Report on the 2011-2012 Northern Uniform Winter Wheat Scab Nurseries (NUWWSN and PNUWWSN)

C. Sneller[1]*, P. Paul[2], L. Herald[1], and B. Sugerman[1]
Dept. of Horticulture and Crop Science[1], Dept. Plant Pathology[2], The Ohio State University, Wooster, Ohio 44691
*Corresponding author: PH:(330)263-3944, E-mail: sneller.5@osu.edu

INTRODUCTION

The objective of the Northern Uniform Winter Wheat Scab Nursery (NUWWSN) and the Preliminary Northern Uniform Winter Wheat Scab Nursery (PNUWWSN) is to screen winter wheat genotypes adapted to the northern portion of the eastern US for scab resistance. Breeders submit entries each also conducts the trial in inoculated and misted FHB nurseries within their programs. Data is then sent to the coordinator for summation and distribution. Public and private breeders submit lines using their own criteria for inclusion though all must be adapted. Entries vary in the degree of pretesting and selection and their purpose (germplasm, cultivars). Most of the entries have only native resistance though some have undergone MAS for FHB1 and other QTL.

MATERIAL AND METHODS

The locations that reported data and the traits assessed are listed in Tables 1 and 2. The NUWWSN had 56 entries (& four checks, Table 3) and we obtained phenotypic data on seven traits from 13 locations. The PNUWWSN had 46 entries (& four checks, Table 4) and we obtained phenotypic data from xx locations. Cooperators collect replicated data and submit means to the coordinator. The means from individual locations are used in an analysis over locations. The genotype x environment interaction (GEI) term is the error and is used to calculate an LSD (0.05). The LSD value is used to determine if a particular entry mean is statistically equal to the lowest entry mean (such values are designated with an "l") or the highest entry mean (such values are designated with an "h") for each trait. Variance components were estimated using PROC MIXED from SAS considering entries and locations to be random. FHB traits were correlated with heading date (HD) in some locations so the variance components were estimated with and without using HD as a covariate.

RESULTS

Several cooperators were not able to produce meaningful FHB data due to warm dry conditions in the spring of 2012. In addition we could not get seed through customs in time for one long-time cooperator. We also did not send seed to Romania due to increased shipping and phytosanitary inspection costs.

The mean for each entry over all environments for all FHB traits are shown in tables 8 and 9. We observed very high levels of FHB resistance in the 2012 uniform tests

- Over 90% of the entries in the PNUWWSN and the NUWWSN had an FHB index < that of Freedom
- 35% of the PNUWWSN and 14% of the NUWWSN entries had an FHB index < that of Truman
- 76% of the PNUWWSN and 43% of the NUWWSN entries had less DON than Freedom
- 76% of the PNUWWSN and 54% of the NUWWSN entries had less DON than Truman

In the NUWWSN, 14 of 60 entries were not significantly different than the most resistant entry for all seven FHB traits while 22 of 50 entries in the PNUWWSN were not different than the most resistant entry for all seven FHB

traits (Tables 7a,7b). It is likely that the entries in the 2012 tests represent one of the most resistant sets that group has ever tested.

Most of the entries have only native resistance (eg not from Asia, or South America). In the NUWWSN, five entries had conclusive molecular marker evidence the Asian allele for resistance at Fhb1 or 5A while just one entry in the PNUWWSN had conclusive evidence of an Asian QTL (Tables 27, 28). The two most resistant lines in the NUWWSN have FHB1 and 5A from Ning 7840 (Table 7a). The other three lines in the NUWWSN with FHB1 were not as resistant. Note: not all marker data is shown in Tables 26 and 27 due to size limitations. Excel files with all the data has been forwarded to all cooperators and can be obtained from Clay Sneller at sneller.5@osu.edu.

Most of FHB traits were positively correlated in the NUWWSN and PNUWWSN where the correlations among INC, SEV, IND, FDK, ISK, and DON all exceeded 0.37 and 27 of 30 correlations exceeded 0.55 (Table 5a). GHSEV was correlated to most other FHB traits, though the coefficients were generally lower than those seen among the field traits.

Using means over all environments, HD was negatively correlated to SEV, IND in both tests. The correlation of HD with FHB traits varied considerably by environment (Table 5b). In the NUWWSN the correlations of HD with traits ranged from -0.61 to 0.63 for INC, -0.50 to 0.73 for SEV, -0.66 to 0.69 for IND, ns to 0.62 for FDK, ns to 0.70 for ISK, ns to 0.68 for DON. The correlation of HD with FHB traits was ns in MD except for DON where the correlation was 0.64.

There is no significance test for GEI, but the ratio of genetic variance to GEI variance to total suggests GEI is important (Table 6). The ratio of genetic variance to GEI variance for FHB traits ranged from 0.14 (INC) to 1.0 (DON) in the NUWWSN and from 0.22 (FDK) to 1.04 (DON) in the PNUWWSN. If we accept the assumption needed to calculate heritability then entry mean heritability ranged from 0.50 (INC) to 0.80 (DON) in the NUWWSN and 0.30 (FDK) to 0.68 (DON) in the PNUWWSN. Due to the variable correlation of FHB traits with HD I added HD as a covariate to the model and re-estimated the variance components. For most traits heritability was not greatly affected by adding the HD covariate (Table 6), though heritability did decrease noticeably for FDK, ISK, and DON in the NUWWSN. Apparently variation for HD contributed to some of the genetic variation attributed to those traits.

Table 1. Cooperators in the 2011-2012 P+NUWWSN

ENV CODE	LOCATION	NUWWSN	PNUWWSN	COOPERATORS	INSTITUTE	CODE
ILURB	Urbana, IL	yes	yes	Fred Kolb, Eric Brucker	University of Illinois	UIL
INLAY	Lafayette, IN	yes	yes	Herb Ohm	Purdue University	PUR
KYLEX	Lexington, KY	yes	yes	David Van Sanford	Unversity of Kentucky	UKY
MDSAL	Salisbury, MD	yes	no	Jose Costa	University of Maryland	UMD
MIELA	East Lansing, MI	yes	yes	Russ Freed, Lee Siler	Michigan State University	MSU
MOCOL	Columbia, MO	yes	yes	Anne McKendry, David Teague	University of Missouri	UMO
NEMEA	Jan, NE	yes	no	Stephen Baenziger, S Wegulo	University of Nebraska	UNE
NYITH	Ithaca, NY	yes	no	Mark Sorrells, Gary Bergstrom	Cornell University	COR
OHWOO	Wooster, Ohio	yes	yes	Clay Sneller, Pierce Paul	The Ohio State University	OSU
VABLA	Blacksburg, VA	yes	yes	Carl Griffey	Virginia Tech	VAT

Table 2. Traits assessed in 2011-12 P+NUWWSN

Code	Trait	Description	PNUWWSN Locations	NUWWSN Locations
INC	Disease incidence	% of heads with at least one infected spikelets	KY, MI, MO, VA	KY, MD, MI, MO, NE, NY, VA
SEV	Disease severity from field tests	% of infected spikelets in an infected head.	KY, MI, MO, VA	KY, MD, MI, MO, NE, NY, VA
IND	Disease index	IND = (SEVxINC)/100	KY, MI, MO, OH, VA	KY, MD, MI, MO, NE, NY, OH, VA
FDK	Fusarium damaged kernels	Either a visual assessment of the percent infected kernels, or a percent of scabby seed by weight	KY, MO	KY, MD, MO, NE, NY, OH
ISK	Composite of head and kernel traits	ISK Index = .3 (Severity) + .3 (Incidence)+.4 (FDK)	KY, MO	KY, MD, MO, NE, NY, OH
DON	DON (vomitoxin)	PPM of vomitoxin in grain	KY, VA	KY, MD, OH, VA
GH	Greenhouse severity	Same as SEV except from greenhouse	IL, MO	IL, MO
HD	Heading Date	Julian date when 50% of spikes have emerged from the boot		
HGT	Plant Height	Height in inches from soil to top of spike of a typical plant		
Mill Qual	Milling quality score	A relative composite score based on traits that affect milling		VA
Bake Qual	Baking quality score	A relative composite score based on traits that affect baking		VA
SE Qual	Softness equivalent score	A relative score based on softness equivalent		VA
TW	Test weight	Test weight in lbs/bu of clean grain		VA
WGP	Whole grain protein	Percent protein of whole grain		VA
WGH	Whole Grain Hardness			VA
FP	Flour protein	NIR estimate of flour protein percentage (based on 13% moisture)		VA
FY	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.		VA
SE	Softness equivalent	Percentage of flour that passes through a 94 mesh screen		VA
LA	Lactic acid solvent retention capacity	A measure of gluten strength based on percentage of LA solvent retained by a flour sample after centrifugation		VA
SU	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		VA
ECD	Estimated cookie diameter	Diameter of a cookie in cm as estimated from sucrose SRC and softness equivalent		VA

Table 3. Entries in the 2011-2012 NUWWSN

Source	Entry	Name	Pedigree
Check	1	ERNIE	
Check	2	FREEDOM	
Check	3	TRUMAN	
Check	4	PIONEER2545	
COR	5	NY103-208-7263	Cayuga/Caledonia
COR	6	NY94052-3329	Pioneer2737w/Harus
COR	7	NY05072&75-1	Superior*6/Pinb-a
KWS	8	KWS007	IL87-2834-1 / 960314
KWS	9	KWS001	TOTEM / M98-2152
KWS	10	KWS002	TWO44-094 / HONEY
KWS	11	KWS003	95-3245/ Ernie
LIM	12	LCS19214	T814/L900819
LIM	13	LCS19209	Goldfield//IL84-3010/T812
LIM	14	LCS19231	VA99W-200/Patton
LIM	15	LCS19103	IL84-3010/T812
LIM	16	LCS19104	Auburn/T812
MSU	17	E9021R	Pioneer 2552/D8006
OSU	18	OH05-200-74	OH629/HOPEWELL
OSU	19	OH06-159-6	P.92145E8-7-7-1-9-1 / OH728
MSU	20	F0065	Pioneer 25R37/D6234
OSU	21	OH08-133-25	HONEY / COKER 9663
OSU	22	OH06-180-57	KY90C-042-37-1/OH687
OSU	23	OH07-166-41	OH708 / OH684
OSU	24	OH07-263-3	OH748 / BRAVO
PUR	25	P04606RA1-1-7-1-6	Truman/INW0316
PUR	26	P0537A1-3-12	INW0411/2754//INW0412/98134
PUR	27	P0566A1-3-1-67	INW0412/992060
PUR	28	P05222A1-1-2-7	99840/INW0304//INW0304/INW0316
SYN	29	MH07-7483	M95-2994-1/P 25R57
SYN	30	MH07-7474	M97-1048/ELKHART
SYN	31	M08-8036#	COKER 9511/BRANSON
SYN	32	M08-8214	COOPER/PIO2552
UGR	33	DH1-46	Superior x D8006W
UGR	34	DH1-62	Superior x D8006W
UGR	35	DH2-4	25R47 x ADV Dyno
UGR	36	DH2-45	25R47 x ADV Dyno
UGR	37	DH5-56	25R56 X Emmit
UIL	38	IL06-13721	IL00-8530 / IL97-3632
UIL	39	IL06-23571	IL96-6472/ Pioneer 25W33 // 94-1653
UIL	40	IL07-4415	P96169RE2-3-6-4 / IL01-34159
UIL	41	IL07-19334	IL01-36115 / IL79-008T-B-B
UKY	42	KY04C-2004-1-1-3	Roane/Allegiance
UKY	43	KY03C-1224-10-12-3	25R18/VA87W-375ws//KY96C-0767-1
UKY	44	KY03C-1195-10-8-5	KY92C-0010-17//25R18/KY92C-0017-17
UKY	45	KY04C-2031-29-7-3	Truman/VA97W-375ws
UMD	46	MD08-22-1-6-2	Ning7840/McCormick*3
UMD	47	MD08-22-32	Ning7840/McCormick*3
UMO	48	MO090932	980829/Ernie
UMO	49	MO081320	980525//981020/AP Patton
UMO	50	MO090478	980429/Ernie
UMO	51	MO091068	Ernie/Colorben 4
UNE	52	NE10514	NE99533-3/NE99464
UNE	53	NE10449	NI03418/Camelot
UNE	54	NW03666	N94S097KS/NE93459
UNE	55	NW10401	SHARK/F4105W2.1//NI02425
UNE	56	NE10418	OK99212/Overland
VAT	57	VA09W-52	GF921221E16 / McCormick"S" // VA99W-200
VAT	58	VA09W-73	SS 520 (VA96W-158) / VA99W-188 // TRIBUTE
VAT	59	VA10W-21	Z00-5018 / VA01W-158
VAT	60	VA09W-75	SS 520 (VA96W-158) / VA99W-188 // TRIBUTE

Table 4. Entries in the 2011-2012 PNUWWSN

SOURCE	ENTRY	NAME	PEDIGREE
Check	1	ERNIE	
Check	2	FREEDOM	
Check	3	TRUMAN	
Check	4	PIONEER2545	
KWS	5	KWS006	PUR 89118 / RINGO
KWS	6	KWS004	RAVEN / ATLAS
KWS	7	KWS005	HARVARD / DINGO
MSU	8	F0051R	Goldfield/CJ9306//Caledonia/CJ9403/3/Caledonia/4/Caledonia
MSU	9	F0014	Pioneer 2552 / E0029
MSU	10	F0038	D8006 / CJ9306 // Cladeonia /3/ Caledonia /4/ Caledonia
MSU	11	F0036R	D6234/W14/E0038-1/3/E0038-1
MSU	12	OH08-172-42	DOUGLAS / JEKYL
OSU	13	7x831-1-I-03Ser (2)	Malabar*4/Karl
OSU	14	OH08-172-42	DOUGLAS / JEKYL
OSU	15	OH08-180-48	DOUGLAS / MCCORMICK
OSU	16	OH08-269-58	P.92226E2-5-3 / OH708
OSU	17	OH07-254-11	OH728 / VA97W-361WS
PUR	18	P05247A1-7-7-3-1	99840*2/03726//99794
PUR	19	P0566A1-3-1-65	INW0412/992060
PUR	20	P05247A1-7-3-27	99840*2/03726//99794
PUR	21	P05247A1-7-3-120	99840*2/03726//99794
PUR	22	P0762A1-2-8	981129/99793//INW0301/92145/3/981477/981312//INW0316
PUR	23	P07287RA1-14	INW0304/INW0316//97462/3/Truman
SYN	24	M09-9811#	TRUMAN/CK9511
SYN	25	M09-9826#	CK9511/M03-3002
UIL	26	IL07-21847	IL99-2536/ IL97-3632// IL00-8061
UIL	27	IL08-8844	IL00-8109 / IL02-24251
UIL	28	IL08-22206	IL00-8530 / VA01-476 // IL79-002DH
UIL	29	IL08-33373	IL79-005T-B-B / IL00-8530
UIL	30	IL07-20728	McCormick/IL97-1828// IL00-8061
UIL	31	IL07-20743	McCormick/IL97-1828// IL00-8061
UKY	32	KY04C-2031-29-6-1	Truman/VA97W-375ws
UKY	33	KY03C-2022-16-18-1	KY93C-0876-66/25R18
UKY	34	KY04C-2006-45-5-1	Roane/KY93C-1238-17-1
UKY	35	KY04C-2150-66-16-5	25R18/KY93C-1238-17-1
UKY	36	KY04C-2150-64-16-1	25R18/KY93C-1238-17-1
UKY	37	KY04C-2150-64-17-1	25R18/KY93C-1238-17-1
UMO	38	MO100295	981020/010895
UMO	39	MO101235	001164/IL 96-6472
UMO	40	MO100532	000925//980525/433-1-2
UMO	41	MO100314	010708/AP Patton
UMO	42	MO100410	980829/IL 96-346
UMO	43	MO101259	002409/980525
UMO	44	MO081765	L910097/MO 92-599
VAT	45	VA08W-613	FREEDOM / NEUSE"S" // VA98W-688
VAT	46	VA09W-608	P97397B1-4-5 / McCORMICK // COKER 9511
VAT	47	VA10W-663	P97397B1-4-5 / McCORMICK // COKER 9511
VAT	48	VA10W-28	SS-MPV57 (VA97W-24) / M99*3098
VAT	49	VA09W-654	VA98W-749 / IL96-3073 // P9793A1-5
VAT	50	VA10W-617	VA98W-749 / IL96-3073 // COKER 9474

Table 5a. Correlation of traits in the 2011-2012 P+NUWWSN. Above diagonal are correlations of means from the NUWWSN. Below diagonal are correlations of entry means from the PNUWWSN. "ns" indicates not significant at P < 0.05.

	INC	SEV	IND	FDK	ISK	DON	GHSEV	HD	HGT
INC		0.76	0.66	0.55	0.89	0.68	0.33	ns	ns
SEV	0.63		0.87	0.55	0.84	0.67	0.53	-0.43	ns
IND	0.53	0.84		0.58	0.92	0.65	0.48	-0.59	ns
FDK	0.49	0.38	0.59		0.57	0.66	0.28	0.33	ns
ISK	0.90	0.71	0.84	0.72		0.67	0.43	ns	ns
DON	0.55	0.76	0.92	0.61	0.69		0.31	ns	0.38
GHSEV	ns	0.66	0.74	0.30	ns	0.67		-0.28	ns
HD	ns	-0.54	-0.62	ns	ns	-0.54	-0.62		0.59
HGT	ns	ns	ns	ns	-0.34	ns	ns	0.58	

Table 5b. Correlation of FHB traits with heading date by environment. "ns" indicates not significant at P < 0.05. Black squares indicate correlation could not calculate as one trait was missing.

