.7	30.8	26.9	14
14	SD3247	80.0	35.8	31.9	32
15	SD3249	75.7	30.8	26.0	27
16	AC Domain	83.3	44.2	39.8	19
17	93FHB#21	74.7	30.8	25.9	33
18	93FHB#37	86.7	41.7	38.2	55
19	94FHB#9	58.0	36.7	32.8	19
20	94FHB#28	73.3	30.0	25.7	47
21	MN2514	98.0	44.2	43.4	44
22	MN2538	50.0	19.2	12.1	65
23	MN94382	96.7	44.2	43.0	73
24	MN94390	75.7	28.3	22.9	77
25	B92-0058	93.3	52.5	50.8	32
26	N92-0248	84.7	39.2	33.1	28
27	N92-2031	84.3	43.3	39.8	64
28	N93-0305	91.0	52.5	50.0	43
29	N93-0351	85.3	36.7	31.9	18
30	Katepwa	87.7	37.5	33.1	29
31	N93-0214	83.3	31.7	28.4	18
	MEANS	79.7	36.5	32.7	39
	LSD	35.4	32.2	36.4	15.3
	CV	27.2	54.1	68.3	19.1

1. Percent of kernels that sink from 100g sample.

Table 7.

HRSW SCAB NURSERY - NDSU Langdon Research Center - 1995

#	Variety	7/31/95			8/16/95		8/22/95	Tombstone
		ZGS *	Foliar ** %	FHB *** %	ZGS *	FHB *** %	FHB *** %	Kernals %
1	2375	70	9.3	0.2	81	14.1	69.4	29.8
2	Wheaton	68	24.0	0.0	75	27.5	60.8	75.2
3	Frontana	45	5.3	0.0	67	0.0	8.6	22.7
4	MT9354	66	4.0	0.1	83	2.8	53.3	48.8
5	MT9360	69	40.0	0.0	86	20.0	61.4	40.0
6	ND2603	70	5.3	0.3	85	3.6	70.6	37.8
7	ND2604	68	8.0	0.0	82	22.3	85.6	50.8
8	ND2713	68	41.7	0.0	83	35.4	62.2	41.0
9	ND2729	71	3.0	0.0	84	39.5	85.3	43.0
10	ND2731	69	6.7	0.0	83	41.4	56.4	38.8
11	SD3195	67	7.0	0.0	80	2.4	39.2	35.2
12	SD3219	70	15.0	0.4	83	47.8	81.9	30.7
13	SD3236	70	11.7	1.0	85	4.1	70.0	35.2
14	SD3247	70	28.3	2.8	83	23.8	74.2	33.7
15	SD3249	71	27.3	0.1	84	11.8	61.4	28.0
16	AC Domain	70	17.0	1.0	82	39.5	89.4	33.3
17	93FHB21	71	5.3	0.0	81	8.1	54.7	40.0
18	93FHB37	67	5.7	0.0	75	2.3	51.1	33.2
19	94FHB9	69	76.7	0.1	80	13.8	48.6	48.2
20	94FHB28	69	18.3	0.4	82	5.1	66.4	43.3
21	MN2514	65	10.0	0.0	80	21.1	47.2	41.8
22	MN2538	72	8.0	0.4	85	9.8	68.3	30.0
23	MN94382	63	4.0	0.0	75	0.8	16.7	20.3
24	MN94390	50	5.3	0.0	73	0.0	13.3	29.2
25	B920058	68	24.7	0.0	83	26.5	66.4	32.0
26	N920248	70	7.7	0.8	84	10.6	70.8	46.8
27	N922031	69	7.7	0.0	86	38.5	66.9	32.8
28	N930305	66	3.0	0.0	81	17.5	61.1	43.2
29	N930351	71	41.7	0.9	76	4.2	51.9	45.7
30	Katepwa	59	2.7	0.0	77	21.3	52.5	25.2
31	N930214	65	2.7	0.0	78	5.3	51.9	47.8
32	D87240	55	5.3	0.0	79	13.1	56.7	32.7
	LSD (0.05)						12.3	9.1

* ZGS - Zadok's growth stage

** Foliar - percent leaf area affected by foliar pathogens

*** FHB - percent severity of fusarium head blight based on average of 10 heads per plot.

The trial was planted on 26 May, a randomized trial with 3 replications. Scabby seed was spread on the ground at heading time for additional inoculum, although natural inoculum were abundant in spore trapping observations. A sprinkler irrigation method was used this year to maintain canopy moisture on the dry sunny days. This method did not seem to work as well as the mist system used the previous year.

