Report on the 2006-07 Preliminary (PNUWWSN) and Advanced (NUWWSN) Northern Uniform Winter Wheat Scab Nurseries

C.H. Sneller[1]*, P. Paul[2], L. Herald[1], B. Sugerman[1], and A. Johnston[2]
Dept. Horticulture and Crop Science, Dept. Plant Pathology, The Ohio State University, 1680 Madison Av. Wooster, OH 44691 * Corresponding author (30)263-3944, sneller.5@osu.edu

INTRODUCTION

The PNUWWSN and NUWWSN test the Fusarium Head Blight resistance of primarily soft red winter wheat adapted to the northern areas of North America. There are a few hard and white wheat entries. Each test is conducted in multiple locations with more data collected for the NUWWSN than the PNUWWSN. Some additional features of this report.

- Stripe rust reaction of the NUWWSN entries (Table)
- Quality data on the NUWWSN entries (Table 31)
- Haplotypes of the NUWWSN and PNUWWSN entries (Tables 32, 33)
- Performance data on the OH and IL entries (Tables 34, 35, 36)

ENTRIES AND LOCATIONS

There were 56 lines from 13 breeding programs and 4 checks in the NUWWSN (Table 1.1). There were 40 lines from nine breeding programs and 4 checks in the PNUWWSN (Table 1.2). The NUWWSN entries were successfully evaluated in 13 field locations and two greenhouse tests (Table 2). The PNUWWSN entries were evaluated in eight field locations and one GH test.

TRAITS

Data was collected on heading date (HD), height (HGT), disease severity (SEV), disease incidence (INC), disease index (IND), kernel rating (KR), percent scabby seed (PSS), ISK, and DON (Table 2) from field nurseries. Severity was also assessed in the greenhouse assays (GH). Some collaboratorss collected additional data that are summarized and described separately. The USDA Soft Wheat Quality lab performed quality analyses (Table 2) on all entries in both tests using grain from locations where the entries were grown without inoculation and thus had minimal scab. The USDA Small Grains Genotyping Center in Raleigh North Carolina haplotyped all entries for FHB QTL located on chromosomes 3BS, 5AS, and 2DL.

ANALYSIS

All cooperators sent entry means (not raw data) with some summary statistics from their trials. These means and statistics are presented in the appropriate tables and no additional within-location analyses were performed. The entry means from individual locations were used to analyze results over tests. We used the LSMEANS option in PROC GLM of SAS to calculate the means over locations even though the data was generally quite balanced. ANOVAs (model: trait = genotype + environment) were conducted for each trait and the genotype x environment mean square (residual or error in this model) was used as the error term to calculate a LSD (0.05) for entry means over environment. There was no test for significance for the genotype x environment interaction (GEI) effect. Correlations were calculated between all traits using entry means averaged over all appropriate locations. Additional correlation of INC, SEV, and IND with HD and HGT were conducted for each location.

RESULTS

Entry and location effect was significant for all traits in the PNUWWSN and the NUWWSN. The genotype x environment interaction was likely quite important for INC and IND in both tests as shown by the small ratio of genotype to GEI sum of squares and the large portion of total SS attributed to GEI (Table 4). Using the same criteria, GEI appeared important for SEV in the NUWWSN. It would appear that much of the GEI for INC and IND is attributed to the varying relationship between HD and these traits over locations. In the NUWWSN, the correlation of HD with IND ranged from -0.57 to 0.31, the correlation of INC with HD ranged from -0.48 to 0.26, and the correlation of INC with HD ranged from 0.44 to -0.74 (Table 5). Similar ranges of correlations were noted for INC and IND with HD among the locations of the PNUWWSN (Table 6) where the correlation of HD and INC ranged from -0.66 to 0.56.

Table 1.1. Entries in the 2006-07 NUWWSN.

	NAME	PEDIGREE	SOURCE
1	ERNIE	MODERATE RESISTANT CHECK	
2	TRUMAN	MOD RES - RESISTANT CHECK	
3	FREEDOM	MODERATE RESISTANT CHECK	
4	PIONEER 2545	SUSCEPTIBLE CHECK	
5	NY88046-8138	Susquehanna/Harus	SORRELLS
6	NY93285SP-7343	SuMei Comp: 92002	SORRELLS
7	NY93285-7110	SuMei Comp: 92002	SORRELLS
8	NY91028SP-9082	Harus/4/CS/A.Curvif//Glenn/3/Ald/Pvn(M-30)	SORRELLS
9	NY93306-7091	18cc-59/Pio2548	SORRELLS
10	KS04HW47-3	X921012-A-7-1/TGO	BOCKUS
11	KS04HW101-3	98HW423(JGR/93HW242)/98HW170(ARL/WGRC15)	BOCKUS
12	P.011035A1-71	981128A1/981477A1//92145E8	OHM
13	P.011036A1-14	981128A1/97462A1//92145E8	OHM
14	P.02444A1-23-6	981129A1/99793RE2//INW0301/92145E8	OHM
15	P.03647A1-1	981477A1/INW0315//981517A1/97462A1	OHM
16	P.04287A1-10	INW0315*2/5/INW0304/4/9346/CS5A// 91202/3/INW0301/INW0315	OHM
17	NE01643	NE94482 (=ARA/ABILENE//NE86488)/ND8974	BAENZIGER
18	HARRY	NE90614 (=BRL/4/PKR*4/AGT//BEL.198/LCR/3/NWT/BRL) /NE87612 (=NWT//WRR*5/AGT/3/NE69441)	BAENZIGER
19	NI04421	NE96644(=ODESSKAYA P./CODY)//PAVON/*3SCOUT66/3/NE94653(=ARAPAHOE/ABILENE//ARAPAHOE))	BAENZIGER
20	NE04653	N97S084//W96-500W/N95L158	BAENZIGER
21	NE03490	WI90-540W/NE93554 (=NE82419/ARAPAHOE)//(NE93554 (=NE82419/ARAPAHOE))	BAENZIGER
22	MD01W233-06-11	MCCORMICK/CHOPTANK	COSTA
23	M03-3002	Winter/Winter FHB Bulk	FOGLEMAN
24	M03-3104	Hopewell / M94-1107	FOGLEMAN
25	M03-3616	Hopewell / Patton	FOGLEMAN
26	M03*3877	T8141 / D93-6093	FOGLEMAN
27	M03*3861	Pio2552 / M94-1407	FOGLEMAN
28	RCUOG19/21	AC Ron/WEK0609H3xACRon	TAMBURIC
29	RCUOGF110202D/4	SD97060 x Ringo Star	TAMBURIC
30	RCUOGF111202A/3	Freedom x Harding	TAMBURIC
31	RCUOGDHACF1109O2D	SD97060 x Freedom	TAMBURIC
32	RCUOGNS984-1	Not available	TAMBURIC
33	IL00-8530	IL89-1687 // IL90-6364 / IL93-2489	KOLB
34	IL01-11445	IL87-2834-1 / IL95-678	KOLB
35	IL01-11934	IL90-6364 / IL94-1909	KOLB
36	IL02-19463	Patton / Cardinal // IL96-2550	KOLB
37	IL02-23168	IL94-1909 / Pioneer25R26 // IL95-4162	KOLB
38	KY97C-0540-01-03	COKER 9803/L910097//2552	VAN SANFORD
39	KY97C-0554-03-06	VA94-54-549/Roane//Kristy	VAN SANFORD
40	KY97C-0554-04-05	VA94-54-549/Roane//Kristy	VAN SANFORD
41	KY97C-0508-01-01A-1	FFR 555W/VA94-52-25//2568	VAN SANFORD
42	KY97C-0554-03-02	VA94-54-549/Roane//Kristy	VAN SANFORD
43	MO 040165	Bess RS, earlier	MCKENDRY
44	MO 050101	Bess RS, same	MCKENDRY
45	MO 050143	Bess RS, shorter	MCKENDRY
46	MO 050197	MO 12278/Pioneer 2552	MCKENDRY
47	MSU Line E3023	CALEDONIA/NY85020-395	SILER
48	MSU Line E5015	CALEDONIA/PIONEER_25W33	SILER
49	MSU Line E6001	PIONEER_25W60/CJ9306	SILER
50	MSU Line E6002	VA96W-403WS /CJ9403	SILER
51	MSU Line E6003	VA96W-403WS /W14	SILER
52	VA06W-600	P89118RC1-X-9-3-3-1/TRIBUTE//M94-1069,F7	GRIFFEY
53	VA06W-602	P89118RC1-X-9-3-3-1/TRIBUTE//M94-1069, F7	GRIFFEY
54	VA06W-587	ROANE//OH 552/AGS 2000, F7	GRIFFEY
55	VA06W-594	P88288C1-6-1-2-8/VAN98W-346//RC STRATEGY,F7	GRIFFEY
56	VA06W-585	Roane / Ernie//McCORMICK,F8	GRIFFEY
57	OH02-15978	PATTERSON/HOPEWELL	SNELLER
58	OH02-12678	FOSTER/HOPEWELL//OH581/OH569	SNELLER
59	OH02-12686	FOSTER/HOPEWELL//OH581/OH569	SNELLER
60	OH02-13567	OH581/IN83127E1-24-5-2-1-31//5088B-D-32-1/OH601	SNELLER

Table 1.2. Entries in the 2006-07 PNUWWSN.

	NAME	PEDIGREE	SOURCE
1	ERNIE	MODERATE RESISTANT CHECK	
2	TRUMAN	MOD RES - RESISTANT CHECK	
3	FREEDOM	MODERATE RESISTANT CHECK	
4	PIONEER 2545	SUSCEPTIBLE CHECK	
5	P.981129A1--17	92829A1/Patton	OHM
6	P.99751RA1--94	92212/961331/5/92212/4/F201R/3/9547//Patterson/Ernie	OHM
7	P.0128A1-44-1-7	981129A1/981312A1	OHM
8	P.03528A1-10	INW0315/9895C1/3/INW0301/INW0304//981542A1	OHM
9	P.03630A1-18	99751RA1/INW0315//981358C1/97462	OHM
10	SE981089-34	P25R57/SE1694-12	FIORITTO
11	SE91 1492-4	TAISHANG1/GR863//CARDINAL	FIORITTO
12	SE94-1012-25	T814/L880119	FIORITTO
13	M04-4843	KM2186-92/M94*1649//Patton	FOGLEMAN
14	M04-4788	Pio26R61/Patton	FOGLEMAN
15	M04*5109	VA94-54-479/Pio2628	FOGLEMAN
16	M04-4258	Madison/Roane	FOGLEMAN
17	M04-4393	M94*1586-1/Roane	FOGLEMAN
18	RCUOGGoldenValue	N/A	TAMBURIC
19	RCUOGL15	ACRONxSVP/R/FR.#1	TAMBURIC
20	RCUOGL4	2737W x EX9806/TF13	TAMBURIC
21	RCUOGL17	SVPx ACRON/TF18	TAMBURIC
22	RCUOG10/18	ACRON x R/FR. #1	TAMBURIC
23	IL03-18438	IL97-3574 / IL95-4162	KOLB
24	IL03-15452	IL96-2526 / IL97-3574	KOLB
25	IL03-453	Ernie/ IL95-4162	KOLB
26	IL01-34159	IL84-2191 / IL87-2834 // IL90-6364 / IL96-24851 (= IL90-6364 // IL90-9464 / Ning 7840)	KOLB
27	IL79-002T-B-B	IL94-6727 / IL96-6472	KOLB
28	KY99C-1298-08-1	KY 89C-804-11/KY 89C-225-5//2540	VAN SANFORD
29	KY99C-1051-03-1	2552/2684//2540	VAN SANFORD
30	KY99C-1176-02-1	NC96 BGT 6/2552//25R26	VAN SANFORD
31	MO 050600	Kingraze/Bess ‘S’	MCKENDRY
32	MO 050699	950016/3/950016//90X54-1-1/MO 91-1009	MCKENDRY
33	MO 050917	Truman ‘S’/MO 960815	MCKENDRY
34	MO 050921	Ernie/Truman ‘S’	MCKENDRY
35	VA06W-598	P89118RC1-X-9-3-3-1/TRIBUTE//M94-1069,F7	GRIFFEY
36	VA06W-557	IL 94-1549/AGS 2000,F8	GRIFFEY
37	VA06W-595	P88288C1-6-1-2-8/VAN98W-346//RC STRATEGY,F7	GRIFFEY
38	VA06W-608	FREEDOM/NC96-13374//RC STRATEG, F7	GRIFFEY
39	VA06W-627	IL 94-1549/VA97W-375//COKER 9025, F7	GRIFFEY
40	OH03-183-32	15497 /897A	SNELLER
41	OH03-235-2	OH552 /HOPEWELL	SNELLER
42	OH03-41-45	IL91-14167 /OH599	SNELLER
43	OH03-97-6	P88288C1-6-1-2 /OH536	SNELLER
44	OH03-75-58	HOPEWELL /OH655	SNELLER

Table 2. Cooperators in 2007 PNUWWSN and NUWWSN

ILURB			
INSTITUTE:	University of Illinois	FERTILIZER:	40 lbs N/A preplant, no spring topdress
COOPERATOR(S):	Fred Kolb and Eric Brucker	IRR./MISTING METHOD:	overhead misting 4 times per 24 hour period, 60 minutes each time
TEST LOCATION:	Urbana, IL	INOCULATION METHOD:	325lbs/acre of infected corn spawn spread - split over three dates (4/10, 4/24, 5/3)
PLOT SIZE:	single 3' row	PRECIP DURING GRAIN FILL:	
REPS:	Three	AVG. TEMP. DURING GRAIN FILL:	
SEEDING DATE:	9/27/2006	DATE/FEEKES WHEN RATED:	June 7-15, 2007
HARVEST DATE:	7/2/2007	COMMENTS:	
INWLA			
INSTITUTE:	Purdue University	FERTILIZER:	100 0 0
COOPERATOR(S):	Herb Ohm	IRR./MISTING METHOD:	Mist: 2 wk prior to 2 wk post flowering
TEST LOCATION:	Lafayette, IN	INOCULATION METHOD:	point, bagged 3d
PLOT SIZE:	1 m row	PRECIP DURING GRAIN FILL:	
REPS:	10 (spikes)	AVG. TEMP. DURING GRAIN FILL:	
SEEDING DATE:	9/26/2006	DATE/FEEKES WHEN RATED:	
HARVEST DATE:		COMMENTS:	
KSMAN			
INSTITUTE:	Kansas State University	FERTILIZER:	Normal recommendation
COOPERATOR(S):	W. W. Bockus, M. A. Davis	IRR./MISTING METHOD:	During anthesis 3 min per hour from 9:00 p.m. until 6:00 a.m.
TEST LOCATION:	Manhattan, KS	INOCULATION METHOD:	Colonized corn kernels (8 g per ft^2)
PLOT SIZE:	Single rows, 7.5 ft long	PRECIP DURING GRAIN FILL:	
REPS:	4	AVG. TEMP. DURING GRAIN FILL:	
SEEDING DATE:	Oct. 2, 2006	DATE/FEEKES WHEN RATED:	Barley yellow dwarf (BYD) rated on May 24; FHB rated five times; May 28, June 1, June 5, June 8, and June 11
HARVEST DATE:	July 3, 2007	COMMENTS:	Severe FHB due to rain events at anthesis plus mist irrigation
KYLEX			
INSTITUTE:	University of Kentucky	FERTILIZER:	P, K acc. to soil tests; 110# N, split appl.
COOPERATOR(S):	David Van Sanford, Nicki Mundell	IRR./MISTING METHOD:	Overhead misting
TEST LOCATION:	Lexington, KY	INOCULATION METHOD:	Scabby corn
PLOT SIZE:	2 rows, 4 ft long	PRECIP DURING GRAIN FILL:	2.42"
REPS:	2	AVG. TEMP. DURING GRAIN FILL:	72°F
SEEDING DATE:	10/24/2006	DATE/FEEKES WHEN RATED:	10.5
HARVEST DATE:	6/27/2007	COMMENTS:	
MDSAL			
INSTITUTE:	University of Maryland	FERTILIZER:	10/16/06: 300# 16-03-18+S+B; 3/1/07: 250# 16-03-18+S+B; 3/28/07: 60# N as 30% + 0.4oz/a Harmony XP
COOPERATOR(S):	Jose Costa, Aaron Cooper	IRR./MISTING METHOD:	overhead misters 40 min X 4
TEST LOCATION:	LESREC Salisbury	INOCULATION METHOD:	Corn spread by hand before heading
PLOT SIZE:	1-row 4 ft in length	PRECIP DURING GRAIN FILL:	
REPS:	2	AVG. TEMP. DURING GRAIN FILL:	
SEEDING DATE:	10/23/2006	DATE/FEEKES WHEN RATED:	6/6 (early lines) & 6/12/2007
HARVEST DATE:	6/23/2007	COMMENTS:	Scab was later than usual, we rated twice (6/6) and (6/12), the first rating used for those that had turned by 6/12
MIELA			
INSTITUTE:	MICHIGAN STATE UNIVERSITY	FERTILIZER:	150# 6-24-24 @ PLANTING
COOPERATOR(S):	LEE SILER / JIM KELLS		196# 46-0-0 @ GREEN-UP
TEST LOCATION:	EAST LANSING, MICHIGAN	IRR./MISTING METHOD:	MIST IRRIGATION
PLOT SIZE:	1 ROW PLOTS : 4 FEET IN LENGTH	INOCULATION METHOD:	INCOULATED WHEAT GRAIN
REPS:	4 REPLICATIONS	PRECIP DURING GRAIN FILL:	
SEEDING DATE:	Oct. 30, 2006	AVG. TEMP. DURING GRAIN FILL:	
HARVEST DATE:	N / A	DATE/FEEKES WHEN RATED:	

MOCOL			
INSTITUTE:	University of Missouri	FERTILIZER:	40 Fall/80 Spring N; 40 lb/acre P; 60 lb/acre K
COOPERATOR(S):	Anne McKendry, Julie Solomon, David Tague	IRR./MISTING METHOD:	Overhead mist irrigation
TEST LOCATION:	Columbia, Missouri	INOCULATION METHOD:	Spray - 50,000 macroconidia/mL at 75% heading
PLOT SIZE:	4-row; 5 ft.	PRECIP DURING GRAIN FILL:	
REPS:	3 - for those traits with stats/1 harvested for yield, TW	AVG. TEMP. DURING GRAIN FILL:	
SEEDING DATE:	10/6/2006	DATE/FEEKES WHEN RATED:	18 days post inoculation
HARVEST DATE:	6/27/2007	COMMENTS:	Freeze damage reduced yields, test weight, stands in some lines, see below. Heading dates were variable within lines across reps due to freeze.

NEMEA			
INSTITUTE:	University of Nebraska - Lincoln	FERTILIZER:	none
COOPERATOR(S):	Wegulo S., Baenziger S., Counsell J., Breathnach J.	IRR./MISTING METHOD:	misting from overhead risers
TEST LOCATION:	ARDC, near Mead, Nebraska	INOCULATION METHOD:	spray 70 000 condia/ml, at Feeke's 10.5
PLOT SIZE:	1 row * 8ft long	PRECIP DURING GRAIN FILL:	total 0.78 inches. (Note: above average precip Feb, March, April and May, but below Average Precip June and July).
REPS:	3	AVG. TEMP. DURING GRAIN FILL:	79 F
SEEDING DATE:	10/4/2006	DATE/FEEKES WHEN RATED:	soft dough = Feeke's 11.2
HARVEST DATE:	6/20/2007	COMMENTS:	Severe FHB.

NYITH			
INSTITUTE:	Cornell University	FERTILIZER:	
COOPERATOR(S):	Mark E. Sorrells, Gary Bergstrom	IRR./MISTING METHOD:	overhead mist system
TEST LOCATION:	Ithaca, NY	INOCULATION METHOD:	sprayer applied 3 times
PLOT SIZE:	single rows, 1.2 m	PRECIP DURING GRAIN FILL:	
REPS:	5	AVG. TEMP. DURING GRAIN FILL:	
SEEDING DATE:	10/26/2006	DATE/FEEKES WHEN RATED:	
HARVEST DATE:		COMMENTS:	

OHWOO			
INSTITUTE:	The Ohio State University	FERTILIZER:	as needed
COOPERATOR(S):	Clay Sneller, Pierce Paul	IRR./MISTING METHOD:	misted
TEST LOCATION:	Wooster, Ohio	INOCULATION METHOD:	corn spawn
PLOT SIZE:	1 3' row	PRECIP DURING GRAIN FILL:	
REPS:	3	AVG. TEMP. DURING GRAIN FILL:	
SEEDING DATE:	10/1/2006	DATE/FEEKES WHEN RATED:	
HARVEST DATE:		COMMENTS:	

ONRID			
INSTITUTE:	University of Guelph, Ridgetown Campus	FERTILIZER:	
COOPERATOR(S):	Lily Tamburic-Ilincic, Art Schaafsma	IRR./MISTING METHOD:	overhead mist system
TEST LOCATION:	Ridgetown, Ontario	INOCULATION METHOD:	sprayer applied 3 times
PLOT SIZE:	single rows, 4 m	PRECIP DURING GRAIN FILL:	
REPS:	4	AVG. TEMP. DURING GRAIN FILL:	
SEEDING DATE:	10/26/2006	DATE/FEEKES WHEN RATED:	
HARVEST DATE:		COMMENTS:	

ROMAN			
INSTITUTE:	National Agricultural Research-Development Institute Fundulea	FERTILIZER:	110 kg N
COOPERATOR(S):	Marianna Ittu	IRR./MISTING METHOD:	
TEST LOCATION:	Fundulea, Calarasi, Romania (Europe)	INOCULATION METHOD:	Syringe (point) inoculation at anthesis with four Fusarium graminearum and culmorum isolates-20-25 heads/replication/isolate
PLOT SIZE:	0.5 M2	PRECIP DURING GRAIN FILL:	31 mm (variable for the same period over 43 yrs=67 mm)
REPS:	3	AVG. TEMP. DURING GRAIN FILL:	Sum of grads =756.9 C
SEEDING DATE:	10/13/2006	DATE/FEEKES WHEN RATED:	

HARVEST DATE:	7/3/2007	COMMENTS:	
VABLA			
INSTITUTE:	Virginia Polytechnical Institute and State Univ.	FERTILIZER:	Fall-lime 1.0 ton/Ac, 30 N/ 60P// 80 K Lb/Ac- Spring N 100 Lb/Ac
Cooperator(S):	Dr. Carl Griffey & Patty Gundrum	IRR./MISTING METHOD:	Overhead irrigation/misters used.
Test Location:	Blacksburg, VA	INOCULATION METHOD:	Field inoculation using CO2 backpack boom sprayer.Inoculum concentration 5x104 spores/ml
PLOT SIZE:	4x5 two-row plots	PRECIP DURING GRAIN FILL:	
REPS:	3	AVG. TEMP. DURING GRAIN FILL:	
SEEDING DATE:	10 October, 2006	DATE/FEEKES WHEN RATED:	14 June, 2007
HARVEST DATE:	2 July, 2007	COMMENTS:	Vvery little rain during infection period.