	NUWWSN					
	KYLEX	MDSAL	MIELA	NYITH	OHWOO	VABLA
INC with HD	0.63	ns	-0.61	ns		ns
SEV with HD	0.73	ns	-0.13	0.26		-0.50
IND with HD	0.69	ns	-0.66	ns	0.50	-0.63
FDK with HD	0.62	ns		ns	0.49	
ISK with HD	0.70	ns		ns	0.56	
DON with HD	0.51	0.64			0.49	0.68

	PNUWWSN					
	KYLEX		MIELA		OHWOO	VABLA
INC with HD	0.44		-0.63			0.16
SEV with HD	0.33		-0.32			-0.58
IND with HD	0.38		-0.71		0.08	-0.67
FDK with HD	ns					
ISK with HD	0.41					
DON with HD	0.17					0.51

Table 6. Summary of genotype (V_g) and error (V_{error}) variances from the ANOVA of the 2011-2012 P+NUWWSN

	NUWWSN					PNUWWSN				
	# env	Vg	Verror	Vg/Verror	"h2" of entry mean	# env	Vg	Verror	Vg/Verror	"h2" of entry mean
INC	7	36	250	0.14	0.50	4	67	185	0.36	0.59
SEV	7	30	108	0.28	0.66	4	32	107	0.30	0.54
IND	8	16	54	0.30	0.70	5	20	54	0.37	0.65
FDK	6	18	79	0.23	0.58	2	17	79	0.22	0.30
ISK	6	25	72	0.35	0.68	2	28	55	0.51	0.50
DON	4	21	21	1.00	0.80	2	7.4	7.1	1.04	0.68
GHSEV	2	122	290	0.42	0.46	2	7.8	263	0.03	0.06
HD	6	13.1	4.9	2.67	0.94	4	6.2	4.2	1.48	0.86
HGT	2	8.5	2.8	3.04	0.86	1				

	NUWWSN using HD as a covariate					PNUWWSN using HD as covariate				
	# env	Vg	Verror	Vg/Verror	"h2" of entry mean	# env	Vg	Verror	Vg/Verror	"h2" of entry mean
INC	7	37	224	0.17	0.54	4	60	139	0.43	0.63
SEV	7	26	105	0.25	0.63	4	32	105	0.30	0.55
IND	8	15	51	0.28	0.69	5	20	54	0.37	0.65
FDK	6	14	80	0.17	0.50	2	17	80	0.21	0.30
ISK	6	25	55	0.45	0.73	2	39	38	1.03	0.67
DON	4	9	21	0.43	0.63	2	6.6	7.3	0.90	0.64

Table 7a. Best and worst entries in the 2011-2012 NUWWSN

NAME	INC	SEV	IND	FDK	ISK	DON	GHSEV	HD	HGT	#l	#h
MD08-22-1-6-2	20.4 l	7.4 l	1.9 l	5.7 l	10.0 l	1.8 l	13.9 l	136	34	7	0
MD08-22-32	21.5 l	8.1 l	2.0 l	9.7 l	11.4 l	1.9 l	10.0 l	134	35	7	0
IL07-4415	22.2 l	5.1 l	2.1 l	9.6 l	12.8 l	1.9 l	11.7 l	130 l	35	7	0
IL07-19334	25.2 l	6.5 l	2.5 l	5.3 l	11.5 l	4.7 l	8.3 l	134	38	7	0
MO091068	19.3 l	10.0 l	2.9 l	11.0 l	13.9 l	4.4 l	8.2 l	133	35	7	0
M08-8214	28.2 l	7.2 l	3.0 l	6.5 l	13.8 l	4.2 l	24.3 l	131 l	40	7	0
MO090932	21.7 l	8.4 l	3.1 l	7.5 l	10.4 l	7.8 l	6.0 l	139	41	7	0
IL06-13721	21.3 l	9.5 l	3.5 l	11.1 l	15.9 l	2.7 l	19.0 l	129 l	35	7	0
LCS19103	23.1 l	9.5 l	3.8 l	11.2 l	16.3 l	2.8 l	17.9 l	131 l	40	7	0
IL06-23571	33.0 l	11.3 l	5.2 l	7.0 l	16.6 l	2.6 l	11.8 l	129 l	37	7	0
M08-8036#	35.9 l	13.1 l	5.3 l	9.1 l	18.7 l	3.6 l	21.0 l	130 l	35	7	0
LCS19214	34.2 l	11.1 l	5.7 l	7.7 l	18.5 l	3.4 l	38.0 hl	131 l	35	7	1
MO081320	24.6 l	7.2 l	6.3 l	10.3 l	17.8 l	4.5 l	34.3 hl	131 l	37	7	1
MO090478	24.9 l	13.0 l	6.3 l	13.8 l	18.2 l	4.5 l	19.0 l	129 l	33	7	0
TRUMAN	21.2 l	6.0 l	3.8 l	8.5 l	12.8 l	8.3	8.5 l	139	41	6	0
NW10401	25.9 l	14.0 l	5.0 l	10.5 l	15.9 l	6.6 l	63.0 h	131 l	38	6	1
LCS19209	33.9 l	11.0 l	6.1 l	8.8 l	19.3	4.1 l	24.8 l	131 l	35	6	0
ERNIE	26.5 l	9.6 l	6.4 l	14.2 l	19.7	7.5 l	17.8 l	129 l	34	6	0
LCS19104	27.1 l	16.7	6.6 l	12.7 l	18.0 l	3.7 l	15.8 l	132	40	6	0
OH07-166-41	28.3 l	15.2 l	6.7 l	7.5 l	18.0 l	5.1 l	57.9 h	134	38	6	1
LCS19231	34.6 l	18.5	7.5 l	10.1 l	19.0 l	5.4 l	33.8 hl	133	43	6	1
KY03C-1224-10-12-3	29.1 l	15.4 l	7.9 l	10.5 l	17.3 l	8.5	8.5 l	134	32 l	6	0
NE10514	28.8 l	12.5 l	5.6 l	17.8	18.6 l	12.1	23.3 l	138	38	5	0
OH05-200-74	31.9 l	7.3 l	5.7 l	15.9	20.2	8.1 l	15.4 l	136	38	5	0
VA09W-52	36.5	13.1 l	8.2 l	8.3 l	20.1	3.4 l	24.6 l	130 l	34	5	0
P0537A1-3-12	34.5 l	17.4	8.4 l	15.6 l	23.3	7.2 l	21.2 l	132	35	5	0
OH08-133-25	43.0 h	26.1 h	15.1	21.7 h	31.9 h	8.7	51.4 h	132	37	0	5
PIONEER2545	54.4 h	32.6 h	28.1 h	23.2 h	40.7 h	17.3	58.7 h	135	38	0	6
AVERAGE	34.9	16.2	8.7	14.6	22.1	8.7	26.9	134	37		
MINUMUM	19.3	5.1	1.9	5.3	10.0	1.8	5.3	129	29		
MAXIMUM	54.4	33.6	28.1	29.0	40.7	26.1	63.0	143	47		
LSD(0.05)	16.9	11.1	7.3	10.3	9.3	6.4	34.1	3	3		
# LOCATIONS	7	7	8	6	6	4	2	6	2		

Table 7b. Best and worst entries in the 2011-2012 NUWWSN

NAME	INC		SEV		IND		FDK		ISK		DON		GH		HG		HGT	#l	#h
P0762A1-2-8	23.7	l	4.0	l	2.2	l	8.3	l	20.0	l	3.2	l	11.4	l	135	l	34	7	0
MO101259	30.0	l	7.9	l	2.6	l	11.1	hl	17.2	l	5.2	l	16.8	l	140	h	42	7	1
KY04C-2150-66-16-5	33.7	l	6.4	l	3.1	l	7.6	l	22.2	l	2.9	l	17.1	l	139	h	35	7	0
MO100295	29.0	l	12.3	l	3.9	l	4.5	l	18.6	l	3.7	l	30.6	hl	136		43	7	1
MO100314	33.9	l	8.8	l	4.0	l	5.9	l	18.6	l	2.3	l	6.9	l	138		50	7	0
MO081765	32.3	l	9.7	l	4.2	l	7.7	l	22.8	l	1.7	l	9.8	l	136		37	7	0
MO100532	32.6	l	11.5	l	4.5	l	3.7	l	20.1	l	2.2	l	24.8	l	134	l	41	7	0
VA10W-617	26.4	l	11.2	l	5.0	l	3.7	l	19.0	l	2.5	l	22.8	l	134	l	37	7	0
KY04C-2150-64-16-1	42.4	l	10.6	l	5.2	l	8.7	l	24.8	l	3.6	l	13.4	l	138		38	7	0
IL07-20743	34.4	l	9.1	l	5.3	l	7.5	l	22.8	l	4.5	l	26.4	l	137		39	7	0
MO101235	32.4	l	13.7	l	5.5	l	5.1	l	19.2	l	4.8	l	14.5	l	136		40	7	0
IL07-21847	32.5	l	9.7	l	5.8	l	13.5	hl	22.6	l	2.3	l	21.5	l	134	l	38	7	1
P05247A1-7-3-27	39.8	l	8.4	l	5.9	l	17.4	hl	28.1	l	5.2	l	35.4	hl	134	l	34	7	2
VA09W-608	31.7	l	12.4	l	5.9	l	9.6	l	23.0	l	1.6	l	10.3	l	134	l	35	7	0
IL08-33373	39.4	l	6.6	l	6.1	l	15.2	hl	24.8	l	2.7	l	10.6	l	140	h	40	7	1
TRUMAN	42.4	l	15.8	l	6.2	l	4.8	l	23.7	l	6.5	l	7.9	l	142	h	41	7	0
IL07-20728	40.5	l	14.8	l	6.3	l	3.4	l	20.4	l	2.0	l	30.0	hl	137		38	7	1
IL08-22206	35.6	l	8.1	l	6.6	l	4.8	l	24.3	l	1.8	l	23.8	l	134	l	37	7	0
MO100410	33.7	l	7.8	l	6.9	l	7.4	l	21.3	l	5.3	l	6.9	l	142	h	51	7	0
IL08-8844	35.3	l	17.5	l	7.1	l	9.0	l	22.2	l	3.3	l	19.0	l	134	l	39	7	0
VA09W-654	28.6	l	14.0	l	7.7	l	4.7	l	18.3	l	2.1	l	33.0	hl	139		43	7	1
VA08W-613	33.6	l	9.0	l	8.0	l	18.2	hl	30.0	l	4.7	l	13.3	l	132	l	35	7	1
P07287RA1-14	29.9	l	11.9	l	5.3	l	17.4	hl	27.4	l	3.5	l	47.0	h	133	l	34	6	2
M09-9811#	36.8	l	20.8	h	6.2	l	8.1	l	23.4	l	3.1	l	21.4	l	135		40	6	1
KY04C-2150-64-17-1	48.7	h	9.2	l	6.8	l	5.3	l	28.5	l	4.8	l	15.5	l	139		36	6	1
ERNIE	36.3	l	7.6	l	8.8	l	11.7	hl	27.7	l	5.3	l	16.9	l	133	l	35	6	0
P0566A1-3-1-65	48.9	h	18.2	l	9.6	l	5.3	l	32.8	h	5.5	l	13.6	l	133	l	36	5	2
VA10W-28	44.5		26.9	h	11.2	l	3.4	l	30.2	l	2.0	l	22.0	l	133	l	34	5	1
P05247A1-7-7-3-1	54.8	h	18.0	l	11.3	l	10.9	hl	34.4	h	5.4	l	34.6	hl	140	h	38	5	3
OH08-172-42	52.5	h	20.6	h	12.7		20.2	hl	34.2	h	7.8		36.4	hl	137		41	2	5
OH07-254-11	50.3	h	28.6	h	12.9		24.4	h	36.3	h	12.8	h	26.5	l	135		37	1	5
OH08-180-48	52.5	h	14.1	l	13.8		19.9	hl	39.6	h	11.2	h	37.8	hl	138		35	3	5
FREEDOM	53.7	h	25.6	h	20.0	h	23.8	h	38.6	h	6.2	l	13.2	l	139		38	2	5
F0038	56.7	h	29.1	h	20.2	h	15.3	hl	36.3	h	13.1	h	30.3	hl	139		38	1	6
PIONEER2545	67.7	h	25.0	h	26.6	h	25.9	h	45.3	h	12.8	h	22.6	l	138		39	1	6
F0014	61.0	h	33.2	h	28.0	h	25.3	h	45.3	h	15.3	h	22.9	l	137		35	1	6
AVERAGE	42.6		16.1		9.5		12.9		28.7		5.3		22.8		137		38		
MINUMUM	23.7		4.0		2.2		3.4		17.2		1.6		6.9		132		27		
MAXIMUM	67.7		33.2		28.0		28.4		45.3		15.3		60.6		142		51		
LSD(0.05)	19.2		14.7		9.3		17.8		14.8		5.3		32.6		3		.		
# LOCATIONS	4.0		4.0		5.0		2.0		2.0		2.0		2.0		4		1		

Table 8. Summary of all FHB traits from the 2011-2012 NUWWSN: " h" and "l" indicate means that are not significantly different from the highest (h) or lowest (l) mean in that column.

NAME	INC	SEV	IND	FDK	ISK	DON	GHSEV	HD	HGT	#l	#h
ERNIE	26.5 l	9.6 l	6.4 l	14.2 l	19.7	7.5 l	17.8 l	129 l	34	6	0
FREEDOM	46.0 h	20.5	14.2	13.3 l	27.4	6.9 l	7.6 l	134	38	3	1
TRUMAN	21.2 l	6.0 l	3.8 l	8.5 l	12.8 l	8.3	8.5 l	139	41	6	0
PIONEER2545	54.4 h	32.6 h	28.1 h	23.2 h	40.7 h	17.3	58.7 h	135	38	0	6
NY103-208-7263	43.1 h	24.9 h	13.6	16.9	26.4	18.2	14.8 l	143 h	43	1	2
NY94052-3329	49.2 h	25.5 h	16.9	21.5 h	31.3	26.1 h	21.3 l	142 h	39	1	4
NY05072&75-1	39.2 h	22.7 h	12.1	20.7 h	25.3	10.4	25.8 l	143 h	47 h	1	3
KWS007	45.4 h	25.1 h	14.8	16.4	29.4	13.2	44.5 h	136	38	0	3
KWS001	39.1 h	19.7	11.9	18.5	28.0	13.5	33.8 hl	135	34	1	2
KWS002	42.1 h	19.3	9.1 l	15.7	24.9	10.1	9.9 l	136	39	2	1
KWS003	41.0 h	17.4	8.1 l	13.2 l	22.5	6.3 l	23.6 l	136	34	4	1
LCS19214	34.2 l	11.1 l	5.7 l	7.7 l	18.5 l	3.4 l	38.0 hl	131 l	35	7	1
LCS19209	33.9 l	11.0 l	6.1 l	8.8 l	19.3	4.1 l	24.8 l	131 l	35	6	0
LCS19231	34.6 l	18.5	7.5 l	10.1 l	19.0 l	5.4 l	33.8 hl	133	43	6	1
LCS19103	23.1 l	9.5 l	3.8 l	11.2 l	16.3 l	2.8 l	17.9 l	131 l	40	7	0
LCS19104	27.1 l	16.7	6.6 l	12.7 l	18.0 l	3.7 l	15.8 l	132	40	6	0
E9021R	42.7 h	27.7 h	13.7	10.0 l	25.7	8.3	45.3 h	133	39	1	3
OH05-200-74	31.9 l	7.3 l	5.7 l	15.9	20.2	8.1 l	15.4 l	136	38	5	0
OH06-159-6	29.7 l	10.4 l	5.2 l	18.6	20.8	8 l	62.3 h	130 l	35	4	1
F0065	46.3 h	33.6 h	20.5	14.9 l	33.6 h	11.7	55.7 h	134	37	1	4
OH08-133-25	43.0 h	26.1 h	15.1	21.7 h	31.9 h	8.7	51.4 h	132	37	0	5
OH06-180-57	38.4 h	21.6	15.0	12.3 l	27.0	10.9	56.9 h	134	37	1	2
OH07-166-41	28.3 l	15.2 l	6.7 l	7.5 l	18.0 l	5.1 l	57.9 h	134	38	6	1
OH07-263-3	40.9 h	17.7	11.6	8.7 l	22.5	6.1 l	47.1 h	131 l	38	2	2
P04606RA1-1-7-1-6	45.9 h	12.1 l	10.0	16.5	26.3	17.7	5.3 l	136	41	2	1
P0537A1-3-12	34.5 l	17.4	8.4 l	15.6 l	23.3	7.2 l	21.2 l	132	35	5	0
P0566A1-3-1-67	38.0 h	11.5 l	7.1 l	20.3 h	25.1	5.6 l	8.6 l	130 l	33	4	2
P05222A1-1-2-7	39.2 h	11.3 l	7.5 l	18.2	24.5	9.5	30.1 hl	130 l	29 l	3	2
MH07-7483	40.4 h	18.1	9.9	20.6 h	27.3	14.9	27.1 l	134	36	1	2
MH07-7474	34.3 l	19.7	8.4 l	14.0 l	21.5	9.3	35.3 hl	134	36	4	1
M08-8036#	35.9 l	13.1 l	5.3 l	9.1 l	18.7 l	3.6 l	21.0 l	130 l	35	7	0
M08-8214	28.2 l	7.2 l	3.0 l	6.5 l	13.8 l	4.2 l	24.3 l	131 l	40	7	0
DH1-46	33.6 l	15.4 l	10.4	23.4 h	25.4	13.9	53.8 h	141	42	2	2
DH1-62	43.7 h	26.1 h	13.6	25.6 h	29.4	19.4	13.0 l	143 h	42	1	3
DH2-4	34.5 l	18.8	7.9 l	29.0 h	24.0	16.6	7.7 l	141 h	38	3	1
DH2-45	44.7 h	22.2	13.7	22.7 h	29.8	12.9	37.3 hl	134	36	1	3
DH5-56	37.8 h	26.0 h	12.9	19.9 h	30.0	7.8 l	34.2 hl	136	38	2	4
IL06-13721	21.3 l	9.5 l	3.5 l	11.1 l	15.9 l	2.7 l	19.0 l	129 l	35	7	0
IL06-23571	33.0 l	11.3 l	5.2 l	7.0 l	16.6 l	2.6 l	11.8 l	129 l	37	7	0
IL07-4415	22.2 l	5.1 l	2.1 l	9.6 l	12.8 l	1.9 l	11.7 l	130 l	35	7	0
IL07-19334	25.2 l	6.5 l	2.5 l	5.3 l	11.5 l	4.7 l	8.3 l	134	38	7	0
KY04C-2004-1-1-3	37.3	18.6	8.4 l	20.0 h	24.5	9.4	9.8 l	135	37	2	1
KY03C-1224-10-12-3	29.1 l	15.4 l	7.9 l	10.5 l	17.3 l	8.5	8.5 l	134	32 l	6	0
KY03C-1195-10-8-5	50.2 h	12.7 l	10.6	15.2 l	26.3	9.9	9.8 l	136	35	3	1
KY04C-2031-29-7-3	36.8	20.9	10.9	9.7 l	22.5	7.4 l	39.4 h	133	33	2	1
MD08-22-1-6-2	20.4 l	7.4 l	1.9 l	5.7 l	10.0 l	1.8 l	13.9 l	136	34	7	0
MD08-22-32	21.5 l	8.1 l	2.0 l	9.7 l	11.4 l	1.9 l	10.0 l	134	35	7	0
MO090932	21.7 l	8.4 l	3.1 l	7.5 l	10.4 l	7.8 l	6.0 l	139	41	7	0
MO081320	24.6 l	7.2 l	6.3 l	10.3 l	17.8 l	4.5 l	34.3 hl	131 l	37	7	1
MO090478	24.9 l	13.0 l	6.3 l	13.8 l	18.2 l	4.5 l	19.0 l	129 l	33	7	0
MO091068	19.3 l	10.0 l	2.9 l	11.0 l	13.9 l	4.4 l	8.2 l	133	35	7	0
NE10514	28.8 l	12.5 l	5.6 l	17.8	18.6 l	12.1	23.3 l	138	38	5	0
NE10449	32.2 l	16.3	7.8 l	26.2 h	25.9	14.2	33.3 hl	138	41	3	2
NW03666	38.0 h	15.1 l	8.0 l	18.3	22.9	16.7	27.0 l	136	40	3	1
NW10401	25.9 l	14.0 l	5.0 l	10.5 l	15.9 l	6.6 l	63.0 h	131 l	38	6	1
NE10418	36.4	17.7	7.0 l	17.1	22.7	9.2	26.2 l	130 l	40	2	0
VA09W-52	36.5	13.1 l	8.2 l	8.3 l	20.1	3.4 l	24.6 l	130 l	34	5	0
VA09W-73	41.3 h	22.5 h	10.2	16.7	24.6	4.7 l	25.0 l	131 l	35	2	2
VA10W-21	34.3 l	17.1	8.3 l	12.5 l	21.2	5.6 l	42.3 h	131 l	34	4	1
VA09W-75	42.8 h	22.8 h	10.7	17.8	25.4	8.4	32.1 hl	133	36	1	3
AVERAGE	34.9	16.2	8.7	14.6	22.1	8.7	26.9	134	37		
MINUMUM	19.3	5.1	1.9	5.3	10.0	1.8	5.3	129	29		
MAXIMUM	54.4	33.6	28.1	29.0	40.7	26.1	63.0	143	47		
LSD(0.05)	16.9	11.1	7.3	10.3	9.3	6.4	34.1	3	3		
# LOCATIONS	7	7	8	6	6	4	2	6	2		

Table 9. Summary of all FHB traits from the 2011-2012 PNUWWSN: " h" and "l" indicate means that are not significantly different from the highest (h) or lowest (l) mean in that column.

