

Report of the 2008 Uniform Regional Scab Nursery for Spring Wheat Parents

Coordinator: David F. Garvin

USDA-ARS, Plant Science Research Unit
411 Borlaug Hall, University of Minnesota
1991 Upper Buford Circle, St. Paul, MN 55108

Report prepared by: David F. Garvin and Zachary Blankenheim

The Uniform Regional Scab Nursery for Spring Wheat Parents (URSN) was grown for the 14th year in 2008. Five mist-irrigated locations at Brookings, SD, St. Paul and Crookston, MN, Langdon, ND, and Glenlea, Manitoba, Canada were planted.

A total of 36 entries were included in the 2008 URSN, including the resistant checks 2375, BacUp, and ND2710, and the susceptible checks Wheaton and Oslo. Rugby was included as a durum check. The other entries were contributed by 8 university, and industry breeding programs. Three of these entries were durum wheat, and the rest were hard red spring wheat.

A core set of traits evaluated provided from most locations included scab incidence, scab severity, disease index (incidence x severity), and visual scabby kernel ratings (VSK, tombstone, \cong FDK). Additional recorded trait data such as grain deoxynivalenol content, plot yield, and heading date, are presented in individual location summary tables. Overall means for traits across locations are presented, as are relative rankings for scab incidence, severity, disease index, and VSK. Correlation coefficients are provided between scab incidence and severity, disease index, and VSK.

This material is based upon work supported by the U.S. Department of Agriculture, in cooperation with the U.S. Wheat & Barley Scab Initiative. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the authors and do not necessarily reflect the view of the U.S. Department of Agriculture.

St. Paul, MN
February, 2009

CONTENTS	PAGE
Cooperating Agencies, Stations and Personnel	1
Table 1. List of Entries in the 2008 URSN	2
Tables 2-6. Nursery Data by Individual Location	3-7
Table 7. Trait Means Across Locations, with Rankings	8
Table 8. Correlations Between Traits, by Location	9
Table 9. Correlations Between Traits Across Locations	10

Cooperators for the 2008 Uniform Regional Scab Nursery for Spring Wheat Parents

North Dakota State University (Langdon):

Scott Halley

South Dakota State University (Brookings):

Karl Glover

University of Minnesota (St. Paul, Crookston):

Jim Anderson, Ruth Dill-Macky, and John Wiersma

Agri-Food Canada, Glenlea, Manitoba:

Jeannie Gilbert and Gavin Humphreys

Table 1. Entries for the Uniform Regional Scab Nursery for Spring Wheat Parents, 2008.

Entry No.	Name	Pedigree	First Year Entered	Source
1	2375	CHECK		
2	Wheaton	CHECK		
3	Bacup	CHECK		
4	Oslo	CHECK		
5	ND2710	CHECK		
6	Rugby*	CHECK		
7	SD3942	SD3367/SD3623	2008	SDSU
8	SD4181	SD3618/ND739	2008	SDSU
9	SD4182	SD3618/ND739	2008	SDSU
10	SD4186	PI67392/SD3696//ND744	2008	SDSU
11	SD4192	SD3728/MN98389-A	2008	SDSU
12	NDSW0714	PI 634196/Alsen//*2Alsen	2007	NDSU
13	NDSW0715	PI 634196/Alsen//*2Alsen	2007	NDSU
14	ND07/3-10	ND2849/ND721	2008	NDSU
15	ND07/3-11	ARINA//PARSHALL/2817/3/ND716-21	2008	NDSU
16	ND08/3-11	SUMAI 3/STOA//ND674/3/PARSHALL/4/ND716 SELN	2008	NDSU
17	ND07/3-12	ND2831/ND706 SIB	2008	NDSU
18	ND08/3-12	ND721*2/TOKAI 66	2008	NDSU
19	MN03342-4	MN97695-4//MN99221/MN98366	2008	UMN
20	MN03358-4	MN98389/MN97518	2008	UMN
21	MN05058	MN97369-1/MN99322-25	2008	UMN
22	MN05117-7	MN97448-17/MN99017-6	2008	UMN
23	MN05149-5	MN99163-7/MN97369-98	2008	UMN
24	01S0335-4-3	98S0047-03//CHISCAB#140/N90-0690	2008	AgriPro
25	02S0066-13	N96-0001ES/3/KNUDSON//FHB5227/LARS	2008	AgriPro
26	02S0178-1	KNUDSON/4/NORLANDER/3/N92-0098//SUMAI3/DALEN	2008	AgriPro
27	02S0208-22	N92-0176//FHB5227/LARS/3/KNUDSON	2008	AgriPro
28	CA905-780	Granite/Briggs	2008	WestBred
29	CA907-824	(Alsen/Keystone)/(Granite/Knudson)	2008	WestBred
30	CA907-830	Trooper/(Granite/Tokai66)	2008	WestBred
31	CA907-834	Trooper/(Alsen/Keystone)	2008	WestBred
32	CA907-835	Trooper/Polaris	2008	WestBred
33	06MSP 18	Alsen//B1021/Norm	2007	Trigen
34	CA807-806*	Duraking/Primo D'oro	2007	WestBred
35	CA807-808*	Lebsock/CA801-748	2008	WestBred
36	CA807-810*	Duraking/Primo D'oro	2008	WestBred