Table 3. Traits assessed in the 2006-07 PNUWWSN and NUWWSN tests

Code	Trait	Description	PNUWWSN Locations*	NUWWSN Locations*
SEV	Disease severity from field tests	% of infected spikelets in an infected head.	IL,KY,MI,MO,ON,VA	IL,KY,MD,MI,MO,NE,NY,OH,ON, VA
INC	Disease incidence	% of heads with at least one infected spikelets	IL,KY,MI,MO,ON,VA	IL,KY,MD,MI,MO,NE,NY,OH,ON, VA
IND	Disease index	IND = (SEVxINC)/100	IL,IN,,KY,MI,MO,OH,ON, VA	IL,IN,KS,KY,MD,MI,MO,NE,NY, OH,ON,RO,VA
KR	Kernel rating	A visual assessment of the percent infected kernels	IL	IL,KS
PSS	Percent scabby seed	Percent of scabby seed by weight	KY,MO	KY,MD,MO,NE,RO
ISK	Composite of head and kernel traits	ISK Index = .3 (Severity) + .3 (Incidence)+.4 (% FDK or PSS)	IL,KY,MO	IL,KY,MD,MO,NE
DON	DON (vomitoxin)	PPM of vomitoxin in grain	IL,KY,VA	IL,KS,KY,MD,NE,NY,VA
GH	Greenhouse severity	Same as SEV except from greenhouse	IL	IL,MO
MILL Score	Milling score	A relative composite score based on traits that affect milling		INWLA, VAWAR
BAKE Score	Baking score	A relative composite score based on traits that affect baking		INWLA, VAWAR
SE Score	Softness equivalent score	A relative core based on softness equivalent		INWLA, VAWAR
TW	Test weight	Test weight in lbs/bu of clean grain		INWLA, VAWAR
SE	Softness equivalent	Percentage of flour that passes through a 94 mesh screen		INWLA, VAWAR
PRO	Flour protein	NIR estimate of flour protein percentage (based on 13% moisture)		INWLA, VAWAR
LA	Lactic acid solvent retention capacity	A measure of gluten strength based on percentage of LA solvent retained by a flour sample after centrifugation		INWLA, VAWAR
LA adj	LA but adjusted to 9% protien	"		INWLA, VAWAR
SUC	Sucrose solvent retention capacity	A measure of pentosan content, and thus water absorption, based on percentage of sucrose solvent retained by a flour sample after centrifugation		INWLA, VAWAR
FYLD	Flour yield	The weight of the flour that passes through a 40 mesh screen after milling, adjusted for moisture and SE, expressed as percentage of milled grain.		INWLA, VAWAR

* ON and RO indicate Ontario Canada, and Romania, respectively

Table 4. Percentage of total sum of squares attributable to genetic (G), environment (E), and genotype by environment interaction (GEI) effects for the 2007 PNUWWSN and the NUWWSN. The ratio of G to GEI is also presented.

	PNUWWSN					NUWWSN				
	G (%)	E (%)	GEI (%)	GEI as % Total	G/ GEI	G (%)	E (%)	GEI (%)	GEI as % Total	G/GEI
SEV	22	40	38	38.2	0.57	14	38	48	47.6	0.29
INC	9	68	23	33.2	0.42	13	61	27	26.6	0.47
IND	18	43	40	39.7	0.44	10	43	48	47.9	0.20
KR						78	0	21	21.2	3.69
PSS	57	12	31	31.0	1.82	24	27	49	48.9	0.48
ISK	27	55	18	17.8	1.53	29	22	48	48.3	0.61
DON	15	70	15	14.8	1.04	16	62	22	22.0	0.72
GH						63	8	29	29.0	2.16
HD	4	95	1	1.4	2.62	8	90	2	2.5	3.20
HGT	51	28	22	21.8	2.32	61	20	19	19.3	3.14

Table 5. Correlation of Heading Date (HD) and height (HGT) with incidence (INC), severity (SEV), and index (IND), by location and test for the 2007 PNUWWSN and NUWWSN. Values in bold and large font are significant at the 0.05 P level.

		HD				HGT		
TEST	LOCATION	INC	SEV	IND		INC	SEV	IND
NUWWSN	ILURB	-0.04	0.14	0.15				
NUWWSN	INWLA			**-0.27**				
NUWWSN	KSMAN			**-0.57**				
NUWWSN	KYLEX	0.04	-0.04	0.08		-0.09	-0.15	-0.09
NUWWSN	MDSAL	**-0.38**	**-0.37**	**-0.38**		**-0.32**	**-0.36**	**-0.35**
NUWWSN	MIELA	**-0.46**	-0.09	**-0.27**				
NUWWSN	MOCOL	0.18	**0.26**	**0.26**		0.03	-0.24	-0.23
NUWWSN	OHWOO	**0.26**	0.22	**0.31**				
NUWWSN	ONRID					-0.15	0.08	-0.05
NUWWSN	VABLA	0.06	0.03	0.10				
PNUWWSN	ILURB	0.20	-0.15	0.08				
PNUWWSN	INWLA			-0.15				
PNUWWSN	KYLEX	**0.56**	-0.30	0.20		-0.02	-0.36	-0.21
PNUWWSN	MIELA	**-0.66**	-0.24	**-0.45**				
PNUWWSN	MOCOL	-0.16	-0.07	-0.09		-0.27	**-0.46**	**-0.46**
PNUWWSN	OHWOO			0.35				
PNUWWSN	ONRID					-0.02	0.25	-0.09
PNUWWSN	VABLA	-0.17	-0.25	-0.21				

Table 6. Correlation among traits for 2007 NUWWSN (above diagonal, df = 58) and PNUWWSN (below diagonal, df = 42). Correlation |> 0.43| are bold and in large font and are significant at P > 0.01. All correlations were significant at P <0.05.

	INC	SEV	IND	KR	PSS	ISK	DON	GH
INC	1	**0.67**	**0.75**	**0.44**	0.40	**0.81**	**0.65**	**0.48**
SEV	**0.69**	1	**0.89**	0.34	**0.51**	**0.79**	**0.46**	**0.65**
IND	**0.80**	**0.94**	1	0.40	**0.50**	**0.83**	**0.53**	**0.66**
KR	**0.64**	**0.69**	**0.71**	1	**0.53**	0.43	**0.77**	**0.50**
PSS	**0.66**	**0.78**	**0.79**	**0.70**	1	**0.71**	**0.45**	**0.56**
ISK	**0.80**	**0.79**	**0.82**	**0.90**	**0.82**	1	**0.50**	**0.60**
DON	**0.78**	**0.67**	**0.77**	**0.73**	**0.67**	**0.74**	1	**0.60**
GH	0.42	**0.56**	**0.52**	0.40	**0.48**	**0.52**	0.42	1

Table 7. Traits means for 2007 NUWWSN. “l”, “h” indicate means that are not significantly different from the lowest (l) or highest (h) mean.

	NAME	SEV	INC	IND	KR	PSS	ISK	DON	GHS	#l	#h
1	ERNIE	27.1	45.7	16.8	40.6	4.3 l	30.7	6.2	18.0 l	2	0
2	TRUMAN	11.2 l	26.7 l	6.1 l	17.5 l	12.6 l	16.6 l	3.9 l	3.4 l	8	0
3	FREEDOM	24.0	47.2	15.2 l	38.4	7.1 l	34.9	5.8	20.7 l	3	0
4	PIONEER 2545	39.0 h	62.3 h	30.0 h	49.8 h	18.5 lh	50.3 h	11.6	50.5 h	1	7
5	NY88046-8138	38.6 h	54.1 h	24.8 h	44.6	28.0 h	48.5 h	7.8	46.6 h	0	6
6	NY93285SP-7343	25.6	33.3	18.4	24.4 l	33.2 h	32.6	4.4 l	22.3 l	3	1
7	NY93285-7110	34.1 h	32.7	15.8 l	26.3 l	24.4 h	29.5	4.2 l	32.8	3	2
8	NY91028SP-9082	29.9	58.7 h	20.4	36.9	25.1 h	42.2 h	11.6	42.6 h	0	4
9	NY93306-7091	24.2	52.2 h	17.1	45.6	31.4 h	37.9 h	10.1	42.6 h	0	4
10	KS04HW47-3	41.5 h	62.7 h	34.1 h	65.0 h	21.2 h	46.1 h	16.6 h	70.6 h	0	8
11	KS04HW101-3	33.8 h	49.2	24.5 h	41.3	31.8 h	35.4	8.8	40.5	0	3
12	P.011035A1-71	29.7	53.9 h	23.4	31.5	21.4 h	43.4 h	4.2 l	22.1 l	2	3
13	P.011036A1-14	32.6 h	46.9	23.0	32.7	18.6 lh	39.0 h	4.9 l	10.6 l	3	3
14	P.02444A1-23-6	24.7	46.2	17.1	17.1 l	16.1 l	39.8 h	3.9 l	19.8 l	4	1
15	P.03647A1-1	23.6	38.7	13.8 l	22.9 l	17.8 l	27.6	3.4 l	10.2 l	5	0
16	P.04287A1-10	30.4 h	51.2 h	23.8	39.4	13.2 l	34.7	6.6	21.8 l	2	2
17	NE01643	22.5	44.1	19.2	41.6	10.9 l	30.3	6.7	21.4 l	2	0
18	HARRY	23.2	51.1 h	17.6	57.1 h	16.4 l	35.9	11.2	14.1 l	2	2
19	NI04421	28.5	56.8 h	20.3	46.6	25.7 h	39.2 h	10.3	19.5 l	1	3
20	NE04653	27.2	51.5 h	20.6	45.6	20.6 h	31.1	8.8	19.7 l	1	2
21	NE03490	29.1	49.8	21.8	41.0	16.8 l	37.5 h	7.2	25.9 l	2	1
22	MD01W233-06-11	27.2	48.3	19.1	25.2 l	24.4 h	31.1	3.7 l	25.2 l	3	1
23	M03-3002	33.1 h	50.8 h	26.0 h	36.5	12.7 l	43.7 h	6.1	35.6	1	4
24	M03-3104	31.4 h	64.3 h	25.5 h	50.9 h	22.6 h	49.5 h	8.4	59.1 h	0	7
25	M03-3616	28.2	45.2	20.5	26.5 l	27.0 h	36.5 h	4.9 l	21.7 l	3	2
26	M03*3877	27.5	61.8 h	23.3	37.9	20.2 h	37.8 h	8.5	26.7 l	1	3
27	M03*3861	27.6	61.6 h	21.9	44.1	11.7 l	34.1	8.7	20.3 l	2	1
28	RCUOG19/21	28.6	44.9	15.8 l	34.0	14.2 l	29.5	7.8	31.2 l	3	0
29	RCUOGF110202D/4	22.9	25.7 l	14.7 l	32.1	11.1 l	23.5 l	1.7 l	10.7 l	6	0
30	RCUOGF111202A/3	35.4 h	58.5 h	21.9	32.5	22.4 h	42.5 h	5.9	25.5 l	1	4
31	RCUOGDHACF1109O2D	18.3 l	21.4 l	12.1 l	47.1	22.7 h	26.7 l	3.9 l	25.4 l	6	1
32	RCUOGNS984-1	38.0 h	61.1 h	28.3 h	45.6	26.6 h	42.6 h	8.2	46.9 h	0	6
33	IL00-8530	30.3 h	48.4	20.0	18.4 l	19.9 h	30.9	3 l	14.7 l	3	2
34	IL01-11445	32.5 h	39.2	22.3	15.9 l	7.0 l	34.0	3.5 l	11.1 l	4	1
35	IL01-11934	24.0	40.2	18.0	15.0 l	11.9 l	26.3 l	3.1 l	11.6 l	5	0
36	IL02-19463	34.7 h	37.4	22.5	21.0 l	9.7 l	34.8	4 l	25.3 l	4	1
37	IL02-23168	28.8	45.3	20.5	24.1 l	19.1 lh	32.4	4 l	31.8 l	4	1
38	KY97C-0540-01-03	35.4 h	57.9 h	25.6 h	30.0	14.5 l	40.3 h	7.1	39.6	1	4
39	KY97C-0554-03-06	23.7	55.7 h	16.0 l	38.8	22.5 h	42.9 h	4.4 l	12.1 l	3	3
40	KY97C-0554-04-05	24.0	48.6	16.8	23.5 l	30.4 h	42.3 h	4.1 l	9.8 l	3	2
41	KY97C-0508-01-01A-1	23.8	42.8	17.9	45.9	27.7 h	31.9	6.4	28.5 l	1	1
42	KY97C-0554-03-02	20.9 l	50.7 h	16.4	22.9 l	15.5 l	29.2	3.5 l	8.8 l	5	1
43	MO 040165	20.2 l	34.7	12.2 l	16.2 l	15.4 l	25.6 l	3.1 l	4.6 l	7	0
44	MO 050101	21.4 l	40.4	12.7 l	26.2 l	7.3 l	26.3 l	3.9 l	4.5 l	7	0
45	MO 050143	19.5 l	38.1	12.2 l	20.6 l	7.1 l	26.7 l	3.9 l	6.2 l	7	0
46	MO 050197	17.7 l	33.7	11.6 l	17.9 l	8.6 l	21.3 l	3.7 l	39.1	6	0
47	MSU Line E3023	35.4 h	50.0 h	22.0	28.1	12.7 l	38.7 h	7.3	50.7 h	1	4
48	MSU Line E5015	27.2	55.3 h	20.8	29.1	23.6 h	33.9	10.7	17.1 l	1	2
49	MSU Line E6001	19.1 l	41.5	14.2 l	33.1	14.4 l	25.0 l	4.6 l	4.9 l	6	0
50	MSU Line E6002	17.5 l	27.1 l	12.9 l	35.6	13.9 l	26.7 l	4.6 l	25.5 l	7	0
51	MSU Line E6003	14.0 l	18.3 l	6.1 l	24.4 l	17.4 l	12.6 l	4.8 l	8.4 l	8	0
52	VA06W-600	30.1	45.1	27.3 h	29.4	22.5 h	42.2 h	4.1 l	39.5	1	3
53	VA06W-602	32.9 h	49.6	27.7 h	19.0 l	18.5 lh	38.1 h	4.1 l	26.8 l	4	4
54	VA06W-587	33.7 h	55.4 h	23.6	20.9 l	23.4 h	43.1 h	4 l	34.4	2	4
55	VA06W-594	25.9	52.3 h	18.3	24.4 l	13.8 l	35.8	4.8 l	18.8 l	4	1
56	VA06W-585	21.2 l	47.4	18.6	9.4 l	15.1 l	34.2	3.5 l	19.1 l	5	0
57	OH02-15978	25.7	41.5	17.5	37.9	14.1 l	31.3	5.7	50.2 h	1	1
58	OH02-12678	19.4 l	39.5	17.0	15.3 l	11.2 l	25.2 l	4.2 l	13.3 l	6	0
59	OH02-12686	20.2 l	35.5	14.6 l	25.0 l	17.1 l	26.0 l	2.1 l	24.0 l	7	0
60	OH02-13567	18.8 l	43.8	12.8 l	28.5	15.8 l	29.6	5.2 l	12.3 l	5	0
	AVERAGE	26.9	46.2	19.2	31.9	18.0	34.1	5.9	24.9	3.1	1.9
	LSD	11.2	14.3	10.0	17.6	14.8	14.1	3.9	28.8		
	R2	0.53	0.73	0.52	0.79	0.48	0.52	0.8	0.71		
	Number of locations	10	10	13	2	5	5		2		

Table 8. Traits means for 2007 PNUWWSN. "l", "h" indicate means that are not significantly different from the lowest (l) or highest (h) mean in a column. The incidence of each is summed in the last columns.

	NAME	SEV		INC		IND		KR		PSS		ISK		DON		GHSEV		#l	#h
1	ERNIE	22.8	l	44.5	l	12.9	l	33.0		12.7	l	23.6	l	4.9		28.6	l	6	0
2	TRUMAN	16.9	l	38.4	l	7.3	l	13.0	l	9.4	l	17.8	l	2.2	l	12.3	l	8	0
3	FREEDOM	28.3	l	47.5	l	15.6	l	37.0		12.5	l	26.2		6.0	h	5.0	l	5	1
4	PIONEER 2545	38.1		69.0	h	30.9	h	47.0		28.6	h	39.8	h	6.5	h			0	5
5	P.981129A1--17	23.7	l	47.0	l	13.4	l	23.0	l	19.2	l	22.4	l	0.4	l	3.8	l	8	0
6	P.99751RA1--94	23.3	l	47.9	l	15.2	l	20.0	l	15.6	l	23.8	l	3.9	l	4.1	l	8	0
7	P.0128A1-44-1-7	27.6	l	56.9		17.1	l	40.0		17.1	l	30.3		3.0	l	4.9	l	5	0
8	P.03528A1-10	16.9	l	43.2	l	9.6	l	30.0		5.6	l	22.2	l	3.6	l	28.8	l	7	0
9	P.03630A1-18	21.0	l	50.8	l	11.2	l	27.0		10.5	l	24.0	l	2.6	l	3.4	l	7	0
10	SE981089-34	47.8	h	64.4	h	36.4	h	80.0	h	42.8	h	48.0	h	9.9	h	38.8	l	1	7
11	SE91 1492-4	31.7		55.0	l	21.5		32.0		13.0	l	28.7		4.9		44.5		2	0
12	SE94-1012-25	49.6	h	60.0		33.5	h	63.0	h	32.0	h	43.5	h	6.7	h	62.1	h	0	7
13	M04-4843	32.3		42.5	l	20.4		15.0	l	10.8	l	20.0	l	2.6	l	36.1	l	6	0
14	M04-4788	38.4		42.1	l	16.4	l	37.0		20.1	l	29.2		2.8	l	100.0	h	4	1
15	M04*5109	25.0	l	53.7	l	16.0	l	50.0		4.6	l	25.6		5.8	h	21.5	l	5	1
16	M04-4258	29.4	l	56.8		17.9	l	22.0	l	9.1	l	24.9		4.1	l	4.8	l	6	0
17	M04-4393	24.7	l	59.7		14.7	l	35.0		14.0	l	29.1		5.6	h	65.4	h	3	2
18	RCUOGGoldenValue	53.3	h	80.4	h	38.9	h			40.1	h	46.7	h	8.3	h	85.4	h	0	7
19	RCUOGL15	29.8	l	52.1	l	17.9	l	43.0		23.1		35.6	h	4.6	l	76.2	h	4	2
20	RCUOGL4	37.8		53.8	l	22.6		47.0		13.9	l	31.1		6.9	h	40.3	l	3	1
21	RCUOGL17	31.6		51.8	l	17.7	l	40.0		11.2	l	25.6		4.5	l	66.7	h	4	1
22	RCUOG10/18	31.0		48.0	l	16.8	l	11.0	l	6.8	l	16.9	l	1.3	l	17.4	l	7	0
23	IL03-18438	23.1	l	54.7	l	13.3	l	18.0	l	5.1	l	20.2	l	4.1	l	12.5	l	8	0
24	IL03-15452	22.0	l	40.0	l	11.0	l	12.0	l	7.6	l	15.1	l	3.7	l	58.2		7	0
25	IL03-453	24.3	l	57.5		15.8	l	25.0	l	3.0	l	23.5	l	3.7	l	59.3		6	0
26	IL01-34159	18.9	l	40.1	l	8.0	l	8.0	l	5.5	l	14.9	l	0.3	l	3.2	l	8	0
27	IL79-002T-B-B	19.4	l	40.3	l	11.1	l	11.0	l	4.0	l	11.8	l	3.4	l	21.1	l	8	0
28	KY99C-1298-08-1	30.0	l	50.4	l	19.9		35.0		13.7	l	24.3	l	7.8	h	40.9	l	5	1
29	KY99C-1051-03-1	33.3		67.8	h	25.0		43.0		14.8	l	33.6		9.1	h	52.1		1	2
30	KY99C-1176-02-1	31.7		63.3	h	19.7		37.0		28.8	h	34.4		7.5	h	62.2	h	0	4
31	MO 050600	21.7	l	39.1	l	10.0	l	20.0	l	9.8	l	18.9	l	1.8	l	18.0	l	8	0
32	MO 050699	22.6	l	50.8	l	12.6	l	25.0	l	10.6	l	22.5	l	4.9		6.0	l	7	0
33	MO 050917	24.3	l	55.7	l	16.0	l	37.0		6.9	l	31.0		4.4	l	27.5	l	6	0
34	MO 050921	19.9	l	42.7	l	10.4	l	15.0	l	6.4	l	17.2	l	2.7	l	4.0	l	8	0
35	VA06W-598	28.9	l	51.4	l	22.0		30.0		11.3	l	25.7		4.0	l	60.7		4	0
36	VA06W-557	35.5		62.4		27.1		50.0		26.3	h	30.5		8.4	h	42.4		0	2
37	VA06W-595	25.0	l	49.9	l	16.7	l	25.0	l	13.7	l	22.3	l	3.4	l	37.5	l	8	0
38	VA06W-608	30.9		62.6		17.8	l	35.0		16.0	l	30.8		5.6	h	32.5	l	3	1
39	VA06W-627	35.1		62.7		27.8	h	38.0		19.6	l	34.4		7.2	h	66.0	h	1	3
40	OH03-183-32	19.5	l	46.1	l	12.2	l	15.0	l	7.7	l	19.7	l	2.0	l	32.9	l	8	0
41	OH03-235-2	28.7	l	61.4		19.6		38.0		27.3	h	30.8		6.3	h	61.5	h	1	3
42	OH03-41-45	34.3		56.6		21.6		30.0		14.5	l	29.4		4.7		52.7		1	0
43	OH03-97-6	18.8	l	47.7	l	10.0	l	33.0		18.6	l	24.1	l	4.0	l	37.8	l	7	0
44	OH03-75-58	23.6	l	50.0	l	13.3	l	60.0		12.5	l	32.5		3.5	l	40.8	l	6	0
	AVERAGE	28.5		52.7		17.8		31.7		14.9		26.9		4.6		36.7		4.8	1.2
	LSD	13.9		17.5		11.6		17.8		19.6		12.8		4.3		38.6			
	R2	0.6		0.6		0.6		0.8		0.7		0.8		0.9		0.4			
	CV	42.5		42.5		65.5		33.4		65.3		29.4		55.3		90.1			
	Number of locations	6		6		8		1		2		3		3		1			

Table 9. Best (top of table) and worst (bottom of table) entries from the 2007 NUWWSN.

	NAME	SEV		INC		IND		KR		PSS		ISK		DON		GHSEV		#l	#h
2	TRUMAN	11.2	l	26.7	l	6.1	l	17.5	l	12.6	l	16.6	l	3.9	l	3.4	l	8	0
51	MSU Line E6003	14.0	l	18.3	l	6.1	l	24.4	l	17.4	l	12.6	l	4.8	l	8.4	l	8	0
43	MO 040165	20.2	l	34.7		12.2	l	16.2	l	15.4	l	25.6	l	3.1	l	4.6	l	7	0
45	MO 050143	19.5	l	38.1		12.2	l	20.6	l	7.1	l	26.7	l	3.9	l	6.2	l	7	0
44	MO 050101	21.4	l	40.4		12.7	l	26.2	l	7.3	l	26.3	l	3.9	l	4.5	l	7	0
50	MSU Line E6002	17.5	l	27.1	l	12.9	l	35.6		13.9	l	26.7	l	4.6	l	25.5	l	7	0
59	OH02-12686	20.2	l	35.5		14.6	l	25.0	l	17.1	l	26.0	l	2.1	l	24.0	l	7	0
46	MO 050197	17.7	l	33.7		11.6	l	17.9	l	8.6	l	21.3	l	3.7	l	39.1		6	0
31	RCUOGDHACF 1109O2D	18.3	l	21.4	l	12.1	l	47.1		22.7	h	26.7	l	3.9	l	25.4	l	6	1
49	MSU Line E6001	19.1	l	41.5		14.2	l	33.1		14.4	l	25.0	l	4.6	l	4.9	l	6	0
29	RCUOGF110202D/4	22.9		25.7	l	14.7	l	32.1		11.1	l	23.5	l	1.7	l	10.7	l	6	0
58	OH02-12678	19.4	l	39.5		17.0		15.3	l	11.2	l	25.2	l	4.2	l	13.3	l	6	0
5	NY88046-8138	38.6	h	54.1	h	24.8	h	44.6		28.0	h	48.5	h	7.8		46.6	h	0	6
32	RCUOGNS984-1	38.0	h	61.1	h	28.3	h	45.6		26.6	h	42.6	h	8.2		46.9	h	0	6
24	M03-3104	31.4	h	64.3	h	25.5	h	50.9	h	22.6	h	49.5	h	8.4		59.1	h	0	7
4	PIONEER 2545	39.0	h	62.3	h	30.0	h	49.8	h	18.5	lh	50.3	h	11.6		50.5	h	1	7
10	KS04HW47-3	41.5	h	62.7	h	34.1	h	65.0	h	21.2	h	46.1	h	16.6	h	70.6	h	0	8
	AVERAGE	24.1		40.4		17.0		33.3		16.2		30.5		5.7		26.1		4.8	2.1
	LSD	11.2		14.3		10.0		17.6		14.8		14.1		3.9		28.8			
	R2	0.53		0.73		0.52		0.79		0.48		0.52		0.8		0.71			
	CV	46.7		34.7		66.2		27.6		64.9		32.6		60.9		57.8			
	Number of locations	10		10		13		2		5		5				2			

l,h indicate a mean that is not significantly different than the lowest (l) or highest (h) mean in that column

Table 10. Best (top of table) and worst (bottom of table) entries from the 2007 PNUWWSN.