NAME	INC	SEV	IND	FDK	ISK	DON	GH	HD	HGT	#l	#h
ERNIE	36.3 l	7.6 l	8.8 l	11.7 hl	27.7 l	5.3 l	16.9 l	133 l	35	6	0
FREEDOM	53.7 h	25.6 h	20.0 h	23.8 h	38.6 h	6.2 l	13.2 l	139	38	2	5
TRUMAN	42.4 l	15.8 l	6.2 l	4.8 l	23.7 l	6.5 l	7.9 l	142 h	41	7	0
PIONEER2545	67.7 h	25.0 h	26.6 h	25.9 h	45.3 h	12.8 h	22.6 l	138	39	1	6
KWS006	39.2 l	8.0 l	12.1	26.3 h	28.2 l	8.8	9.6 l	136	38	4	1
KWS004	36.6 l	25.9 h	11.2 l	26.0 h	32.0 hl	4.0 l	60.6 h	136	41	4	4
KWS005	48.4	24.6 h	10.6 l	28.4 h	39.1 h	4.9 l	30.1 hl	140 h	40	3	4
F0051R	57.5 h	20.0 h	11.1 l	12.5 hl	37.5 h	6.9 l	14.6 l	140 h	38	4	4
F0014	61.0 h	33.2 h	28.0 h	25.3 h	45.3 h	15.3 h	22.9 l	137	35	1	6
F0038	56.7 h	29.1 h	20.2 h	15.3 hl	36.3 h	13.1 h	30.3 hl	139	38	1	6
F0036R	52.6 h	28.2 h	17.4	16.3 hl	36.4 h	10.5 h	22.9 l	137	35	1	4
OH08-172-42	51.1 h	16.6 l	12.3	16.2 hl	31.9 hl	7.2	15.3 l	137	39	4	3
7x831-1-I-03Ser (2)	45.5	15.2 l	9.0 l	14.6 hl	31.7 hl	8.1	40.3 h	141 h	47	4	2
OH08-172-42	52.5 h	20.6 h	12.7	20.2 hl	34.2 h	7.8	36.4 hl	137	41	2	5
OH08-180-48	52.5 h	14.1 l	13.8	19.9 hl	39.6 h	11.2 h	37.8 hl	138	35	3	5
OH08-269-58	46.0	17.9 l	15.6	14.5 hl	28.9 l	7.5	43.3 h	137	41	3	2
OH07-254-11	50.3 h	28.6 h	12.9	24.4 h	36.3 h	12.8 h	26.5 l	135	37	1	5
P05247A1-7-7-3-1	54.8 h	18.0 l	11.3 l	10.9 hl	34.4 h	5.4 l	34.6 hl	140 h	38	5	3
P0566A1-3-1-65	48.9 h	18.2 l	9.6 l	5.3 l	32.8 h	5.5 l	13.6 l	133 l	36	5	2
P05247A1-7-3-27	39.8 l	8.4 l	5.9 l	17.4 hl	28.1 l	5.2 l	35.4 hl	134 l	34	7	2
P05247A1-7-3-120	48.6 h	16.0 l	10.2 l	16.2 hl	34.3 h	5.8 l	46.7 h	134 l	34	4	4
P0762A1-2-8	23.7 l	4.0 l	2.2 l	8.3 l	20.0 l	3.2 l	11.4 l	135 l	34	7	0
P07287RA1-14	29.9 l	11.9 l	5.3 l	17.4 hl	27.4 l	3.5 l	47.0 h	133 l	34	6	2
M09-9811#	36.8 l	20.8 h	6.2 l	8.1 l	23.4 l	3.1 l	21.4 l	135	40	6	1
M09-9826#	46.1	9.7 l	8.6 l	25.5 h	34.9 h	4.8 l	16.0 l	134 l	34	4	2
IL07-21847	32.5 l	9.7 l	5.8 l	13.5 hl	22.6 l	2.3 l	21.5 l	134 l	38	7	1
IL08-8844	35.3 l	17.5 l	7.1 l	9.0 l	22.2 l	3.3 l	19.0 l	134 l	39	7	0
IL08-22206	35.6 l	8.1 l	6.6 l	4.8 l	24.3 l	1.8 l	23.8 l	134 l	37	7	0
IL08-33373	39.4 l	6.6 l	6.1 l	15.2 hl	24.8 l	2.7 l	10.6 l	140 h	40	7	1
IL07-20728	40.5 l	14.8 l	6.3 l	3.4 l	20.4 l	2.0 l	30.0 hl	137	38	7	1
IL07-20743	34.4 l	9.1 l	5.3 l	7.5 l	22.8 l	4.5 l	26.4 l	137	39	7	0
KY04C-2031-29-6-1	58.9 h	27.8 h	10.9 l	22.1 h	37.5 h	5.4 l	25.8 l	140 h	41	3	4
KY03C-2022-16-18-1	61.2 h	25.6 h	10.7 l	13.2 hl	36.8 h	3.7 l	18.4 l	140 h	36	4	4
KY04C-2006-45-5-1	55.4 h	21.0 h	9.7 l	9.5 l	32.8 h	4.0 l	11.0 l	138	40	4	3
KY04C-2150-66-16-5	33.7 l	6.4 l	3.1 l	7.6 l	22.2 l	2.9 l	17.1 l	139 h	35	7	0
KY04C-2150-64-16-1	42.4 l	10.6 l	5.2 l	8.7 l	24.8 l	3.6 l	13.4 l	138	38	7	0
KY04C-2150-64-17-1	48.7 h	9.2 l	6.8 l	5.3 l	28.5 l	4.8 l	15.5 l	139	36	6	1
MO100295	29.0 l	12.3 l	3.9 l	4.5 l	18.6 l	3.7 l	30.6 hl	136	43	7	1
MO101235	32.4 l	13.7 l	5.5 l	5.1 l	19.2 l	4.8 l	14.5 l	136	40	7	0
MO100532	32.6 l	11.5 l	4.5 l	3.7 l	20.1 l	2.2 l	24.8 l	134 l	41	7	0
MO100314	33.9 l	8.8 l	4.0 l	5.9 l	18.6 l	2.3 l	6.9 l	138	50	7	0
MO100410	33.7 l	7.8 l	6.9 l	7.4 l	21.3 l	5.3 l	6.9 l	142 h	51	7	0
MO101259	30.0 l	7.9 l	2.6 l	11.1 hl	17.2 l	5.2 l	16.8 l	140 h	42	7	1
MO081765	32.3 l	9.7 l	4.2 l	7.7 l	22.8 l	1.7 l	9.8 l	136	37	7	0
VA08W-613	33.6 l	9.0 l	8.0 l	18.2 hl	30.0 l	4.7 l	13.3 l	132 l	35	7	1
VA09W-608	31.7 l	12.4 l	5.9 l	9.6 l	23.0 l	1.6 l	10.3 l	134 l	35	7	0
VA10W-663	45.7	28.0 h	13.8	4.0 l	32.1 h	1.8 l	18.2 l	132 l	27	3	2
VA10W-28	44.5	26.9 h	11.2 l	3.4 l	30.2 l	2.0 l	22.0 l	133 l	34	5	1
VA09W-654	28.6 l	14.0 l	7.7 l	4.7 l	18.3 l	2.1 l	33.0 hl	139	43	7	1
VA10W-617	26.4 l	11.2 l	5.0 l	3.7 l	19.0 l	2.5 l	22.8 l	134 l	37	7	0
AVERAGE	42.6	16.1	9.5	12.9	28.7	5.3	22.8	137	38		
MINUMUM	23.7	4.0	2.2	3.4	17.2	1.6	6.9	132	27		
MAXIMUM	67.7	33.2	28.0	28.4	45.3	15.3	60.6	142	51		
LSD(0.05)	19.2	14.7	9.3	17.8	14.8	5.3	32.6	3			
# LOCATIONS	4	4	5	2	2	2	2	4	1		

Table 10. Summary of incidence (INC, %) from 2011-12 NUWWSN.

NAME	AVG		KYLEX	MDSAL	MIELA	MOCOL	NEMEA	NYITH	VABLA
ERNIE	26.5	l	20.0	35.0	0.3	77.5	7.0	23.0	22.5
FREEDOM	46.0	h	25.0	65.0	18.2	87.5	47.0	29.0	50.0
TRUMAN	21.2	l	40.0	25.0	0.4	17.5	13.0	10.0	42.5
PIONEER2545	54.4	h	60.0	80.0	17.7	97.0	10.0	51.0	65.0
NY103-208-7263	43.1	h	70.0	25.0	14.1	90.0	17.0	18.0	67.5
NY94052-3329	49.2	h	65.0	40.0	20.1	90.0	10.0	32.0	87.5
NY05072&75-1	39.2	h	35.0	20.0	9.2	99.0	17.0	17.0	77.5
KWS007	45.4	h	45.0	55.0	10.5	87.5	47.0	20.0	52.5
KWS001	39.1	h	50.0	45.0	10.8	70.0	53.0	10.0	35.0
KWS002	42.1	h	70.0	45.0	9.5	77.5	27.0	16.0	50.0
KWS003	41.0	h	65.0	45.0	12.7	72.5	27.0	20.0	45.0
LCS19214	34.2	l	25.0	50.0	0.8	90.0	33.0	18.0	22.5
LCS19209	33.9	l	25.0	45.0	3.2	94.5	33.0	24.0	12.5
LCS19231	34.6	l	35.0	40.0	12.2	82.5	13.0	17.0	42.5
LCS19103	23.1	l	20.0	22.5	2.4	55.0	47.0	7.0	7.5
LCS19104	27.1	l	25.0	35.0	20.9	80.0	3.0	6.0	20.0
E9021R	42.7	h	55.0	50.0	16.3	80.0	50.0	15.0	32.5
OH05-200-74	31.9	l	45.0	65.0	0.0	67.5	0.0	6.0	40.0
OH06-159-6	29.7	l	25.0	25.0	6.8	75.0	27.0	19.0	30.0
F0065	46.3	h	60.0	65.0	18.4	87.0	27.0	34.0	32.5
OH08-133-25	43.0	h	35.0	70.0	8.7	92.5	50.0	17.0	27.5
OH06-180-57	38.4	h	30.0	70.0	11.4	80.0	7.0	33.0	37.5
OH07-166-41	28.3	l	40.0	45.0	3.6	57.5	13.0	14.0	25.0
OH07-263-3	40.9	h	25.0	65.0	6.4	100.0	37.0	8.0	45.0
P04606RA1-1-7-1-6	45.9	h	75.0	60.0	0.0	67.5	30.0	26.0	62.5
P0537A1-3-12	34.5	l	45.0	45.0	7.8	72.5	17.0	37.0	17.5
P0566A1-3-1-67	38.0	h	35.0	70.0	4.4	87.5	20.0	29.0	20.0
P05222A1-1-2-7	39.2	h	40.0	45.0	4.2	95.0	27.0	21.0	42.5
MH07-7483	40.4	h	30.0	80.0	4.6	87.0	30.0	14.0	37.5
MH07-7474	34.3	l	40.0	40.0	10.4	62.5	10.0	27.0	50.0
M08-8036#	35.9	l	30.0	45.0	3.7	80.0	30.0	25.0	37.5
M08-8214	28.2	l	25.0	35.0	2.1	75.0	20.0	23.0	17.5
DH1-46	33.6	l	80.0	40.0	5.7	20.0	10.0	12.0	67.5
DH1-62	43.7	h	60.0	17.5	13.6	92.0	20.0	15.0	87.5
DH2-4	34.5	l	50.0	35.0	17.8	17.5	10.0	26.0	85.0
DH2-45	44.7	h	45.0	75.0	6.8	72.5	27.0	19.0	67.5
DH5-56	37.8	h	65.0	45.0	4.9	70.5	23.0	19.0	37.5
IL06-13721	21.3	l	45.0	12.5	2.9	67.5	10.0	9.0	2.5
IL06-23571	33.0	l	35.0	25.0	10.7	77.5	33.0	12.0	37.5
IL07-4415	22.2	l	20.0	7.5	1.0	70.0	23.0	9.0	25.0
IL07-19334	25.2	l	25.0	22.5	4.7	60.0	17.0	12.0	35.0
KY04C-2004-1-1-3	37.3		30.0	60.0	7.5	62.5	27.0	24.0	50.0
KY03C-1224-10-12-3	29.1	l	35.0	7.5	23.2	82.5	3.0	20.0	32.5
KY03C-1195-10-8-5	50.2	h	95.0	50.0	5.1	67.5	27.0	42.0	65.0
KY04C-2031-29-7-3	36.8		55.0	45.0	10.4	90.0	13.0	14.0	30.0
MD08-22-1-6-2	20.4	l	30.0	7.5	2.9	45.0	27.0	3.0	27.5
MD08-22-32	21.5	l	40.0	12.5	12.3	30.0	20.0	6.0	30.0
MO090932	21.7	l	50.0	10.0	2.2	10.0	13.0	9.0	57.5
MO081320	24.6	l	25.0	30.0	2.6	75.0	10.0	17.0	12.5
MO090478	24.9	l	20.0	20.0	11.4	80.0	3.0	15.0	25.0
MO091068	19.3	l	40.0	25.0	2.4	25.0	17.0	11.0	15.0
NE10514	28.8	l	60.0	25.0	2.2	15.0	17.0	15.0	67.5
NE10449	32.2	l	65.0	55.0	1.6	10.0	17.0	17.0	60.0
NW03666	38.0	h	80.0	47.5	4.7	32.5	13.0	28.0	60.0
NW10401	25.9	l	15.0	35.0	8.6	62.5	30.0	3.0	27.5
NE10418	36.4		45.0	35.0	7.3	82.5	20.0	20.0	45.0
VA09W-52	36.5		50.0	40.0	7.0	97.0	17.0	21.0	23.4
VA09W-73	41.3	h	25.0	30.0	28.8	95.0	33.0	47.0	30.0
VA10W-21	34.3	l	35.0	40.0	11.3	90.0	27.0	19.0	17.5
VA09W-75	42.8	h	35.0	60.0	15.4	99.0	20.0	23.0	47.5
AVERAGE	34.9		42.8	41.0	8.4	70.6	22.1	19.2	40.4
MINUMUM	19.3		15.0	7.5	0.0	10.0	0.0	3.0	2.5
MAXIMUM	54.4		95.0	80.0	28.8	100.0	53.0	51.0	87.5
LSD(0.05)	16.9								