* Durum Entries

SDSU, South Dakota State Univ.; NDSU, North Dakota State Univ.; UMN, University of Minnesota

Table 2. 2008 Uniform Regional Scab Nursery for Spring Wheat Parents, Brookings, SD.

Line	Incidence %	Severity %	Disease Index	Tombstone %
2375	98.3	38.0	37.6	9.0
Wheaton	98.3	72.0	71.0	85.0
Bacup	90.0	32.2	28.2	2.7
Oslo	100.0	46.7	46.7	2.3
ND2710	96.7	20.8	20.2	1.7
Rugby	100.0	55.7	55.7	4.0
SD3942	90.0	16.8	15.4	6.3
SD4181	100.0	24.7	24.7	4.7
SD4182	95.0	24.8	23.3	2.7
SD4186	96.7	24.8	24.1	2.7
SD4192	98.3	28.0	27.7	2.3
NDSW0714	93.3	28.2	26.2	1.7
NDSW0715	96.7	32.5	31.9	3.7
ND07/3-10	96.7	39.7	39.0	9.0
ND07/3-11	100.0	30.5	30.5	15.0
ND08/3-11	100.0	29.3	29.3	13.3
ND07/3-12	100.0	29.5	29.5	10.0
ND08/3-12	98.3	24.5	24.2	11.7
MN03342-4	100.0	40.2	40.2	16.7
MN03358-4	100.0	32.2	32.2	5.3
MN05058	100.0	26.5	26.5	4.3
MN05117-7	96.7	29.2	28.1	7.3
MN05149-5	93.3	20.3	19.0	3.0
01S0335-4-3	100.0	32.7	32.7	4.0
02S0066-13	98.3	32.7	32.1	16.7
02S0178-1	100.0	33.2	33.2	3.3
02S0208-22	100.0	36.5	36.5	6.3
CA905-780	98.3	28.0	27.7	8.3
CA907-824	100.0	28.8	28.8	11.7
CA907-830	100.0	31.2	31.2	4.0
CA907-834	100.0	27.8	27.8	11.7
CA907-835	96.7	24.8	24.0	4.7
06MSP 18	100.0	36.8	36.8	4.0
CA807-806	100.0	51.8	51.8	2.3
CA807-808	100.0	49.8	49.8	1.3
CA807-810	100.0	45.2	45.2	2.3
Mean	98.1	33.5	33.0	8.5
LSD	6.2	14.0	14.1	8.5
CV	2.8	33.0	34.0	163.5