	NAME	SEV		INC		IND		KR		PSS		ISK		DON		GHSEV		#l	#h
2	TRUMAN	16.9	l	38.4	l	7.3	l	13.0	l	9.4	l	17.8	l	2.2	l	12.3	l	8	0
26	IL01-34159	18.9	l	40.1	l	8.0	l	8.0	l	5.5	l	14.9	l	0.3	l	3.2	l	8	0
31	MO 050600	21.7	l	39.1	l	10.0	l	20.0	l	9.8	l	18.9	l	1.8	l	18.0	l	8	0
34	MO 050921	19.9	l	42.7	l	10.4	l	15.0	l	6.4	l	17.2	l	2.7	l	4.0	l	8	0
27	IL79-002T-B-B	19.4	l	40.3	l	11.1	l	11.0	l	4.0	l	11.8	l	3.4	l	21.1	l	8	0
40	OH03-183-32	19.5	l	46.1	l	12.2	l	15.0	l	7.7	l	19.7	l	2.0	l	32.9	l	8	0
23	IL03-18438	23.1	l	54.7	l	13.3	l	18.0	l	5.1	l	20.2	l	4.1	l	12.5	l	8	0
5	P.981129A1--17	23.7	l	47.0	l	13.4	l	23.0	l	19.2	l	22.4	l	0.4	l	3.8	l	8	0
6	P.99751RA1--94	23.3	l	47.9	l	15.2	l	20.0	l	15.6	l	23.8	l	3.9	l	4.1	l	8	0
37	VA06W-595	25.0	l	49.9	l	16.7	l	25.0	l	13.7	l	22.3	l	3.4	l	37.5	l	8	0
8	P.03528A1-10	16.9	l	43.2	l	9.6	l	30.0		5.6	l	22.2	l	3.6	l	28.8	l	7	0
43	OH03-97-6	18.8	l	47.7	l	10.0	l	33.0		18.6	l	24.1	l	4.0	l	37.8	l	7	0
24	IL03-15452	22.0	l	40.0	l	11.0	l	12.0	l	7.6	l	15.1	l	3.7	l	58.2		7	0
9	P.03630A1-18	21.0	l	50.8	l	11.2	l	27.0		10.5	l	24.0	l	2.6	l	3.4	l	7	0
32	MO 050699	22.6	l	50.8	l	12.6	l	25.0	l	10.6	l	22.5	l	4.9		6.0	l	7	0
22	RCUOG10/18	31.0		48.0	l	16.8	l	11.0	l	6.8	l	16.9	l	1.3	l	17.4	l	7	0
1	ERNIE	22.8	l	44.5	l	12.9	l	33.0		12.7	l	23.6	l	4.9		28.6	l	6	0
44	OH03-75-58	23.6	l	50.0	l	13.3	l	60.0		12.5	l	32.5		3.5	l	40.8	l	6	0
25	IL03-453	24.3	l	57.5		15.8	l	25.0	l	3.0	l	23.5	l	3.7	l	59.3		6	0
33	MO 050917	24.3	l	55.7	l	16.0	l	37.0		6.9	l	31.0		4.4	l	27.5	l	6	0
16	M04-4258	29.4	l	56.8		17.9	l	22.0	l	9.1	l	24.9		4.1	l	4.8	l	6	0
13	M04-4843	32.3		42.5	l	20.4		15.0	l	10.8	l	20.0	l	2.6	l	36.1	l	6	0
4	PIONEER 2545	38.1		69.0	h	30.9	h	47.0		28.6	h	39.8	h	6.5	h			0	5
12	SE94-1012-25	49.6	h	60.0		33.5	h	63.0	h	32.0	h	43.5	h	6.7	h	62.1	h	0	7
10	SE981089-34	47.8	h	64.4	h	36.4	h	80.0	h	42.8	h	48.0	h	9.9	h	38.8	l	1	7
18	RCUOGGoldenValue	53.3	h	80.4	h	38.9	h			40.1	h	46.7	h	8.3	h	85.4	h	0	7
	Average	26.5		50.3		16.3		31.7		13.6		24.9		3.8		36.7		4.8	1.2
	LSD	13.9		17.5		11.6		17.8		19.6		12.8		4.3		38.6			
	R2	0.6		0.6		0.6		0.8		0.7		0.8		0.9		0.4			
	CV	42.5		42.5		65.5		33.4		65.3		29.4		55.3		90.1			
	Number of locations	6		6		8		1		2		3		3		1			

l,h indicate a mean that is not significantly different than the lowest (l) or highest (h) mean in that column

Table 11. Incidence (INC, %) data from 2007 NUWWSN. "l", "h" indicate means that are not significantly different from the lowest (l) or highest (h) mean.

		AVG		ILURB	KYLEX	MDSAL	MIELA	MOCOL	NEMEA	NYITH	OHWOO	ONRID	VABLA
1	ERNIE	45.7		73.3	22.0	55.1	59.3	100	50.0	5.0	15.0	37.5	40.0
2	TRUMAN	26.7	l	43.3	30.0	15.1	13.6	97	36.7	3.0	10.0	5.0	13.3
3	FREEDOM	47.2		66.7	52.5	45.0	53.1	100	35.0	22.0	38.3	32.5	26.7
4	PIONEER 2545	62.3	h	61.7	65.7	70.0	56.6	100	70.0	48.0	41.7	72.5	36.7
5	NY88046-8138	54.1	h	60.0	97.5	50.0	40.3	100	45.0	10.0	53.3	25.0	60.0
6	NY93285SP-7343	33.3		46.7	37.5	30.0	26.3	100	20.0	10.0	16.7	8.8	36.7
7	NY93285-7110	32.7		50.0	25.0	35.0	20.3	100	3.3	1.0	33.3	8.8	50.0
8	NY91028SP-9082	58.7	h	78.3	92.5	50.0	.	100	23.3	33.0	31.7	70.0	43.3
9	NY93306-7091	52.2	h	.	80.0	45.0	36.1	100	66.7	23.0	50.0	22.5	36.7
10	KS04HW47-3	62.7	h	81.7	38.7	65.1	67.6	100	50.0	31.0	73.3	60.0	60.0
11	KS04HW101-3	49.2		20.0	29.4	50.0	74.7	100	73.3	9.0	33.3	62.5	40.0
12	P.011035A1-71	53.9	h	71.7	56.6	50.0	64.5	100	93.3	18.0	15.0	20.0	50.0
13	P.011036A1-14	46.9		35.0	43.7	55.1	60.5	100	93.3	12.0	1.7	37.5	30.0
14	P.02444A1-23-6	46.2		58.3	54.4	25.1	72.6	98	100.0	4.0	5.0	11.3	33.3
15	P.03647A1-1	38.7		16.7	26.5	35.1	50.7	100	100.0	2.0	8.3	11.3	36.7
16	P.04287A1-10	51.2	h	75.0	47.9	45.1	59.6	100	100.0	20.0	18.3	22.5	23.3
17	NE01643	44.1		56.7	50.0	50.0	47.1	98	30.0	23.0	18.3	57.5	10.0
18	HARRY	51.1	h	66.7	40.0	50.0	44.8	100	33.3	50.0	15.0	77.5	33.3
19	NI04421	56.8	h	70.0	82.5	55.0	53.0	93	53.3	38.0	0.0	70.0	53.3
20	NE04653	51.5	h	63.3	60.0	45.0	48.5	100	36.7	31.0	51.7	35.0	43.3
21	NE03490	49.8		66.7	67.5	55.0	62.3	100	23.3	26.0	28.3	42.5	26.7
22	MD01W233-06-11	48.3		76.7	39.6	40.0	57.8	98	80.0	15.0	28.3	27.5	20.0
23	M03-3002	50.8	h	65.0	38.0	45.0	57.8	100	96.7	14.0	23.3	35.0	33.3
24	M03-3104	64.3	h	58.3	64.0	65.0	72.9	100	100.0	34.0	46.7	75.0	26.7
25	M03-3616	45.2		43.3	29.2	50.0	61.4	100	80.0	11.0	5.0	52.5	20.0
26	M03*3877	61.8	h	78.3	80.0	65.0	60.6	100	83.3	26.0	21.7	60.0	43.3
27	M03*3861	61.6	h	70.0	77.5	50.0	73.3	100	53.3	23.0	61.7	67.5	40.0
28	RCUOG19/21	44.9		61.7	30.0	50.0	20.0	100	46.7	29.0	45.0	30.0	36.7
29	RCUOGF110202D/4	25.7	l	0.7	17.5	7.5	70.4	100	6.7	2.0	0.0	8.8	43.3
30	RCUOGF111202A/3	58.5	h	70.0	55.0	55.0	68.7	100	90.0	13.0	25.0	65.0	43.3
31	RCUOGDHACF1109O2D	21.4	l	3.7	20.0	7.5	.	100	3.3	1.0	0.0	11.3	40.0
32	RCUOGNS984-1	61.1	h	.	77.5	70.0	63.9	100	50.0	38.0	38.3	72.5	30.0
33	IL00-8530	48.4		53.3	26.8	55.0	49.5	97	100.0	5.0	10.0	27.5	60.0
34	IL01-11445	39.2		40.0	43.5	35.1	47.9	92	100.0	2.0	1.7	10.0	20.0
35	IL01-11934	40.2		45.0	40.0	30.0	45.3	95	66.7	11.0	25.0	17.5	26.7
36	IL02-19463	37.4		15.0	26.5	.	71.7	97	96.7	1.0	0.0	10.0	23.3
37	IL02-23168	45.3		50.0	40.0	45.1	51.9	98	96.7	16.0	1.7	23.8	30.0
38	KY97C-0540-01-03	57.9	h	80.0	67.5	50.0	65.0	98	86.7	26.0	31.7	57.5	16.7
39	KY97C-0554-03-06	55.7	h	81.7	80.0	45.0	55.9	100	70.0	9.0	26.7	35.0	53.3
40	KY97C-0554-04-05	48.6		56.7	58.0	35.1	55.3	100	80.0	7.0	5.0	52.5	36.7
41	KY97C-0508-01-01A-1	42.8		51.7	50.0	30.0	56.9	97	76.7	14.0	0.0	21.3	30.0
42	KY97C-0554-03-02	50.7	h	63.3	35.0	45.0	59.2	100	50.0	19.0	26.7	55.0	53.3
43	MO 040165	34.7		65.0	49.5	25.1	14.4	95	73.3	3.0	0.0	11.3	10.0
44	MO 050101	40.4		60.0	27.5	30.0	38.3	98	80.0	4.0	0.0	12.5	53.3
45	MO 050143	38.1		55.0	38.1	30.0	32.6	95	83.3	12.0	10.0	21.3	3.3
46	MO 050197	33.7		46.7	22.8	40.0	28.4	97	30.0	16.0	0.0	22.5	33.3
47	MSU Line E3023	50.0	h	58.3	92.5	35.0	45.4	100	33.3	19.0	35.0	35.0	46.7
48	MSU Line E5015	55.3	h	81.7	70.0	40.0	62.4	100	70.0	12.0	20.0	40.0	56.7
49	MSU Line E6001	41.5		.	55.0	35.1	74.3	100	13.3	16.0	3.3	40.0	26.7
50	MSU Line E6002	27.1	l	.	32.5	10.0	31.8	92	43.3	1.0	6.7	0.0	16.7
51	MSU Line E6003	18.3	l	.	7.4	7.5	8.3	92	20.0	1.0	11.7	0.0	6.7
52	VA06W-600	45.1		46.7	39.3	.	69.9	95	100.0	3.0	0.0	30.0	26.7
53	VA06W-602	49.6		56.7	40.0	55.1	62.4	100	83.3	7.0	33.3	25.0	33.3
54	VA06W-587	55.4	h	71.7	58.3	40.0	64.3	98	96.7	12.0	33.3	30.0	50.0
55	VA06W-594	52.3	h	85.0	51.1	.	57.5	98	83.3	10.0	28.3	15.0	46.7
56	VA06W-585	47.4		.	61.7	40.0	59.2	98	86.7	3.0	5.0	10.0	53.3
57	OH02-15978	41.5		55.0	75.0	45.1	60.8	98	0.0	10.0	13.3	27.5	30.0
58	OH02-12678	39.5		48.3	56.5	45.0	61.3	100	33.3	5.0	0.0	22.5	23.3
59	OH02-12686	35.5		48.3	50.0	35.0	44.7	100	13.3	11.0	33.3	6.3	13.3
60	OH02-13567	43.8		58.3	45.0	35.1	31.8	98	86.7	9.0	13.3	37.5	23.3
	AVERAGE	46.2		56.7	49.5	42.1	52.2	98.5	61.3	14.8	20.5	33.2	34.4
	LSD	14.3		25.6	24.1	24	19.5	4.2	40		28	19.8	21.8
	R2	0.7		0.7	0.7	0.8			0.7		0.4		

Table 12. Severity (SEV, %) data from 2007 NUWWSN. "l", "h" indicate means that are not significantly different from the lowest (l) or highest (h) mean.

		AVG		ILURB	KYLEX	MDSAL	MIELA	MOCOL	NEMEA	NYITH	OHWOO	ONRID	VABLA
1	ERNIE	27.1		36.2	16.9	38.3	35.5	28.9	36.8	11	30.3	24.8	12.1
2	TRUMAN	11.2	l	20.3	11.6	18.3	7.5	13.2	7.0	16	6.7	5.3	5.9
3	FREEDOM	24.0		24.8	41.1	25.0	37.8	39.1	22.4	13	11.3	20.5	5.2
4	PIONEER 2545	39.0	h	43.5	54.1	40.0	38.9	38.6	56.4	35	17.8	50.0	16.0
5	NY88046-8138	38.6	h	50.9	37.1	35.0	41.6	40.9	54.7	33	45.3	32.5	14.9
6	NY93285SP-7343	25.6		48.9	17.8	20.0	35.3	28.6	48.8	12	11.2	18.8	14.2
7	NY93285-7110	34.1	h	28.3	32.9	25.0	32.2	29.4	16.7	100	31.1	30.8	14.5
8	NY91028SP-9082	29.9		54.9	32.1	20.0	.	35.0	7.0	31	17.6	50.0	7.0
9	NY93306-7091	24.2		.	20.4	20.0	36.6	31.6	16.5	20	30.4	22.3	13.2
10	KS04HW47-3	41.5	h	48.8	42.5	38.3	72.8	41.9	47.0	37	38.8	32.5	15.1
11	KS04HW101-3	33.8	h	27.6	32.7	40.0	61.8	24.3	55.2	18	23.5	41.5	13.3
12	P.011035A1-71	29.7		34.0	22.8	30.0	41.6	26.6	91.5	15	6.9	14.0	14.4
13	P.011036A1-14	32.6	h	22.8	28.2	58.3	45.2	29.9	97.8	13	0.7	22.3	7.8
14	P.02444A1-23-6	24.7		18.4	22.2	28.3	41.4	25.3	81.7	6	1.8	10.5	11.7
15	P.03647A1-1	23.6		18.5	13.0	28.3	31.9	33.5	48.7	16	6.3	17.0	22.6
16	P.04287A1-10	30.4	h	35.3	22.2	18.3	39.4	28.3	100.0	14	6.1	29.5	10.8
17	NE01643	22.5		44.5	19.4	25.0	30.2	29.0	9.2	20	7.3	36.8	3.9
18	HARRY	23.2		46.9	26.0	20.0	41.0	29.8	2.6	18	6.5	34.3	7.2
19	NI04421	28.5		56.3	42.7	25.0	53.1	21.1	22.0	16	0.0	30.0	19.0
20	NE04653	27.2		47.2	18.6	25.0	45.1	24.1	23.2	13	28.0	27.0	20.9
21	NE03490	29.1		43.5	28.0	25.0	59.2	31.4	28.3	28	19.4	20.5	8.2
22	MD01W233-06-11	27.2		26.7	29.2	20.0	56.0	24.4	64.7	13	17.6	12.3	8.3
23	M03-3002	33.1	h	45.6	35.4	30.0	49.3	28.6	65.9	13	11.4	45.0	7.1
24	M03-3104	31.4	h	37.6	26.8	30.0	40.8	28.8	50.1	24	30.9	38.3	6.4
25	M03-3616	28.2		26.7	21.2	40.0	34.0	27.5	69.8	18	10.0	27.0	7.8
26	M03*3877	27.5		30.7	37.2	30.0	51.6	21.0	51.3	8	4.2	30.0	10.8
27	M03*3861	27.6		28.5	33.8	25.0	53.6	26.2	30.7	10	26.1	27.0	14.9
28	RCUOG19/21	28.6		50.6	13.5	25.0	24.3	21.8	54.0	31	18.1	38.3	9.6
29	RCUOGF110202D/4	22.9		9.0	9.3	10.0	65.2	46.0	66.7	6	0.0	8.8	7.8
30	RCUOGF111202A/3	35.4	h	29.9	34.8	35.0	71.7	32.7	53.7	25	12.0	44.0	14.9
31	RCUOGDHACF1109O2D	18.3	l	20.6	20.2	15.0	.	38.4	33.3	6	0.0	8.8	8.0
32	RCUOGNS984-1	38.0	h	.	29.5	40.0	63.9	49.4	33.9	29	17.2	58.0	14.1
33	IL00-8530	30.3	h	26.2	15.2	25.0	41.1	27.4	99.0	24	16.5	17.0	11.7
34	IL01-11445	32.5	h	27.6	29.0	28.3	27.4	20.9	99.5	26	30.0	30.3	5.9
35	IL01-11934	24.0		34.8	18.7	15.0	26.4	20.3	53.8	8	20.5	31.3	11.0
36	IL02-19463	34.7	h	27.2	18.8	.	52.4	25.0	96.1	65	0.0	18.3	10.3
37	IL02-23168	28.8		35.0	30.2	38.3	38.6	25.9	62.6	15	6.7	24.0	11.4
38	KY97C-0540-01-03	35.4	h	52.1	35.5	35.0	54.7	24.5	36.5	25	24.3	49.8	16.7
39	KY97C-0554-03-06	23.7		23.8	30.8	20.0	25.7	29.4	27.4	7	33.2	27.0	12.8
40	KY97C-0554-04-05	24.0		30.3	24.1	18.3	41.7	36.7	42.8	12	3.0	21.0	10.3
41	KY97C-0508-01-01A-1	23.8		37.0	26.0	15.0	46.2	24.4	42.7	22	0.0	17.5	7.0
42	KY97C-0554-03-02	20.9	l	25.1	24.7	25.0	35.4	33.2	8.0	11	8.9	27.0	10.4
43	MO 040165	20.2	l	40.0	15.4	18.3	20.9	20.5	44.5	26	0.0	14.0	2.6
44	MO 050101	21.4	l	19.5	13.1	20.0	33.4	19.6	70.9	16	0.0	14.0	7.7
45	MO 050143	19.5	l	21.5	20.3	15.0	26.4	20.2	56.7	10	8.7	14.0	2.0
46	MO 050197	17.7	l	28.5	16.8	15.0	36.3	15.0	26.2	16	0.0	17.5	5.9
47	MSU Line E3023	35.4	h	57.2	36.4	30.0	40.9	34.6	52.7	16	35.0	37.3	13.5
48	MSU Line E5015	27.2		31.7	38.7	25.0	55.3	26.5	29.6	9	6.5	42.5	7.6
49	MSU Line E6001	19.1	l	.	18.5	8.3	54.7	36.4	2.3	8	17.5	12.3	6.5
50	MSU Line E6002	17.5	l	.	14.2	10.0	27.4	19.5	36.4	6	26.1	0.0	10.5
51	MSU Line E6003	14.0	l	.	13.0	7.5	16.5	13.0	43.4	6	13.8	0.0	5.9
52	VA06W-600	30.1		36.0	32.2	.	43.5	21.9	85.8	23	0.0	23.5	6.5
53	VA06W-602	32.9	h	41.0	28.6	48.3	47.0	26.8	70.3	8	14.0	34.3	10.5
54	VA06W-587	33.7	h	30.4	28.6	35.0	53.6	34.2	64.0	22	21.0	38.5	9.5
55	VA06W-594	25.9		30.6	23.8	.	43.0	27.3	48.0	10	21.9	18.8	10.8
56	VA06W-585	21.2	l	.	16.9	20.0	34.5	20.9	33.1	16	15.0	17.0	10.0
57	OH02-15978	25.7		49.8	22.3	18.3	51.5	27.3	0.0	13	37.0	31.0	7.3
58	OH02-12678	19.4	l	37.4	26.7	20.0	34.8	19.2	24.6	9	0.0	15.8	6.4
59	OH02-12686	20.2	l	41.5	16.6	20.0	39.2	21.9	4.7	12	29.3	13.5	3.4
60	OH02-13567	18.8	l	23.1	18.3	28.3	29.0	19.3	15.4	7	13.8	22.3	11.1
	AVERAGE	26.9		34.5	25.4	25.6	41.7	27.8	45.4	18.6	15.0	25.6	10.2
	LSD	11.2		19.9	9.4	16.6	21.9	12.4	46		33	16.3	7.6
	R2	0.5		0.6	0.7	0.8			0.6		0.6		

Table 13. Index (IND, %) data from 2007 NUWWSN. "l", "h" indicate means that are not significantly different from the lowest (l) or highest (h) mean.