Table 11. Summary of severity (SEV, %) data from the 2011-2012 NUWWSN

NAME	AVG		KYLEX	MDSAL	MIELA	MOCOL	NEMEA	NYITH	VABLA
ERNIE	9.6	l	11.0	25.0	0.6	16.5	0.0	12.0	2.3
FREEDOM	20.5		10.8	37.5	49.2	26.4	4.0	9.0	6.3
TRUMAN	6.0	l	17.3	7.5	0.0	1.7	1.0	9.0	5.6
PIONEER2545	32.6	h	34.3	60.0	34.4	66.7	1.0	21.0	10.7
NY103-208-7263	24.9	h	32.4	12.5	85.8	19.1	1.0	12.0	11.8
NY94052-3329	25.5	h	29.3	25.0	49.8	16.8	1.0	33.0	23.4
NY05072&75-1	22.7	h	24.4	17.5	48.6	30.2	1.0	25.0	12.1
KWS007	25.1	h	20.3	32.5	50.9	48.2	3.0	14.0	7.1
KWS001	19.7		22.8	30.0	51.5	18.3	3.0	8.0	4.6
KWS002	19.3		26.4	25.0	45.1	14.9	1.0	15.0	7.5
KWS003	17.4		22.2	17.5	37.3	21.6	2.0	14.0	7.2
LCS19214	11.1	l	10.7	25.0	4.7	21.8	2.0	10.0	3.5
LCS19209	11.0	l	8.6	25.0	4.7	23.7	3.0	11.0	0.9
LCS19231	18.5		11.3	22.5	56.4	22.5	1.0	11.0	4.5
LCS19103	9.5	l	6.9	20.0	9.2	18.2	3.0	8.0	1.1
LCS19104	16.7		11.4	25.0	42.7	20.3	0.0	14.0	3.4
E9021R	27.7	h	29.5	40.0	61.6	40.5	3.0	9.0	10.1
OH05-200-74	7.3	l	12.3	20.0	0.3	7.1	0.0	7.0	4.7
OH06-159-6	10.4	l	9.4	20.0	11.5	16.7	2.0	8.0	5
F0065	33.6	h	26.9	40.0	83.5	45.1	2.0	34.0	3.4
OH08-133-25	26.1	h	15.3	37.5	32.3	65.9	3.0	25.0	3.5
OH06-180-57	21.6		17.0	32.5	39.7	33.8	3.0	20.0	4.9
OH07-166-41	15.2	l	18.2	22.5	21.2	22.8	0.0	17.0	4.6
OH07-263-3	17.7		10.4	40.0	27.1	35.0	1.0	5.0	5.4
P04606RA1-1-7-1-6	12.1	l	25.4	20.0	0.0	20.8	3.0	9.0	6.8
P0537A1-3-12	17.4		11.9	25.0	46.2	20.4	3.0	13.0	2.6
P0566A1-3-1-67	11.5	l	9.9	25.0	8.4	24.9	1.0	10.0	1.6
P05222A1-1-2-7	11.3	l	14.6	25.0	5.1	19.2	1.0	10.0	4.4
MH07-7483	18.1		19.3	45.0	24.8	17.7	2.0	13.0	5
MH07-7474	19.7		12.1	40.0	32.1	24.5	2.0	18.0	9
M08-8036#	13.1	l	10.1	30.0	20.1	13.8	1.0	12.0	4.6
M08-8214	7.2	l	7.7	12.5	6.4	10.0	2.0	10.0	1.6
DH1-46	15.4	l	35.5	20.0	26.1	2.3	1.0	13.0	9.9
DH1-62	26.1	h	33.5	15.0	86.3	20.7	1.0	12.0	14.5
DH2-4	18.8		25.3	15.0	65.7	1.1	1.0	12.0	11.3
DH2-45	22.2		13.4	50.0	31.8	29.4	1.0	15.0	14.8
DH5-56	26.0	h	30.8	50.0	42.9	23.7	1.0	28.0	5.8
IL06-13721	9.5	l	12.0	12.5	15.0	7.9	1.0	18.0	0.4
IL06-23571	11.3	l	7.1	25.0	15.6	11.3	1.0	15.0	4.4
IL07-4415	5.1	l	7.6	5.0	2.6	6.6	5.0	6.0	3.2
IL07-19334	6.5	l	9.0	5.0	9.8	9.9	1.0	7.0	3.5
KY04C-2004-1-1-3	18.6		15.7	25.0	42.6	23.2	1.0	15.0	7.9
KY03C-1224-10-12-3	15.4	l	15.4	17.5	28.5	32.9	1.0	8.0	4.2
KY03C-1195-10-8-5	12.7	l	33.7	17.5	8.0	9.7	0.0	9.0	11.2
KY04C-2031-29-7-3	20.9		22.4	35.0	26.9	41.7	2.0	14.0	4.2
MD08-22-1-6-2	7.4	l	9.8	5.0	25.1	6.0	1.0	2.0	2.6
MD08-22-32	8.1	l	10.6	5.0	24.3	7.4	2.0	4.0	3.7
MO090932	8.4	l	18.7	5.0	18.4	0.5	1.0	7.0	8.5
MO081320	7.2	l	12.5	15.0	5.2	10.4	1.0	5.0	1.4
MO090478	13.0	l	13.8	12.5	24.0	19.7	1.0	16.0	4.1
MO091068	10.0	l	12.6	22.5	17.3	2.7	0.0	13.0	1.6
NE10514	12.5	l	23.4	17.5	25.9	3.2	1.0	8.0	8.2
NE10449	16.3		29.1	37.5	11.2	2.5	1.0	25.0	7.8
NW03666	15.1	l	25.6	22.5	30.1	7.7	1.0	10.0	8.9
NW10401	14.0	l	15.7	20.0	24.2	30.2	1.0	4.0	3
NE10418	17.7		14.6	30.0	25.6	34.3	2.0	12.0	5.1
VA09W-52	13.1	l	13.0	17.5	23.7	27.1	1.0	7.0	2.7
VA09W-73	22.5	h	11.2	15.0	70.5	28.1	1.0	29.0	3
VA10W-21	17.1		11.7	17.5	51.8	25.1	2.0	10.0	1.4
VA09W-75	22.8	h	15.4	40.0	55.8	28.7	1.0	13.0	5.4
AVERAGE	16.2		17.5	24.3	30.4	21.0	1.5	13.1	5.9
MINUMUM	5.1		6.9	5.0	0.0	0.5	0.0	2.0	0.4
MAXIMUM	33.6		35.5	60.0	86.3	66.7	5.0	34.0	23.4
LSD(0.05)	11.1								

Table 12. Summary of index (IND, %) data from the 2011-12 NUWWSN.

NAME	AVG		KYLEX	MDSAL	MIELA	MOCOL	NEMEA	NYITH	OHWOO	VABLA
ERNIE	6.4	l	2.2	9.0	0.5	13.2	0.0	3.0	22.8	0.8
FREEDOM	14.2		2.7	24.0	9.6	23.3	1.9	3.0	45.6	3.5
TRUMAN	3.8	l	6.9	1.8	0.2	0.3	0.1	1.0	17.6	2.4
PIONEER2545	28.1	h	20.6	48.0	7.4	65.3	0.1	11.0	64.4	7.7
NY103-208-7263	13.6		22.7	3.0	13.1	17.2	0.2	2.0	41.1	9.2
NY94052-3329	16.9		19.0	10.0	14.3	15.2	0.1	11.0	45.0	20.9
NY05072&75-1	12.1		8.5	3.5	6.7	30.2	0.2	4.0	34.1	9.8
KWS007	14.8		9.1	18.3	5.7	41.8	1.4	3.0	35.6	3.7
KWS001	11.9		11.4	13.5	6.2	14.0	1.6	1.0	45.6	1.6
KWS002	9.1	l	18.5	12.0	4.2	11.8	0.3	2.0	20.0	3.8
KWS003	8.1	l	14.4	8.3	7.3	16.1	0.5	3.0	12.1	3.4
LCS19214	5.7	l	2.7	12.0	0.0	19.8	0.7	2.0	7.4	0.8
LCS19209	6.1	l	2.1	11.5	0.4	22.6	1.0	3.0	7.7	0.1
LCS19231	7.5	l	4.0	9.0	6.3	18.5	0.1	2.0	18.3	1.9
LCS19103	3.8	l	1.4	4.5	0.3	10.7	1.4	1.0	11.3	0.1
LCS19104	6.6	l	2.8	8.5	8.5	16.3	0.0	1.0	15.2	0.7
E9021R	13.7		16.2	20.0	10.2	32.0	1.5	1.0	24.4	3.9
OH05-200-74	5.7	l	5.5	13.3	0.0	4.8	0.0	0.0	20.2	1.9
OH06-159-6	5.2	l	2.3	4.8	1.1	12.8	0.5	2.0	16.7	1.5
F0065	20.5		16.2	26.0	14.9	39.0	0.5	11.0	55.6	1.1
OH08-133-25	15.1		5.3	25.0	3.0	61.4	1.5	4.0	19.7	1
OH06-180-57	15.0		5.1	22.8	4.2	27.9	0.2	7.0	51.1	2
OH07-166-41	6.7	l	7.3	8.3	1.4	13.6	0.0	2.0	19.4	1.7
OH07-263-3	11.6		2.6	26.0	1.8	35.3	0.4	0.0	23.9	2.4
P04606RA1-1-7-1-6	10.0		19.0	14.0	0.0	17.0	0.9	2.0	22.3	4.6
P0537A1-3-12	8.4	l	5.3	11.8	3.5	18.5	0.5	5.0	21.7	0.7
P0566A1-3-1-67	7.1	l	3.5	17.0	0.8	21.8	0.2	3.0	10.0	0.3
P05222A1-1-2-7	7.5	l	5.8	12.0	0.8	18.3	0.3	2.0	18.9	2.1
MH07-7483	9.9		5.8	36.0	1.6	15.4	0.6	2.0	16.3	1.9
MH07-7474	8.4	l	4.8	16.0	5.2	15.6	0.2	5.0	15.8	4.8
M08-8036#	5.3	l	3.0	14.0	0.1	11.1	0.3	3.0	8.8	1.8
M08-8214	3.0	l	1.9	4.3	0.6	7.3	0.4	2.0	7.0	0.3
DH1-46	10.4		28.4	8.0	2.4	0.6	0.1	2.0	34.7	6.7
DH1-62	13.6		20.1	2.8	11.6	19.4	0.2	2.0	40.2	12.7
DH2-4	7.9	l	12.6	5.0	11.2	0.2	0.1	3.0	21.7	9.7
DH2-45	13.7		6.0	38.0	2.4	21.2	0.3	3.0	28.9	10
DH5-56	12.9		20.0	22.5	2.5	18.8	0.2	5.0	32.2	2.2
IL06-13721	3.5	l	5.4	2.1	0.6	5.3	0.1	2.0	12.2	0
IL06-23571	5.2	l	2.5	7.0	4.8	10.1	0.3	2.0	13.3	1.9
IL07-4415	2.1	l	1.5	0.4	0.0	4.7	1.2	1.0	7.1	0.9
IL07-19334	2.5	l	2.2	1.1	1.2	6.0	0.2	1.0	6.6	1.3
KY04C-2004-1-1-3	8.4	l	4.7	18.0	2.8	14.9	0.3	4.0	18.2	4.2
KY03C-1224-10-12-3	7.9	l	5.4	1.4	10.7	26.9	0.0	2.0	15.0	1.7
KY03C-1195-10-8-5	10.6		32.0	12.5	1.4	7.9	0.0	4.0	19.4	7.2
KY04C-2031-29-7-3	10.9		12.3	16.0	3.5	37.9	0.3	2.0	14.3	1.2
MD08-22-1-6-2	1.9	l	2.9	0.4	1.1	2.3	0.3	0.0	7.3	0.7
MD08-22-32	2.0	l	4.2	0.6	2.8	2.2	0.4	0.0	4.2	1.2
MO090932	3.1	l	9.4	0.5	1.3	0.1	0.1	1.0	7.3	4.8
MO081320	6.3	l	3.1	5.5	0.0	7.8	0.1	1.0	32.8	0.3
MO090478	6.3	l	2.8	2.3	4.6	16.1	0.0	2.0	21.1	1.7
MO091068	2.9	l	5.1	8.3	1.4	0.7	0.0	1.0	6.3	0.2
NE10514	5.6	l	14.0	4.0	2.1	0.5	0.2	1.0	17.4	5.5
NE10449	7.8	l	18.9	17.5	0.2	0.3	0.2	4.0	16.0	5.3
NW03666	8.0	l	20.5	14.8	2.0	2.7	0.1	3.0	15.4	5.4
NW10401	5.0	l	2.4	7.3	6.1	17.9	0.3	0.0	4.9	0.8
NE10418	7.0	l	6.6	9.0	1.0	28.3	0.4	2.0	6.1	2.6
VA09W-52	8.2	l	6.5	7.3	3.3	26.4	0.2	2.0	18.9	0.8
VA09W-73	10.2		2.8	4.5	18.5	26.4	0.3	13.0	15.4	0.9
VA10W-21	8.3	l	4.1	7.3	7.1	22.7	0.5	2.0	22.2	0.3
VA09W-75	10.7		5.4	26.0	8.8	28.7	0.2	3.0	10.6	2.6
AVERAGE	8.7		8.7	12.0	4.3	17.4	0.4	2.9	21.1	3.3
MINUMUM	1.9		1.4	0.4	0.0	0.1	0.0	0.0	4.2	0
MAXIMUM	28.1		32.0	48.0	18.5	65.3	1.9	13.0	64.4	20.9
LSD(0.05)	7.3									

Table 13. Summary of Fusarium Damaged Kernel (FDK, %) data from the 2011-2012 NUWWSN.

NAME	AVG		KYLEX	MDSAL	MOCOL	NEMEA	NYITH	OHWOO
ERNIE	14.2	l	5.3	12.9	19.0	0	20	28
FREEDOM	13.3	l	4.0	12.1	19.0	3	30	12
TRUMAN	8.5	l	4.9	7.4	34.0	0	0	5
PIONEER2545	23.2	h	8.5	27.0	9.0	5	45	45
NY103-208-7263	16.9		12.0	20.3	26.0	8	15	20
NY94052-3329	21.5	h	18.3	25.0	29.0	4	25	28
NY05072&75-1	20.7	h	5.1	14.0	45.0	22	15	.
KWS007	16.4		8.7	20.8	14.0	5	15	35
KWS001	18.5		10.0	14.8	9.0	7	25	45
KWS002	15.7		7.5	13.8	6.0	7	40	20
KWS003	13.2	l	3.4	12.0	31.0	10	20	3
LCS19214	7.7	l	3.3	7.0	19.0	5	10	2
LCS19209	8.8	l	2.6	11.3	16.0	10	10	3
LCS19231	10.1	l	1.0	10.5	31.0	3	10	5
LCS19103	11.2	l	1.9	5.3	23.0	19	15	3
LCS19104	12.7	l	2.0	7.5	40.0	12	10	5
E9021R	10.0	l	7.3	10.5	9.0	5	20	8
OH05-200-74	15.9		5.3	17.8	27.0	5	25	15
OH06-159-6	18.6		5.9	10.5	29.0	21	30	15
F0065	14.9	l	5.9	19.3	19.0	7	20	18
OH08-133-25	21.7	h	6.9	15.0	21.0	7	60	20
OH06-180-57	12.3	l	7.4	17.3	7.0	4	20	18
OH07-166-41	7.5	l	2.2	9.8	9.0	4	10	10
OH07-263-3	8.7	l	4.0	11.0	13.0	2	10	12
P04606RA1-1-7-1-6	16.5		11.4	11.3	21.0	5	35	15
P0537A1-3-12	15.6	l	7.1	10.3	38.0	8	15	15
P0566A1-3-1-67	20.3	h	7.2	9.5	11.0	21	55	18
P05222A1-1-2-7	18.2		9.7	8.3	19.0	9	45	18
MH07-7483	20.6	h	6.4	20.0	17.0	12	40	28
MH07-7474	14.0	l	9.2	12.8	13.0	6	25	18
M08-8036#	9.1	l	4.5	9.8	16.0	9	10	5
M08-8214	6.5	l	1.1	7.8	17.0	5	8	.
DH1-46	23.4	h	14.8	13.5	24.0	13	40	35
DH1-62	25.6	h	13.1	16.5	34.0	10	35	45
DH2-4	29.0	h	14.0	14.0	29.0	7	75	35
DH2-45	22.7	h	9.4	34.8	15.0	2	40	35
DH5-56	19.9	h	5.9	13.8	29.0	9	40	22
IL06-13721	11.1	l	2.4	9.5	26.0	9	10	10
IL06-23571	7.0	l	2.7	6.3	5.0	11	10	7
IL07-4415	9.6	l	2.0	5.8	6.0	14	25	5
IL07-19334	5.3	l	1.9	8.0	8.0	4	0	10
KY04C-2004-1-1-3	20.0	h	4.6	12.5	41.0	7	30	25
KY03C-1224-10-12-3	10.5	l	2.5	15.5	13.0	2	15	15
KY03C-1195-10-8-5	15.2	l	5.7	16.5	21.0	6	20	22
KY04C-2031-29-7-3	9.7	l	6.9	8.3	12.0	8	15	8
MD08-22-1-6-2	5.7	l	0.6	3.3	23.0	2	0	5
MD08-22-32	9.7	l	1.0	6.3	41.0	2	5	3
MO090932	7.5	l	5.8	10.3	9.0	5	10	5
MO081320	10.3	l	3.0	12.0	11.0	16	10	10
MO090478	13.8	l	5.0	10.8	8.0	21	30	8
MO091068	11.0	l	2.2	16.8	12.0	10	20	5
NE10514	17.8		8.1	14.5	21.0	8	15	40
NE10449	26.2	h	13.4	24.0	38.0	7	30	45
NW03666	18.3		8.3	23.3	26.0	2	10	40
NW10401	10.5	l	4.1	15.0	16.0	8	10	10
NE10418	17.1		9.5	21.0	3.0	21	30	18
VA09W-52	8.3	l	5.0	8.8	2.0	9	15	10
VA09W-73	16.7		1.9	10.5	34.0	9	30	15
VA10W-21	12.5	l	2.9	7.3	26.0	15	18	.
VA09W-75	17.8		9.4	34.3	21.0	7	30	5
AVERAGE	14.6		6.1	13.6	20.2	8.2	22.5	17.3
MINUMUM	5.3		0.6	3.3	2.0	0	0	2
MAXIMUM	29.0		18.3	34.8	45.0	22	75	45
LSD(0.05)	10.3		.	.	.	.	.	.

Table 14. Summary of INC/SEV/FDK (ISK, %) data from the 2011-2012 NUWWSN

NAME	AVG		KYLEX	MDSAL	MOCOL	NEMEA	NYITH	OHWOO
ERNIE	19.7		12.5	23.2	35.8	2.1	19.7	24.9
FREEDOM	27.4		13.4	35.6	41.8	16.9	24.5	32.2
TRUMAN	12.8	l	20.9	12.7	19.4	4.3	6.8	12.6
PIONEER2545	40.7	h	35.1	52.8	52.7	5.4	41.5	56.6
NY103-208-7263	26.4		38.8	19.4	43.1	8.7	16.1	32.7
NY94052-3329	31.3		38.5	29.5	43.6	5	33	38.2
NY05072&75-1	25.3		22.3	16.9	56.8	14.3	21.1	20.5
KWS007	29.4		25.1	34.6	46.3	17.3	17.8	35.4
KWS001	28.0		28.1	28.4	30.1	19.9	16.2	45.4
KWS002	24.9		34.5	26.5	30.1	11.3	26.7	20
KWS003	22.5		29.8	23.6	40.6	12.9	19.8	8.5
LCS19214	18.5	l	13.1	25.3	41.1	12.7	13.5	5.2
LCS19209	19.3		12.0	25.5	41.9	15.1	15.5	5.8
LCS19231	19.0	l	15.4	23	43.9	5.5	13.4	13
LCS19103	16.3	l	9.5	14.9	31.2	22.9	11.2	8
LCS19104	18.0	l	12.8	21	46.1	5.7	11.3	11.1
E9021R	25.7		31.2	31.2	39.8	18.2	16.1	17.8
OH05-200-74	20.2		20.6	32.6	33.2	2	14.4	18.1
OH06-159-6	20.8		13.6	17.7	39.1	17.3	21.1	16
F0065	33.6	h	31.1	39.2	47.2	11.7	31.7	40.6
OH08-133-25	31.9	h	19.4	38.3	55.9	19	39.1	19.8
OH06-180-57	27.0		18.8	37.7	36.9	4.9	26.1	37.9
OH07-166-41	18.0	l	20.1	24.2	27.7	5.5	15	15.6
OH07-263-3	22.5		13.3	35.9	45.7	12.3	8.6	19.1
P04606RA1-1-7-1-6	26.3		37.2	28.5	34.9	12.2	25.6	19.4
P0537A1-3-12	23.3		21.1	25.1	43.1	9.5	22.1	19
P0566A1-3-1-67	25.1		17.3	32.3	38.1	14.8	34.7	13.2
P05222A1-1-2-7	24.5		21.7	24.3	41.9	12.1	28.3	18.5
MH07-7483	27.3		19.3	45.5	38.2	14.6	25.5	21
MH07-7474	21.5		20.5	29.1	31.3	6.2	25.3	16.7
M08-8036#	18.7	l	14.8	26.4	34.5	13	16.1	7.3
M08-8214	13.8	l	11.0	17.4	32.3	12.8	7.4	.
DH1-46	25.4		44.1	23.4	16.3	8.6	25	34.8
DH1-62	29.4		36.6	16.4	47.4	10.4	23.3	42.1
DH2-4	24.0		30.7	20.6	17.2	6.2	42.4	27
DH2-45	29.8		22.6	51.4	36.6	9.3	27.6	31.3
DH5-56	30.0		34.2	34	39.9	10.9	33.1	28.1
IL06-13721	15.9	l	19.3	11.3	33	7	13.7	11.3
IL06-23571	16.6	l	14.4	17.5	28.6	14.7	13.5	10.8
IL07-4415	12.8	l	9.8	6.1	25.4	14.5	15	6.3
IL07-19334	11.5	l	11.9	11.5	24.2	7.1	6.5	8
KY04C-2004-1-1-3	24.5		17.1	30.5	42.1	11.3	25	20.9
KY03C-1224-10-12-3	17.3	l	17.7	13.7	39.8	2.1	15.4	15
KY03C-1195-10-8-5	26.3		44.3	26.9	31.6	10.5	24	20.4
KY04C-2031-29-7-3	22.5		28.2	27.3	44.3	7.9	15.8	11.8
MD08-22-1-6-2	10.0	l	13.2	5.1	24.5	9.3	1.9	6.4
MD08-22-32	11.4	l	16.6	7.8	27.6	7.6	5.2	3.7
MO090932	10.4	l	24.8	8.6	6.8	6.3	9.6	6.4
MO081320	17.8	l	13.7	18.3	30	9.8	11.3	23.7
MO090478	18.2	l	13.5	14.1	33.1	9.7	22.8	15.9
MO091068	13.9	l	17.9	21	13.1	9.1	16.4	5.8
NE10514	18.6	l	30.6	18.6	13.9	8.7	13.5	26.4
NE10449	25.9		36.5	37.4	19	8.3	26.9	27.6
NW03666	22.9		37.6	30.3	22.5	5.1	16.5	25.2
NW10401	15.9	l	12.4	22.5	34.2	12.6	6.7	6.9
NE10418	22.7		23.1	27.9	36.2	15.2	22.6	10.9
VA09W-52	20.1		22.2	20.8	38	9.1	15.2	15.3
VA09W-73	24.6		12.7	17.7	50.5	13.9	37.5	15.2
VA10W-21	21.2		16.4	20.2	44.9	15.8	20.5	.
VA09W-75	25.4		20.4	43.7	46.7	9.2	24.1	8.4
AVERAGE	22.1		22.3	25	35.5	10.6	19.9	19.6
MINUMUM	10.0		9.5	5.1	6.8	2	1.9	3.7
MAXIMUM	40.7		44.3	52.8	56.8	22.9	42.4	56.6
LSD(0.05)	9.3							

Table 15. Summary of deoxynivalenol (DON, ppm) data from the 2011-2012 NUWWSN.