Table 3. 2008 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 g
2375	100.0	37.3	37.3	15.0	12.0	33	22.2	10.5
Wheaton	100.0	65.3	65.3	65.0	18.9	36	5.8	-
Bacup	100.0	47.5	47.5	18.5	6.7	31	18.4	10.9
Oslo	82.5	44.9	43.7	25.0	11.2	33	8.7	10.3
ND2710	95.0	19.2	18.4	11.5	8.6	34	21.1	11.1
Rugby	97.5	37.7	37.0	40.0	13.6	35	16.0	8.9
SD3942	100.0	29.1	29.1	13.5	4.9	31	17.1	11.0
SD4181	67.5	12.5	9.7	10.0	2.8	31	31.4	11.9
SD4182	55.0	7.3	4.1	4.0	2.1	32	28.5	11.6
SD4186	77.5	16.2	13.8	10.0	3.8	31	23.0	11.9
SD4192	92.5	26.1	25.2	11.5	5.2	31	22.6	11.3
NDSW0714	100.0	24.6	24.6	11.0	-	35	15.2	10.1
NDSW0715	100.0	18.7	18.7	12.5	8.3	36	16.5	11.1
ND07/3-10	95.0	16.7	16.3	10.0	3.4	33	20.7	11.6
ND07/3-11	95.0	15.3	14.5	20.0	7.5	34	20.5	10.8
ND08/1-11	100.0	30.1	30.1	21.0	4.6	33	18.9	10.7
ND07/3-12	87.5	18.9	18.0	13.5	6.5	34	19.7	10.8
ND08/1-12	90.0	25.5	23.4	11.0	4.7	35	4.8	-
MN03342-4	62.5	10.7	6.7	13.5	7.8	37	18.3	11.1
MN03358-4	100.0	22.9	22.9	16.0	10.0	35	26.7	10.8
MN05058	80.0	15.9	13.6	14.5	6.8	34	23.1	10.9
MN05117-7	85.0	20.4	18.8	11.0	7.2	34	21.8	10.9
MN05149-5	70.0	10.6	7.4	8.0	4.4	31	29.7	11.4
01S0335-4-3	100.0	46.4	46.4	25.0	8.2	33	15.2	11.0
02S0066-13	100.0	28.4	28.4	13.5	11.6	33	13.4	10.7
02S0178-1	100.0	45.7	45.7	21.0	8.9	34	14.5	10.7
02S0208-22	100.0	33.8	33.8	27.5	13.1	34	13.9	10.0
CA905-780	87.5	31.1	29.6	16.0	7.5	35	13.3	10.6
CA907-824	97.5	18.6	18.1	20.0	12.9	37	15.5	11.1
CA907-830	82.5	15.9	13.1	18.5	8.0	32	20.7	11.2
CA907-834	97.5	27.3	27.0	17.5	9.5	36	15.0	10.8
CA907-835	65.0	7.5	4.9	9.0	4.5	34	26.5	11.3
06MSP 18	100.0	22.9	22.9	17.0	9.8	37	20.8	11.2
CA806-806	100.0	38.0	38.0	18.5	13.2	36	21.1	10.0
CA806-808	100.0	44.8	44.8	18.5	13.1	36	13.1	10.1
CA806-810	100.0	52.2	52.2	26.0	14.8	34	20.4	9.6
Mean	90.6	27.4	26.4	17.6	8.5	33.9	18.7	10.8
LSD	21.1	26.5	27.4	8.8	-	1.3	9.0	0.6
CV	50.5	47.6	51.0	24.2	-	5.3	24.1	2.7

¹30 SSW = 30 spike seed weight. This is the sample used to determine VSK.

Note the low to moderate correlations with heading data for all traits.

Table 4. 2008 Uniform Regional Scab Nursery for Spring Wheat Parents, St. Paul, MN.