	AVG		ILUR	INWL	KSMA	KYLE	MDSA	MIEL	MOCO	NEME	NYIT	OHWO	ONT	ROM	VABL
ERNIE	16.8		26.9	13.6	27.6	3.7	22.2	22.8	28.9	20.4	0.6	5.6	13.0	28.1	4.9
TRUMAN	6.1	l	9.8	17.5	11.0	3.5	2.2	0.0	12.9	2.6	0.5	2.0	0.4	16.6	0.8
FREEDOM	15.2	l	15.9	14.2	25.3	21.6	11.5	20.0	39.1	15.7	2.9	6.5	8.3	15.3	2.1
PIONEER 2545	30.0	h	26.6	70.0	41.6	35.5	28.0	22.7	38.6	38.3	16.8	11.1	36.3	17.3	7.8
NY88046-8138	24.8	h	30.3	54.4	38.4	36.2	18.0	15.3	40.9	20.3	3.3	24.0	9.0	22.1	9.8
NY93285SP-7343	18.4		23.1	64.4	24.4	6.7	6.0	8.1	28.6	19.5	1.2	5.6	1.8	44.0	5.5
NY93285-7110	15.8	l	14.5	32.0	25.7	8.2	8.5	8.6	29.4	1.7	1.0	14.4	2.7	50.4	7.8
NY91028SP-9082	20.4		44.5	10.0	17.2	29.7	10.0	.	35.0	1.6	10.2	8.4	35.0	35.7	3.1
NY93306-7091	17.1		.	32.7	36.8	16.3	9.0	10.8	31.6	9.4	4.6	16.5	5.2	27.0	4.7
KS04HW47-3	34.1	h	39.8	86.4	29.2	16.5	26.2	50.2	41.9	24.7	11.5	28.7	21.4	56.9	10.0
KS04HW101-3	24.5	h	5.4	72.9	30.8	9.6	20.0	45.2	24.3	34.7	1.6	11.8	26.6	30.3	5.7
P.011035A1-71	23.4		24.3	31.1	24.9	12.9	15.0	28.7	26.6	85.8	2.7	3.1	3.5	39.3	6.7
P.011036A1-14	23.0		8.2	29.1	25.5	12.3	34.2	28.2	29.9	91.6	1.6	0.0	9.3	26.6	2.6
P.02444A1-23-6	17.1		13.3	10.0	21.1	12.1	7.2	32.0	24.9	81.7	0.2	0.3	1.3	14.9	3.9
P.03647A1-1	13.8	l	3.3	10.0	27.0	3.5	10.2	16.8	33.5	48.7	0.3	1.6	3.1	13.2	8.4
P.04287A1-10	23.8		26.5	20.0	50.4	10.6	8.2	24.5	28.3	100.0	2.8	3.3	6.3	24.4	3.9
NE01643	19.2		26.2	76.7	21.4	9.7	13.5	15.1	28.8	8.3	4.6	2.2	22.7	19.9	0.6
HARRY	17.6		31.2	21.1	25.7	10.4	10.0	17.6	29.8	2.6	9.0	2.9	26.6	39.4	2.6
NI04421	20.3		40.2	11.0	29.1	35.3	15.0	27.6	19.9	18.7	6.1	0.0	21.0	26.6	13.1
NE04653	20.6		28.6	69.0	21.8	11.2	11.5	21.5	24.1	13.1	4.0	13.4	9.8	31.2	9.0
NE03490	21.8		29.2	61.8	16.0	18.9	14.5	38.9	31.4	6.6	7.3	8.5	10.0	37.7	2.2
MD01W233-06-11	19.1		20.4	14.0	17.3	11.6	8.0	33.5	24.2	52.2	2.0	7.1	4.6	50.6	2.4
M03-3002	26.0	h	29.4	70.9	26.5	13.5	13.5	28.1	28.6	64.0	1.8	8.0	18.6	33.2	2.6
M03-3104	25.5	h	22.7	52.2	25.2	17.2	19.5	30.7	28.8	50.1	8.2	14.2	29.6	31.1	1.8
M03-3616	20.5		10.6	39.0	20.5	6.2	22.0	21.0	27.5	58.4	2.0	1.5	14.3	41.3	2.4
M03*3877	23.3		23.8	39.1	36.6	29.7	19.5	31.8	21.0	46.1	2.1	2.8	18.0	28.1	4.7
M03*3861	21.9		19.4	26.7	31.2	26.2	13.0	38.8	25.9	21.3	2.3	16.2	18.4	39.3	6.1
RCUOG19/21	15.8	l	30.9	11.0	26.6	4.0	13.0	4.7	21.8	25.2	9.0	7.9	10.4	38.0	3.5
RCUOGF110202D/4	14.7	l	0.1	62.9	3.6	1.6	0.8	43.3	46.0	6.7	0.1	0.0	0.8	21.6	3.3
RCUOGF111202A/3	21.9		20.9	11.0	14.8	19.1	19.0	49.4	32.7	53.0	3.3	5.4	30.5	18.6	6.9
RCUOGDHACF 1109O2D	12.1	l	1.6	50.0	17.3	4.0	1.3	.	38.4	3.3	0.1	0.0	1.1	19.8	3.3
RCUOGNS984-1	28.3	h	.	30.0	28.6	22.9	28.0	42.8	49.4	19.5	11.0	13.1	41.9	46.6	4.7
IL00-8530	20.0		13.7	33.8	12.3	4.1	14.5	21.5	26.6	99.0	1.2	1.5	5.2	19.0	7.1
IL01-11445	22.3		11.1	54.4	14.3	12.6	10.2	13.8	19.6	99.5	0.5	1.5	2.4	48.3	1.2
IL01-11934	18.0		15.1	78.8	17.0	7.5	4.0	13.7	19.5	35.5	0.9	8.0	5.3	24.9	4.3
IL02-19463	22.5		4.6	16.7	28.0	5.0	.	38.4	24.3	93.1	0.7	0.0	2.0	60.7	3.7
IL02-23168	20.5		18.3	25.6	16.9	12.1	18.2	21.5	25.6	61.7	2.4	0.3	5.6	54.8	3.1
KY97C-0540-01-03	25.6	h	40.8	39.1	34.2	23.9	17.5	36.0	24.3	31.9	6.5	12.2	27.8	34.9	3.1
KY97C-0554-03-06	16.0	l	19.8	16.4	21.1	24.6	9.0	15.3	29.4	20.2	0.6	8.5	9.5	26.7	6.7
KY97C-0554-04-05	16.8		17.9	11.1	27.4	14.0	6.2	23.3	36.7	35.7	0.8	0.5	11.0	30.5	3.9
KY97C-0508-01-01A-1	17.9		17.8	36.7	29.9	13.0	5.0	26.6	23.6	31.4	3.1	0.0	4.3	39.3	2.2
KY97C-0554-03-02	16.4		15.0	.	22.5	8.7	11.0	20.7	33.2	5.2	2.1	4.2	15.5	35.5	5.5
MO 040165	12.2	l	26.0	10.0	20.2	7.6	4.2	1.9	19.7	41.7	0.8	0.0	1.8	24.6	0.8
MO 050101	12.7	l	11.7	10.0	19.4	3.6	6.0	15.9	19.2	57.8	0.6	0.0	1.8	15.1	4.1
MO 050143	12.2	l	12.5	11.0	19.9	7.8	5.0	8.8	19.5	49.9	1.2	1.8	3.9	17.3	0.2
MO 050197	11.6	l	12.6	33.3	16.3	3.8	5.5	11.0	14.6	6.3	2.6	0.0	4.2	39.0	2.0
MSU Line E3023	22.0		33.2	14.6	30.7	33.7	10.5	19.0	34.6	20.7	3.0	18.4	14.1	43.8	9.2
MSU Line E5015	20.8		26.4	28.9	34.1	27.1	10.0	34.7	26.5	16.9	1.1	2.0	19.7	38.4	4.3
MSU Line E6001	14.2	l	.	10.0	26.1	10.2	2.2	42.6	36.4	0.9	1.3	1.8	5.3	30.4	1.8
MSU Line E6002	12.9	l	.	13.0	22.8	4.6	1.0	11.1	18.1	20.3	0.1	2.9	0.0	58.4	2.0
MSU Line E6003	6.1	l	.	10.0	12.1	1.0	0.6	1.5	11.9	13.8	0.1	4.8	0.0	15.4	0.6
VA06W-600	27.3	h	19.0	93.0	33.1	12.7	.	30.3	21.2	85.8	0.7	0.0	8.0	29.1	1.8
VA06W-602	27.7	h	25.4	83.3	20.1	11.5	28.2	28.5	26.8	57.0	0.6	6.9	8.2	60.0	3.7
VA06W-587	23.6		22.2	45.0	23.6	16.7	14.0	36.2	33.8	63.0	2.6	10.3	10.8	23.7	4.7
VA06W-594	18.3		25.9	18.2	31.1	12.1	.	24.6	27.0	38.7	1.0	6.6	2.5	33.7	5.5
VA06W-585	18.6		.	72.5	20.8	10.4	9.0	21.1	20.6	31.9	0.5	1.4	1.6	26.6	5.7
OH02-15978	17.5		27.2	45.0	24.8	16.7	8.2	30.7	27.0	0.0	1.3	6.9	8.2	29.9	2.2
OH02-12678	17.0		18.5	75.0	25.3	15.1	9.0	21.8	19.2	8.3	0.5	0.0	3.7	22.7	1.6
OH02-12686	14.6	l	20.1	65.6	15.9	8.3	7.0	16.9	21.9	0.9	1.3	7.9	1.2	21.0	1.4
OH02-13567	12.8	l	13.6	38.0	17.8	8.2	10.2	10.7	19.0	12.7	0.6	2.8	8.4	21.8	2.6
AVERAGE	19.2		20.7	37.4	24.3	13.6	12.0	23.7	27.5	34.8	2.9	6.0	10.9	31.8	4.2
LSD	10.0		14.3	11.3	0.8		11.5	17.3	12.6	35		11	9.9		5.1
R2	0.5		0.7				0.8			0.7		0.6			

Table 14. Kernel Rating (KR, %) and Percent Scabby Seed (PSS, %) data from 2007 NUWWSN

		KR				PSS						
		AVG		ILURB	KSMAN	AVG		KYLEX	MDSAL	MOCOL	NEMEA	ROMAN
1	ERNIE	40.6		30.0	51.3	4.3	l	.	1.5	5.0	10.2	0.6
2	TRUMAN	17.5	l	20.0	15.0	12.6	l	18.8	11.5	20.0	4.1	8.4
3	FREEDOM	38.4		33.0	43.8	7.1	l	13.7	3.0	3.0	15.0	1.0
4	PIONEER 2545	49.8	h	47.0	52.5	18.5	lh	12.9	5.5	32.5	35.4	6.0
5	NY88046-8138	44.6		43.0	46.3	28.0	h	39.8	12.0	57.5	12.8	17.9
6	NY93285SP-7343	24.4	l	30.0	18.8	33.2	h	41.5	7.0	47.5	43.0	27.0
7	NY93285-7110	26.3	l	30.0	22.5	24.4	h	10.9	0.5	40.0	36.0	34.8
8	NY91028SP-9082	36.9		45.0	28.8	25.1	h	31.6	3.5	35.0	32.7	22.7
9	NY93306-7091	45.6		60.0	31.3	31.4	h	59.6	11.5	32.0	34.6	19.3
10	KS04HW47-3	65.0	h	80.0	50.0	21.2	h	27.6	9.5	41.5	16.8	10.7
11	KS04HW101-3	41.3		30.0	52.5	31.8	h	44.4	12.0	32.5	18.6	51.7
12	P.011035A1-71	31.5		33.0	30.0	21.4	h	4.5	13.5	47.5	8.0	33.3
13	P.011036A1-14	32.7		33.0	32.5	18.6	lh	16.7	6.5	49.5	10.9	9.2
14	P.02444A1-23-6	17.1	l	13.0	21.3	16.1	l	14.7	7.5	25.0	23.5	9.7
15	P.03647A1-1	22.9	l	27.0	18.8	17.8	l	13.8	6.5	57.5	9.9	1.5
16	P.04287A1-10	39.4		30.0	48.8	13.2	l	13.0	8.0	17.0	23.0	5.0
17	NE01643	41.6		47.0	36.3	10.9	l	12.2	6.5	8.5	13.7	13.8
18	HARRY	57.1	h	53.0	61.3	16.4	l	12.8	8.5	25.0	25.6	10.3
19	NI04421	46.6		47.0	46.3	25.7	h	18.0	5.5	32.5	58.2	14.3
20	NE04653	45.6		40.0	51.3	20.6	h	22.6	12.5	20.0	35.6	12.4
21	NE03490	41.0		32.0	50.0	16.8	l	12.7	8.5	12.5	36.8	13.7
22	MD01W233-06-11	25.2	l	33.0	17.5	24.4	h	15.0	12.0	40.0	33.0	21.9
23	M03-3002	36.5		43.0	30.0	12.7	l	17.9	3.5	5.0	17.8	19.1
24	M03-3104	50.9	h	43.0	58.8	22.6	h	24.3	10.5	45.5	20.0	12.9
25	M03-3616	26.5	l	28.0	25.0	27.0	h	24.6	11.0	72.5	7.3	19.4
26	M03*3877	37.9		37.0	38.8	20.2	h	17.4	7.5	35.0	26.3	15.0
27	M03*3861	44.1		47.0	41.3	11.7	l	8.2	11.0	18.5	15.3	5.3
28	RCUOG19/21	34.0		33.0	35.0	14.2	l	9.2	12.0	21.0	15.0	13.7
29	RCUOGF110202D/4	32.1		43.0	21.3	11.1	l	12.4	11.0	18.0	2.0	12.3
30	RCUOGF111202A/3	32.5		40.0	25.0	22.4	h	20.7	1.0	17.5	56.6	16.1
31	RCUOGDHACF1109O2D	47.1		43.0	51.3	22.7	h	32.2	14.0	29.0	29.9	8.5
32	RCUOGNS984-1	45.6		.	45.0	26.6	h	8.4	2.0	27.5	86.2	8.7
33	IL00-8530	18.4	l	18.0	18.8	19.9	h	28.9	12.5	40.0	5.2	12.8
34	IL01-11445	15.9	l	13.0	18.8	7.0	l	5.6	8.0	10.5	8.4	2.7
35	IL01-11934	15.0	l	20.0	10.0	11.9	l	24.2	4.5	26.5	0.0	4.1
36	IL02-19463	21.0	l	17.0	25.0	9.7	l	10.3	3.5	18.5	7.0	9.3
37	IL02-23168	24.1	l	27.0	21.3	19.1	lh	11.9	5.5	45.0	2.1	30.9
38	KY97C-0540-01-03	30.0		40.0	20.0	14.5	l	8.1	5.5	17.5	3.4	38.2
39	KY97C-0554-03-06	38.8		40.0	37.5	22.5	h	25.2	10.0	22.5	20.0	34.9
40	KY97C-0554-04-05	23.5	l	27.0	20.0	30.4	h	47.5	9.5	40.0	40.6	14.4
41	KY97C-0508-01-01A-1	45.9		38.0	53.8	27.7	h	37.7	6.5	57.5	24.7	12.2
42	KY97C-0554-03-02	22.9	l	27.0	18.8	15.5	l	18.1	4.5	26.5	7.1	21.5
43	MO 040165	16.2	l	10.0	22.5	15.4	l	14.6	7.5	31.5	10.3	13.3
44	MO 050101	26.2	l	30.0	22.5	7.3	l	10.4	5.5	12.5	4.1	3.9
45	MO 050143	20.6	l	25.0	16.3	7.1	l	11.6	5.5	10.0	3.1	5.2
46	MO 050197	17.9	l	22.0	13.8	8.6	l	8.8	7.5	16.5	5.0	5.1
47	MSU Line E3023	28.1		30.0	26.3	12.7	l	15.9	2.5	4.0	34.7	6.2
48	MSU Line E5015	29.1		27.0	31.3	23.6	h	24.0	6.5	24.0	48.5	14.9
49	MSU Line E6001	33.1		.	32.5	14.4	l	18.3	13.5	19.0	9.0	12.0
50	MSU Line E6002	35.6		.	35.0	13.9	l	7.6	6.5	34.0	17.5	3.7
51	MSU Line E6003	24.4	l	.	23.8	17.4	l	4.8	3.5	40.0	17.0	21.5
52	VA06W-600	29.4		40.0	18.8	22.5	h	23.6	6.5	40.0	18.0	24.5
53	VA06W-602	19.0	l	18.0	20.0	18.5	lh	8.2	6.5	37.5	12.2	28.2
54	VA06W-587	20.9	l	23.0	18.8	23.4	h	13.9	3.5	45.0	48.4	6.4
55	VA06W-594	24.4	l	20.0	28.8	13.8	l	11.1	6.5	36.0	8.3	7.2
56	VA06W-585	9.4	l	.	8.8	15.1	l	9.4	4.5	39.0	7.5	15.2
57	OH02-15978	37.9		37.0	38.8	14.1	l	14.0	8.0	43.5	0.0	5.0
58	OH02-12678	15.3	l	13.0	17.5	11.2	l	4.1	5.0	13.0	28.0	6.1
59	OH02-12686	25.0	l	30.0	20.0	17.1	l	8.7	4.0	16.0	50.5	6.2
60	OH02-13567	28.5		17.0	40.0	15.8	l	19.6	6.0	17.5	31.3	4.6
	AVERAGE	31.9		32.8	31.3	18.0		18.3	7.3	29.2	21.4	14.1
	LSD	17.6		14.7	18.4	14.8		11.0	7.5			
	R2	0.8		0.7	0.6	0.5		0.8	0.6			

Table 15. ISK (%) data from 2007 NUWWSN. "l", "h" indicate means that are not significantly different from the lowest (l) or highest (h) mean.

		AVG		ILURB	KYLEX	MDSAL	MOCOL	NEMEA
1	ERNIE	30.7		44.8	19.2	32.6	29.3	27.7
2	TRUMAN	16.6	l	27.1	18.0	11.2	7.4	19.1
3	FREEDOM	34.9		40.8	33.2	23.2	45.7	31.4
4	PIONEER 2545	50.3	h	50.2	51.8	37.8	68.4	43.0
5	NY88046-8138	48.5	h	50.6	57.0	28.3	59.6	47.1
6	NY93285SP-7343	32.6		40.7	20.9	15.2	51.3	35.0
7	NY93285-7110	29.5		35.5	30.0	19.4	43.5	19.1
8	NY91028SP-9082	42.2	h	58.0	61.2	25.6	43.4	23.0
9	NY93306-7091	37.9	h	.	41.2	23.3	49.8	31.7
10	KS04HW47-3	46.1	h	71.1	42.1	35.8	45.1	36.5
11	KS04HW101-3	35.4		26.3	20.4	32.4	56.0	41.8
12	P.011035A1-71	43.4	h	45.1	30.5	26.6	54.8	59.8
13	P.011036A1-14	39.0	h	30.7	27.5	37.0	33.2	66.7
14	P.02444A1-23-6	39.8	h	28.4	28.5	18.6	65.3	58.5
15	P.03647A1-1	27.6		21.2	17.1	22.2	23.9	53.8
16	P.04287A1-10	34.7		45.1	25.9	21.6	15.2	65.5
17	NE01643	30.3		49.0	25.9	25.9	28.7	22.0
18	HARRY	35.9		55.4	27.0	23.2	39.8	34.0
19	NI04421	39.2	h	56.6	46.6	29.0	27.2	36.9
20	NE04653	31.1		49.2	28.7	24.4	20.7	32.7
21	NE03490	37.5	h	45.7	34.7	28.8	49.9	28.7
22	MD01W233-06-11	31.1		45.2	27.8	19.4	12.8	50.6
23	M03-3002	43.7	h	50.5	31.8	26.7	52.8	56.8
24	M03-3104	49.5	h	46.1	37.1	32.9	83.5	48.0
25	M03-3616	36.5	h	32.4	22.1	30.0	42.6	55.5
26	M03*3877	37.8	h	47.4	38.4	32.9	23.6	46.5
27	M03*3861	34.1		48.2	37.1	27.3	26.7	31.2
28	RCUOG19/21	29.5		47.0	18.0	26.9	24.7	31.0
29	RCUOGF110202D/4	23.5	l	20.2	16.3	5.7	30.8	44.6
30	RCUOGF111202A/3	42.5	h	46.0	39.8	32.6	38.9	55.1
31	RCUOGDHACF1109O2D	26.7	l	24.6	15.4	7.6	40.6	45.5
32	RCUOGNS984-1	42.6	h	.	43.7	38.0	56.0	27.2
33	IL00-8530	30.9		31.2	14.8	27.2	18.1	63.1
34	IL01-11445	34.0		25.6	31.4	20.8	32.4	59.9
35	IL01-11934	26.3	l	32.0	21.8	14.9	23.9	39.0
36	IL02-19463	34.8		19.3	18.4	.	53.5	58.7
37	IL02-23168	32.4		36.2	24.3	27.2	25.1	49.1
38	KY97C-0540-01-03	40.3	h	55.7	41.0	29.5	30.3	44.9
39	KY97C-0554-03-06	42.9	h	47.6	52.2	23.3	45.7	45.5
40	KY97C-0554-04-05	42.3	h	36.8	39.7	18.6	69.5	46.8
41	KY97C-0508-01-01A-1	31.9		41.9	30.0	15.3	33.5	38.6
42	KY97C-0554-03-02	29.2		37.2	23.8	24.0	39.3	21.5
43	MO 040165	25.6	l	35.5	23.6	15.2	16.5	37.0
44	MO 050101	26.3	l	35.9	16.8	17.2	15.3	46.5
45	MO 050143	26.7	l	30.5	21.1	16.5	21.4	44.0
46	MO 050197	21.3	l	31.2	18.2	17.5	8.9	30.7
47	MSU Line E3023	38.7	h	46.7	48.3	22.1	31.4	45.2
48	MSU Line E5015	33.9		44.7	39.9	24.9	26.3	33.5
49	MSU Line E6001	25.0	l	.	25.1	15.6	42.1	11.7
50	MSU Line E6002	26.7	l	.	15.9	7.4	47.1	30.7
51	MSU Line E6003	12.6	l	.	6.1	5.1	10.4	23.1
52	VA06W-600	42.2	h	40.8	30.9	.	45.0	62.9
53	VA06W-602	38.1	h	36.7	23.9	33.6	45.2	51.0
54	VA06W-587	43.1	h	39.9	31.6	23.9	52.7	67.6
55	VA06W-594	35.8		42.7	26.9	.	41.8	42.7
56	VA06W-585	34.2		.	27.3	19.8	45.2	38.9
57	OH02-15978	31.3		46.1	34.8	22.2	53.4	0.0
58	OH02-12678	25.2	l	31.1	26.6	21.5	18.1	28.6
59	OH02-12686	26.0	l	39.0	23.5	18.1	23.7	25.6
60	OH02-13567	29.6		31.1	26.8	21.4	25.8	43.1
	AVERAGE	34.1		40.3	29.7	23.2	37.2	40.6
	LSD	14.1		17.3	0.8			
	R2	0.5						

Table 16. Deoxynivenal (DON, ppm) data from 2007 NUWWSN. "l", "h" indicate means that are not significantly different from the lowest (l) or highest (h) mean.

		AVG		ILURB	KSMAN	KYLEX	MDSAL	NEMEA	NYITH	VABLA
1	ERNIE	6.2		1.4	14.2	15.6	10.0	1.2	1.0	0.1
2	TRUMAN	3.9	l	0.5	12.7	8.4	2.5	1.5	1.1	0.3
3	FREEDOM	5.8		1.8	15.9	14.2	5.3	2.0	1.5	0.1
4	PIONEER 2545	11.6		2.7	15.1	34.7	19.7	2.5	5.2	1.5
5	NY88046-8138	7.8		4.0	19.9	15.3	10.1	3.9	1.2	0.2
6	NY93285SP-7343	4.4	l	2.1	13.5	8.2	2.4	2.7	1.4	0.4
7	NY93285-7110	4.2	l	1.8	11.1	8.5	4.6	2.4	1.3	0.1
8	NY91028SP-9082	11.6		4.3	17.1	36.4	15.5	2.4	4.3	1.0
9	NY93306-7091	10.1		5.6	14.1	37.6	7.7	1.3	4.2	0.3
10	KS04HW47-3	16.6	h	15.6	24.4	45.0	15.2	3.6	11.2	1.5
11	KS04HW101-3	8.8		5.2	17.6	16.7	13.7	.	3.9	0.2
12	P.011035A1-71	4.2	l	1.3	9.3	10.7	6.7	0.6	0.6	0.2
13	P.011036A1-14	4.9	l	0.9	14.3	14.2	4.0	0.5	0.3	0.1
14	P.02444A1-23-6	3.9	l	0.9	8.5	13.3	3.8	0.3	0.5	0.3
15	P.03647A1-1	3.4	l	0.7	7.9	10.1	4.0	0.6	0.3	0.0
16	P.04287A1-10	6.6		2.2	13.9	21.7	5.2	0.9	2.3	0.3
17	NE01643	6.7		3.0	17.9	18.2	4.9	1.8	1.2	0.1
18	HARRY	11.2		7.6	29.4	29.0	6.1	4.1	2.1	0.5
19	NI04421	10.3		4.3	22.5	29.3	8.6	3.8	3.5	0.5
20	NE04653	8.8		4.7	20.9	23.9	4.8	4.1	3.0	0.1
21	NE03490	7.2		3.9	17.9	20.1	5.5	1.6	1.3	0.2
22	MD01W233-06-11	3.7	l	1.4	7.3	13.0	3.0	0.8	0.5	0.3
23	M03-3002	6.1		2.1	10.8	14.7	13.9	0.3	0.7	.
24	M03-3104	8.4		2.4	17.4	20.5	16.3	0.8	1.2	0.1
25	M03-3616	4.9	l	1.5	10.7	13.1	6.6	0.9	1.3	0.1
26	M03*3877	8.5		6.9	22.4	20.0	5.7	1.7	2.6	0.1
27	M03*3861	8.7		4.8	23.2	20.6	7.6	2.0	2.4	0.5
28	RCUOG19/21	7.8		4.4	18.7	6.7	17.1	4.4	2.8	0.2
29	RCUOGF110202D/4	1.7	l	1.1	6.9	2.2	0.7	0.5	0.1	0.2
30	RCUOGF111202A/3	5.9		3.9	13.0	14.1	6.7	2.0	1.3	0.3
31	RCUOGDHACF1109O2D	3.9	l	1.4	14.6	3.0	1.7	6.0	0.1	0.3
32	RCUOGNS984-1	8.2		.	18.8	13.8	13.6	2.4	3.4	0.5
33	IL00-8530	3.0	l	1.1	14.8	3.5	3.4	0.7	0.6	.
34	IL01-11445	3.5	l	1.7	11.7	7.4	2.4	0.9	0.3	0.0
35	IL01-11934	3.1	l	1.1	12.0	3.8	3.5	0.3	0.6	0.2
36	IL02-19463	4.0	l	1.9	9.3	10.4	5.7	0.3	0.3	0.0
37	IL02-23168	4.0	l	1.4	11.8	7.5	5.0	1.1	1.0	0.0
38	KY97C-0540-01-03	7.1		5.1	14.6	19.2	8.1	1.2	1.5	0.0
39	KY97C-0554-03-06	4.4	l	2.3	10.0	11.3	4.9	1.0	0.8	0.2
40	KY97C-0554-04-05	4.1	l	1.1	12.1	9.9	5.0	0.5	0.3	0.1
41	KY97C-0508-01-01A-1	6.4		3.4	16.0	17.5	4.2	1.0	2.7	0.2
42	KY97C-0554-03-02	3.5	l	1.6	9.1	7.6	4.4	1.0	0.5	0.3
43	MO 040165	3.1	l	1.1	10.3	4.8	4.4	0.5	0.2	0.4
44	MO 050101	3.9	l	2.2	11.2	8.5	4.1	0.3	0.7	0.2
45	MO 050143	3.9	l	0.9	10.9	8.3	4.9	0.8	1.2	0.3
46	MO 050197	3.7	l	1.2	10.9	6.4	1.9	4.6	0.7	0.4
47	MSU Line E3023	7.3		4.0	16.4	13.1	11.3	2.2	2.5	1.8
48	MSU Line E5015	10.7		6.0	16.9	33.3	13.6	1.0	3.9	0.4
49	MSU Line E6001	4.6	l	.	12.5	10.1	6.0	0.9	1.4	0.1
50	MSU Line E6002	4.6	l	.	14.0	12.0	2.1	1.8	1.0	0.1
51	MSU Line E6003	4.8	l	.	16.1	.	0.5	0.8	0.9	0.0
52	VA06W-600	4.1	l	1.6	9.3	11.2	4.9	1.1	0.6	0.0
53	VA06W-602	4.1	l	1.2	11.8	9.2	5.2	0.8	0.3	0.5
54	VA06W-587	4.0	l	1.8	8.4	12.7	3.3	0.5	0.9	0.2
55	VA06W-594	4.8	l	1.5	9.1	17.0	4.8	1.4	0.6	.
56	VA06W-585	3.5	l	.	8.6	10.7	4.2	0.7	0.3	0.0
57	OH02-15978	5.7		1.2	10.9	15.9	8.8	1.4	1.6	0.2
58	OH02-12678	4.2	l	0.9	5.8	15.7	6.1	0.5	0.6	0.2
59	OH02-12686	2.1	l	0.8	6.5	6.4	3.0	1.4	0.2	.
60	OH02-13567	5.2	l	1.6	14.3	14.2	3.8	1.9	1.4	.
	AVERAGE	5.9		2.7	13.8	14.9	6.5	1.6	1.6	
	LSD	3.9		2.0	5.0	5.0	6.4			
	R2	0.8		0.9	0.72	0.9	0.8			

Table 17. Greenhouse Severity (GH, %) data from 2007 NUWWSN. . "l", "h" indicate means that are not significantly different from the lowest (l) or highest (h) mean.