NAME	AVG		KYLEX	MDSAL	OHWOO	VABLA
ERNIE	7.5	l	9	9.9	8.9	2.2
FREEDOM	6.9	l	5.8	15.9	3	3
TRUMAN	8.3		7.6	14.4	4	7.2
PIONEER2545	17.3		12.3	35.6	11.6	9.8
NY103-208-7263	18.2		15.4	40.5	7.7	9.1
NY94052-3329	26.1	h	25.1	53.1	11.5	14.8
NY05072&75-1	10.4		9.7	21	3	.
KWS007	13.2		14.8	25.9	7	5.2
KWS001	13.5		17.9	22	10.5	3.8
KWS002	10.1		9.7	18.4	6.3	6.2
KWS003	6.3	l	8.6	12.8	1.5	2.4
LCS19214	3.4	l	5.7	5.2	1.2	1.7
LCS19209	4.1	l	3.8	9.9	1.5	1.5
LCS19231	5.4	l	3	9	5.8	3.8
LCS19103	2.8	l	3.6	3.6	3	0.9
LCS19104	3.7	l	5.1	4.5	3.2	2.1
E9021R	8.3		13.1	11.9	4.7	3.5
OH05-200-74	8.1	l	7.6	13.5	9.4	2
OH06-159-6	8	l	11.3	9.2	7.9	3.6
F0065	11.7		15.6	16.6	11.3	3.4
OH08-133-25	8.7		8.8	18.9	5.3	2
OH06-180-57	10.9		12	19.8	8.4	3.5
OH07-166-41	5.1	l	6	8.4	3.6	2.3
OH07-263-3	6.1	l	5.8	9.6	6	2.9
P04606RA1-1-7-1-6	17.7		27.8	24.8	11.8	6.3
P0537A1-3-12	7.2	l	14	7.5	5.3	2.2
P0566A1-3-1-67	5.6	l	6.9	9.9	4	1.6
P05222A1-1-2-7	9.5		15.5	12.1	6.8	3.5
MH07-7483	14.9		11.3	30	13.3	5
MH07-7474	9.3		13.1	13.2	8.7	2.2
M08-8036#	3.6	l	4.6	6.7	2.2	0.9
M08-8214	4.2	l	4.6	7.6	2.2	2.4
DH1-46	13.9		15.8	24.8	7.4	7.7
DH1-62	19.4		16.9	38.4	13.2	9.1
DH2-4	16.6		18.9	30.1	8.5	9.2
DH2-45	12.9		14.3	18.6	15	3.6
DH5-56	7.8	l	9.9	9.8	8.4	3.2
IL06-13721	2.7	l	3.7	3.9	2.7	0.7
IL06-23571	2.6	l	3.6	2.8	2.7	1.5
IL07-4415	1.9	l	2.4	2.9	1.4	0.9
IL07-19334	4.7	l	3.6	9.8	3.1	2.3
KY04C-2004-1-1-3	9.4		7.7	12.7	13.3	3.8
KY03C-1224-10-12-3	8.5		6.4	10.8	14.2	2.4
KY03C-1195-10-8-5	9.9		11.1	14	10.6	3.8
KY04C-2031-29-7-3	7.4	l	10.8	9.9	7	2.1
MD08-22-1-6-2	1.8	l	1.6	3.6	1.7	0.4
MD08-22-32	1.9	l	2.2	3.5	1.4	0.6
MO090932	7.8	l	12.9	12	2.9	3.4
MO081320	4.5	l	6.4	7.1	2.9	1.6
MO090478	4.5	l	7	7.6	2.7	0.9
MO091068	4.4	l	4	10.8	1.2	1.6
NE10514	12.1		16.3	18.8	8.6	4.8
NE10449	14.2		13.7	31.8	5.4	5.8
NW03666	16.7		15.9	34.9	12.4	3.6
NW10401	6.6	l	7.8	14.7	2.7	1.1
NE10418	9.2		11	20.7	3.5	1.5
VA09W-52	3.4	l	5.8	5.4	1.5	1
VA09W-73	4.7	l	6	7.3	3.5	1.9
VA10W-21	5.6	l	8.1	6.6	5.8	2.1
VA09W-75	8.4		10.7	16.8	1.4	4.9
AVERAGE	8.7		9.8	15.2	6.1	3.5
MINUMUM	1.8		1.6	2.8	1.2	0.4
MAXIMUM	26.1		27.8	53.1	15	14.8
LSD(0.05)	6.4					

Table 15. Summary of greenhouse severity (GHSEV, %) data from the 2011-2012 NUWWSN.

NAME	AVG		ILURB	MOCOL
ERNIE	17.8	l	9.8	25.7
FREEDOM	7.6	l	6.0	9.2
TRUMAN	8.5	l	7.3	9.7
PIONEER2545	58.7	h	100.0	17.4
NY103-208-7263	14.8	l	16.5	13.2
NY94052-3329	21.3	l	23.7	18.9
NY05072&75-1	25.8	l	25.3	26.2
KWS007	44.5	h	48.0	41
KWS001	33.8	hl	50.0	17.5
KWS002	9.9	l	5.0	14.8
KWS003	23.6	l	11.0	36.3
LCS19214	38.0	hl	41.2	34.8
LCS19209	24.8	l	19.4	30.2
LCS19231	33.8	hl	35.5	32.1
LCS19103	17.9	l	4.0	31.9
LCS19104	15.8	l	4.8	26.8
E9021R	45.3	h	64.3	26.3
OH05-200-74	15.4	l	9.7	21.2
OH06-159-6	62.3	h	97.3	27.3
F0065	55.7	h	67.7	43.6
OH08-133-25	51.4	h	55.5	47.3
OH06-180-57	56.9	h	80.4	33.3
OH07-166-41	57.9	h	75.8	40
OH07-263-3	47.1	h	58.0	36.1
P04606RA1-1-7-1-6	5.3	l	3.5	7
P0537A1-3-12	21.2	l	15.0	27.4
P0566A1-3-1-67	8.6	l	2.7	14.5
P05222A1-1-2-7	30.1	hl	23.7	36.5
MH07-7483	27.1	l	26.2	28
MH07-7474	35.3	hl	28.5	42.2
M08-8036#	21.0	l	11.5	30.5
M08-8214	24.3	l	17.0	31.5
DH1-46	53.8	h	86.6	21.1
DH1-62	13.0	l	7.5	18.5
DH2-4	7.7	l	3.5	11.8
DH2-45	37.3	hl	45.2	29.5
DH5-56	34.2	hl	42.4	26.1
IL06-13721	19.0	l	12.3	25.8
IL06-23571	11.8	l	3.5	20.1
IL07-4415	11.7	l	6.2	17.1
IL07-19334	8.3	l	3.0	13.5
KY04C-2004-1-1-3	9.8	l	3.0	16.5
KY03C-1224-10-12-3	8.5	l	3.5	13.4
KY03C-1195-10-8-5	9.8	l	6.4	13.2
KY04C-2031-29-7-3	39.4	h	63.8	15.1
MD08-22-1-6-2	13.9	l	11.6	16.3
MD08-22-32	10.0	l	3.8	16.2
MO090932	6.0	l	7.2	4.7
MO081320	34.3	hl	39.8	28.9
MO090478	19.0	l	15.6	22.4
MO091068	8.2	l	4.3	12.1
NE10514	23.3	l	17.7	29
NE10449	33.3	hl	52.8	13.8
NW03666	27.0	l	24.0	29.9
NW10401	63.0	h	81.3	44.7
NE10418	26.2	l	35.7	16.7
VA09W-52	24.6	l	24.8	24.4
VA09W-73	25.0	l	20.0	29.9
VA10W-21	42.3	h	36.2	48.5
VA09W-75	32.1	hl	28.0	36.2
AVERAGE	26.9		28.9	24.9
MINUMUM	5.3		2.7	4.7
MAXIMUM	63.0		100.0	48.5
LSD(0.05)	34.1			

Table 16. Summary of heading date (HD, Julian days) and height (HGT, inches) data from the 2011-2012 NUWWSN

	HD								HGT			
NAME	AVG		KYLEX	MDSAL	MIELA	NYITH	OHWOO	VABLA	AVG		KYLEX	MDSAL
ERNIE	129	l	109	109	173	137	128	122	34.0		35.5	32.5
FREEDOM	134		113	115	177	137	134	130	38.0		40.0	36.0
TRUMAN	139		124	122	179	141	138	130	40.5		40.5	40.5
PIONEER2545	135		117	115	176	138	135	130	38.0		38.5	37.5
NY103-208-7263	143	h	129	131	182	142	141	136	43.0		44.0	42.0
NY94052-3329	142	h	129	127	180	145	140	133	38.5		38.0	39.0
NY05072&75-1	143	h	127	127	181	145	140	136	47.3	h	51.5	43.0
KWS007	136		115	113	178	140	138	130	37.5		35.5	39.5
KWS001	135		116	116	177	139	135	130	34.3		34.5	34.0
KWS002	136		119	119	176	138	132	130	38.8		38.5	39.0
KWS003	136		118	120	178	141	131	130	33.5		34.5	32.5
LCS19214	131	l	111	112	172	136	128	124	35.0		36.0	34.0
LCS19209	131	l	110	113	173	136	128	124	35.0		35.5	34.5
LCS19231	133		114	113	177	139	131	127	43.3		46.0	40.5
LCS19103	131	l	110	112	175	137	129	124	40.0		42.5	37.5
LCS19104	132		112	113	175	140	129	124	40.3		42.0	38.5
E9021R	133		114	115	175	139	131	124	38.8		38.5	39.0
OH05-200-74	136		118	120	177	140	134	130	38.3		39.0	37.5
OH06-159-6	130	l	110	110	172	137	128	124	34.5		36.5	32.5
F0065	134		115	113	177	140	133	124	36.8		37.5	36.0
OH08-133-25	132		114	114	175	137	130	124	36.8		41.0	32.5
OH06-180-57	134		113	114	177	140	133	127	37.3		40.5	34.0
OH07-166-41	134		115	115	176	141	134	124	38.0		39.0	37.0
OH07-263-3	131	l	112	111	175	136	129	124	37.5		38.5	36.5
P04606RA1-1-7-1-6	136		119	114	178	139	134	130	40.5		42.0	39.0
P0537A1-3-12	132		110	109	177	140	132	124	35.3		36.5	34.0
P0566A1-3-1-67	130	l	110	111	173	137	127	124	32.8		34.5	31.0
P05222A1-1-2-7	130	l	108	109	175	136	128	124	29.3	l	29.5	29.0
MH07-7483	134		113	115	177	137	133	130	36.3		38.0	34.5
MH07-7474	134		112	113	177	140	132	127	35.5		36.0	35.0
M08-8036#	130	l	110	111	174	135	129	124	35.0		36.5	33.5
M08-8214	131	l	110	112	174	136	129	124	40.0		39.5	40.5
DH1-46	141		125	126	178	143	139	133	41.8		42.5	41.0
DH1-62	143	h	130	129	181	145	140	133	42.0		44.5	39.5
DH2-4	141	h	126	125	180	145	139	133	38.0		39.0	37.0
DH2-45	134		112	114	174	139	133	130	35.5		36.0	35.0
DH5-56	136		119	118	176	138	133	130	38.0		39.5	36.5
IL06-13721	129	l	108	109	173	135	127	122	35.3		37.0	33.5
IL06-23571	129	l	108	110	171	135	128	124	37.3		38.0	36.5
IL07-4415	130	l	111	112	172	135	128	124	34.8		38.0	31.5
IL07-19334	134		116	114	174	137	131	130	37.5		38.0	37.0
KY04C-2004-1-1-3	135		115	114	176	139	133	130	37.0		39.0	35.0
KY03C-1224-10-12-3	134		112	114	179	141	134	124	32.3	l	35.5	29.0
KY03C-1195-10-8-5	136		119	114	177	141	134	130	35.3		37.0	33.5
KY04C-2031-29-7-3	133		116	114	175	137	131	124	33.3		34.5	32.0
MD08-22-1-6-2	136		117	114	176	141	136	130	34.0		35.5	32.5
MD08-22-32	134		117	115	176	139	133	127	34.5		36.5	32.5
MO090932	139		123	123	178	141	138	130	40.5		40.0	41.0
MO081320	131	l	107	114	174	135	132	122	36.5		36.0	37.0
MO090478	129	l	108	109	173	135	127	124	33.0		35.5	30.5
MO091068	133		119	113	173	138	129	124	35.0		37.5	32.5
NE10514	138		121	122	178	139	136	130	37.5		38.0	37.0
NE10449	138		123	120	179	140	135	130	41.0		41.5	40.5
NW03666	136		119	114	178	140	135	130	40.0		42.5	37.5
NW10401	131	l	107	109	175	139	130	124	38.0		39.0	37.0
NE10418	130	l	106	108	175	136	131	124	40.3		40.5	40.0
VA09W-52	130	l	108	109	174	137	130	122	34.3		36.0	32.5
VA09W-73	131	l	110	109	175	140	129	124	35.3		37.5	33.0
VA10W-21	131	l	109	112	174	137	129	124	33.8		35.0	32.5
VA09W-75	133		112	114	176	138	128	130	35.7		37.5	34.0
AVERAGE	134		115	115	176	139	132	127	37.1		38.4	35.8
MINUMUM	129		106	108	171	135	127	122	29.3		29.5	29.0
MAXIMUM	143		130	131	182	145	141	136	47.3		51.5	43.0
LSD(0.05)	3								3.3			

Table 17. Summary of other traits collected on the 2011-2012 NUWWSN

	Purdue	Univ. of Missouri	Univ. of Missouri
	FHB Rating	Field: # SYMPT. FLORETS	GH: # SYMPT. FLORETS
	0-9	number	number
ERNIE	0.8	2.7	3.5
FREEDOM	1.9	4.8	1.8
TRUMAN	1.0	0.4	2.0
PIONEER2545	4.3	11.3	3.9
NY103-208-7263	.	3.6	2.7
NY94052-3329	.	3.2	2.6
NY05072&75-1	3.3	6.0	5.3
KWS007	0.7	7.9	6.9
KWS001	0.8	3.3	3.5
KWS002	2.4	2.9	3.5
KWS003	1.6	3.8	6.1
LCS19214	1.1	3.5	5.0
LCS19209	1.3	3.7	4.4
LCS19231	0.8	4.7	6.8
LCS19103	0.2	3.0	5.6
LCS19104	2.0	3.2	4.8
E9021R	2.4	5.4	3.9
OH05-200-74	0.9	1.4	4.2
OH06-159-6	1.2	2.8	4.5
F0065	4.3	8.2	7.6
OH08-133-25	0.9	11.7	8.9
OH06-180-57	1.0	6.1	6.1
OH07-166-41	1.1	3.4	6.0
OH07-263-3	1.3	6.1	6.5
P04606RA1-1-7-1-6	0.8	3.7	1.4
P0537A1-3-12	0.8	3.3	4.3
P0566A1-3-1-67	1.0	3.9	2.7
P05222A1-1-2-7	0.7	3.0	5.3
MH07-7483	1.1	2.9	5.5
MH07-7474	1.1	4.1	7.7
M08-8036#	0.7	2.1	3.6
M08-8214	1.0	1.9	5.9
DH1-46	0.8	0.5	4.0
DH1-62	0.7	4.0	3.5
DH2-4	1.0	0.3	2.5
DH2-45	0.6	5.0	4.9
DH5-56	0.5	4.8	6.7
IL06-13721	0.8	1.3	5.0
IL06-23571	0.8	2.0	3.5
IL07-4415	0.5	1.2	3.4
IL07-19334	0.7	1.9	2.6
KY04C-2004-1-1-3	0.4	4.0	2.9
KY03C-1224-10-12-3	0.7	5.0	2.4
KY03C-1195-10-8-5	0.9	1.6	2.5
KY04C-2031-29-7-3	0.9	6.5	3.1
MD08-22-1-6-2	0.8	0.9	3.1
MD08-22-32	0.8	1.3	2.8
MO090932	0.8	0.1	1.1
MO081320	.	1.8	5.4
MO090478	1.2	3.4	3.2
MO091068	1.0	0.5	2.5
NE10514	1.4	0.6	5.0
NE10449	0.7	0.5	2.8
NW03666	1.2	1.3	5.7
NW10401	0.8	4.9	5.8
NE10418	0.6	5.5	2.0
VA09W-52	0.8	4.8	4.1
VA09W-73	0.8	4.8	5.1
VA10W-21	0.9	4.1	8.3
VA09W-75	0.8	4.9	5.8
Average	1.1	3.6	4.4
Max	4.3	11.7	8.9
Min	0.2	0.1	1.1

Table 18. Summary of incidence (INC, %) from 2011-12 PNUWWSN.