The trial was complicated by the abundant presence of the orange wheat blossom midge. Head blight ratings were unexpectedly high for some lines such as some of the crosses with the sumai 3. There were lots of bleached kernels in the grain samples which were poorly distinguishable from the tombstone kernels.

Table 8. 1995 UNIFORM FUSARIUM HEAD BLIGHT (FHB) NURSERY FOR
SPRING WHEAT PARENTS-ALL LOCATION MEANS FOR HEAD SYMPTOMS

Entry	Name	Infected Heads %	Infected Spikelets %	Index %
1	2375	74.1	41.4	33.3
2	Wheaton	82.9	46.5	42.6
3	Frontana ¹	-----	-----	-----
4	MT9354	94.5	59.4	57.3
5	MT9360	85.7	50.3	46.1
6	ND2603	65.7	27.3	20.2
7	ND2604	74.0	27.6	23.2
8	ND2713	65.4	20.8	14.8
9	ND2729	69.4	26.9	20.8
10	ND2731	45.4	24.1	14.4
11	SD3195	48.7	17.8	10.9
12	SD3219	81.1	37.1	31.1
13	SD3236	80.6	31.1	26.0
14	SD3247	79.0	35.7	29.5
15	SD3249	68.1	29.4	21.7
16	AC Domain	85.0	40.4	42.7
17	93FHB#21	41.7	23.7	12.2
18	93FHB#37	61.1	30.0	19.8
19	94FHB#9	78.1	30.8	26.6
20	94FHB#28	61.3	20.3	15.0
21	MN2514	69.6	26.2	21.1
22	MN2538	71.0	33.8	29.1
23	MN94382 ¹	-----	-----	-----
24	MN94390 ¹	-----	-----	-----
25	B92-0058	87.6	40.6	37.0
26	N92-0248	75.8	32.6	26.8
27	N92-2031	66.8	30.4	22.2
28	N93-0305	77.1	32.8	28.6
29	N93-0351	83.1	34.6	30.7
30	Katepwa ¹	-----	-----	-----
31	N93-0214	90.5	50.8	47.3
32	D87240 ¹	-----	-----	-----

1. Data not available at all locations.

Table 9. 1995 UNIFORM FUSARIUM HEAD BLIGHT (FHB) NURSERY FOR
SPRING WHEAT PARENTS-SEED SYMPTOMS

Entry	Name	LOCATION SUMMARY			Kernel Mean
		-----Floating Kernel % 1 -----		--Tombstone %--	
		St. Paul	Morris	Langdon	
1	2375	66	58	30	51
2	Wheaton	95	90	75	87
3	Frontana	79	49	23	50
4	MT9354	87	100	49	79
5	MT9360	81	65	40	62
6	ND2603	79	72	38	63
7	ND2604	70	44	51	55
8	ND2713	76	27	41	48
9	ND2729	86	70	43	66
10	ND2731	90	49	39	59
11	SD3195	68	37	35	47
12	SD3219	72	50	31	51
13	SD3236	87	86	35	69
14	SD3247	69	68	34	57
15	SD3249	61	73	28	54
16	AC Domain	93	81	33	69
17	93FHB#21	89	67	40	65
18	93FHB#37	84	45	33	54
19	94FHB#9	88	81	48	72
20	94FHB#28	85	53	43	60
21	MN2514	75	56	42	58
22	MN2538	55	35	30	40
23	MN94382	61	27	20	36
24	MN94390	56	23	29	35
25	B92-0058	80	68	32	60
26	N92-0248	62	72	47	60
27	N92-2031	67	36	33	45
28	N93-0305	72	57	43	57
29	N93-0351	73	82	46	67
30	Katepwa	94	71	25	63
31	N93-0214	89	82	48	73
32	D87240 ₂	95	---	33	---
	LSD0.05				17

1. Floating Kernels=Density (Heavy Kernels) - 100
2. No data at Morris