ENTRY	NAME	AVG		ILURB	MOCOL
1	ERNIE	18.0	l	19.2	16.8
2	TRUMAN	3.4	l	2.7	4.1
3	FREEDOM	20.7	l	15.7	25.7
4	PIONEER 2545	50.5	h	53.2	47.8
5	NY88046-8138	46.6	h	70.5	22.7
6	NY93285SP-7343	22.3	l	33.5	11.0
7	NY93285-7110	32.8		35.8	29.7
8	NY91028SP-9082	42.6	h	63.5	21.6
9	NY93306-7091	42.6	h	42.3	42.9
10	KS04HW47-3	70.6	h	100.0	41.2
11	KS04HW101-3	40.5		53.5	27.5
12	P.011035A1-71	22.1	l	22.2	22.0
13	P.011036A1-14	10.6	l	11.7	9.6
14	P.02444A1-23-6	19.8	l	34.5	5.1
15	P.03647A1-1	10.2	l	12.0	8.4
16	P.04287A1-10	21.8	l	26.9	16.7
17	NE01643	21.4	l	8.0	34.8
18	HARRY	14.1	l	7.2	21.0
19	NI04421	19.5	l	16.9	22.1
20	NE04653	19.7	l	11.9	27.5
21	NE03490	25.9	l	8.8	42.9
22	MD01W233-06-11	25.2	l	18.9	31.4
23	M03-3002	35.6		49.9	21.3
24	M03-3104	59.1	h	71.5	46.6
25	M03-3616	21.7	l	16.8	26.6
26	M03*3877	26.7	l	29.3	24.0
27	M03*3861	20.3	l	24.1	16.5
28	RCUOG19/21	31.2	l	42.0	20.4
29	RCUOGF110202D/4	10.7	l	.	5.4
30	RCUOGF111202A/3	25.5	l	29.9	21.0
31	RCUOGDHACF1109O2D	25.4	l	.	20.1
32	RCUOGNS984-1	46.9	h	79.0	14.7
33	IL00-8530	14.7	l	19.0	10.3
34	IL01-11445	11.1	l	16.2	5.9
35	IL01-11934	11.6	l	8.8	14.4
36	IL02-19463	25.3	l	30.6	20.0
37	IL02-23168	31.8	l	52.7	10.9
38	KY97C-0540-01-03	39.6		44.3	34.9
39	KY97C-0554-03-06	12.1	l	19.0	5.2
40	KY97C-0554-04-05	9.8	l	15.1	4.4
41	KY97C-0508-01-01A-1	28.5	l	14.7	42.3
42	KY97C-0554-03-02	8.8	l	11.6	5.9
43	MO 040165	4.6	l	6.6	2.5
44	MO 050101	4.5	l	5.0	3.9
45	MO 050143	6.2	l	7.6	4.8
46	MO 050197	39.1		51.0	27.1
47	MSU Line E3023	50.7	h	57.0	44.3
48	MSU Line E5015	17.1	l	19.0	15.1
49	MSU Line E6001	4.9	l	6.4	3.3
50	MSU Line E6002	25.5	l	26.3	24.7
51	MSU Line E6003	8.4	l	7.6	9.1
52	VA06W-600	39.5		41.2	37.8
53	VA06W-602	26.8	l	27.0	26.5
54	VA06W-587	34.4		56.7	12.2
55	VA06W-594	18.8	l	26.9	10.6
56	VA06W-585	19.1	l	34.2	3.9
57	OH02-15978	50.2	h	75.4	25.0
58	OH02-12678	13.3	l	16.3	10.2
59	OH02-12686	24.0	l	44.4	3.5
60	OH02-13567	12.3	l	12.9	11.6
	AVERAGE	24.9		30.4	19.7
	LSD	28.8		32.9	
	R2	0.7		0.5	

Table 18. Heading Date (Julian days) data from 2007 NUWWSN. "l", "h" indicate means that are not significantly different from the lowest (l) or highest (h) mean.

ENTRY	NAME	AVG		ILURB	INWLA	KSMAN	KYLEX	MDSAL	MIELA	MOCOL	OHWOO	VABLA
1	ERNIE	138	l	134	162	136	130	128	153	132	140	131
2	TRUMAN	145		141	172	140	135	136	160	138	144	137
3	FREEDOM	141		134	166	135	133	132	159	136	141	134
4	PIONEER 2545	139	l	132	165	131	131	133	155	130	141	133
5	NY88046-8138	147		143	172	139	141	136	162	142	147	139
6	NY93285SP-7343	147		141	172	140	141	138	161	140	147	140
7	NY93285-7110	147		142	172	140	143	138	161	138	148	141
8	NY91028SP-9082	149	h	144	174	141	144	141	169	143	149	140
9	NY93306-7091	144		146	168	136	135	135	162	136	145	137
10	KS04HW47-3	141		135	165	140	131	127	157	136	141	133
11	KS04HW101-3	138	l	130	162	130	130	128	154	130	141	133
12	P.011035A1-71	138	l	133	165	134	131	130	154	131	136	132
13	P.011036A1-14	138	l	131	165	135	131	127	152	136	135	132
14	P.02444A1-23-6	138	l	133	165	137	130	128	153	132	136	132
15	P.03647A1-1	138	l	131	165	133	130	129	155	130	137	132
16	P.04287A1-10	139	l	136	165	132	129	129	155	136	138	132
17	NE01643	143		137	168	139	135	133	160	137	144	134
18	HARRY	144		138	169	139	135	134	162	137	144	136
19	NI04421	142		135	166	138	134	133	157	136	143	135
20	NE04653	143		137	169	138	134	134	160	137	144	137
21	NE03490	143		135	166	140	135	134	158	137	143	136
22	MD01W233-06-11	140	l	136	166	134	130	132	155	133	140	133
23	M03-3002	140	l	134	165	133	131	132	155	131	143	133
24	M03-3104	139	l	131	166	134	131	132	154	130	140	133
25	M03-3616	139	l	132	165	137	130	133	154	130	140	134
26	M03*3877	141		139	165	134	132	132	155	136	141	133
27	M03*3861	141		135	172	134	133	132	155	133	142	133
28	RCUOG19/21	146		140	179	139	136	137	162	140	147	138
29	RCUOGF110202D/4	151	h	149	166	141	146	145	172	144	151	143
30	RCUOGF111202A/3	145		140	179	139	134	132	158	138	145	139
31	RCUOGDHACF1109O2D	150	h	142	166	140	146	145	172	146	147	143
32	RCUOGNS984-1	142		145	162	138	134	132	155	136	143	135
33	IL00-8530	138	l	132	166	139	131	128	153	130	136	131
34	IL01-11445	140	l	133	165	140	132	130	154	131	138	133
35	IL01-11934	140	l	132	162	140	131	131	154	133	140	133
36	IL02-19463	136	l	129	166	133	127	126	151	130	135	130
37	IL02-23168	140		134	166	139	136	127	154	136	139	132
38	KY97C-0540-01-03	140	l	136	165	133	132	132	156	133	140	134
39	KY97C-0554-03-06	140	l	135	165	135	132	132	155	132	140	133
40	KY97C-0554-04-05	139	l	133	166	136	130	130	154	130	138	133
41	KY97C-0508-01-01A-1	139	l	132	165	138	132	128	155	133	138	133
42	KY97C-0554-03-02	140	l	134	167	136	130	130	154	133	139	133
43	MO 040165	140		136	166	135	131	132	156	133	140	133
44	MO 050101	141		138	166	136	131	130	157	136	141	133
45	MO 050143	140	l	136	166	134	132	131	157	133	139	133
46	MO 050197	143		136	168	138	134	136	160	137	143	135
47	MSU Line E3023	149	h	143	174	140	141	144	165	142	148	141
48	MSU Line E5015	139	l	133	165	131	131	132	156	131	139	133
49	MSU Line E6001	141		.	168	134	131	127	156	139	142	134
50	MSU Line E6002	140	l	.	166	136	132	132	155	131	141	133
51	MSU Line E6003	147		146	174	139	137	137	162	140	146	139
52	VA06W-600	138	l	131	165	132	129	130	153	130	138	131
53	VA06W-602	138	l	135	165	137	131	127	153	130	137	132
54	VA06W-587	137	l	132	162	136	129	128	151	130	137	131
55	VA06W-594	138	l	134	165	132	129	126	154	130	140	131
56	VA06W-585	139	l	.	166	136	130	131	153	130	140	131
57	OH02-15978	139	l	132	162	135	131	130	152	133	141	133
58	OH02-12678	140		133	166	134	132	133	155	131	144	134
59	OH02-12686	144		140	169	139	135	137	159	138	144	138
60	OH02-13567	142		134	166	136	134	135	158	136	142	134
	AVERAGE	141		136	167	136	133	132	157	135	141	134
	LSD	10.8										
	R2	1.0										

Table 19. Height (inches) data from 2007 NUWWSN. "l", "h" indicate means that are not significantly different from the lowest (l) or highest (h) mean.

ENTRY	NAME	AVG		KYLEX	MDSAL	MOCOL	ONRID
1	ERNIE	30.7		30.0	31.0	30.0	31.7
2	TRUMAN	36.4		38.5	33.0	40.0	34.3
3	FREEDOM	33.6		35.5	33.0	32.0	34.1
4	PIONEER 2545	32.9		33.0	32.0	35.0	31.7
5	NY88046-8138	35.8		39.0	35.0	34.0	35.2
6	NY93285SP-7343	38.3		41.5	36.0	39.0	36.8
7	NY93285-7110	38.4		41.0	37.0	39.0	36.4
8	NY91028SP-9082	36.1		38.5	35.0	36.0	34.8
9	NY93306-7091	29.1	l	30.0	30.0	27.0	29.5
10	KS04HW47-3	31.4		34.5	32.0	27.0	32.1
11	KS04HW101-3	31.5		34.0	30.0	32.0	29.9
12	P.011035A1-71	32.0		34.5	32.0	31.0	30.3
13	P.011036A1-14	29.5	l	31.0	29.0	28.0	30.1
14	P.02444A1-23-6	29.6	l	33.5	30.0	26.0	28.7
15	P.03647A1-1	30.9		32.0	31.0	29.0	31.7
16	P.04287A1-10	31.9		33.0	33.0	28.0	33.7
17	NE01643	35.9		41.0	34.0	34.0	34.5
18	HARRY	33.4		37.0	33.0	31.0	32.7
19	NI04421	33.5		37.0	33.0	32.0	32.1
20	NE04653	36.6		41.0	34.0	36.0	35.2
21	NE03490	31.9		36.0	30.0	32.0	29.7
22	MD01W233-06-11	29.1	l	32.5	29.0	26.0	28.7
23	M03-3002	33.2		35.0	32.0	33.0	32.7
24	M03-3104	31.0		33.0	30.0	30.0	31.1
25	M03-3616	32.9		36.0	33.0	31.0	31.7
26	M03*3877	30.7		32.5	31.0	30.0	29.1
27	M03*3861	30.5		32.0	31.0	30.0	29.1
28	RCUOG19/21	40.4	h	44.5	37.0	41.0	39.0
29	RCUOGF110202D/4	35.3		38.0	38.0	33.0	32.1
30	RCUOGF111202A/3	33.8		38.0	35.0	29.0	33.1
31	RCUOGDHACF1109O2D	35.4		36.0	35.0	34.0	36.4
32	RCUOGNS984-1	28.8	l	31.0	30.0	24.0	30.1
33	IL00-8530	32.7		36.5	33.0	29.0	32.5
34	IL01-11445	31.9		34.5	32.0	30.0	30.9
35	IL01-11934	31.3		33.0	32.0	29.0	31.1
36	IL02-19463	29.9		31.0	30.0	27.0	31.5
37	IL02-23168	30.7		34.0	30.0	28.0	30.9
38	KY97C-0540-01-03	31.6		34.0	33.0	30.0	29.5
39	KY97C-0554-03-06	30.4		32.0	31.0	28.0	30.7
40	KY97C-0554-04-05	31.6		34.0	31.0	30.0	31.3
41	KY97C-0508-01-01A-1	29.3	l	31.5	30.0	26.0	29.5
42	KY97C-0554-03-02	29.7		30.0	33.0	27.0	28.7
43	MO 040165	32.9		33.5	31.0	34.0	33.1
44	MO 050101	32.1		33.5	32.0	32.0	30.7
45	MO 050143	32.5		34.0	33.0	32.0	30.9
46	MO 050197	36.4		41.5	36.0	36.0	32.1
47	MSU Line E3023	34.3		38.0	34.0	34.0	31.1
48	MSU Line E5015	30.4		32.0	29.0	29.0	31.5
49	MSU Line E6001	29.4	l	31.5	32.0	25.0	29.1
50	MSU Line E6002	32.5		34.0	35.0	30.0	31.1
51	MSU Line E6003	33.4		36.0	33.0	33.0	31.7
52	VA06W-600	29.5	l	32.0	29.0	30.0	27.2
53	VA06W-602	32.1		35.0	30.0	33.0	30.3
54	VA06W-587	31.2		33.0	31.0	30.0	30.7
55	VA06W-594	30.0		32.5	30.0	26.0	31.5
56	VA06W-585	31.9		33.5	33.0	29.0	32.3
57	OH02-15978	34.3		38.5	32.0	33.0	33.7
58	OH02-12678	33.7		38.5	32.0	32.0	32.3
59	OH02-12686	33.4		36.0	33.0	34.0	30.5
60	OH02-13567	36.0		41.0	32.0	38.0	33.1
	AVERAGE	32.6		35.1	32.3	31.2	31.8
	LSD	10.8					
	R2	0.81					

Table 20. Other trait data from 2007 NUWWSN.

	IL Winter Surv.	MO Freeze	KS BYDV	MO BYDV	VA BYDV	KS Yield	MO Yield	MD 100 Wgt	MO Test Wgt	OH Leaf Rust	VA Stag GB	VA Pow. Mil.	ROMA Index
	%	0-9	%	%	0-9	gm/plot	bu/a	gms	lbs/bu	0-9	0-9	%	AUDPC
ERNIE	28.3	6.3	27.5	17	2	55.5	31.6	3.1	45.4	6.0	7	23	221.4
TRUMAN	41.7	4.2	16.3	7	1	181.5	82.1	3.1	50.4	4.3	6	17	147.0
FREEDOM	100.0	6.3	36.3	28	4	98.5	51.1	3.2	44.6	4.0	7	0	151.7
PIONEER 2545	100.0	4.7	28.8	21	3	100.5	43.4	2.8	43.0	6.3	7	5	158.8
NY88046-8138	56.7	3.8	26.3	16	3	57.0	31.0	3.2	42.3	4.0	1	14	183.3
NY93285SP-7343	65.0	4.7	38.8	19	4	80.3	49.1	3.3	44.6	3.5	1	0	301.5
NY93285-7110	68.3	5.0	33.8	20	5	85.0	58.2	3.3	47.5	3.3	4	0	322.0
NY91028SP-9082	73.3	4.3	20.0	4	3	70.5	28.3	3.1	43.0	2.0	3	1	268.6
NY93306-7091	2.0	5.2	15.0	11	2	159.0	49.4	2.9	48.1	2.3	7	10	212.4
KS04HW47-3	36.7	8.0	51.3	33	4	33.0	31.0	3.6	46.7	2.3	2	35	417.4
KS04HW101-3	100.0	4.0	31.3	17	4	137.0	51.6	2.5	48.6	2.7	0	35	247.9
P.011035A1-71	46.7	5.7	17.5	19	3	76.8	26.6	2.6	42.1	4.0	8	5	299.7
P.011036A1-14	83.3	5.7	26.3	27	3	82.0	33.2	2.9	45.6	3.0	8	10	218.5
P.02444A1-23-6	33.3	6.3	16.3	12	3	79.8	11.5	3.8	.	3.0	7	8	156.6
P.03647A1-1	100.0	7.0	20.0	15	2	141.5	52.4	3.4	47.7	3.3	7	0	141.6
P.04287A1-10	31.7	6.3	13.8	2	0	105.8	62.0	3.2	47.9	2.3	9	1	226.6
NE01643	98.3	4.7	7.5	3	1	145.8	85.7	3.0	49.5	2.3	6	31	190.3
HARRY	100.0	5.3	56.3	23	5	45.8	52.7	3.3	45.0	4.0	7	29	284.9
NI04421	100.0	4.5	48.8	35	5	44.8	40.6	3.2	47.2	3.7	9	43	222.2
NE04653	100.0	4.3	41.3	17	5	80.8	63.4	3.6	49.2	3.0	8	24	232.7
NE03490	100.0	4.3	37.5	23	5	42.3	32.9	3.1	47.2	3.7	9	26	282.0
MD01W233-06-11	18.3	6.2	21.3	16	3	133.3	35.7	3.0	50.8	3.3	5	0	383.2
M03-3002	83.3	6.2	38.8	21	3	114.5	45.0	2.8	46.2	4.3	7	3	269.7
M03-3104	91.7	6.0	25.0	9	2	106.8	45.6	3.3	39.3	5.0	5	3	272.2
M03-3616	100.0	4.2	20.0	26	3	125.0	43.7	3.1	44.8	5.3	7	0	322.5
M03*3877	20.0	7.0	13.8	5	2	112.5	49.4	3.6	47.6	4.7	8	2	264.4
M03*3861	70.0	6.3	20.0	8	2	126.3	59.0	3.6	47.7	2.7	5	0	333.3
RCUOG19/21	100.0	4.0	26.3	16	4	80.3	34.0	2.9	48.0	3.0	4	6	283.6
RCUOGF110202D/4	95.0	4.3	70.0	42	4	41.5	16.5	2.8	48.1	3.3	7	0	197.5
RCUOGF111202A/3	10.3	8.0	32.5	20	4	49.3	17.3	3.4	47.8	3.3	8	23	180.8
RCUOGDHACF1109O2D	83.3	4.2	76.3	38	2	45.8	15.9	2.4	48.6	2.0	0	0	194.8
RCUOGNS984-1	0.7	7.3	31.3	25	6	25.8	11.0	2.9	.	2.7	6	3	342.0
IL00-8530	75.0	7.7	8.8	7	2	96.3	38.4	3.2	49.8	3.0	2	29	172.0
IL01-11445	96.7	7.3	28.8	17	2	49.8	41.7	3.3	51.1	3.3	4	0	318.1
IL01-11934	100.0	7.3	22.5	27	2	65.8	15.4	3.2	51.5	4.7	8	0	204.6
IL02-19463	98.3	6.0	10.0	16	2	127.3	10.2	3.1	.	3.3	7	9	350.3
IL02-23168	55.0	8.0	30.0	16	1	80.3	45.0	3.0	51.8	2.7	9	0	443.6
KY97C-0540-01-03	23.7	6.0	20.0	7	2	129.0	53.8	3.5	47.9	1.7	8	0	339.9
KY97C-0554-03-06	20.0	7.3	26.3	18	1	109.8	41.7	3.2	45.8	2.7	5	0	258.8
KY97C-0554-04-05	76.7	6.3	41.3	20	2	68.8	26.4	3.1	45.6	4.7	6	0	244.4
KY97C-0508-01-01A-1	50.0	7.3	27.5	28	3	79.3	27.5	3.3	45.4	3.3	9	0	318.1
KY97C-0554-03-02	33.3	7.3	21.3	18	2	107.0	24.2	3.1	47.1	2.7	6	5	298.9
MO 040165	15.0	6.2	16.3	7	1	128.0	60.7	3.0	49.7	5.7	7	27	220.5
MO 050101	8.3	6.5	11.3	7	1	159.8	64.0	3.2	49.5	5.7	8	28	146.8
MO 050143	13.3	6.0	22.5	11	2	164.3	50.2	3.1	47.6	5.3	7	29	168.1
MO 050197	100.0	6.2	15.0	10	2	174.3	72.8	3.2	52.9	2.7	6	36	299.2
MSU Line E3023	93.3	3.3	22.5	7	2	60.8	30.7	3.0	43.0	3.3	3	8	351.7
MSU Line E5015	60.0	6.3	28.8	19	2	114.3	36.0	2.8	46.0	5.7	8	0	323.7
MSU Line E6001	0.3	7.0	36.3	19	4	82.5	30.7	3.4	45.7	6.7	9	0	214.6
MSU Line E6002	0.0	6.0	23.8	23	3	80.8	35.7	3.4	46.8	4.0	4	0	460.6
MSU Line E6003	0.7	5.0	33.8	24	6	93.5	47.5	3.2	51.6	5.3	6	44	114.8
VA06W-600	100.0	5.8	27.5	24	2	174.8	36.5	2.9	41.5	5.7	8	13	320.4
VA06W-602	16.7	6.0	13.8	12	2	101.0	49.1	2.8	47.7	5.7	7	41	437.0
VA06W-587	55.0	6.2	16.3	26	2	72.8	27.7	3.4	45.3	5.3	7	5	217.5
VA06W-594	10.3	6.2	21.3	16	3	132.5	43.7	2.5	47.1	4.3	6	0	266.4
VA06W-585	0.0	6.7	21.3	13	2	95.3	40.1	3.5	47.1	4.0	6	0	253.4
OH02-15978	100.0	5.2	35.0	19	4	102.8	50.2	3.3	44.6	7.0	7	14	243.3
OH02-12678	100.0	4.3	26.3	9	1	130.5	82.4	3.0	48.7	3.7	4	0	205.9
OH02-12686	98.3	2.3	40.0	13	2	171.3	64.2	2.9	47.5	3.3	5	0	185.2
OH02-13567	100.0	4.7	35.0	17	2	127.0	52.7	2.9	48.6	5.0	6	32	196.3
AVERAGE	60.6	5.7	27.8	17.4	2.8	99.0	42.3	3.1	47.0	3.9	7.0	11.3	258.4

Table 21. Summary of Stripe Rust data for the 2007 NUWWSN from Arkansas (Gene Milus). Means over three replication are presented.