NAME	AVG		KYLEX	MIELA	MOCOL	VABLA
ERNIE	36.3	l	55.0	0.4	70.0	20.0
FREEDOM	53.7	h	65.0	14.8	85.0	50.0
TRUMAN	42.4	l	60.0	9.6	55.0	45.0
PIONEER2545	67.7	h	85.0	23.3	90.0	72.5
KWS006	39.2	l	30.0	2.0	70.0	55.0
KWS004	36.6	l	20.0	16.4	75.0	35.0
KWS005	48.4		50.0	8.6	90.0	45.0
F0051R	57.5	h	85.0	10.2	95.0	40.0
F0014	61.0	h	65.0	8.9	95.0	75.0
F0038	56.7	h	85.0	11.8	70.0	60.0
F0036R	52.6	h	60.0	12.9	90.0	47.5
OH08-172-42	51.1	h	47.5	7.0	90.0	60.0
7x831-1-I-03Ser (2)	45.5		45.0	4.6	95.0	37.5
OH08-172-42	52.5	h	47.5	7.4	95.0	60.0
OH08-180-48	52.5	h	85.0	0.0	75.0	50.0
OH08-269-58	46.0		50.0	24.0	75.0	35.0
OH07-254-11	50.3	h	45.0	11.4	90.0	55.0
P05247A1-7-7-3-1	54.8	h	70.0	16.7	90.0	42.5
P0566A1-3-1-65	48.9	h	65.0	8.3	100.0	22.5
P05247A1-7-3-27	39.8	l	40.0	4.4	75.0	40.0
P05247A1-7-3-120	48.6	h	50.0	24.5	95.0	25.0
P0762A1-2-8	23.7	l	20.0	0.0	75.0	0.0
P07287RA1-14	29.9	l	25.0	2.1	80.0	12.5
M09-9811#	36.8	l	25.0	7.2	85.0	30.0
M09-9826#	46.1		35.0	1.9	100.0	47.5
IL07-21847	32.5	l	15.0	7.7	80.0	27.5
IL08-8844	35.3	l	25.0	11.4	80.0	25.0
IL08-22206	35.6	l	30.0	2.3	95.0	15.0
IL08-33373	39.4	l	45.0	0.0	60.0	52.5
IL07-20728	40.5	l	20.0	12.2	80.0	50.0
IL07-20743	34.4	l	20.0	5.1	85.0	27.5
KY04C-2031-29-6-1	58.9	h	70.0	28.0	85.0	52.5
KY03C-2022-16-18-1	61.2	h	70.0	9.9	100.0	65.0
KY04C-2006-45-5-1	55.4	h	60.0	19.2	95.0	47.5
KY04C-2150-66-16-5	33.7	l	35.0	0.0	70.0	30.0
KY04C-2150-64-16-1	42.4	l	50.0	12.1	70.0	37.5
KY04C-2150-64-17-1	48.7	h	55.0	0.0	90.0	50.0
MO100295	29.0	l	30.0	8.4	60.0	17.5
MO101235	32.4	l	25.0	19.6	65.0	20.0
MO100532	32.6	l	25.0	13.1	80.0	12.5
MO100314	33.9	l	20.0	8.0	70.0	37.5
MO100410	33.7	l	50.0	0.0	45.0	40.0
MO101259	30.0	l	20.0	2.4	50.0	47.5
MO081765	32.3	l	25.0	4.2	85.0	15.0
VA08W-613	33.6	l	25.0	2.1	95.0	12.5
VA09W-608	31.7	l	15.0	1.9	90.0	20.0
VA10W-663	45.7		60.0	22.9	90.0	10.0
VA10W-28	44.5		45.0	7.9	100.0	25.0
VA09W-654	28.6	l	20.0	17.1	65.0	12.5
VA10W-617	26.4	l	15.0	5.5	80.0	5.0
AVERAGE	42.6		43.6	9.2	81.4	36.4
MINUMUM	23.7		15.0	0.0	45.0	0.0
MAXIMUM	67.7		85.0	28.0	100.0	75.0
LSD(0.05)	19.2					

Table 19. Summary of severity (SEV, %) data from the 2011-2012 PNUWWSN

NAME	AVG		KYLEX	MIELA	MOCOL	VABLA
ERNIE	7.6	l	12.6	0.0	15.9	1.9
FREEDOM	25.6	h	26.7	53.1	16.8	6.0
TRUMAN	15.8	l	20.5	28.6	9.6	4.6
PIONEER2545	25.0	h	36.5	29.1	21.3	13.2
KWS006	8.0	l	9.8	6.5	7.8	7.8
KWS004	25.9	h	18.7	50.7	29.9	4.4
KWS005	24.6	h	25.3	46.7	19.7	6.5
F0051R	20.0	h	24.2	39.6	12.6	3.5
F0014	33.2	h	33.3	42.8	41.2	15.3
F0038	29.1	h	40.0	57.2	6.0	13.0
F0036R	28.2	h	25.7	57.6	23.4	6.0
OH08-172-42	16.6	l	16.4	27.1	15.5	7.4
7x831-1-I-03Ser (2)	15.2	l	14.9	25.4	17.2	3.5
OH08-172-42	20.6	h	16.4	43.3	15.4	7.4
OH08-180-48	14.1	l	36.9	0.0	13.8	5.8
OH08-269-58	17.9	l	19.0	37.3	10.1	5.3
OH07-254-11	28.6	h	20.4	66.4	21.4	6.1
P05247A1-7-7-3-1	18.0	l	26.1	27.5	14.0	4.2
P0566A1-3-1-65	18.2	l	15.3	30.9	23.5	3.2
P05247A1-7-3-27	8.4	l	10.1	4.4	15.5	3.7
P05247A1-7-3-120	16.0	l	13.4	21.1	26.6	3.0
P0762A1-2-8	4.0	l	7.6	0.0	8.2	0.0
P07287RA1-14	11.9	l	12.9	15.6	18.1	1.1
M09-9811#	20.8	h	8.3	56.9	16.0	2.1
M09-9826#	9.7	l	12.7	4.0	16.6	5.4
IL07-21847	9.7	l	9.3	16.4	10.2	2.8
IL08-8844	17.5	l	7.0	48.4	11.8	2.6
IL08-22206	8.1	l	8.8	6.3	15.5	1.8
IL08-33373	6.6	l	13.0	0.0	6.7	6.7
IL07-20728	14.8	l	11.6	25.3	15.3	7.0
IL07-20743	9.1	l	10.4	6.4	16.5	3.2
KY04C-2031-29-6-1	27.8	h	25.3	69.3	10.7	5.8
KY03C-2022-16-18-1	25.6	h	26.3	53.4	14.3	8.2
KY04C-2006-45-5-1	21.0	h	21.2	40.4	16.6	5.7
KY04C-2150-66-16-5	6.4	l	12.8	0.0	10.1	2.6
KY04C-2150-64-16-1	10.6	l	14.6	16.4	7.6	3.9
KY04C-2150-64-17-1	9.2	l	19.2	0.0	11.8	5.7
MO100295	12.3	l	8.0	25.8	14.1	1.4
MO101235	13.7	l	12.2	29.1	12.0	1.6
MO100532	11.5	l	7.6	25.5	11.4	1.6
MO100314	8.8	l	7.3	13.5	10.6	3.7
MO100410	7.8	l	21.9	0.0	4.9	4.3
MO101259	7.9	l	11.2	12.1	3.7	4.7
MO081765	9.7	l	8.4	15.9	12.6	1.8
VA08W-613	9.0	l	13.5	4.3	17.3	0.9
VA09W-608	12.4	l	8.8	24.5	14.0	2.1
VA10W-663	28.0	h	39.6	57.8	14.1	0.7
VA10W-28	26.9	h	24.8	58.4	22.1	2.5
VA09W-654	14.0	l	14.4	30.6	9.7	1.2
VA10W-617	11.2	l	8.9	22.7	12.8	0.4
AVERAGE	16.1		17.4	27.5	14.9	4.5
MINUMUM	4.0		7.0	0.0	3.7	0.0
MAXIMUM	33.2		40.0	69.3	41.2	15.3
LSD(0.05)	14.7					

Table 20. Summary of index (IND, %) data from the 2011-12 PNUWWSN.

NAME	AVG		KYLEX	MIELA	MOCOL	OHWOO	VABLA
ERNIE	8.8	l	6.9	0.1	11.6	25.0	0.4
FREEDOM	20.0	h	17.3	9.0	14.2	56.7	3.0
TRUMAN	6.2	l	12.3	2.2	5.6	8.8	2.3
PIONEER2545	26.6	h	31.1	13.3	19.1	60.0	9.6
KWS006	12.1		2.9	0.2	6.1	46.7	4.7
KWS004	11.2	l	3.7	11.0	24.4	15.2	1.7
KWS005	10.6	l	12.7	7.3	18.0	12.3	2.9
F0051R	11.1	l	20.5	4.9	11.8	16.9	1.4
F0014	28.0	h	21.7	4.2	39.3	62.2	12.4
F0038	20.2	h	34.0	6.9	4.2	48.3	7.8
F0036R	17.4		15.4	7.5	21.0	40.0	3.0
OH08-172-42	12.3		7.8	2.4	13.9	32.8	4.5
7x831-1-I-03Ser (2)	9.0	l	6.7	2.4	16.4	17.9	1.5
OH08-172-42	12.7		7.8	3.2	14.6	33.3	4.5
OH08-180-48	13.8		31.4	0.0	10.1	24.4	2.9
OH08-269-58	15.6		9.5	9.1	7.6	49.4	2.6
OH07-254-11	12.9		9.2	7.4	19.3	25.0	3.5
P05247A1-7-7-3-1	11.3	l	18.3	4.6	12.6	19.4	1.8
P0566A1-3-1-65	9.6	l	10.0	4.7	23.5	9.1	0.8
P05247A1-7-3-27	5.9	l	4.0	0.4	11.7	11.7	1.5
P05247A1-7-3-120	10.2	l	6.7	4.8	25.4	13.3	0.9
P0762A1-2-8	2.2	l	1.5	0.0	6.7	2.7	0.0
P07287RA1-14	5.3	l	3.2	0.7	14.4	7.8	0.3
M09-9811#	6.2	l	2.1	3.9	13.5	10.8	0.6
M09-9826#	8.6	l	4.4	1.2	16.6	18.3	2.6
IL07-21847	5.8	l	1.4	1.5	8.3	16.7	1.1
IL08-8844	7.1	l	1.8	7.3	9.8	15.6	0.9
IL08-22206	6.6	l	2.6	0.3	14.7	15.0	0.5
IL08-33373	6.1	l	5.9	0.0	4.6	16.3	3.5
IL07-20728	6.3	l	2.3	3.0	12.2	10.6	3.5
IL07-20743	5.3	l	2.1	0.7	13.7	9.1	0.9
KY04C-2031-29-6-1	10.9	l	17.7	18.1	9.1	5.8	3.6
KY03C-2022-16-18-1	10.7	l	18.4	6.2	14.3	9.1	5.5
KY04C-2006-45-5-1	9.7	l	12.7	8.0	15.8	9.3	2.7
KY04C-2150-66-16-5	3.1	l	4.5	0.0	7.4	2.8	0.8
KY04C-2150-64-16-1	5.2	l	7.3	4.0	5.3	7.7	1.5
KY04C-2150-64-17-1	6.8	l	10.5	0.0	10.8	9.7	2.9
MO100295	3.9	l	2.4	2.6	8.4	5.7	0.2
MO101235	5.5	l	3.0	8.8	8.7	6.9	0.3
MO100532	4.5	l	1.9	3.0	9.5	7.6	0.4
MO100314	4.0	l	1.5	2.1	8.1	7.1	1.4
MO100410	6.9	l	11.0	0.0	2.3	19.7	1.7
MO101259	2.6	l	2.2	0.6	2.0	5.8	2.2
MO081765	4.2	l	2.1	1.5	11.1	5.8	0.3
VA08W-613	8.0	l	3.4	0.2	16.4	20.0	0.1
VA09W-608	5.9	l	1.3	1.2	12.6	13.9	0.4
VA10W-663	13.8		23.8	10.9	12.7	21.7	0.1
VA10W-28	11.2	l	11.2	4.9	22.1	17.2	0.6
VA09W-654	7.7	l	2.9	10.7	7.2	17.7	0.1
VA10W-617	5.0	l	1.3	2.3	10.1	11.1	0.0
AVERAGE	9.5		9.1	4.2	12.8	19.1	2.2
MINUMUM	2.2		1.3	0.0	2.0	2.7	0.0
MAXIMUM	28.0		34.0	18.1	39.3	62.2	12.4
LSD(0.05)	9.3						

Table 21. Summary of Fusarium Damaged Kernel (FDK, %) data from the 2011-2012 PNUWWSN.

NAME	AVG		KYLEX	MOCOL
ERNIE	11.7	hl	5.3	18.0
FREEDOM	23.8	h	6.7	41.0
TRUMAN	4.8	l	7.6	2.0
PIONEER2545	25.9	h	9.9	42.0
KWS006	26.3	h	10.5	42.0
KWS004	26	h	4.9	47.0
KWS005	28.4	h	3.8	53.0
F0051R	12.5	hl	4.9	20.0
F0014	25.3	h	12.6	38.0
F0038	15.3	hl	7.7	23.0
F0036R	16.3	hl	12.6	20.0
OH08-172-42	16.2	hl	6.4	26.0
7x831-1-I-03Ser (2)	14.6	hl	7.2	22.0
OH08-172-42	20.2	hl	6.4	34.0
OH08-180-48	19.9	hl	10.8	29.0
OH08-269-58	14.5	hl	7.9	21.0
OH07-254-11	24.4	h	11.8	37.0
P05247A1-7-7-3-1	10.9	hl	2.9	19.0
P0566A1-3-1-65	5.3	l	6.7	4.0
P05247A1-7-3-27	17.4	hl	3.9	31.0
P05247A1-7-3-120	16.2	hl	4.5	28.0
P0762A1-2-8	8.3	l	3.6	13.0
P07287RA1-14	17.4	hl	2.8	32.0
M09-9811#	8.1	l	4.2	12.0
M09-9826#	25.5	h	4.9	46.0
IL07-21847	13.5	hl	2	25.0
IL08-8844	9	l	4.9	13.0
IL08-22206	4.8	l	1.5	8.0
IL08-33373	15.2	hl	1.4	29.0
IL07-20728	3.4	l	0.9	6.0
IL07-20743	7.5	l	3.9	11.0
KY04C-2031-29-6-1	22.1	h	3.3	41.0
KY03C-2022-16-18-1	13.2	hl	3.3	23.0
KY04C-2006-45-5-1	9.5	l	3.1	16.0
KY04C-2150-66-16-5	7.6	l	1.3	14.0
KY04C-2150-64-16-1	8.7	l	2.3	15.0
KY04C-2150-64-17-1	5.3	l	3.7	7.0
MO100295	4.5	l	2.9	6.0
MO101235	5.1	l	4.2	6.0
MO100532	3.7	l	0.4	7.0
MO100314	5.9	l	0.8	11.0
MO100410	7.4	l	8.8	6.0
MO101259	11.1	hl	6.2	16.0
MO081765	7.7	l	1.5	14.0
VA08W-613	18.2	hl	7.5	29.0
VA09W-608	9.6	l	1.2	18.0
VA10W-663	4	l	4.1	4.0
VA10W-28	3.4	l	1.9	5.0
VA09W-654	4.7	l	1.5	8.0
VA10W-617	3.7	l	2.4	5.0
AVERAGE	12.9		4.9	20.9
MINUMUM	3.4		0.4	2.0
MAXIMUM	28.4		12.6	53.0
LSD(0.05)	17.8			

Table 22. Summary of INC/SEV/FDK (ISK, %) data from the 2011-2012 PNUWWSN

NAME	AVG		KYLEX	MOCOL
ERNIE	27.7	l	22.4	33
FREEDOM	38.6	h	30.2	46.9
TRUMAN	23.7	l	27.2	20.2
PIONEER2545	45.3	h	40.4	50.2
KWS006	28.2	l	16.2	40.1
KWS004	32	hl	13.6	50.3
KWS005	39.1	h	24.1	54.1
F0051R	37.5	h	34.7	40.3
F0014	45.3	h	34.6	56.1
F0038	36.3	h	40.6	32
F0036R	36.4	h	30.8	42
OH08-172-42	31.9	hl	21.7	42.1
7x831-1-l-03Ser (2)	31.7	hl	20.9	42.5
OH08-172-42	34.2	h	21.7	46.7
OH08-180-48	39.6	h	40.9	38.2
OH08-269-58	28.9	l	23.9	33.9
OH07-254-11	36.3	h	24.3	48.2
P05247A1-7-7-3-1	34.4	h	30	38.8
P0566A1-3-1-65	32.8	h	26.8	38.7
P05247A1-7-3-27	28.1	l	16.6	39.6
P05247A1-7-3-120	34.3	h	20.8	47.7
P0762A1-2-8	20	l	9.7	30.2
P07287RA1-14	27.4	l	12.5	42.2
M09-9811#	23.4	l	11.7	35.1
M09-9826#	34.9	h	16.3	53.4
IL07-21847	22.6	l	8.1	37.1
IL08-8844	22.2	l	11.6	32.7
IL08-22206	24.3	l	12.2	36.4
IL08-33373	24.8	l	18	31.6
IL07-20728	20.4	l	9.8	31
IL07-20743	22.8	l	10.7	34.9
KY04C-2031-29-6-1	37.5	h	29.9	45.1
KY03C-2022-16-18-1	36.8	h	30.2	43.5
KY04C-2006-45-5-1	32.8	h	25.6	39.9
KY04C-2150-66-16-5	22.2	l	14.8	29.6
KY04C-2150-64-16-1	24.8	l	20.3	29.3
KY04C-2150-64-17-1	28.5	l	23.7	33.3
MO100295	18.6	l	12.6	24.6
MO101235	19.2	l	12.8	25.5
MO100532	20.1	l	9.9	30.2
MO100314	18.6	l	8.5	28.6
MO100410	21.3	l	25.1	17.4
MO101259	17.2	l	11.9	22.5
MO081765	22.8	l	10.6	34.9
VA08W-613	30	l	14.6	45.3
VA09W-608	23	l	7.6	38.4
VA10W-663	32.1	h	31.5	32.8
VA10W-28	30.2	l	21.7	38.6
VA09W-654	18.3	l	10.9	25.6
VA10W-617	19	l	8.1	29.8
AVERAGE	28.7		20.3	37.2
MINUMUM	17.2		7.6	17.4
MAXIMUM	45.3		40.9	56.1
LSD(0.05)	14.8			

Table 23. Summary of deoxynivalenol (DON, ppm) data from the 2011-2012 PNUWWSN.