Line	Incidence %	Severity %	Disease Index	VSK %	DON ppm	30 SSW ¹ g	micro TWT g	Heading d from 6-1
2375	45.0	8.7	4.2	14.5	2.4	35.0	11.2	29
Wheaton	90.0	43.1	41.2	17.5	38.2	9.0	8.1	33
Bacup	80.0	13.1	10.3	23.5	5.3	20.8	10.7	26
Oslo	70.0	22.7	19.0	6.0	9.1	21.3	9.3	29
ND2710	38.3	6.3	2.5	41.5	3.0	37.4	11.4	30
Rugby	100.0	39.8	39.8	21.5	14.7	35.8	10.5	34
SD3942	80.0	11.2	9.1	17.5	5.4	27.5	11.2	26
SD4181	40.0	6.9	2.9	22.5	4.7	33.1	11.2	26
SD4182	41.7	7.8	4.2	12.5	3.9	36.9	11.7	26
SD4186	38.3	7.8	3.1	19.0	4.4	27.0	11.5	26
SD4192	31.7	9.3	2.9	14.5	4.5	25.0	11.0	26
NDSW0714	81.7	14.7	12.5	13.5	10.3	21.6	10.8	30
NDSW0715	98.3	22.7	22.4	20.0	15.8	13.8	10.2	33
ND07/3-10	71.7	9.7	8.0	13.5	5.0	31.2	11.5	29
ND07/3-11	78.3	13.7	10.6	62.5	16.1	26.9	10.9	30
ND08/1-11	78.3	14.8	12.5	8.0	9.7	27.9	11.0	29
ND07/3-12	76.7	12.0	9.5	42.5	9.9	28.2	11.0	29
ND08/1-12	73.3	10.5	8.0	22.5	4.1	30.4	11.3	30
MN03342-4	40.0	10.0	4.7	18.0	3.5	26.0	10.9	32
MN03358-4	63.3	12.7	10.3	16.5	4.4	33.3	11.1	33
MN05058	68.3	17.1	14.9	15.5	5.9	28.4	10.7	30
MN05117-7	56.7	9.5	5.6	5.0	7.0	25.0	10.0	32
MN05149-5	68.3	7.0	4.8	6.0	3.7	30.6	10.8	26
01S0335-4-3	95.0	22.7	22.0	18.0	8.2	20.0	10.4	27
02S0066-13	88.3	21.0	19.0	23.5	28.0	17.5	9.7	31
02S0178-1	90.0	14.6	13.3	33.0	8.7	23.4	11.3	30
02S0208-22	80.0	16.7	14.6	7.0	7.0	27.0	10.6	31
CA905-780	83.3	19.2	16.4	41.0	10.0	22.9	10.4	32
CA907-824	76.7	12.5	9.9	53.5	12.3	20.0	10.8	33
CA907-830	73.3	6.8	5.1	12.5	7.8	28.6	11.6	26
CA907-834	93.3	29.8	28.8	9.0	19.3	23.0	10.4	31
CA907-835	45.0	8.0	3.7	11.0	4.4	30.8	10.9	30
06MSP 18	100.0	35.2	35.2	12.5	14.5	19.5	10.4	34
CA806-806	90.0	22.6	20.8	23.0	22.7	36.8	9.8	31
CA806-808	100.0	84.6	84.6	21.5	34.1	14.6	9.2	33
CA806-810	78.3	31.3	26.6	20.5	10.9	42.3	10.5	30
Mean	72.3	18.2	15.6	20.6	10.5	26.6	10.6	29.8
LSD	34.0	15.5	16.9	16.1	-	10.4	0.9	2.4
CV	28.9	52.5	66.4	38.7	-	19.2	4.2	4.9

¹30 SSW = 30 spike seed weight. This is the sample used to determine VSK.

Note the moderate to high correlations with heading data for all traits.

Table 5. 2008 Uniform Regional Scab Nursery for Spring Wheat Parents, Langdon, ND.

Line	Incidence %	Severity %	Disease ¹ Index	FDK %	DON ppm	3-ADON ² ppm	Heading ³ Date	1000 KWT g
2375	100.0	40.4	37.2	22.5	15.0	0.6	8.8	33.1
Wheaton	100.0	82.7	76.0	45.5	27.7	0.8	15.8	24.7
Bacup	97.5	35.2	31.5	18.0	11.8	0.5	7.0	26.8
Oslo	100.0	88.7	81.5	56.0	30.7	1.0	12.3	22.1
ND2710	90.0	30.1	25.8	16.0	5.3	0.5	10.5	29.6
Rugby	100.0	56.2	52.1	42.8	17.6	0.6	12.3	31.2
SD3942	100.0	46.4	44.0	20.3	9.9	0.5	7.0	24.9
SD4181	72.5	14.6	9.6	10.3	5.1	0.5	7.0	34.2
SD4182	100.0	31.7	29.0	10.8	5.0	0.5	12.3	35.3
SD4186	95.0	21.4	18.9	12.8	4.5	0.5	8.8	32.1
SD4192	100.0	34.4	31.6	13.0	6.7	0.5	7.0	29.2
NDSW0714	100.0	66.7	59.5	23.3	13.6	0.5	12.3	28.2
NDSW0715	100.0	40.5	36.6	11.5	9.5	0.5	12.3	29.0
ND07/3-10	100.0	30.8	29.1	13.3	8.7	0.5	7.0	29.1
ND07/3-11	90.0	41.8	36.0	32.0	18.6	0.6	8.8	31.6
ND08/3-11	97.5	37.7	34.5	12.8	12.4	0.6	7.0	30.9
ND07/3-12	100.0	37.3	34.1	17.0	8.5	0.5	8.8	32.7
ND08/3-12	97.5	26.8	22.9	12.3	9.4	0.5	7.0	30.4
MN03342-4	100.0	64.9	58.9	11.8	6.6	0.5	17.5	26.3
MN03358-4	100.0	59.6	54.6	25.8	11.4	0.5	10.5	30.3
MN05058	100.0	67.9	61.7	23.3	8.5	0.5	12.3	25.9
MN05117-7	100.0	65.0	59.6	20.5	7.9	0.5	10.5	30.0
MN05149-5	95.0	21.6	18.7	10.5	4.9	0.5	7.0	31.8
01S0335-4-3	100.0	70.0	64.2	34.3	20.0	1.0	10.5	25.7
02S0066-13	100.0	80.0	73.9	38.5	20.7	0.8	15.8	26.9
02S0178-1	100.0	77.9	70.9	18.5	12.7	0.6	12.3	26.4
02S0208-22	100.0	75.1	68.6	33.0	19.9	0.6	12.3	26.5
CA905-780	100.0	91.9	85.5	29.3	16.4	0.5	15.8	27.7
CA907-824	100.0	93.8	85.1	21.8	17.1	0.6	14.0	21.6
CA907-830	97.5	46.3	41.3	14.8	9.1	0.5	8.8	33.5
CA907-834	100.0	56.9	52.2	22.0	15.4	0.7	10.5	29.0
CA907-835	100.0	33.5	30.1	13.5	7.7	0.5	8.8	33.1
06MSP 18	100.0	52.1	48.2	18.0	10.2	0.5	12.3	29.1
CA807-806	100.0	77.9	73.0	31.5	18.7	0.6	12.3	31.2
CA807-808	100.0	71.2	65.7	34.0	32.2	1.3	14.0	32.3
CA807-810	97.5	55.3	50.2	46.5	23.6	0.7	8.8	33.3
Alsen*	97.5	46.7	41.8	14.3	6.3	0.5	10.5	29.1
Mean	98.0	53.3	48.5	23.0	13.2	0.6	10.7	29.3
LSD	8.7	33.3	33.2	13.9	6.2	0.3	4.9	3.0
CV	6.3	45.9	44.4	43.1	33.4	36.0	32.5	7.4