	Stripe Rust %	Infection Type	Growth Stage
ERNIE	75	.	10
TRUMAN	0	.	9
FREEDOM	75	.	10
PIONEER 2545	63	5	10
NY88046-8138	57	8	9
NY93285SP-7343	10	5	9
NY93285-7110	17	5	9
NY91028SP-9082	5	.	9
NY93306-7091	1	.	9.7
KS04HW47-3	0	.	10
KS04HW101-3	0	.	10
P.011035A1-71	15	8	10
P.011036A1-14	12	8	10
P.02444A1-23-6	2	.	10
P.03647A1-1	22	5	10
P.04287A1-10	10	.	10
NE01643	0	.	9
HARRY	1	.	9
NI04421	0	.	9.7
NE04653	0	.	9
NE03490	0	.	9.7
MD01W233-06-11	43	5	10
M03-3002	32	7	10
M03-3104	1	.	10
M03-3616	70	.	10
M03*3877	2	.	10
M03*3861	12	7	9.7
RCUOG19/21	37	5	9
RCUOGF110202D/4	1	.	9
RCUOGF111202A/3	75	.	10
RCUOGDHACF1109O2D	1	.	9
RCUOGNS984-1	10	.	10
IL00-8530	1	.	10
IL01-11445	70	.	10
IL01-11934	70	.	10
IL02-19463	6	.	10
IL02-23168	1	.	10
KY97C-0540-01-03	80	.	9.7
KY97C-0554-03-06	3	.	10
KY97C-0554-04-05	12	8	10
KY97C-0508-01-01A-1	10	8	10
KY97C-0554-03-02	3	.	10
MO 040165	37	5	10
MO 050101	37	5	10
MO 050143	37	5	10
MO 050197	57	.	9
MSU Line E3023	2	.	9
MSU Line E5015	0	.	10
MSU Line E6001	80	.	10.1
MSU Line E6002	1	.	10
MSU Line E6003	15	.	9
VA06W-600	88	.	10
VA06W-602	93	5	10
VA06W-587	83	.	10
VA06W-594	90	.	10.3
VA06W-585	17	5	10.1
OH02-15978	57	8	9.7
OH02-12678	43	7	9.7
OH02-12686	20	5	9
OH02-13567	78	.	9
Pat	1		
Mason	3		
C9663	74		
CG514W	94		

Table 22. Incidence (INC, %) data from 2007 PNUWWSN

ENTRY	NAME	AVG		ILURB	KYLEX	MIELA	MOCOL	ONRID	VABLA
1	ERNIE	44.5	l	65.0	13.6	70	90	8.8	20.0
2	TRUMAN	38.4	l	46.7	32.1	23	100	8.8	20.0
3	FREEDOM	47.5	l	63.3	21.2	46	100	37.5	16.7
4	PIONEER 2545	69.0	h	66.7	72.8	65	100	72.5	36.7
5	P.981129A1--17	47.0	l	48.3	15.2	80	100	11.3	26.7
6	P.99751RA1--94	47.9	l	50.0	45.0	69	100	10.0	13.3
7	P.0128A1-44-1-7	56.9		65.0	57.2	78	100	21.3	20.0
8	P.03528A1-10	43.2	l	65.0	40.0	38	100	10.0	6.7
9	P.03630A1-18	50.8	l	46.7	57.5	56	100	17.5	26.7
10	SE981089-34	64.4	h	60.0	38.4	66	100	75.0	46.7
11	SE91 1492-4	55.0	l	68.3	23.9	64	100	50.0	23.3
12	SE94-1012-25	60.0		65.0	38.5	55	100	55.0	46.7
13	M04-4843	42.5	l	43.3	4.1	70	100	13.8	23.3
14	M04-4788	42.1	l	41.7	6.9	51	100	20.0	33.3
15	M04*5109	53.7	l	82.5	36.7	68	100	15.0	20.0
16	M04-4258	56.8		63.3	23.4	58	100	40.0	56.7
17	M04-4393	59.7		83.3	46.1	62	100	40.0	26.7
18	RCUOGGoldenValue	80.4	h		48.0	89	100	92.5	63.3
19	RCUOGL15	52.1	l	78.3	50.0	20	100	21.3	43.3
20	RCUOGL4	53.8	l	73.3	21.3	52	100	30.0	46.7
21	RCUOGL17	51.8	l	53.3	17.9	58	100	45.0	36.7
22	RCUOG10/18	48.0	l	48.3	9.5	18	100	79.1	33.3
23	IL03-18438	54.7	l	70.0	30.5	70	100	21.3	36.7
24	IL03-15452	40.0	l	35.0	13.7	61	100	3.8	26.7
25	IL03-453	57.5		90.0	26.5	58	90	17.5	63.3
26	IL01-34159	40.1	l	30.0	37.5	50	100	6.3	16.7
27	IL79-002T-B-B	40.3	l	15.0	21.2	67	100	11.5	26.7
28	KY99C-1298-08-1	50.4	l	48.3	25.5	72	100	30.0	26.7
29	KY99C-1051-03-1	67.8	h	71.7	63.5		100	52.5	46.7
30	KY99C-1176-02-1	63.3	h	65.0	53.4	65	100	40.0	56.7
31	MO 050600	39.1	l	47.5	27.5	23	100	13.8	23.3
32	MO 050699	50.8	l	60.0	37.5	37	100	40.0	30.0
33	MO 050917	55.7	l	81.7	62.5	44	100	12.5	33.3
34	MO 050921	42.7	l	16.7	59.5	35	90	11.3	43.3
35	VA06W-598	51.4	l	66.7	18.9	60	100	42.5	20.0
36	VA06W-557	62.4		68.3	11.2	82	100	50.0	63.3
37	VA06W-595	49.9	l	90.0	14.3	63	80	8.8	43.3
38	VA06W-608	62.6		80.0	46.3	65	100	57.5	26.7
39	VA06W-627	62.7		71.7	74.0	69	100	35.0	26.7
40	OH03-183-32	46.1	l	58.3	35.0	64	80	12.5	26.7
41	OH03-235-2	61.4		78.3	50.0	59	100	61.0	20.0
42	OH03-41-45	56.6		65.0	48.0	56	100	40.0	30.0
43	OH03-97-6	47.7	l	60.0	22.5	65	100	12.5	26.7
44	OH03-75-58	50.0	l	81.7	45.0	39	100	17.5	16.7
	AVERAGE	52.7		61.1	35.1	57.2	98.4	31.2	32.2
	LSD	17.5		28.5	23.4	19		20.9	21.5
	R2	0.6		0.7	0.6				
	CV	42.5							

l,h indicate a mean that is not significantly different than the lowest (l) or highest (h) mean in that column

Table 23. Severity (SEV, %) data from 2007 PNUWWSN

ENTRY	NAME	AVG		ILURB	KYLEX	MIELA	MOCOL	ONRID	VABLA
1	ERNIE	22.8	l	36.5	23.9	43.0	18.5	7.0	7.8
2	TRUMAN	16.9	l	20.9	11.6	28.9	23.9	7.0	8.9
3	FREEDOM	28.3	l	29.4	16.9	40.0	48.5	24.0	10.8
4	PIONEER 2545	38.1		56.0	23.0	43.4	40.1	58.0	7.8
5	P.981129A1--17	23.7	l	14.9	13.8	40.8	49.6	10.5	12.4
6	P.99751RA1--94	23.3	l	24.8	14.2	50.8	35.2	10.5	4.2
7	P.0128A1-44-1-7	27.6	l	25.5	16.5	64.9	38.9	8.8	11.3
8	P.03528A1-10	16.9	l	27.2	16.9	23.9	18.0	12.3	2.9
9	P.03630A1-18	21.0	l	18.1	17.7	33.6	35.4	15.8	5.5
10	SE981089-34	47.8	h	52.6	33.9	39.1	74.3	72.0	14.8
11	SE91 1492-4	31.7		35.1	18.0	40.2	64.0	25.3	7.8
12	SE94-1012-25	49.6	h	52.4	34.6	56.7	73.9	57.8	22
13	M04-4843	32.3		30.6	8.8	44.9	63.8	32.0	13.7
14	M04-4788	38.4		62.5	31.3	33.7	46.4	45.5	11.3
15	M04*5109	25.0	l	34.2	17.2	59.7	20.7	12.3	5.9
16	M04-4258	29.4	l	43.6	11.3	37.8	53.5	17.5	12.5
17	M04-4393	24.7	l	25.9	21.5	39.5	23.0	22.3	16.1
18	RCUOGGoldenValue	53.3	h	.	31.6	79.4	71.0	57.3	18.2
19	RCUOGL15	29.8	l	55.3	13.4	28.2	38.7	34.3	8.8
20	RCUOGL4	37.8		49.2	31.5	39.8	35.9	61.0	9.4
21	RCUOGL17	31.6		49.4	15.8	54.8	35.5	25.3	8.6
22	RCUOG10/18	31.0		36.7	13.8	13.3	26.5	86.1	9.8
23	IL03-18438	23.1	l	18.8	23.0	41.8	22.0	24.3	8.8
24	IL03-15452	22.0	l	25.2	12.2	45.9	28.2	14.3	6.3
25	IL03-453	24.3	l	26.2	13.4	48.4	29.6	18.8	9.7
26	IL01-34159	18.9	l	31.3	8.4	36.9	16.9	7.0	12.8
27	IL79-002T-B-B	19.4	l	25.8	13.0	32.3	16.9	20.5	7.8
28	KY99C-1298-08-1	30.0	l	47.8	15.9	68.9	22.3	18.8	6.4
29	KY99C-1051-03-1	33.3		55.5	26.0	.	20.9	37.3	11.1
30	KY99C-1176-02-1	31.7		49.5	24.3	53.2	25.6	30.0	7.8
31	MO 050600	21.7	l	37.8	11.3	27.4	11.6	27.0	15.4
32	MO 050699	22.6	l	27.2	10.9	37.6	27.6	19.3	13.1
33	MO 050917	24.3	l	56.7	18.7	31.5	22.8	10.5	5.9
34	MO 050921	19.9	l	12.2	17.0	41.2	28.9	12.3	7.7
35	VA06W-598	28.9	l	42.9	30.7	33.7	27.3	30.0	8.8
36	VA06W-557	35.5		39.0	25.8	81.0	23.0	30.0	14.3
37	VA06W-595	25.0	l	29.8	14.3	54.8	16.8	12.3	22.2
38	VA06W-608	30.9		33.0	25.1	49.3	33.1	37.3	7.8
39	VA06W-627	35.1		50.4	30.7	67.4	12.5	24.0	25.5
40	OH03-183-32	19.5	l	39.7	11.7	39.4	10.5	8.8	6.9
41	OH03-235-2	28.7	l	23.7	15.1	56.2	16.2	55.0	5.9
42	OH03-41-45	34.3		53.0	28.3	40.3	21.0	46.5	16.8
43	OH03-97-6	18.8	l	30.7	12.4	32.6	20.9	8.8	7.5
44	OH03-75-58	23.6	l	57.7	13.1	43.0	13.6	10.5	3.9
	AVERAGE	28.5		37.1	19.1	44.2	31.9	27.4	10.5
	LSD	13.9		19.7	7.3	23.1		20.5	9.2
	R2	0.6		0.7	0.8				
	CV	42.5							

l,h indicate a mean that is not significantly different than the lowest (l) or highest (h) mean in that column

Table 24. Index (IND, %) data from 2007 PNUWWSN

ENTRY	NAME	AVG		ILURB	INWLA	KYLEX	MIELA	MOCOL	OHWOO	ONRID	VABLA
1	ERNIE	12.9	l	22.8	13.0	3.3	30.0	16.6	15.0	0.6	1.6
2	TRUMAN	7.3	l	9.2	10.0	3.7	6.3	23.9	2.9	0.6	1.7
3	FREEDOM	15.6	l	17.1	20.0	3.6	18.7	48.5	6.8	8.5	2
4	PIONEER 2545	30.9	h	38.3	76.0	16.7	28.9	40.1	2.2	41.9	2.9
5	P.981129A1--17	13.4	l	7.1	10.0	2.1	32.8	49.6	0.9	1.7	3.1
6	P.99751RA1--94	15.2	l	12.4	21.0	6.4	36.3	35.2	8.3	1.4	0.8
7	P.0128A1-44-1-7	17.1	l	16.8	12.0	9.4	51.0	38.9	1.0	3.9	3.7
8	P.03528A1-10	9.6	l	17.7	20.0	6.8	9.5	18.0	2.9	1.2	0.6
9	P.03630A1-18	11.2	l	7.9	11.0	10.2	19.0	35.4	1.3	2.8	2.4
10	SE981089-34	36.4	h	34.1	57.0	13.0	25.2	74.3	24.1	54.3	8.8
11	SE91 1492-4	21.5		23.0	36.0	4.3	26.6	64.0	1.6	14.1	2.4
12	SE94-1012-25	33.5	h	33.7	70.0	13.3	31.6	73.9	3.2	31.4	11
13	M04-4843	20.4		14.8	43.0	0.4	31.8	63.8	0.6	5.6	2.9
14	M04-4788	16.4	l	24.9	23.0	2.1	17.7	46.4	4.2	9.1	4.1
15	M04*5109	16.0	l	28.6	27.0	6.3	39.9	20.7	2.1	1.9	1.2
16	M04-4258	17.9	l	27.7	18.0	2.6	22.1	53.5	4.1	7.4	7.7
17	M04-4393	14.7	l	21.5	17.0	9.9	24.4	23.0	9.6	8.9	2.9
18	RCUOGGoldenValue	38.9	h	.	39.0	15.1	71.1	71.0	4.2	52.8	12.9
19	RCUOGL15	17.9	l	43.3	29.0	6.7	6.3	38.7	5.1	10.3	4.1
20	RCUOGL4	22.6		36.3	57.0	6.7	21.1	35.9	0.7	18.8	4.5
21	RCUOGL17	17.7	l	28.9	22.0	2.8	31.9	35.5	3.6	12.6	4.5
22	RCUOG10/18	16.8	l	17.6	11.0	1.3	5.4	26.5	0.2	69	3.5
23	IL03-18438	13.3	l	13.8	11.0	7.0	29.5	22.0	1.3	18.1	3.3
24	IL03-15452	11.0	l	8.3	16.0	1.7	29.2	28.2	1.2	1.3	1.8
25	IL03-453	15.8	l	23.6	27.0	3.6	28.3	26.6	7.1	3.2	6.7
26	IL01-34159	8.0	l	9.2	10.0	3.1	20.4	16.9	1.0	1.1	2.4
27	IL79-002T-B-B	11.1	l	3.6	39.0	2.8	21.8	16.9	0.2	2.5	2.2
28	KY99C-1298-08-1	19.9		24.6	40.0	4.1	49.3	22.3	10.2	7.1	1.8
29	KY99C-1051-03-1	25.0		40.2	56.0	16.5		20.9	6.7	19.9	5.1
30	KY99C-1176-02-1	19.7		32.8	32.0	13.0	32.5	25.6	4.9	11.7	4.7
31	MO 050600	10.0	l	17.8	25.0	3.1	8.5	11.6	5.1	4.8	4.1
32	MO 050699	12.6	l	16.0	20.0	4.1	15.5	27.6	5.7	7.9	3.9
33	MO 050917	16.0	l	46.8	21.0	11.7	14.0	22.8	7.8	1.9	2
34	MO 050921	10.4	l	2.2	11.0	10.1	15.0	26.0	13.7	1.5	3.5
35	VA06W-598	22.0		28.7	65.0	5.8	21.0	27.3	13.5	12.8	1.8
36	VA06W-557	27.1		26.8	72.0	2.9	64.9	23.0	2.5	15.6	9
37	VA06W-595	16.7	l	26.8	40.0	2.0	35.8	13.4	4.8	1.1	9.8
38	VA06W-608	17.8	l	26.4	13.0	11.6	33.0	33.1	1.0	22	2.4
39	VA06W-627	27.8	h	36.1	82.0	22.7	45.0	12.5	8.3	8.6	7.1
40	OH03-183-32	12.2	l	23.3	30.0	4.1	25.2	8.4	2.9	1.6	1.8
41	OH03-235-2	19.6		18.3	35.0	7.5	32.4	16.2	7.9	38.1	1.2
42	OH03-41-45	21.6		35.4	52.0	13.6	22.6	21.0	5.1	17.8	5.5
43	OH03-97-6	10.0	l	18.2	10.0	2.8	21.0	20.9	3.2	1.2	2.4
44	OH03-75-58	13.3	l	47.6	15.0	5.9	18.1	13.6	3.3	1.8	1
	AVERAGE	17.8		23.5	31.0	7.0	27.2	31.6	5.0	12.7	3.9
	LSD	11.6		17.1	9.6		18.2		17.5	11.8	4.9
	R2	0.6		0.7	0.8				0.7		
	CV	65.5									

l,h indicate a mean that is not significantly different than the lowest (l) or highest (h) mean in that column

Table 25. Kernel Rating (KR, %), Percent Scabby Seed (PSS, %), and Greenhouse severity (GHSEV, %) data from 2007 PNUWWSN

ENTRY	NAME	KR ILURB		PSS AVG		KYLEX	MOCOL	GHSEV ILURB	
1	ERNIE	33		12.7	l	7.4	18	28.6	l
2	TRUMAN	13	l	9.4	l	12.8	6	12.3	l
3	FREEDOM	37		12.5	l	12.1	13	5.0	l
4	PIONEER 2545	47		28.6	h	12.2	45		
5	P.981129A1--17	23	l	19.2	l	5.4	33	3.8	l
6	P.99751RA1--94	20	l	15.6	l	6.3	25	4.1	l
7	P.0128A1-44-1-7	40		17.1	l	9.1	25	4.9	l
8	P.03528A1-10	30		5.6	l	4.2	7	28.8	l
9	P.03630A1-18	27		10.5	l	11.1	10	3.4	l
10	SE981089-34	80	h	42.8	h	17.6	68	38.8	l
11	SE91 1492-4	32		13.0	l	7.1	19	44.5	
12	SE94-1012-25	63	h	32.0	h	21.0	43	62.1	h
13	M04-4843	15	l	10.8	l	4.7	17	36.1	l
14	M04-4788	37		20.1	l	15.3	25	100.0	h
15	M04*5109	50		4.6	l	4.2	5	21.5	l
16	M04-4258	22	l	9.1	l	12.3	6	4.8	l
17	M04-4393	35		14.0	l	13.0	15	65.4	h
18	RCUOGGoldenValue			40.1	h	30.2	50	85.4	h
19	RCUOGL15	43		23.1		16.2	30	76.2	h
20	RCUOGL4	47		13.9	l	12.8	15	40.3	l
21	RCUOGL17	40		11.2	l	9.4	13	66.7	h
22	RCUOG10/18	11	l	6.8	l	8.6	5	17.4	l
23	IL03-18438	18	l	5.1	l	6.2	4	12.5	l
24	IL03-15452	12	l	7.6	l	5.2	10	58.2	
25	IL03-453	25	l	3.0	l	2.0	4	59.3	
26	IL01-34159	8	l	5.5	l	3.9	7	3.2	l
27	IL79-002T-B-B	11	l	4.0	l	3.9	4	21.1	l
28	KY99C-1298-08-1	35		13.7	l	8.4	19	40.9	l
29	KY99C-1051-03-1	43		14.8	l	17.7	12	52.1	
30	KY99C-1176-02-1	37		28.8	h	9.5	48	62.2	h
31	MO 050600	20	l	9.8	l	6.6	13	18.0	l
32	MO 050699	25	l	10.6	l	8.2	13	6.0	l
33	MO 050917	37		6.9	l	6.9	7	27.5	l
34	MO 050921	15	l	6.4	l	9.9	3	4.0	l
35	VA06W-598	30		11.3	l	4.7	18	60.7	
36	VA06W-557	50		26.3	h	7.6	45	42.4	
37	VA06W-595	25	l	13.7	l		18	37.5	l
38	VA06W-608	35		16.0	l	12.0	20	32.5	l
39	VA06W-627	38		19.6	l	9.2	30	66.0	h
40	OH03-183-32	15	l	7.7	l	10.5	5	32.9	l
41	OH03-235-2	38		27.3	h	34.5	20	61.5	h
42	OH03-41-45	30		14.5	l	11.0	18	52.7	
43	OH03-97-6	33		18.6	l	9.2	28	37.8	l
44	OH03-75-58	60		12.5	l	17.0	8	40.8	l
	AVERAGE	31.7		14.9		10.6	19.3	36.7	
	LSD	17.8		19.6				38.6	
	R2	0.8		0.7				0.4	
	CV	33.4		65.3				90.1	

l,h indicate a mean that is not significantly different than the lowest (l) or highest (h) mean in that column

Table 26. ISK (%) data from 2007 PNUWWSN

ENTRY	NAME	AVG		ILURB	KYLEX	MOCOL
1	ERNIE	23.6	l	43.8	14.2	12.8
2	TRUMAN	17.8	l	25.6	18.2	9.7
3	FREEDOM	26.2		42.5	16.3	19.8
4	PIONEER 2545	39.8	h	55.5	33.6	30.3
5	P.981129A1--17	22.4	l	28.3	10.8	28.2
6	P.99751RA1--94	23.8	l	30.4	20.3	20.8
7	P.0128A1-44-1-7	30.3		43.2	25.7	22.0
8	P.03528A1-10	22.2	l	39.7	18.7	8.3
9	P.03630A1-18	24.0	l	30.1	27.0	14.9
10	SE981089-34	48.0	h	65.8	28.7	49.6
11	SE91 1492-4	28.7		43.7	15.4	26.9
12	SE94-1012-25	43.5	h	60.6	30.3	39.5
13	M04-4843	20.0	l	28.2	5.8	26.0
14	M04-4788	29.2		45.9	17.6	24.2
15	M04*5109	25.6		50.5	17.8	8.5
16	M04-4258	24.9		40.7	15.3	18.6
17	M04-4393	29.1		48.6	25.4	13.2
18	RCUOGGoldenValue	46.7	h		35.9	41.6
19	RCUOGL15	35.6	h	57.5	25.5	23.9
20	RCUOGL4	31.1		55.4	20.9	17.1
21	RCUOGL17	25.6		46.8	13.9	16.0
22	RCUOG10/18	16.9	l	30.0	10.4	10.2
23	IL03-18438	20.2	l	33.7	18.5	8.5
24	IL03-15452	15.1	l	22.7	9.8	12.8
25	IL03-453	23.5	l	46.9	12.8	10.7
26	IL01-34159	14.9	l	21.5	15.3	8.0
27	IL79-002T-B-B	11.8	l	16.5	11.8	7.0
28	KY99C-1298-08-1	24.3	l	42.8	15.8	14.4
29	KY99C-1051-03-1	33.6		55.5	34.0	11.2
30	KY99C-1176-02-1	34.4		49.0	27.1	27.0
31	MO 050600	18.9	l	33.6	14.3	8.8
32	MO 050699	22.5	l	36.2	17.8	13.6
33	MO 050917	31.0		56.2	27.1	9.8
34	MO 050921	17.2	l	14.7	26.9	10.1
35	VA06W-598	25.7		44.9	16.8	15.5
36	VA06W-557	30.5		52.2	14.1	25.2
37	VA06W-595	22.3	l	45.9	8.6	12.3
38	VA06W-608	30.8		47.9	26.2	18.2
39	VA06W-627	34.4		51.9	35.1	16.1
40	OH03-183-32	19.7	l	35.4	18.2	5.4
41	OH03-235-2	30.8		45.9	33.3	13.2
42	OH03-41-45	29.4		47.4	27.3	13.6
43	OH03-97-6	24.1	l	40.5	14.1	17.6
44	OH03-75-58	32.5		65.8	24.2	7.4
	AVERAGE	26.9		42.3	20.4	17.5
	LSD	12.8		14.6		
	R2	0.8		0.8		
	CV	29.4				

l,h indicate a mean that is not significantly different than the lowest (l) or highest (h) mean in that column