NAME	AVG		KYLEX	VABLA
ERNIE	5.3	l	8.8	1.9
FREEDOM	6.2	l	9	3.5
TRUMAN	6.5	l	10.2	2.8
PIONEER2545	12.8	h	17.1	8.5
KWS006	8.8		14.5	3.1
KWS004	4	l	6.2	1.8
KWS005	4.9	l	7.1	2.8
F0051R	6.9	l	10.4	3.5
F0014	15.3	h	21.7	8.9
F0038	13.1	h	16.8	9.3
F0036R	10.5	h	16.3	4.6
OH08-172-42	7.2		8.5	6.0
7x831-1-l-03Ser (2)	8.1		12.5	3.7
OH08-172-42	7.8		12.2	3.4
OH08-180-48	11.2	h	18.5	4.0
OH08-269-58	7.5		9.9	5.1
OH07-254-11	12.8	h	21	4.7
P05247A1-7-7-3-1	5.4	l	5.4	5.4
P0566A1-3-1-65	5.5	l	8.5	2.6
P05247A1-7-3-27	5.2	l	8.4	1.9
P05247A1-7-3-120	5.8	l	9.8	1.8
P0762A1-2-8	3.2	l	5.8	0.6
P07287RA1-14	3.5	l	5.9	1.2
M09-9811#	3.1	l	4.8	1.4
M09-9826#	4.8	l	8.6	1.1
IL07-21847	2.3	l	2.7	1.8
IL08-8844	3.3	l	5.8	0.8
IL08-22206	1.8	l	2.7	0.9
IL08-33373	2.7	l	3.2	2.2
IL07-20728	2	l	1.4	2.6
IL07-20743	4.5	l	6.3	2.8
KY04C-2031-29-6-1	5.4	l	7.2	3.7
KY03C-2022-16-18-1	3.7	l	5.5	1.8
KY04C-2006-45-5-1	4	l	5.5	2.5
KY04C-2150-66-16-5	2.9	l	3.9	1.9
KY04C-2150-64-16-1	3.6	l	4.6	2.7
KY04C-2150-64-17-1	4.8	l	7.3	2.4
MO100295	3.7	l	6.7	0.7
MO101235	4.8	l	8.1	1.6
MO100532	2.2	l	3.1	1.4
MO100314	2.3	l	2.4	2.1
MO100410	5.3	l	8.6	2.0
MO101259	5.2	l	7.1	3.4
MO081765	1.7	l	2.4	1.1
VA08W-613	4.7	l	8.3	1.2
VA09W-608	1.6	l	1.9	1.4
VA10W-663	1.8	l	3.3	0.4
VA10W-28	2	l	3	1.0
VA09W-654	2.1	l	2.6	1.7
VA10W-617	2.5	l	4.3	0.7
AVERAGE	5.3		7.9	2.8
MINUMUM	1.6		1.4	0.4
MAXIMUM	15.3		21.7	9.3
LSD(0.05)	5.3		.	.

Table 24. Summary of greenhouse severity (GHSEV, %) data from the 2011-2012 PNUWWSN.

NAME	AVG		ILURB	MOCOL
ERNIE	16.9	l	20.7	13.1
FREEDOM	13.2	l	10.2	16.1
TRUMAN	7.9	l	4.0	11.8
PIONEER2545	22.6	l	24.5	20.7
KWS006	9.6	l	6.5	12.7
KWS004	60.6	h	87.3	33.8
KWS005	30.1	hl	39.3	20.9
F0051R	14.6	l	9.5	19.7
F0014	22.9	l	9.3	36.4
F0038	30.3	hl	26.4	34.2
F0036R	22.9	l	17.7	28
OH08-172-42	15.3	l	14.6	15.9
7x831-1-I-03Ser (2)	40.3	h	68.0	12.5
OH08-172-42	36.4	hl	56.0	16.8
OH08-180-48	37.8	hl	40.2	35.4
OH08-269-58	43.3	h	56.7	29.9
OH07-254-11	26.5	l	32.2	20.7
P05247A1-7-7-3-1	34.6	hl	54.6	14.6
P0566A1-3-1-65	13.6	l	4.2	22.9
P05247A1-7-3-27	35.4	hl	51.0	19.8
P05247A1-7-3-120	46.7	h	76.7	16.7
P0762A1-2-8	11.4	l	4.8	18
P07287RA1-14	47.0	h	62.8	31.2
M09-9811#	21.4	l	3.0	39.7
M09-9826#	16.0	l	7.8	24.2
IL07-21847	21.5	l	13.3	29.6
IL08-8844	19.0	l	10.7	27.2
IL08-22206	23.8	l	8.8	38.8
IL08-33373	10.6	l	15.8	5.3
IL07-20728	30.0	hl	41.0	19
IL07-20743	26.4	l	23.5	29.3
KY04C-2031-29-6-1	25.8	l	35.3	16.3
KY03C-2022-16-18-1	18.4	l	3.6	33.1
KY04C-2006-45-5-1	11.0	l	3.5	18.4
KY04C-2150-66-16-5	17.1	l	13.0	21.2
KY04C-2150-64-16-1	13.4	l	3.5	23.3
KY04C-2150-64-17-1	15.5	l	6.2	24.7
MO100295	30.6	hl	40.5	20.6
MO101235	14.5	l	9.0	20
MO100532	24.8	l	27.0	22.5
MO100314	6.9	l	6.6	7.1
MO100410	6.9	l	5.0	8.8
MO101259	16.8	l	20.3	13.3
MO081765	9.8	l	3.8	15.8
VA08W-613	13.3	l	14.5	12.1
VA09W-608	10.3	l	4.0	16.5
VA10W-663	18.2	l	3.8	32.7
VA10W-28	22.0	l	18.2	25.8
VA09W-654	33.0	hl	48.3	17.7
VA10W-617	22.8	l	27.3	18.4
AVERAGE	22.8		23.9	21.7
MINUMUM	6.9		3.0	5.3
MAXIMUM	60.6		87.3	39.7
LSD(0.05)	32.6			

Table 25. Summary of other traits collected on the 2011-2012 PNUWWSN

	Purdue	Univ. of Missouri
	FHB Rating	GH: # SYMPT. FLORETS
	0-9	number
ERNIE		2.0
FREEDOM	0.67	2.9
TRUMAN	0.75	2.8
PIONEER2545	0.92	3.8
KWS006	0.60	2.5
KWS004	1.08	5.9
KWS005	1.08	4.0
F0051R	0.92	3.5
F0014	0.92	4.9
F0038	1.00	5.6
F0036R	0.83	4.4
OH08-172-42	0.90	3.1
7x831-1-I-03Ser (2)	1.00	2.6
OH08-172-42	0.75	3.5
OH08-180-48	1.00	6.5
OH08-269-58	1.42	5.0
OH07-254-11	1.58	3.0
P05247A1-7-7-3-1	0.92	3.1
P0566A1-3-1-65	1.50	3.8
P05247A1-7-3-27	0.92	3.2
P05247A1-7-3-120	1.00	3.0
P0762A1-2-8	0.75	3.1
P07287RA1-14	.	5.5
M09-9811#	1.00	6.3
M09-9826#	.	3.8
IL07-21847	1	5.0
IL08-8844	0.60	5.0
IL08-22206	0.90	4.8
IL08-33373	0.67	1.1
IL07-20728	0.83	3.6
IL07-20743	1.25	4.9
KY04C-2031-29-6-1	1.33	3.3
KY03C-2022-16-18-1	0.92	5.6
KY04C-2006-45-5-1	1.33	4.0
KY04C-2150-66-16-5	0.67	3.5
KY04C-2150-64-16-1	0.70	3.8
KY04C-2150-64-17-1	0.58	4.8
MO100295	1.50	3.5
MO101235	0.75	2.9
MO100532	0.42	3.1
MO100314	0.8	1.4
MO100410	0.92	1.9
MO101259	1.2	3.0
MO081765	1.6	2.8
VA08W-613	0.8	1.7
VA09W-608	1.6	1.8
VA10W-663	.	4.1
VA10W-28	1.0	3.1
VA09W-654	1.8	3.1
VA10W-617	1.2	2.4

Table 26. Summary of heading date (HD, Julian days) and height (HGT, inches) data from the 2011-2012 PNUWWN

	HD						HGT
NAME	AVG		KYLEX	MIELA	OHWOO	VABLA	KYLEX
ERNIE	133	l	110	174	127	122	35.0
FREEDOM	139		116	178	132	130	37.5
TRUMAN	142	h	125	176	136	130	41.0
PIONEER2545	138		117	175	132	130	38.5
KWS006	136		112	174	131	127	38.0
KWS004	136		112	176	131	124	40.5
KWS005	140	h	117	178	134	130	39.5
F0051R	140	h	119	177	134	130	37.5
F0014	137		113	175	131	127	34.5
F0038	139		119	177	131	130	37.5
F0036R	137		111	177	130	130	34.5
OH08-172-42	137		113	176	130	129	38.5
7x831-1-I-03Ser (2)	141	h	122	179	134	130	46.5
OH08-172-42	137		113	177	130	129	40.5
OH08-180-48	138		119	175	133	127	35.0
OH08-269-58	137		114	176	133	127	41.0
OH07-254-11	135		111	176	129	124	37.0
P05247A1-7-7-3-1	140	h	119	179	133	130	38.0
P0566A1-3-1-65	133	l	110	170	128	124	35.5
P05247A1-7-3-27	134	l	110	175	127	124	34.0
P05247A1-7-3-120	134	l	109	175	128	124	33.5
P0762A1-2-8	135	l	109	177	128	124	33.5
P07287RA1-14	133	l	107	173	128	122	34.0
M09-9811#	135		112	177	129	124	40.0
M09-9826#	134	l	107	176	128	124	33.5
IL07-21847	134	l	112	173	128	124	38.0
IL08-8844	134	l	109	176	128	124	39.0
IL08-22206	134	l	109	173	128	124	36.5
IL08-33373	140	h	119	176	133	130	39.5
IL07-20728	137		114	175	129	130	38.0
IL07-20743	137		113	176	130	130	39.0
KY04C-2031-29-6-1	140	h	119	178	131	130	40.5
KY03C-2022-16-18-1	140	h	118	179	133	130	35.5
KY04C-2006-45-5-1	138		119	174	131	127	39.5
KY04C-2150-66-16-5	139	h	118	177	133	130	34.5
KY04C-2150-64-16-1	138		116	175	133	127	38.0
KY04C-2150-64-17-1	139		117	176	134	130	35.5
MO100295	136		113	176	130	124	43.0
MO101235	136		111	175	130	127	39.5
MO100532	134	l	110	175	129	124	40.5
MO100314	138		115	176	132	130	49.5
MO100410	142	h	124	179	135	130	51.0
MO101259	140	h	116	179	136	130	42.0
MO081765	136		112	177	128	127	37.0
VA08W-613	132	l	108	175	126	119	35.0
VA09W-608	134	l	108	177	128	124	35.0
VA10W-663	132	l	106	175	129	119	26.5
VA10W-28	133	l	107	175	130	122	34.0
VA09W-654	139		119	176	135	124	43.0
VA10W-617	134	l	111	173	128	124	36.5
AVERAGE	137		114	176	131	127	38.0
MINUMUM	132		106	170	126	119	26.5
MAXIMUM	142		125	179	136	130	51.0
LSD(0.05)	4						

Table 27. Presence or absence of FHB QTL in the 2011-12 NUWWSN entries. Entries were also genotyped for Rht, Ppd, Vrn,rust, PM, Hessian Fly, BYDV, rye translocation, and quality genes. That data is available in an excel file from sneller.5@osu.edu. Data is from the USDA Eastern Regional Small Grains Genotyping Lab.

		Fusarium Head Blight alleles				
Entry	Sample Name	Fhb1	Fhb Ernie 3Bc	Fhb 2DL-Wuhan1/W14	Fhb 5A Ernie	*Fhb 5A Ning7840*
1	Ernie	no	**Fhb Ernie 3Bc het?**	no	**Fhb 5A Ernie het?**	*no*
2	Freedom	no	**Fhb Ernie 3Bc?**	no	no	*no*
3	Truman	no	no	no	no	*no*
4	Pioneer2545	no	no	nd	no	*no*
5	NY103-208-7263	no	no	no	no	*no*
6	NY94052-3329	no	no	no	no	*no*
7	NY05072&75-1	no	no	no	no	*no*
8	KWS007	no	no	nd	no	*no*
9	KWS001	no	no	no	no	*no*
10	KWS002	no	no	no	no	*no*
11	KWS003	no	no	no	no	*no*
12	LCS19214	no	no	no	no	*no*
13	LCS19209	no	no	no	no	*no*
14	LCS19231	no	no	no	**Fhb 5A Ernie**	*no*
15	LCS19103	no	no	no	no	*no*
16	LCS19104	no	no	no	no	*no*
17	E9021R	no	no	no	no	*no*
18	OH05-200-74	no	**Fhb Ernie 3Bc het?**	no	no	*no*
19	OH06-159-6	no	no	no	no	*no*
20	F0065	no	no	no	no	*no*
21	OH08-133-25	no	no	nd	no	*no*
22	OH06-180-57	no	no	no	no	***Fhb 5A Ning7840?***
23	OH07-166-41	no	**Fhb Ernie 3Bc?**	no	no	*no*
24	OH07-263-3	no	no	no	no	*no*
25	P04606RA1-1-7-1-6	no	no	no	no	*no*
26	P0537A1-3-12	no	no	no	no	*no*
27	P0566A1-3-1-67	no	no	no	no	*no*
28	P05222A1-1-2-7	no	no	no	**Fhb 5A Ernie**	*no*
29	MH07-7483	no	no	no	no	*no*
30	MH07-7474	no	no	no	no	*no*
31	M08-8036#	no	no	no	no	*no*
32	M08-8214	no	no	no	no	*no*
33	DH1-46	no	no	no	no	*no*
34	DH1-62	no	no	no	no	*no*
35	DH2-4	no	no	no	no	*no*
36	DH2-45	no	no	no	no	*no*
37	DH5-56	no	no	no	no	*no*
38	IL06-13721	no	no	no	no	*no*
39	IL06-23571	no	no	no	no	*no*
40	IL07-4415	no	**Fhb Ernie 3Bc**	no	no	*no*
41	IL07-19334	no	**Fhb Ernie 3Bc**	no	no	***Fhb 5A Ning7840?***
42	KY04C-2004-1-1-3	no	no	no	no	*no*
43	KY03C-1224-10-12-3	**Fhb1**	no	no	no	*no*
44	KY03C-1195-10-8-5	**Fhb1**	no	no	no	*no*
45	KY04C-2031-29-7-3	no	no	no	no	*no*
46	MD08-22-1-6-2	**Fhb1**	no	no	no	***Fhb 5A Ning7840***
47	MD08-22-32	**Fhb1**	no	no	no	***Fhb 5A Ning7840***
48	MO090932	no	no	no	no	*no*
49	MO081320	no	no	no	**Fhb 5A Ernie het**	*no*
50	MO090478	no	no	no	**Fhb 5A Ernie**	*no*
51	MO091068	no	no	no	**Fhb 5A Ernie het?**	*no*
52	NE10514	no	no	no	no	*no*
53	NE10449	no	no	no	no	*no*
54	NW03666	**Fhb1**	no	**Fhb 2DL-wuhan/W14**	no	*no*
55	NW10401	no	no	no	no	*no*
56	NE10418	no	no	no	no	*no*
57	WA09W-52	no	no	no	no	*no*
58	VA09W-73	no	no	no	no	*no*
59	VA10W-21	no	no	no	no	*no*
60	VA09W-75	no	no	nd	no	*no*

Table 28. Presence or absence of FHB QTL in the 2011-12 PNUWWSN entries. Entries were also genotyped for Rht, Ppd, Vrn,rust, PM, Hessian Fly, BYDV, rye translocation, and quality genes. That data is available in an excel file from sneller.5@osu.edu. Data is from the USDA Eastern Regional Small Grains Genotyping Lab.

		Fusarium Head Blight alleles				
Entry	**Sample Name**	**Fhb1**	**Fhb Ernie 3Bc**	**Fhb 2DL-Wuhan1/W14**	**Fhb 5A Ernie**	***Fhb 5A Ning7840***
1	Ernie	no	**Fhb Ernie 3Bc**	no	**Fhb 5A Ernie het?**	*no*
2	Freedom	no	**Fhb Ernie 3Bc?**	no	no	*no*
3	Truman	no	no	no	no	*no*
4	Pioneer2545	no	no	nd	no	*no*
5	KWS006	no	no	no	**Fhb 5A Ernie**	*no*
6	KWS004	no	no	no	no	*no*
7	KWS005	no	no	no	no	*no*
8	F0051R	no	no	no	no	*no*
9	F0014	no	no	no	no	*no*
10	F0038	no	no	no	no	*no*
11	F0036R	no	no	no	no	*no*
12	OH08-172-42	no	**Fhb Ernie 3Bc het?**	no	no	*no*
13	7x831-1-I-03Ser (2)	no	**Fhb Ernie 3Bc het?**	no	**Fhb 5A Ernie**	*no*
14	OH08-172-42	no	**Fhb Ernie 3Bc het?**	no	no	*no*
15	OH08-180-48	no	no	no	no	*no*
16	OH08-269-58	no	**Fhb Ernie 3Bc**	no	no	*no*
17	OH07-254-11	no	no	no	no	*no*
18	P05247A1-7-7-3-1	no	no	no	**Fhb 5A Ernie**	*no*
19	P0566A1-3-1-65	no	no	no	no	*no*
20	P05247A1-7-3-27	no	no	no	**Fhb 5A Ernie het**	*no*
21	P05247A1-7-3-120	no	no	no	**Fhb 5A Ernie**	*no*
22	P0762A1-2-8	**Fhb1?**	no	nd	**Fhb 5A Ernie het**	*no*
23	P07287RA1-14	no	no	no	no	*no*
24	M09-9811#	no	no	no	no	*no*
25	M09-9826#	no	**Fhb Ernie 3Bc?**	no	no	*no*
26	IL07-21847	no	no	no	no	*no*
27	IL08-8844	no	no	no	no	***Fhb 5A Ning7840?***
28	IL08-22206	no	no	no	**Fhb 5A Ernie het**	*no*
29	IL08-33373	no	no	no	**Fhb 5A Ernie**	*no*
30	IL07-20728	no	no	no	no	*no*
31	IL07-20743	no	no	no	no	*no*
32	KY04C-2031-29-6-1	no	no	no	**Fhb 5A Ernie het**	*no*
33	KY03C-2022-16-18-1	no	no	no	no	*no*
34	KY04C-2006-45-5-1	no	no	no	no	*no*
35	KY04C-2150-66-16-5	**Fhb1**	no	nd	no	*no*
36	KY04C-2150-64-16-1	no	no	no	no	*no*
37	KY04C-2150-64-17-1	no	no	no	no	*no*
38	MO100295	no	no	no	no	*no*
39	MO101235	no	no	no	**Fhb 5A Ernie het**	*no*
40	MO100532	no	no	no	no	*no*
41	MO100314	no	**Fhb Ernie 3Bc?**	no	**Fhb 5A Ernie het**	*no*
42	MO100410	no	no	no	no	*no*
43	MO101259	no	no	no	no	*no*
44	MO081765	no	no	no	no	*no*
45	VA08W-613	no	no	no	no	*no*
46	VA09W-608	no	no	no	no	*no*
47	VA10W-663	no	no	no	no	*no*
48	VA10W-28	no	no	no	no	*no*
49	VA09W-654	no	no	no	no	*no*
50	VA10W-617	no	no	no	no	*no*

Table 29. Quality parameters for the 2011-2012 NUWWSN. Data is from the USDA Soft Wheat Quality Lab.