¹Disease index calculated as number of infected kernels per head divided by total kernels per individual spike.

²3-ADON was reported as <0.5 ppm for the minimum. <0.5 ppm was converted to 0.5 ppm for the statistical analysis.

³Heading dates were scores at one week intervals (as 7, 14 or 21) and reported as means of these intervals

*Extra entry

Table 6. 2008 Uniform Regional Scab Nursery for Spring Wheat Parents, Glenlea, Canada.

Line	Disease* Index	FDK %	DON ppm
2375	10.6	9.9	10.7
Wheaton	50.7	32.0	27.7
Bacup	0.8	0.8	1.8
Oslo	52.5	21.9	26.7
ND2710	21.5	9.8	8.8
Rugby	9.1	5.3	13.0
SD3942	0.4	1.7	2.2
SD4181	1.6	1.3	1.8
SD4182	0.3	0.9	1.9
SD4186	0.1	0.0	1.3
SD4192	1.1	1.1	1.9
NDSW0714	1.3	3.3	6.7
NDSW0715	2.4	3.8	4.8
ND07/3-10	0.1	0.5	2.1
ND07/3-11	3.3	5.1	5.1
ND08/3-11	3.4	3.3	4.4
ND07/3-12	1.5	2.5	4.1
ND08/3-12	1.4	2.2	4.0
MN03342-4	1.8	1.5	2.5
MN03358-4	4.0	2.4	3.3
MN05058	1.8	2.4	3.3
MN05117-7	4.5	2.6	3.7
MN05149-5	0.4	1.3**	3.0**
01S0335-4-3	3.3	6.4	5.9
02S0066-13	5.5	4.6	5.5
02S0178-1	16.4	9.2	10.5
02S0208-22	2.1	4.5	8.1
CA905-780	19.3	6.7	5.4
CA907-824	7.6	6.4	6.4
CA907-830	3.7	2.2	3.8
CA907-834	2.8	5.5	6.0
CA907-835	1.3	2.0	3.7
06MSP 18	6.8	6.1	4.8
CA807-806	10.4	6.3	15.0
CA807-808	16.9	6.5	12.5
CA807-810	3.0	9.1	16.1
Mean	7.6	5.4	7.0

* Calculated from visual estimates of individual plot incidence and severity

** Only data for three out of four reps

Table 7. 2008 Uniform Regional Scab Nursery for Spring Wheat Parents, Summary of Means Across Locations.