Table 27. Deoxynivenal (DON, ppm) data from 2007 PNUWWSN

ENTRY	NAME	AVG		ILURB	KYLEX	VABLA
1	ERNIE	4.9		2.7	12.0	0.1
2	TRUMAN	2.2	l	1.3	5.3	0.1
3	FREEDOM	6.0	h	2.9	14.8	0.2
4	PIONEER 2545	6.5	h	4.3	14.7	0.5
5	P.981129A1--17	0.4	l	0.9	4.4	
6	P.99751RA1--94	3.9	l	1.0	10.4	0.2
7	P.0128A1-44-1-7	3.0	l	2.2	6.7	0.0
8	P.03528A1-10	3.6	l	2.1	8.5	0.1
9	P.03630A1-18	2.6	l	1.5	6.2	0.1
10	SE981089-34	9.9	h	5.9	22.4	1.3
11	SE91 1492-4	4.9		1.6	12.7	0.3
12	SE94-1012-25	6.7	h	5.4	14.1	0.7
13	M04-4843	2.6	l	1.6	6.3	0.1
14	M04-4788	2.8	l	1.4	6.8	0.2
15	M04*5109	5.8	h	8.3	9.0	0.2
16	M04-4258	4.1	l	1.6	10.5	0.2
17	M04-4393	5.6	h	1.9	14.6	0.2
18	RCUOGGoldenValue	8.3	h		18.1	0.2
19	RCUOGL15	4.6	l	4.5	8.9	0.5
20	RCUOGL4	6.9	h	5.9	14.5	0.3
21	RCUOGL17	4.5	l	3.2	10.0	0.2
22	RCUOG10/18	1.3	l	0.7	3.1	0.1
23	IL03-18438	4.1	l	3.3	8.9	0.1
24	IL03-15452	3.7	l	2.0	9.0	0.1
25	IL03-453	3.7	l	3.7	6.8	0.7
26	IL01-34159	0.3	l	0.4	4.8	
27	IL79-002T-B-B	3.4	l	0.7	9.3	0.1
28	KY99C-1298-08-1	7.8	h	3.8	19.2	0.4
29	KY99C-1051-03-1	9.1	h	5.5	21.4	0.3
30	KY99C-1176-02-1	7.5	h	5.2	17.2	0.2
31	MO 050600	1.8	l	0.8	4.2	0.3
32	MO 050699	4.9		1.4	13.0	0.3
33	MO 050917	4.4	l	3.7	9.0	0.4
34	MO 050921	2.7	l	1.0	6.5	0.7
35	VA06W-598	4.0	l	1.4	10.4	0.3
36	VA06W-557	8.4	h	5.9	19.0	0.2
37	VA06W-595	3.4	l	2.3	8.0	0.1
38	VA06W-608	5.6	h	2.9	13.7	0.2
39	VA06W-627	7.2	h	4.5	16.6	0.4
40	OH03-183-32	2.0	l	0.7	5.2	0.1
41	OH03-235-2	6.3	h	3.2	15.5	0.2
42	OH03-41-45	4.7		1.9	12.0	0.1
43	OH03-97-6	4.0	l	2.1	9.6	0.2
44	OH03-75-58	3.5	l	3.1	7.1	0.2
	AVERAGE	4.6		2.8	10.9	0.3
	LSD	4.3		2.8	6.4	
	R2	0.9		0.8	0.6	
	CV	55.3				

l,h indicate a mean that is not significantly different than the lowest (l) or highest (h) mean in that column

Table 28. Heading Date (Julian days) data from 2007 PNUWWSN

ENTRY	NAME	AVG	ILURB	INWLA	KYLEX	MIELA	MOCOL	OHWOO	VABLA
1	ERNIE	140 l	133	162	128	153	131	141	131
2	TRUMAN	147	142	172	136	160	137	143	140
3	FREEDOM	142	134	166	129	158	136	140	134
4	PIONEER 2545	141	132	165	131	154	131	140	133
5	P.981129A1--17	140 l	132	162	128	152	137	137	132
6	P.99751RA1--94	142	134	166	130	153	137	143	134
7	P.0128A1-44-1-7	142	134	166	132	152	137	138	133
8	P.03528A1-10	144	135	166	134	154	137	141	140
9	P.03630A1-18	143	133	166	135	156	136	140	133
10	SE981089-34	141	133	165	129	155	131	142	134
11	SE91 1492-4	142	132	166	129	155	136	141	134
12	SE94-1012-25	142	134	166	131	155	136	140	133
13	M04-4843	140 l	133	165	129	151	131	138	132
14	M04-4788	140	131	165	128	153	131	140	133
15	M04*5109	143	139	166	132	155	136	142	134
16	M04-4258	140	132	162	129	153	136	138	131
17	M04-4393	143	139	166	130	155	136	141	133
18	RCUOGGoldenValue	142	134	168	129	154	137	141	133
19	RCUOGL15	148	139	172	137	161	141	151	137
20	RCUOGL4	141	133	165	130	154	136	139	133
21	RCUOGL17	142	134	165	130	154	137	141	133
22	RCUOG10/18	141	133	165	129	155	136	140	132
23	IL03-18438	140 l	132	162	131	151	136	138	129
24	IL03-15452	138 l	129	162	127	153	131	135	131
25	IL03-453	143	135	165	133	155	141	141	131
26	IL01-34159	142	133	166	133	154	136	140	133
27	IL79-002T-B-B	139 l	131	162	127	153	136	136	131
28	KY99C-1298-08-1	141	131	165	130	154	137	138	132
29	KY99C-1051-03-1	142	133	166	132	155	131	141	134
30	KY99C-1176-02-1	141	132	165	130	155	131	141	133
31	MO 050600	144	136	166	133	159	136	143	134
32	MO 050699	145	137	169	135	159	137	144	134
33	MO 050917	147	140	169	137	161	137	146	140
34	MO 050921	150 h	144	172	140	163	141	147	143
35	VA06W-598	140 l	132	162	128	153	131	140	131
36	VA06W-557	141	136	165	129	154	131	140	133
37	VA06W-595	141	136	162	128	153	136	141	131
38	VA06W-608	142	135	165	130	155	136	140	132
39	VA06W-627	142	133	166	132	157	131	142	134
40	OH03-183-32	143	136	168	133	156	136	142	133
41	OH03-235-2	144	136	168	134	157	137	142	134
42	OH03-41-45	142	133	166	131	154	136	141	133
43	OH03-97-6	145	140	168	134	156	137	143	134
44	OH03-75-58	146	141	169	136	158	137	142	137
	AVERAGE	142	135	166	131	155	135	141	134
	LSD	1.7							
	R2	1.0							
	CV	1.1							

l,h indicate a mean that is not significantly different than the lowest (l) or highest (h) mean in that column

Table 29. Height (inches) data from 2007 PNUWWSN

ENTRY	NAME	AVG		KYLEX	MOCOL	ONRID
1	ERNIE	31.0		33.0	31	28.9
2	TRUMAN	35.5	h	39.5	33	34.1
3	FREEDOM	33.3		36.5	30	33.5
4	PIONEER 2545	33.3		35.0	33	31.9
5	P.981129A1--17	29.5	l	32.0	27	29.5
6	P.99751RA1--94	29.3	l	31.5	26	30.3
7	P.0128A1-44-1-7	25.8	l	28.5	23	25.8
8	P.03528A1-10	32.7		34.5	32	31.7
9	P.03630A1-18	28.5	l	31.0	27	27.6
10	SE981089-34	28.1	l	29.0	28	27.4
11	SE91 1492-4	28.1	l	31.5	26	26.8
12	SE94-1012-25	31.8		34.5	28	32.9
13	M04-4843	29.7	l	31.5	26	31.5
14	M04-4788	31.4		33.0	30	31.1
15	M04*5109	31.6		35.0	29	30.9
16	M04-4258	29.9		33.5	28	28.2
17	M04-4393	29.2	l	31.0	27	29.5
18	RCUOGGoldenValue	27.1	l	31.0	24	26.2
19	RCUOGL15	34.2		42.0	26	34.7
20	RCUOGL4	36.0	h	34.5	34	39.4
21	RCUOGL17	37.5	h	43.0	30	39.4
22	RCUOG10/18	35.5	h	39.5	30	37.0
23	IL03-18438	26.6	l	30.5	21	28.4
24	IL03-15452	30.4		36.5	24	30.7
25	IL03-453	29.0	l	32.0	25	29.9
26	IL01-34159	32.5		35.5	32	30.1
27	IL79-002T-B-B	30.3		33.0	29	28.9
28	KY99C-1298-08-1	31.8		34.0	30	31.3
29	KY99C-1051-03-1	30.5		32.0	31	28.4
30	KY99C-1176-02-1	32.3		36.0	32	28.9
31	MO 050600	36.6	h	39.5	34	36.2
32	MO 050699	31.0		34.0	30	28.9
33	MO 050917	35.8	h	40.0	34	33.5
34	MO 050921	32.7		36.5	32	29.5
35	VA06W-598	28.9	l	30.0	28	28.7
36	VA06W-557	32.2		34.5	32	30.1
37	VA06W-595	30.1		32.5	30	27.8
38	VA06W-608	30.6		33.0	27	31.9
39	VA06W-627	30.0		32.0	30	28.0
40	OH03-183-32	38.3	h	44.5	40	30.5
41	OH03-235-2	33.0		34.0	33	31.9
42	OH03-41-45	35.3	h	39.0	35	31.9
43	OH03-97-6	34.8	h	38.0	36	30.5
44	OH03-75-58	35.5	h	42.5	29	35.0
	AVERAGE	31.8		34.8	29.6	30.9
	LSD	4.0				
	R2	0.8				
	CV	7.6				

l,h indicate a mean that is not significantly different than the lowest (l) or highest (h) mean in that column

Table 30. Other trait data from 2007 PNUWWSN

		ILURB	MOCOL	OHWOO	VABLA	VABLA	VABLA
		Winter Survival %	Test Weight lbs/bu	Leaf Rust 0-9	Stag. Glume Blotch 0-9	Powdery Mildew %	Barley Yellow Dwarf Virus 0-9
1	ERNIE	56.7	48.4	5.3	6	28	2
2	TRUMAN	41.7	50.0	4.3	5	24	1
3	FREEDOM	95.0	44.5	4.0	7	9	4
4	PIONEER 2545	100.0	43.5	5.0	7	14	3
5	P.981129A1--17	21.7		4.3	8	0	4
6	P.99751RA1--94	98.3	47.3	7.0	6	2	1
7	P.0128A1-44-1-7	36.7		5.7	7	0	3
8	P.03528A1-10	100.0	51.7	5.0	7	1	3
9	P.03630A1-18	100.0	50.1	4.0	6	0	2
10	SE981089-34	98.3	38.0	7.0	5	6	2
11	SE91 1492-4	100.0	49.5	3.7	7	0	3
12	SE94-1012-25	100.0	45.1	5.7	7	0	2
13	M04-4843	90.0	49.8	5.7	7	41	4
14	M04-4788	100.0	47.3	4.7	8	21	3
15	M04*5109	5.0	50.2	4.7	4	32	4
16	M04-4258	66.7	50.0	6.3	4	16	2
17	M04-4393	10.0	47.8	4.0	7	16	2
18	RCUOGGoldenValue	1.0		5.7	9	42	4
19	RCUOGL15	76.7	43.9	3.0	5	11	3
20	RCUOGL4	95.0	48.5	6.0	6	15	3
21	RCUOGL17	95.0	49.9	4.7	5	20	3
22	RCUOG10/18	66.7	51.4	6.3	7	23	2
23	IL03-18438	11.7		3.3	6	16	3
24	IL03-15452	70.0		3.3	7	3	3
25	IL03-453	8.3		3.0	6	17	2
26	IL01-34159	100.0	50.8	3.0	5	15	2
27	IL79-002T-B-B	93.3	51.4	3.0	6	14	2
28	KY99C-1298-08-1	100.0	49.7	3.3	5	14	2
29	KY99C-1051-03-1	88.3	45.3	3.7	3	0	1
30	KY99C-1176-02-1	76.7	43.3	5.3	4	15	2
31	MO 050600	16.7	49.1	4.0	5	1	2
32	MO 050699	90.0	48.6	3.3	6	4	0
33	MO 050917	56.7	50.0	4.3	5	11	2
34	MO 050921	16.7	52.2	4.7	6	13	0
35	VA06W-598	76.7	46.8	6.3	6	15	2
36	VA06W-557	26.7	40.9	3.7	3	2	3
37	VA06W-595	7.0	47.7	3.3	5	6	2
38	VA06W-608	3.7	46.5	3.3	9	0	1
39	VA06W-627	100.0	43.9	3.3	1	26	2
40	OH03-183-32	100.0	50.3	6.0	2	0	1
41	OH03-235-2	98.3	46.5	5.0	7	0	3
42	OH03-41-45	100.0	48.4	5.0	6	19	2
43	OH03-97-6	25.0	45.0	4.3	6	11	1
44	OH03-75-58	53.3	49.5	5.0	5	23	3
	AVERAGE	65.3	47.7	4.6	5.8	12.4	2.3

Table 31. Quality data from the USDA Soft Wheat Quality Lab for the 2007 NUWWSN using grain from IN and VA.

		MILLING SCORE	BAKING SCORE	SE SCORE	TW LB/BU	FYLD %	SE %	PRO %	LA adj SRC	LA SRC	SUC %
1	ERNIE	56.0	67.5	57.2	59.8	68.4	57.2	8.9	93.4	93.0	82.7
2	TRUMAN	58.9	66.4	55.2	62.2	69.0	55.2	9.1	92.2	93.1	81.3
3	FREEDOM	57.5	70.0	54.0	60.4	68.7	54.0	9.0	77.9	77.7	79.3
4	STD = PIONEER 2545	55.5	67.5	58.7	60.7	68.3	58.7	9.2	89.6	91.0	83.2
5	NY88046-8138	66.8	78.8	58.2	60.3	70.5	58.2	8.8	73.5	71.9	78.9
6	NY93285SP-7343	58.5	77.3	55.1	60.2	68.9	55.1	9.0	80.9	80.8	76.9
7	NY93285-7110	57.3	71.4	54.2	59.9	68.7	54.2	9.6	78.9	82.8	77.6
8	NY91028SP-9082	48.4	67.9	58.5	60.9	66.9	58.5	9.8	77.2	82.6	81.7
9	NY93306-7901	62.5	64.6	55.7	61.5	69.7	55.7	9.4	95.7	98.4	82.0
10	KS04HW47-3	60.2	22.8	31.1	62.9	69.2	31.1	8.9	100.2	99.9	83.5
11	KS04HW101-3	61.3	42.5	41.7	62.7	69.5	41.7	8.5	95.0	91.4	83.5
12	P.011036A1-14	60.8	55.1	57.3	60.8	69.3	57.3	9.5	93.0	96.5	86.9
13	P.0111035A1-71	63.6	60.1	56.9	61.4	69.9	56.9	9.3	88.0	90.1	84.9
14	P.02444A1-23-6	58.0	54.3	57.3	60.3	68.8	57.3	8.5	94.7	91.2	89.2
15	P.03647A1-1	57.2	61.5	53.4	61.0	68.6	53.4	9.9	69.8	76.0	80.6
16	P.04287A1-10	70.8	66.2	51.0	60.1	71.4	51.0	8.5	74.5	71.0	79.8
17	NE01643	70.9	52.5	47.0	62.3	71.4	47.0	8.1	92.6	86.6	83.6
18	HARRY	61.3	37.2	48.1	60.2	69.5	48.1	9.1	106.0	106.7	88.9
19	NIO4421	67.0	47.2	47.5	61.4	70.6	47.5	8.8	102.9	101.4	84.9
20	NE046953	71.7	50.5	42.9	62.1	71.5	42.9	8.7	102.0	100.1	80.4
21	NE03490	73.1	57.0	49.3	62.1	71.8	49.3	8.5	107.7	103.9	82.7
22	MD01W233-06-11	57.1	53.5	58.4	62.2	68.6	58.4	10.0	93.8	100.8	87.3
23	M03-3002	63.4	63.1	56.1	61.2	69.9	56.1	9.1	86.1	86.7	83.5
24	M03-3104	53.6	66.3	58.3	58.7	67.9	58.3	8.7	89.4	87.0	84.6
25	M03-3616	55.4	68.0	58.5	59.7	68.3	58.5	9.4	82.7	85.2	82.5
26	M03*3877	68.1	64.2	59.0	61.9	70.8	59.0	8.7	105.8	103.7	85.8
27	M03*3861	69.3	63.4	58.9	61.0	71.0	58.9	8.5	106.8	103.5	86.5
28	RCUOG19/21	62.5	65.9	56.0	59.5	69.7	56.0	9.7	95.5	100.7	80.9
29	RCUOGF11020D/4	66.2	26.4	38.0	57.8	70.4	38.0	12.1	55.6	77.4	80.2
30	RCUOGF111202A/3	61.8	8.3	38.3	61.5	69.5	38.3	10.8	94.1	107.1	90.8
31	RCUOGDHACF110902D	66.0	27.1	40.5	62.0	70.4	40.5	12.0	58.6	79.3	82.0
32	RCUOGNS984-1	60.4	24.5	45.4	63.1	69.3	45.4	11.4	100.7	117.7	87.6
33	IL00-8530	72.7	72.1	57.6	61.5	71.7	57.6	8.7	103.0	100.9	81.5
34	IL01-11445	63.7	66.6	61.7	60.9	69.9	61.7	8.8	105.7	104.1	86.6
35	IL01-11934	66.0	69.0	57.8	62.6	70.4	57.8	8.8	99.8	98.2	82.8
36	IL02-19463	56.6	51.3	61.4	60.9	68.5	61.4	10.1	106.1	113.8	90.1
37	IL02-23168	63.6	64.5	56.1	62.5	69.9	56.1	10.1	100.0	107.7	80.8
38	KY97C-0540-01-03	56.1	53.4	57.7	63.4	68.4	57.7	9.2	114.9	116.2	88.6
39	KY97C-0554-03-06	68.9	39.4	46.3	61.7	70.9	46.3	9.5	97.1	100.6	85.9
40	KY97C-0554-04-05	79.8	44.3	48.2	61.8	73.1	48.2	9.7	91.5	96.6	84.7
41	KY97C-0508-01-01A-1	53.4	54.9	58.2	60.5	67.9	58.2	9.3	106.6	109.0	87.9
42	KY97C-0554-03-02	73.4	47.2	48.0	62.3	71.9	48.0	8.7	100.6	98.6	85.4
43	MO 040165	57.1	59.4	56.0	61.0	68.6	56.0	9.4	97.2	99.8	84.4
44	MO 050101	57.4	57.2	55.9	61.7	68.7	55.9	9.6	90.2	94.6	84.8
45	MO 050143	56.4	61.7	56.7	60.5	68.5	56.7	9.2	96.4	97.6	84.3
46	MO 050197	61.9	61.0	52.9	62.9	69.5	52.9	9.8	96.6	102.3	80.7
47	MSU LINE E0323	67.4	76.5	56.2	59.6	70.7	56.2	8.9	91.5	90.9	78.2
48	MSU LINE E5015	57.4	60.5	59.1	59.9	68.7	59.1	9.2	94.4	95.9	86.4
49	MSU LINE E6001	43.8	29.7	52.0	61.2	66.0	52.0	10.4	89.5	99.6	92.2
50	MSU LINE E6002	54.8	49.5	48.2	61.7	68.2	48.2	9.3	85.3	87.0	83.5
51	MSU LINE E6003	58.6	47.6	50.6	63.0	68.9	50.6	10.8	101.4	113.8	82.8
52	VA06W-600	56.8	50.0	63.8	59.5	68.5	63.8	8.8	109.7	108.0	95.1
53	VA06W-602	69.1	65.4	58.9	60.4	71.0	58.9	8.7	102.7	100.6	85.3
54	VA06W-587	59.4	67.6	57.9	62.8	69.1	57.9	8.2	96.3	90.3	84.8
55	VA06W-594	63.0	55.0	56.7	62.8	69.8	56.7	9.5	97.7	101.5	86.5
56	VA06W-585	59.1	55.8	56.5	63.1	69.0	56.5	8.6	91.6	88.5	88.0
57	OH02-15978	52.0	62.0	61.2	61.0	67.6	61.2	8.8	109.3	107.8	88.2
58	OH02-12678	60.6	62.9	56.2	60.9	69.3	56.2	8.8	88.3	86.9	84.2
59	OH02-12686	53.9	51.5	51.3	62.1	68.0	51.3	9.3	84.3	86.2	84.7
60	OH02-13567	66.3	69.8	56.2	60.5	70.4	56.2	8.5	90.6	87.4	81.8
	Standard Error	2.4	4.9	1.7	1.2	0.5	1.7	0.5	4.2	3.4	1.3

SWQL Notes on NUWWSN grain samples from Herb Ohm, Purdue University

A total of 60 entries were submitted from the NUWWSN. These entries comprised a single nursery and were all evaluated together. PION 2545 was used as the standard for this group of samples. Of the 830 cultivars in the SWQL database of Allis-milled cultivars, PION 2545 ranks 611th for Milling Score based on data from 12 millings.

The standard data is compared to the "historical average" for the cultivar, and quality scores are adjusted to this average. Quality scores for each of the entries in the nursery are then adjusted by the same factor as the standard. These factors are shown in the following table:

	All Entries
Milling Quality Score Factor	+11.8
Baking Quality Score Factor	-5.6
Softness Equivalent Factor	-14.3

This year a new tab called "HISTORICAL" has been added to the evaluation worksheet. On this page we will try to show how the data from each of the check cultivars from the set compares to historical data from the SWQL micro database.

Upon inspection of the grain it was noted that while FHB was seen in nearly every sample, levels were generally low. Also, low amounts of shriveled grain remained after the samples were aspirated. Sprouting was observed in approximately half of the entries.

Comparing the quality data of the check cultivars with their historic averages, it was seen that they lined up well in most areas. Test weight values agreed very well with the exception of ERNIE (57.0 lb/bu vs. 60.1 lb/bu, historically). Since sprouting was seen in many entries throughout the set, it is not surprising to see that the checks all displayed elevations in Lactic Acid SRC of between 5-14% above their historic values.

SWQL Notes on NUWWSN grain samples from Carl Griffey, Virginia Tech University

The ERNIE entry was used as the standard for the Virginia NUWWSN. Of the 830 cultivars in the SWQL database of Allis-milled cultivars, ERNIE ranks 722nd for Milling Score based on data from 8 millings.

The standard data is compared to the "historical average" for the cultivar, and quality scores are adjusted to this average. Quality scores for each of the entries in the nursery are then adjusted by the same factor as the standard. These factors are shown in the following table:

	NUWWSN
Milling Quality Score Factor	-0.2
Baking Quality Score Factor	+19.2
Softness Equivalent Factor	+2.1

This year a new tab called "HISTORICAL" has been added to the evaluation worksheet. On this page we will present data from the SWQL Allis and Micro databases for the check cultivars as a historical comparison.

In examining the grain condition, it was seen that the samples were in excellent condition. FHB was seen in low levels in a few of the entries while weathering and sprouting were not observed to be a problem. The grain was aspirated prior to milling which removed all of the shriveled grain from the majority of the samples. The shriveling that did remain was in generally low amounts.

While Sucrose SRC values for ERNIE showed excellent agreement among the three nurseries, the Lactic Acid values displayed some variation with only the entry from the NUWWSN (#711630) agreeing well with its historic value of 87.2%.

Other cultivars were included as checks in each of the three nurseries and in most instances they showed good agreement with their historic quality data. Test weights for the checks tended to be higher than their historic values, often exceeding them by between 1 and 2 lb/bu.

Notes from Edward Souza on the combined analysis of the NUWWSN

The NUWWSN evaluation this year was sponsored through a grant with the North American Millers Association. I am grateful for their assistance with this important project. Thanks to Herb Ohm's crew with Purdue University for producing the trial at Indiana and Carl Griffey's Virginia Tech program for producing the NUWWSN nursery in Virginia.

The information from this trial should be used in combination with the Fusarium resistance ratings to identify new candidate cultivars but also the best crossing parents for the new cycle of crossing. The important traits to select soft wheat cultivars are milling yield, softness equivalent, and sucrose SRC (probably in that order). The lines with the best combination of these three quality traits are listed in table below. Other lines within the nursery also are within acceptable limits for quality.

The effect of FHB was minimal in this set. The presence of some pre-harvest sprouting may have elevated the lactic acid SRC values in this set (see the Historical Table worksheet in the Excel file). The sucrose SRC value was likely unaffected by the presence of pre-harvest sprouting.

A number of hard wheat cultivars are in this trial, including the hard red winter wheat 'Harry'. We did not evaluate the lines for hard wheat quality. The trial also contains a number soft wheat lines with very coarse texture. These lines have softness equivalents similar to hard wheat cultivars. These lines likely will not have acceptable soft wheat quality.