ENTRY	Milling Quality Score		Baking Quality Score		Softness Equivalent Score		Test Weight (LB/BU)	Grain Protein (at 12%)	Grain Hardness (0-100)	Flour Yield (%)		Softness Equivalent (%)		Flour Protein (at 14%)		As Is Lactic Acid SRC (%)		Sucrose SRC (%)		Estimated Cookie Diameter (cm)	
ERNIE	43.7	E	55.6	D	64.1	C	56.8	12.9	23.8	62.3	q	55.1		9.5		138.1	s	105.6	q	17.6	
FREEDOM	56.1	D	65.0	C	59.2	D	55.4	12.1	28.9	64.8		53.4		9.0		111.4	w	100.9		17.9	
TRUMAN	59.6	D	78.8	B	67.1	C	56.8	12.1	20.6	65.5	+	56.2		8.9		117.2		96.2	+	18.2	
PIONEER2545	54.9	D	66.0	C	64.9	C	55.9	12.3	33.6	64.5		55.4		9.3		103.6	w	102.1		17.9	
NY103-208-7263	51.9	D	76.9	B	79.1	B	6.1			63.9		60.5	+	8.8		114.4	w	101.7		18.3	+
NY94052-3329	49.7	E	66.9	C	69.8	C	30.7	13.6	24.9	63.5		57.2	+	9.5		122.5	s	102.1		17.9	
NY05072&75-1	44.6	E	67.6	C	61.6	C	54.5	12.8	25.2	62.5	q	54.3		9.2		95.4	w	100.8		18.0	
KWS007	60.4	C	72.2	B	60.9	C	46.3	11.4	22.1	65.6	+	54.0		8.8		127.3	s	97.6	+	18.0	
KWS001	52.0	D	69.0	C	69.6	C	56.9	14.1	24.0	64.0		57.1		10.2	q	93.9	w	100.6		18.0	
KWS002	65.9	C	79.5	B	67.1	C	57.3	12.1	29.2	66.7	+	56.2		9.1		109.8	w	95.8	+	18.2	
KWS003	74.1	B	55.2	D	66.7	C	56.6	12.8	19.5	68.4	+	56.0		9.8	q	143.6	s	105.9	q	17.5	q
LCS19214	58.7	D	56.4	D	58.3	D	58.1	12.1	28.0	65.3	+	53.1		9.2		142.5	s	103.6		17.5	q
LCS19209	53.4	D	43.4	E	52.1	D	57.8	12.3	27.0	64.2		50.9	q	9.4		141.4	s	108.1	q	17.2	q
LCS19231	65.2	C	71.4	B	49.8	E	59.3	12.5	28.5	66.6	+	50.1	q	9.9	q	132.2	s	91.5	+	17.8	
LCS19103	72.5	B	100.7	A	83.9	A	56.6	11.0	28.0	68.1	+	62.1	+	8.6	+	116.4		90.9	+	18.9	+
LCS19104	72.2	B	96.1	A	80.9	A	57.5	11.3	23.1	68.0	+	61.1	+	8.5	+	115.2		92.5	+	18.8	+
E9021R	51.8	D	47.6	E	69.1	C	56.0	12.5	25.9	63.9		56.9		9.6		150.4	s	110.8	q	17.4	q
OH05-200-74	41.4	E	65.8	C	68.5	C	55.1	11.8	32.1	61.8	q	56.7		8.8		123.7	s	103.8		17.9	
OH06-159-6	57.8	D	64.0	C	58.0	D	56.7	11.6	28.9	65.1		53.0		9.2		124.7	s	100.3		17.8	
F0065	61.6	C	89.5	A	78.7	B	55.9	11.9	28.7	65.9	+	60.3	+	9.0		117.5		94.2	+	18.5	+
OH08-133-25	71.5	B	65.3	C	45.2	E	57.4	11.9	20.3	67.9	+	48.5	q	9.2		100.2	w	96.1	+	17.8	
OH06-180-57	58.8	D	76.6	B	74.2	B	55.6	11.9	26.1	65.3	+	58.7	+	8.9		120.7	s	99.7		18.2	
OH07-166-41	59.5	D	68.7	C	67.9	C	56.3	12.3	24.9	65.4	+	56.5		9.1		129.3	s	101.0		17.9	
OH07-263-3	63.1	C	87.8	A	64.9	C	58.3	11.9	23.4	66.2	+	55.4		9.0		103.7	w	91.0	+	18.4	+
P04606RA1-1-7-1-6	52.2	D	55.0	D	65.4	C	56.8	12.5	25.8	64.0		55.6		9.5		93.3	w	108.4	q	17.7	
P0537A1-3-12	58.7	D	65.2	C	67.4	C	56.7	11.0	27.5	65.3	+	56.3		9.1		137.8	s	102.4		17.8	
P0566A1-3-1-67	55.8	D	67.8	C	64.2	C	56.1	11.7	22.7	64.7		55.2		8.9		111.2	w	101.4		18.0	
P05222A1-1-2-7	57.3	D	57.2	D	51.8	D	54.5	13.1	25.1	65.0		50.8	q	9.6		93.6	w	102.0		17.6	
MH07-7483	56.6	D	65.2	C	74.2	B	55.0	11.8	30.3	64.9		58.7	+	8.9		119.3		106.0	q	18.0	
MH07-7474	54.3	D	54.1	D	62.1	C	56.3	13.1	29.7	64.4		54.4		9.7	q	143.7	s	105.0	q	17.5	q
M08-8036#	57.2	D	41.5	E	57.7	D	57.5	14.3	26.0	65.0		52.9	q	10.7	q	148.8	s	108.0	q	17.0	q
M08-8214	56.2	D	44.2	E	67.1	C	57.3	12.7	27.7	64.8		56.2		9.9	q	143.5	s	111.7	q	17.3	q
DH1-46	69.4	C	97.8	A	87.6	A	52.4	11.6	14.9	67.4	+	63.5	+	8.3	+	122.9	s	94.0	+	18.8	+
DH1-62	62.1	C	73.8	B	80.9	A	52.6	11.9	24.0	66.0	+	61.1	+	9.0		137.3	s	102.7		18.1	
DH2-4	69.7	C	97.6	A	74.6	B	52.5	11.5	18.6	67.5	+	58.8	+	8.1	+	109.5	w	90.7	+	18.8	+
DH2-45	60.7	C	79.3	B	82.2	A	53.1	12.8	17.8	65.7	+	61.5	+	9.5		122.9	s	99.7		18.3	+
DH5-56	54.6	D	78.0	B	68.7	C	56.4	12.1	24.4	64.5		56.8		8.9		121.9	s	97.1	+	18.2	
IL06-13721	64.0	C	66.4	C	66.9	C	58.7	11.8	28.8	66.4	+	56.1		9.3		134.3	s	101.4		17.8	
IL06-23571	73.4	B	73.3	B	83.5	A	58.4	12.6	23.0	68.3	+	62.0	+	9.3		129.0	s	103.4		18.2	
IL07-4415	47.9	E	69.7	C	58.7	D	56.9	11.9	31.0	63.1	q	53.2		9.3		136.4	s	96.5	+	17.8	
IL07-19334	74.5	B	69.9	C	60.4	C	58.7	11.7	26.5	68.5	+	53.8		8.8		133.2	s	98.2	+	17.9	
KY04C-2004-1-1-3	59.0	D	45.3	E	68.8	C	58.8	12.9	28.9	65.3	+	56.8		9.4		134.2	s	113.1	q	17.4	q
KY03C-1224-10-12-3	67.2	C	57.9	D	52.5	D	59.7	12.0	30.5	67.0	+	51.0	q	9.1		118.4		102.0		17.6	
KY03C-1195-10-8-5	69.5	C	67.7	C	68.2	C	58.0	11.5	27.7	67.5	+	56.6		9.1		138.1	s	101.3		17.9	
KY04C-2031-29-7-3	67.6	C	57.6	D	42.5	E	58.3	12.8	21.3	67.1	+	47.5	q	9.6		120.8	s	97.5	+	17.5	q
MD08-22-1-6-2	54.2	D	70.4	B	58.3	D	59.9	11.4	37.2	64.4		53.1		9.0		124.9	s	97.2	+	17.9	
MD08-22-32	67.3	C	72.3	B	66.0	C	45.2	12.0	31.6	67.0	+	55.8		9.2		132.0	s	98.1	+	18.0	
MO090932	54.1	D	65.2	C	54.5	D	57.1	11.8	29.3	64.4		51.7	q	9.1		125.5	s	98.6		17.8	
MO081320	68.0	C	54.4	D	58.8	D	58.4	12.1	18.4	67.2	+	53.3		9.4		127.6	s	105.2	q	17.5	
MO090478	46.6	E	48.8	E	54.7	D	56.4	12.8	27.1	62.9	q	51.8	q	10.2	q	140.6	s	104.4	q	17.2	q
MO091068	45.8	E	48.8	E	64.2	C	56.9	11.8	28.5	62.7	q	55.2		9.0		135.2	s	110.5	q	17.5	q
NE10514	81.9	A	34.0	F	30.4	F	56.5	12.5	31.7	70.0	+	43.2	q	11.5	q	147.6	s	100.8		16.6	q
NE10449	81.0	A	27.7	F	18.1	F	56.1	12.3	27.3	69.8	+	38.8	q	12.0	q	131.5	s	99.6		16.3	q
NW03666	77.2	B	39.2	F	40.9	E	56.9	11.7	23.5	69.0	+	46.9	q	10.5	q	147.8	s	103.9		16.9	q
NW10401	69.8	C	18.1	F	16.6	F	57.0	11.9	25.5	67.5	+	38.3	q	10.7	q	124.5	s	107.4	q	16.3	q
NE10418	68.1	C	37.8	F	37.6	F	57.3	12.5	29.5	67.2	+	45.8	q	10.7	q	138.0	s	103.5		16.8	q
VA09W-52	59.5	D	55.7	D	67.9	C	57.7	12.7	28.6	65.5	+	56.5		9.6		141.7	s	106.4	q	17.6	
VA09W-73	69.6	C	72.3	B	69.3	C	59.6	11.2	30.2	67.5	+	57.0		8.7	+	128.3	s	100.6		18.1	
VA10W-21	82.8	A	40.6	E	35.3	F	59.3	10.8	30.0	70.1	+	45.0	q	9.7	q	133.4	s	103.5		17.0	q
VA09W-75	75.2	B	57.1	D	54.1	D	56.8	12.3	26.3	68.6	+	51.6	q	9.6		123.9	s	101.7		17.5	
Average	61.5		63.5		61.9		55.2	12.2	26.3	65.9		54.4		9.4		125.8		101.3		17.8	

2012 Crop
Micro Milling and Baking Evaluation
Set 2012 M05

2012 NUWWSN

A total of 60 samples were grown as a micro sample set and were submitted for milling and baking quality evaluations. The standard quality data were compared to the average for the cultivar checks given for this nursery and quality scores for all entries are adjusted to the check average. A table of observed and historical quality scores is given below.

			From Advanced Milling Database Scoring						Predicted from Measured Data					
Lab Number	Entry Number	ENTRY	Milling Quality Score		Baking Quality Score		Softness Equivalent Score		Milling Quality Score		Baking Quality Score		Softness Equivalent Score	
1210889	1	ERNIE	53.03	D	58.62	D	57.83	D	27.51	F	20.64	F	57.17	D
1210890	2	FREEDOM	54.43	D	72.21	B	63.53	C	39.91	F	30.08	F	52.31	D
1210891	3	TRUMAN	57.1	D	68.09	C	67.52	C	43.42	E	43.93	E	60.18	C
1210892	4	PIONEER 2545	49.86	E	66.52	C	66.33	C	38.73	F	31.14	F	57.99	D
		Average	53.61		66.36		63.8		37.39		31.45		56.91	
		Adjustment Bias for Trial	16.21		34.91		6.89							
		Diagnostics - Correlations	0.4		0.6		0.3							

The adjusted average values of the provided checks are predicted to have decreased milling, baking, and softness equivalent scores when compared to the historical average. The observed scores for the checks correlated to the historical scores for milling, baking, and softness equivalence at a level of $r>0.4$, $r>0.6$, and $r>0.3$, respectively. The correlation for the baking quality score is lower than usual and may not be as predictive of future breeding performance as in previous trials, probably due to the overall compression of scale for the softness equivalent and solvent retention capacity values. Milling and softness equivalent quality scores are also uncharacteristically low and should be monitored, as it may not be as predictive of future breeding performance as in previous trials.

Changes in 2012 Evaluations
The Soft Wheat Quality Lab is continuously striving to improve the milling and baking quality of soft wheat cultivars in the Eastern US by developing new methods of evaluating quality and conducting cooperative research with wheat breeding programs.

One improvement we focused on was the micro milling procedure using the Quadrumat Junior Flour Mill. Our standard procedure has been to mill the grain and recover the product for sifting on a Great Western Sifter Box. The sifter has 40 and 94 mesh screens that separate mill product into bran (above 40), mids (between 40 and 94) and flour (through the 94 screen). The bran and mid fractions were then weighed to help determine milling yield and softness equivalence. In past years, the mids were then added back to the fraction that passed through the 94 mesh screen to produce the final flour product for further analysis.

Since advanced milling involves several reduction steps with an end product of fine particle size, we reasoned that baking predictions might improve by analyzing only the flour (through the 94 screen without mids). We found that removing the mids from the flour, we improved our efficiency and quality analysis. Using the new micro-milling method, the four solvent retention capacity tests of lactic acid, sucrose, sodium carbonate, and water generated results that are more comparable to the advanced milling four solvent retention capacity tests. This new method also gives a better estimated cookie diameter. I have attached a spreadsheet that shows the four solvent results which compares the advanced milling procedure, the micro milling procedure with the over 94

fraction, and the new micro milling procedure without adding the over 94 fraction. The similarity of the advanced milling procedure to that of the new micro milling procedure is evident.

Milling yield, softness equivalence, and flour protein are not affected by the new procedure, as we continue to measure these traits as we have always done.

We will be moving forward with this improved micro milling procedure starting this year for the 2012 harvest. If you have an ongoing, multiyear project, your SRC data could be affected by values produced using new method.

Additional Information on Analysis

Across this trial, flour analysis shows that the quality trait averages of flour protein, lactic acid SRC, and sucrose SRC all had above average values, whereas the milling yield had reduced values. Softness equivalent was within the limits for soft wheat characteristics.

Of the characteristics of quality we measure at the Soft Wheat Quality Laboratory, milling yield is the most reproducible and perhaps most important because it is genetically and environmentally associated with good soft wheat flour quality. The cumulative average for the checks tallied 64.3%. There were 45 test lines that computed greater milling yield than this average with VA10W-21 being tops at 70.1%. Others worth noting consist of NE10514, NE10449, and NW03666.

After milling yield, the second trait that we recommend for use in selection is softness equivalent. It tends to have high heritability and is an important predictor of break flour yield. Larger values are preferred for most soft wheat manufactured goods, particularly cakes and other high sugar baked products. This nursery produced an average softness equivalence of 54.4% with 6 entries scoring an "A". This list is comprised of DH1-46, LCS19103, IL06-23571, DH2-45, DH1-62, and LCS19104. Overall, a total of 8 entries had poor softness equivalence (below 50%), a sign that these lines may not have commercial application as a cultivar. A few samples include high millers such as NW10401, NE10449, NE10514, and VA10W-21.

Sucrose SRC is probably the best predictor of cookie quality and is a measure of arabinoxylan content, which can strongly affect water absorption in baked products. Sucrose SRC typically increases in wheat samples with lower flour yield and lower softness equivalent. The cross hydration of gliadins by sucrose also causes sucrose SRC values to be correlated to flour protein and lactic acid SRC. Soft wheat flours for cookies typically have a target of 95% or less for sucrose SRC. The majority of this group (88% of the samples) was above the target range as only 7 samples fell below 95% sucrose SRC absorption. The lowest of the 7 samples was DH2-4 at 90.7%, but LCS19103 recorded the highest baking score at 100.7. This is due to the combination of low sucrose SRC and low flour protein that typically produces a larger cookie diameter and higher baking scores, which is evident with this sample.

Typically, as sucrose SRC values increase, so do lactic acid SRC values. The sucrose SRC preferentially hydrates arabinoxylans but also swells the gliadins of the flour. Elevated sucrose values in those given entries were likely due to gliadins and would be acceptable for most soft wheat products that require strong gluten. A few examples are KWS003, IL06-23571, and MO081320.

The lactic acid SRC also correlates to flour protein concentration, but the effect is dependent on genotypes and growing conditions. As a reminder, weathering often falsely elevates lactic acid SRC values. The average for this trial was 125.8% which exhibit "strong" characteristics of gluten strength (above 105%). There were 7 samples below 105% including the check Pioneer 2545. Pioneer 2545 historically attain low lactic acid SRC values and entries beneath Pioneer 2545 should be considered for discarding. Likely some of the genotypes in this trial are strong gluten genotypes that may have extra value in the marketplace for the manufacture of crackers or other products requiring gluten strength.

Soft wheat products such as cookies and crackers require flours with low water absorption. To select the best lines for milling and baking quality, we sequentially sorted for flour yield and selected all lines with greater flour yield than the nursery average. We then repeated the operation for softness equivalent and the solvent retention capacities of sucrose and lactic acid, selecting the lines that were better than average in each case. After the sort, MD08-22-32 and VA09W-73 fit these criteria.

Please contact me if you have questions concerning this trial.

Best regards,
Tony Karcher