Line	Incidence %	Incidence Rank	Severity %	Severity Rank	Disease Index	Disease Index Rank	VSK %*	VSK Rank	DON ppm	DON Rank
No. of Locations	4	4	4	4	5	5	5	5	4	4
2375	85.8	10	31.1	17	25.4	22	14.2	21	10.0	22
Wheaton	97.1	28	65.8	36	60.8	36	49.0	36	28.1	36
Bacup	91.9	19	32.0	21	23.6	18	12.7	18	6.4	12
Oslo	88.1	12	50.7	34	48.7	34	22.2	32	19.4	34
ND2710	80.0	6	19.1	6	17.7	7	16.1	23	6.4	12
Rugby	99.4	34	47.3	32	38.7	32	22.7	33	14.7	30
SD3942	92.5	21	25.9	13	19.6	13	11.8	14	5.6	9
SD4181	70.0	1	14.7	1	9.7	1	9.8	8	3.6	3
SD4182	72.9	2	17.9	4	12.2	4	6.2	1	3.2	1
SD4186	76.9	5	17.5	3	12.0	3	8.9	5	3.5	2
SD4192	80.6	7	24.5	10	17.7	7	8.5	4	4.6	5
NDSW0714	93.7	23	33.5	22	24.8	20	10.5	11	10.2	23
NDSW0715	98.8	32	28.6	15	22.4	15	10.3	9	9.6	19
ND07/3-10	90.8	15	24.2	8	18.5	9	9.2	6	4.8	6
ND07/3-11	90.8	15	25.3	12	19.0	12	26.9	35	11.8	26
ND08/3-11	94.0	24	28.0	14	22.0	14	11.7	13	7.8	18
ND07/3-12	91.0	18	24.4	9	18.5	9	17.1	27	7.2	15
ND08/3-12	89.8	14	21.8	7	16.0	6	11.9	15	5.6	9
MN03342-4	75.6	3	31.4	18	22.4	15	12.3	17	5.1	7
MN03358-4	90.8	15	31.8	19	24.8	20	13.2	20	7.3	17
MN05058	87.1	11	31.8	19	23.7	19	12.0	16	6.1	11
MN05117-7	84.6	9	31.0	16	23.3	17	9.3	7	6.4	12
MN05149-5	81.7	8	14.9	2	10.0	2	6.9	2	4.3	4
01S0335-4-3	98.8	32	42.9	29	33.7	28	17.5	28	10.6	25
02S0066-13	96.7	27	40.5	26	31.8	27	19.4	29	16.4	31
02S0178-1	97.5	29	42.9	29	35.9	31	17.0	26	10.2	23
02S0208-22	95.0	26	40.5	26	31.1	26	15.7	22	12.0	27
CA905-780	92.3	20	42.5	28	35.7	30	20.2	30	9.8	20
CA907-824	93.5	22	38.4	25	29.9	24	22.7	33	12.2	28
CA907-830	88.3	13	25.0	11	18.8	11	10.4	10	7.2	15
CA907-834	97.7	31	35.5	23	27.7	23	13.1	19	12.5	29
CA907-835	76.7	4	18.4	5	12.8	5	8.0	3	5.1	7
06MSP 18	100.0	35	36.7	24	30.0	25	11.5	12	9.8	20
CA807-806	97.5	29	47.6	33	38.8	33	16.3	24	17.4	33
CA807-808	100.0	35	62.6	35	52.4	35	16.4	25	23.0	35
CA807-810	94.0	24	46.0	31	35.4	29	20.9	31	16.4	31
Mean	89.8		33.1		26.3		15.1		9.8	

Table 8. Correlation coefficients between traits, by individual location.

Correlation Between	Brookings	Crookston	St. Paul	Langdon	Glenlea
Incidence & Severity	0.38	0.63	0.62	0.49	
Incidence & Disease Index	0.44	0.67	0.67	0.52	
Incidence & Tombstone/FDK/VSK	0.09	0.42	0.10	0.25	
Incidence & DON		0.57	0.64	0.28	
Severity & Disease Index	1.00	1.00	1.00	1.00	
Severity & Tombstone/FDK/VSK	0.54	0.74	-0.04	0.71	
Severity & DON		0.70	0.78	0.71	
Disease Index & Tombstone/FDK/VSK	0.53	0.73	-0.03	0.71	0.93
Disease Index & DON		0.70	0.79	0.71	0.87
Tombstone/FDK/VSK & DON		0.76	0.13	0.89	0.91

Table 9. Correlation coefficients between traits, using means across locations.

	Incidence %	Severity %	Disease Index	VSK %	DON ppm
Incidence %					
Severity %	0.69				
Disease Index	0.66	0.99			
VSK %	0.44	0.70	0.74		
DON ppm	0.63	0.91	0.93	0.80	

Note: Correlation coefficients were calculated with means across locations.