A more complete analysis of this set will follow when the information is combined with the FHB resistance information.

The data file that accompanies this summary has both locations and then an average of the two locations. My comments about specific cultivars are based on the two location summary.

Of the lines in the nursery that had FHB incidence and DON levels that were not different from Truman (See Table 7) the following were the best quality wheats: MO 040165, MO 050101, MO 050143, MO 050197, and OH02-13567. These lines had acceptable to superior quality for milling yield, softness equivalent, and sucrose SRC. The following lines: MSU LINE E6003, KY97C-0554-03-06, VA06W-585, and P.011036A1-14, had generally superior quality but were poor for one of the quality measures.

The five superior quality lines and the four lines in the next tier of quality represent good parents for crop improvement program because they represent a desirable combination of disease resistance and end-use quality. Depending on their agronomic performance, these lines may also make desirable cultivars to reduce FHB incidence while improving the overall quality of the winter wheat crop.

Table 32. Haplotype data provided by the USDA Small Grains Genotyping Center for entries in the 2007 NUWWN for FHB QTL

	3BS			5AS				2DL					
	STS 256	gwm 533Pd	gwm 533Pd	gwm 304Fd	gwm 304Fd	barc 117Fd	barc 117Fd	gwm 539Vd	gwm 539Vd	cfd 233	cfd 233	gwm 608	gwm 608
ERNIE	224	156		220		211		137		284		150	
TRUMAN	224	119		199		217		137		290		162	
FREEDOM	224	129		214	217	211	224	137	163	270	290	162	
PIONEER 2545	224	129		201		217		139		270		156	
NY88046-8138	224	119		201		217	224	141		282		152	
NY93285SP-7343	224	119		201		217		139	143	278		152	
NY93285-7110	224	119		201		217		141		278		152	
NY91028SP-9082	224	119		201		217		nd		280		152	
NY93306-7091	224	119		221		211		124	133	288		152	
KS04HW47-3	224	119		201		217		126		270		156	
KS04HW101-3	224	119		220		211		135		284		154	
P.011035A1-71	224	119		221		211		124		270		150	
P.011036A1-14	224	147	156	201	222	217	211	137		270	280	150	154
P.02444A1-23-6	224	119		199		217		139		290		150	
P.03647A1-1	224	119	145	199	203	217	211	139	161	278	288	150	
P.04287A1-10	224	119		203		217		139		278		150	
NE01643	224	177		201		217		126		270		154	
HARRY	224	177		201	212	211		124		274		154	
NI04421	224	119		201	212	217	211	124	148	274	278	158	
NE04653	224	129	144	212		211		126		274		154	
NE03490	224	177		201	212	217	211	126	150	274	288	154	
MD01W233-06-11	224	147	156	201		217		135		278		150	
M03-3002	224	156		221		211		143		nd		nd	
M03-3104	224			220		211		137		290		154	
M03-3616	224	162		201	221	211		131	139	270	290	150	154
M03*3877	224	119		199		217		133		270		156	
M03*3861	224					217		133	143	nd		nd	
RCUOG19/21	224	119		201		217		141		278		150	
RCUOGF110202D/4	224	119		201		217		131		274		150	
RCUOGF111202A/3	224	119		214		224		131	137	268		156	
RCUOGDHACF1109O2D	224	119		201		217		131		276		150	
RCUOGNS984-1	224	119		203		217		126	137	288		152	
IL00-8530	224	119		221		211		124		280		150	
IL01-11445	224	119				217	211	124		290		162	
IL01-11934	224	147	156	199	220	217	211	124		290		162	
IL02-19463	224	119		199		217		137		278	284	150	
IL02-23168	224	119		199		217		131		280		150	
KY97C-0540-01-03	224	119		199		217		133		270		156	
KY97C-0554-03-06	224	119	156	199		217		124	150	278	288	150	156
KY97C-0554-04-05	224	119		199		217		148		278		150	
KY97C-0508-01-01A-1	224	119		199		217		133		272		156	
KY97C-0554-03-02	224	156		199		217		148		278		150	
MO 040165	224	119		199		217		137		290		162	
MO 050101	224	119		199		217		137		290		162	
MO 050143	224	119		199		217		137		290		162	
MO 050197	224	156		199		217		133		270		156	
MSU Line E3023	224\	141		201		217		139		274		154	
MSU Line E5015	224	119		201		217		139		272		156	
MSU Line E6001	230	143		217	223	211		126	137	268	276	152	
MSU Line E6002	224	119		203		217	225	127		276		152	
MSU Line E6003	229	143		217		221		126		276		152	
VA06W-600	224	119		199		217		131		272		156	
VA06W-602	224	119		199		217		131	137	272		156	
VA06W-587	224	156		199		217		124	131	280	278	150	
VA06W-594	224	119		199		217		135	139	270		150	
VA06W-585	224	nd		nd		221		nd		nd		150	
OH02-15978	224	119		201	217	217	221	131		270		150	
OH02-12678	224	147	156	217		221		131		278		150	
OH02-12686	224	147	156	217		221		nd		270		150	
OH02-13567	224	147	156	220		221		155		270		150	
Ning7840	230	145		217		221		126		274		152	
Sumai3	230	145		217		221		126		276		152	

Table 32. Haplotype data provided by the USDA Small Grains Genotyping Center for entries in the 2007 PNUWWN for FHB QTL on chromosomes 3BS. 5AS, and 2DL.

		3BS				5AS					2DL					
		STS 256	gwm 533Pd	gwm 533Pd	gwm 533Pd	gwm 304Fd	gwm 304Fd	gwm 304Fd	barc 117Fd	barc 117Fd	gwm 539Vd	gwm 539Vd	cfd 233	cfd 233	gwm 608	gwm 608
1	ERNIE	224	119			197	220		211		137	143	270	284	150	
2	TRUMAN	224	119			199			217		137		290		162	
3	FREEDOM	224	129			214			224		137		290		162	
4	PIONEER 2545	224	119			201	217		217	211	131	139	270	278	156	
5	P.981129A1--17	230	145			221			211		139		278		154	
6	P.99751RA1--94	224	119			217			211		161		278		150	
7	P.0128A1-44-1-7	na	145			221			224		139		278		150	
8	P.03528A1-10	224	144			215			224		135		288		143	
9	P.03630A1-18	230	145			217			211		137		278		150	
10	SE981089-34	224				199			217		143		284		150	
11	SE91 1492-4	224				222			211		137		290		156	
12	SE94-1012-25	224	147	156		199			217		137		288		156	
13	M04-4843	224	119	156		221			211		139		290		154	
14	M04-4788	224	119			199			217		124		272		148	
15	M04*5109	224	119			199			217		133		270		156	
16	M04-4258	224	119			200			217		131	146	280	284	150	
17	M04-4393	224	156			199			217	224	131		268		nd	
18	RCUOGGoldenValue	224	131			203	207	214	217	224	137		268		150	156
19	RCUOGL15	224	119			201			217		141		278		150	
20	RCUOGL4	224	119	147	156	201	214		217	224			270	278	150	156
21	RCUOGL17	224	119			201			217		131	133	272		166	
22	RCUOG10/18	224	119	129		201			217		133	141	270	278	150	156
23	IL03-18438	224	119	147	156	199	212		217	211	131		278		150	
24	IL03-15452	224	119			199			217		135	161	278		150	
25	IL03-453	224	119			212			211		131	137	280	284	150	
26	IL01-34159	230	147			220			211		131		280		150	
27	IL79-002T-B-B	224	147	156		220			211		139		278		150	
28	KY99C-1298-08-1	224	119	147		199			217		133		270		156	
29	KY99C-1051-03-1	224	129			199			217		133		270		156	
30	KY99C-1176-02-1	224	119			199			217	224	131		270		156	
31	MO 050600	224	119			199			217		137		290		162	
32	MO 050699	224	119			221			211		161		278		150	
33	MO 050917	224	162			199			217	224	131		290		154	
34	MO 050921	224	119			199			217		137		284	290	150	162
35	VA06W-598	224	119			199			217		131	133	272		156	
36	VA06W-557	224	119			199			217		131	135	278		150	158
37	VA06W-595	224	119			199			217		139		270	278	150	
38	VA06W-608	224	119			199			217		137		290		162	
39	VA06W-627	230	119	145		199			217		131	137	290		162	
40	OH03-183-32	224	147	156		221			211		155		270		150	
41	OH03-235-2	224	147	156		220			211	224	131		270		150	
42	OH03-41-45	224	147	156		199			217		124	133	288		156	162
43	OH03-97-6	224	119			220			211		135		268		154	
44	OH03-75-58	224	129			197			217				270	288	150	
	Ning7840	230	145			217			221		126		274		152	
	Sumai3	230	145			217			221		126		276		152	

Table 34. 2006+2007 Performance data for NUWWSN and PNUWWSN entries from The Ohio State University. Entry numbers for the NUWWSN (N) and PNUWWSN (P) are provided in the left column

12 OH Environments

	2007, 2006 NAME	YLD	HD days	HGT in	LDG 0-9	TW lb/bu	PM 0-9	LR 0-9	SLB %	SGB %	FHB %
	PIONEER 25R47	82.5	141	35	1.0	57.7	4.7	6.3	.	.	6.5
	HOPEWELL	73.2	143	40	1.0	58.6	3.7	7.0	.	.	11.3
N57	OH02-15978	72.9	139	40	2.7	59.6	2.2	6.7	16.1	7.9	16.4
N58	OH02-12678	75.4	143	41	2.3	59.1	1.0	3.0	8.1	1.5	2.6
N59	OH02-12686	75.1	146	40	1.0	58.6	0.7	2.7	4.5	0.0	3.2
N60	OH02-13567	73.2	142	42	1.0	59.4	3.0	4.3	9.9	2.8	1.7
	TRUMAN	.	.	.	.	.	.	5.3	.	.	0.3
	FREEDOM	.	.	.	.	.	.	4.7	.	.	1.5
	PIONEER 2545	.	.	.	.	.	.	7	.	.	14.4
	BECKER	.	.	.	.	.	6.7	.	.	.	.
	COKER 9663	.	.	.	.	.	.	.	1.3	0.8	.
	GR 863	.	.	.	.	.	.	.	16	11.6	.
	PIONEER 25R26	.	.	.	.	.	.	.	.	.	.

9 OH Environments

	2007, 2006 NAME	YLD	HD days	HGT in	LDG 0-9	TW lb/bu	PM 0-9	LR 0-9	SLB %	SGB %	FHB %
	PIONEER 25R47	82.1	140	36	1.0	58.1	.	6.3	.	.	15.3
	HOPEWELL	74.1	142	40	1.0	58.7	.	7.0	.	.	9.8
P40	OH03-183-32	70.5	142	45	1.3	60.2	2.5	5.7	2.6	1.7	2.0
P41	OH03-235-2	72.9	143	42	1.0	59.0	1.2	6.7	13.5	5.4	7.1
P42	OH03-41-45	76.6	141	44	3.0	60.5	2.7	4.7	12.3	8.8	8.2
P43	OH03-97-6	72.3	142	41	4.0	58.9	1.2	4.7	3.5	7.5	8.0
P44	OH03-75-58	72.7	144	45	1.0	59.0	2.5	4.7	2.4	0.2	7.7
	TRUMAN	.	.	.	.	.	.	5.3	.	.	0.1
	FREEDOM	.	.	.	.	.	.	4.7	.	.	2.2
	PIONEER 2545	.	.	.	.	.	.	7	.	.	9.7
	BECKER	.	.	.	.	.	6.7	.	.	.	.
	COKER 9663	.	.	.	.	.	.	.	3.9	8.4	.
	GR 863	.	.	.	.	.	.	.	14.5	20.8	.

Table 34. 2007 Performance data for NUWWSN and PNUWWSN entries from the University of Illinois at Urbana-Champaign. Entry numbers for the NUWWSN (N) and PNUWWSN (P) are provided in the left column

Urbana

	Name	Yield	Yield Rank	TW	Ht	Heading Date	BYDV stunting	Milling	Baking	Awns	FHB Inc.	FHB Sev.	FHB Index	FDK	ISK Index
		(bu/A)		(lbs/bu)	(in)	(after4/30)	(%)				(%)	(%)	%	(%)	%
	Kaskaskia	80.5	5	59.3	40	11	20.5	D	F	B	51.7	33.2	21.0	22	34.1
	Bess	51.9	97	58.8	31	13	0.0	D	E	S	40.0	26.2	10.5	13	27.9
	Pio 25R47	72.0	25	56.2	32	10	6.4	B	A	B	71.7	40.5	30.3	67	60.3
	Pio 25R35	83.0	3	58.8	36	11	4.5	D	D	B	36.7	22.3	8.1	33	31.0
	Pio 25R54	62.6	63	57.2	33	12	4.8	B	C	B	50.0	65.7	32.9	23	42.7
	Foster	63.4	60	58.1	33	13	18.8	B	B	S	--	--	--	--	--
	Branson	66.2	53	58.0	31	8	6.8	B	B	S	60.0	36.0	20.1	30	38.8
	Excel 307	68.2	45	58.1	35	12	4.2	B	C	S	35.0	42.8	17.5	20	31.3
	FS 8302	47.0	107	58.5	29	14	6.8	--	--	--	72.5	35.3	25.3	40	48.4
N33	**00-8530**	69.2	38	59.2	34	8	17.0	A	C	S	36.7	49.6	14.2	15	31.9
N34	**01-11445**	70.5	31	58.5	34	13	10.9	C	D	S	35.0	34.8	12.0	13	26.3
N35	**01-11934**	70.0	35	58.3	33	13	11.1	C	D	S	38.3	35.4	15.3	13	27.4
N36	**02-19463**	70.8	29	59.2	34	8	9.3	C	D	B	28.3	40.1	14.7	15	26.5
N37	**02-23168**	59.9	74	59.4	34	13	15.9	C	F	S	62.5	43.3	26.3	20	41.8
P23	**03-18438**	35.8	117	58.6	29	7	-23.3	D	F	B	--	--	--	30	--
P24	**03-15452**	59.6	77	58.1	34	7	1.0	C	D	B	76.7	38.6	29.6	23	43.9
P25	**03-453**	34.9	118	58.8	28	13	1.9	C	D	S	--	--	--	--	--
P26	**01-34159**	71.0	27	58.5	37	14	8.4	C	D	S	18.3	29.0	5.5	4	15.9
P27	**79-002T-B-B**	68.9	40	59.6	35	8	-10.5	D	D	S	6.7	23.0	1.6	6	11.2
	MEAN	61.9		57.6	33.2	9.5	6.4				39.2	40.0	15.8	22.9	33.1
	LSD (0.05)	7.6		1.2	2.1	1.9					29.9	28.8	17.9	14.7	15.1
	CV (%)	7.7		1.3	4.0	12.3					45.8	43.3	67.9	38.9	27.3

	Name	Carmi Septoria Blight	Winter Survival Urbana	DeKalb	Scab Nursery	Mean	Across Locations Mean Yield	Mean Rank	Mean TW	Mean rank	Mean Height
		(0-9)	(%)	(%)	(%)	(%)	(bu/A)		(lb/bu)		(inches)
	Kaskaskia	6.3	100.0	100.0	100.0	100	67.7	8	60.4	8	39.0
	Bess	3.3	60.0	75.0	16.7	51	55.9	76	58.6	66	32.0
	Pio 25R47	3.3	96.7	100.0	95.0	97	72.3	3	56.5	116	32.5
	Pio 25R35	3.3	100.0	100.0	100.0	100	74.9	1	59.5	32	35.0
	Pio 25R54	3.7	63.3	75.0	41.7	60	64.9	16	57.1	113	34.0
	Foster	3.7	85.0	90.0	--	88	57.4	71	58.5	70	34.0
	Branson	3.3	86.7	92.5	33.3	71	63.7	21	58.2	87	32.5
	Excel 307	4.7	91.7	100.0	96.7	96	62.1	36	58.4	78	37.0
	FS 8302	4.0	65.0	62.5	45.3	58	58.6	62	58.5	69	31.5
N33	**00-8530**	5.3	98.3	100.0	98.3	99	59.8	51	59.4	36	34.5
N34	**01-11445**	4.0	100.0	100.0	100.0	100	62.4	33	59.6	29	34.5
N35	**01-11934**	4.3	98.3	100.0	100.0	99	63.3	25	57.7	102	33.5
N36	**02-19463**	4.3	100.0	100.0	90.0	97	61.0	44	59.9	21	34.5
N37	**02-23168**	4.7	86.7	62.5	48.3	66	53.4	81	60.0	18	34.0
P23	**03-18438**	5.0	78.3	77.5	11.7	56	37.6	118	59.9	20	28.0
P24	**03-15452**	5.0	88.3	100.0	30.0	73	50.6	94	58.8	61	34.5
P25	**03-453**	4.3	46.7	100.0	3.7	50	45.9	109	59.4	40	30.0
P26	**01-34159**	3.7	100.0	100.0	100.0	100	65.7	14	58.7	64	36.0
P27	**79-002T-B-B**	4.7	98.3	82.5	88.3	90	59.0	57	61.2	2	35.0
	MEAN	4.0	89.1	90.5	75.0	89	57.0		58.5		33.6
	LSD (0.05)	1.5	13.4	26.2	24.4		5.5		1.1		1.7
	CV (%)	22.7	9.3	14.6	20.2		12.0		1.6		4.4

Table 34. 2007 Performance data for NUWWSN and PNUWWSN entries from the University of Illinois at Urbana-Champaign. Entry numbers for the NUWWSN (N) and PNUWWSN (P) are provided in the left column

		Urbana															
	Name	Yield	Yield Rank	TW	Ht	Heading Date	Leaf Rust	Powery Mildew	SBMV Rep 1	SBMV Rep 2	BYDV stunting	FHB Inc.	FHB Sev.	FHB Index	FDK Rating	ISK Index	DON
		(bu/A)		(lbs/bu)	(in)	(after4/30)	(0-9)	(0-9)	(0-9)	(0-9)	(%)	(%)	(%)	%	(% FDK)	%	ppm
	Ernie	87.2	101	58.4	39	9	4.3	1.7	9	9	0.2	60.0	38.9	22.9	20	37.7	6.8
	Kaskaskia	106.4	35	61.5	48	12	2.7	1.7	8	7	12.9	88.3	71.9	63.7	37	62.7	13.0
	Roane	104.8	41	62.2	40	10	2.0	1.3	9	9	13.9	80.0	38.9	33.0	23	45.0	7.5
	Bess	102.6	48	59.1	43	10	6.7	1.3	9	8	4.5	46.7	25.7	12.7	13	27.1	6.5
	Truman	102.9	47	58.4	45	18	4.7	1.0	9	8	1.4	36.7	33.2	12.8	8	24.3	1.8
	Pio 25R47	120.6	1	56.8	41	11	1.3	1.0	8	8	6.3	90.0	61.1	54.9	60	69.3	16.0
	Pio 25R35	115.6	3	60.0	43	14	1.3	1.0	9	9	6.0	63.3	38.6	24.5	30	42.6	7.3
	Pio 25R54	107.8	24	58.8	42	11	5.3	1.0	8	7	4.5	63.3	56.9	36.8	37	50.8	14.8
	Foster	91.7	93	58.4	42	11	6.0	1.0	8	7	12.0	88.3	67.6	59.9	63	72.1	15.3
	Branson	107.4	30	56.8	40	8	7.7	1.0	9	7	4.7	80.0	63.6	51.8	53	64.4	16.3
	Cooper	112.8	5	60.4	40	10	2.3	1.3	9	8	11.0	90.0	66.8	61.6	77	77.7	23.0
N33	**00-8530**	104.9	40	61.5	41	9	6.3	1.3	8	8	15.0	63.3	38.1	23.0	17	37.1	4.3
N34	**01-11445**	92.9	88	59.6	44	11	9.0	1.0	7	5	4.8	56.7	49.1	28.0	27	42.4	5.3
N35	**01-11934**	107.6	26	60.2	44	11	9.0	0.7	7	6	7.8	65.0	41.3	28.9	20	39.9	5.8
N36	**02-19463**	115.1	4	60.5	43	6	2.7	1.7	7	6	-2.0	58.3	48.0	29.3	20	39.9	7.0
N37	**02-23168**	103.7	44	59.6	42	10	0.7	1.3	6	2	11.9	46.7	44.5	21.2	23	36.7	5.5
P23	**03-18438**	109.5	13	60.0	39	6	0.7	1.7	9	8	8.7	80.0	24.2	18.8	33	44.6	10.5
P24	**03-15452**	109.4	14	59.1	44	6	2.0	1.0	7	8	3.4	40.0	43.9	18.4	17	31.9	6.3
P25	**03-453**	100.1	61	59.2	41	10	4.3	1.3	9	9	5.2	76.7	37.3	29.5	33	47.5	10.5
P26	**01-34159**	108.1	20	61.0	43	14	1.0	1.3	7	7	7.9	36.7	15.9	5.8	7	18.4	1.0
P27	**79-002T-B-B**	102.4	50	61.7	43	10	0.3	1.3	9	9	6.6	28.3	23.3	6.8	17	22.1	2.8
	GRAND MEAN	**100.8**		**59.6**	**41.7**	**9.4**	**3.9**	**1.6**	**7.5**	**7.2**	**7.0**	**63.5**	**46.2**	**30.6**	**29.3**	**44.6**	**7.9**
	LSD (0.05)	**7.8**		**0.9**	**2.1**	**1.1**	**2.3**	**0.9**				**26.1**	**20.7**	**19.7**	**15.6**	**13.2**	**5.7**
	CV (%)	**4.8**		**0.9**	**3.1**	**7.4**	**36.4**	**35.9**				**25.5**	**27.9**	**40.0**	**33.2**	**18.4**	**35.9**

		Brownstown		St. Jacob	Across Locations					
	Name	Ht	BYDV	BYDV	Mean Yield	Mean Yield Rank	Mean TW	Mean TW rank	Mean Height	Mean BYDV
		(in)	(0-9)	(0 - 9)	(bu/A)		(lb/bu)		(inches)	(0-9)
	Ernie	35	4.0	2.7	64.0	102	57.6	93	37.0	3.3
	Kaskaskia	40	5.7	5.7	66.4	89	59.7	14	44.0	5.7
	Roane	33	2.3	2.7	71.1	52	61.1	1	36.5	2.5
	Bess	38	3.3	3.7	71.8	47	59.0	38	40.5	3.5
	Truman	41	6.3	3.3	65.8	95	57.4	96	43.0	4.8
	Pio 25R47	34	2.3	2.7	85.5	1	56.5	108	37.5	2.5
	Pio 25R35	36	3.0	3.0	78.7	11	58.6	59	39.5	3.0
	Pio 25R54	36	2.3	1.0	85.0	2	57.8	87	39.0	1.7
	Foster	36	4.0	4.3	65.7	96	57.5	94	39.0	4.2
	Branson	35	5.3	5.3	77.2	19	57.1	104	37.5	5.3
	Cooper	33	1.7	4.3	80.7	6	58.9	43	36.5	3.0
N33	**00-8530**	37	1.7	2.0	80.7	7	60.2	4	39.0	1.8
N34	**01-11445**	38	5.3	4.3	68.3	76	59.1	33	41.0	4.8
N35	**01-11934**	37	4.0	5.0	78.3	12	59.9	9	40.5	4.5
N36	**02-19463**	36	3.3	2.0	78.8	10	59.6	17	39.5	2.7
N37	**02-23168**	38	2.3	2.3	80.8	5	59.3	23	40.0	2.3
P23	**03-18438**	34	2.0	2.7	77.3	17	59.0	39	36.5	2.3
P24	**03-15452**	37	5.3	3.0	74.4	28	58.4	66	40.5	4.2
P25	**03-453**	37	2.7	1.7	73.1	35	58.7	56	39.0	2.2
P26	**01-34159**	37	6.0	6.3	61.4	106	58.9	41	40.0	6.2
P27	**79-002T-B-B**	37	2.7	4.3	71.2	51	60.1	5	40.0	3.5
	GRAND MEAN	**36.5**	**3.6**	**3.3**	**71.4**		**58.6**		**39.1**	**3.4**
	LSD (0.05)	**1.5**	**2.3**	**2.2**	**4.6**		**0.9**		**1.8**	**1.6**
	CV (%)	**2.5**	**41.1**	**41.7**	**8.0**		**1.3**		**2.8**	**41.4**