Report on the 2014-2015 Northern Uniform Winter Wheat Scab Nurseries (NUWWSN and PNUWWSN)

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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 60 entries (56 lines & four checks, Table 3) and we obtained phenotypic data on seven traits from 11 locations. The PNUWWSN had 41 entries (37 lines & four checks, Table 4) and we obtained phenotypic data from 8 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.

RESULTS

The mean for each entry over all environments for all FHB traits are shown in tables 8 and 9. We observed good levels of FHB resistance in the 2015 uniform tests, similar to the 2014 tests, though not as good as in the 2013 trials.

- Over 68% of the entries in the PNUWWSN and the NUWWSN had an FHB index < that of Freedom (this was 69% in 2014 and 90% in2013)
- 23% of the PNUWWSN and 27% of the NUWWSN entries had an FHB index < that of Truman (vs 4% and 24% in 2014 and 2013)
- 83% of the PNUWWSN and 35% of the NUWWSN entries had less DON than Freedom (vs 90 and 65% in 2014)
- 22% of the PNUWWSN and 37% of the NUWWSN entries had less DON than Truman (vs 63% and 35% in 2014)
- In the NUWWSN, 14 of 60 entries (23%) were not significantly different than the most resistant entry for all seven FHB traits with an LSD while 11 of 41 entries (26.8%) in the PNUWWSN were not different than the most resistant entry for all seven FHB traits (Tables 7a,7b).

- While the percentage of line < Freedom of Truman was not very different from 2014, there were very few entries placed in the "worst" category in either test (Tables 7a and 7b) (worst equal not significantly different from worst entry for 5 or more of the seven FHB traits). No breeding line was considered a "worst" entry in the PNUWWSN.

There appears to be more entries with the resistant allele at Fhb1 than has been observed in past years though most of the entries have only native resistance (eg not from Asia, or South America). In the NUWWSN, 13 entries had conclusive molecular marker evidence the Asian allele for resistance at Fhb1, one had 5A from Ning but none had 2DL from Wuhan. There were five entries in the PNUWWSN that had conclusive evidence of an Asian QTL at FHB1 (Table 29). The mean of lines with Fhb1 and without Fhb1 are shown below and indicate that lines with the resistant allele at Fhb1 are slightly more resistant than lines without Fhb1: this was particularly true for SEV, IND, and GHSEV but not for INC and ISK.

NUWWSN	n	INC	SEV	IND	FDK	ISK	DON	GHSEV
Fhb1	13	64.8	32.4	20.3	28.1	35.5	6.9	20.2
No Fhb1	43	65.8	35.8	22.8	25.5	35.9	7.0	25.1
Ratio Fhb1/No Fhb1		0.99	0.91	0.89	1.10	0.99	0.98	0.81

PNUWWSN	n	INC	SEV	IND	FDK	ISK	DON	GHSEV
Fhb1	5	64.6	23.9	16.5	19.9	33.2	3.9	25.7
No Fhb1	32	62.7	27.2	18.6	22.4	34.0	4.2	28.8
Ratio Fhb1/No Fhb1		1.03	0.88	0.89	0.89	0.98	0.93	0.89

Most of FHB traits were positively correlated in the NUWWSN and PNUWWSN where the correlations among the field traits INC, SEV, IND, FDK, ISK, and DON all exceeded 0.43 and 22 of these 30 correlations exceeded 0.60 (Tables 5a and 5b). HD was not strongly correlated to any FHB trait while HGT was somewhat negatively correlated to most field FHB traits in the PNUWWSN.

Table 1. Cooperators in the 2014-2015 P+NUWWSN

ENV CODE	LOCATION	NUWWSN	PNUWWSN	COOPERATORS	INSTITUTE	CODE
ILCHA	Champaign, IL	yes	yes	Jana Murche	KWS Cereals	KWS
ILURB	Urbana, IL	yes	yes	Fred Kolb, Eric Brucker	University of Illinois	UIL
INLAF	Lafayette, IN	yes	yes	Don Obert	Limagrain	LIM
INWLA	W. Lafayette, IN	yes	yes	Herb Ohm	Purdue University	PUR
INHIG	High Bottom, IN	yes	no	Jennifer Vonderwall	Syngenta	SYN
INTHO	,IN	no	yes	Jennifer Vonderwall	Syngenta	SYN
KYLEX	Lexington, KY	yes	yes	David Van Sanford	Unversity of Kentucky	UKY
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	Mead, NE	yes	no	Stephen Baenziger, S Wegulo	University of Nebraska	UNE
NYITH	Ithaca, NY	yes	no	Mark Sorrells, Gary Bergstrom	Cornell University	COR
OHNAP	Napolean, OH	yes	yes	Don Obert	Limagrain	LIM
OHWOO	Wooster, Ohio	yes	yes	Clay Sneller, Pierce Paul	The Ohio State University	OSU
ONRID	Ridgetwon, Ontartio	yes	yes	Lily Tamburic	University of Guelph Ridgetown	UGR
VABLA	Blacksburg, VA	yes	yes	Carl Griffey	Virginia Tech	VAT

Tables 2a and b. Traits assessed in 2014-15 P+NUWWSN and locations where the traits were assessed

a. Trait descriptions

Code	Trait	Description
INC	Disease incidence	% of heads with at least one infected spikelets
SEV	Disease severity from field tests	% of infected spikelets in an infected head.
IND	Disease index	IND = (SEVxINC)/100
FDK	Fusarium damaged kernels	Either a visual assessment of the percent infected kernels, or a percent of scabby seed by weight
ISK	Composite of head and kernel traits	ISK Index = .3 (Severity) + .3 (Incidence)+.4 (FDK)
DON	DON (vomitoxin)	PPM of vomitoxin in grain
GH	Greenhouse severity	Same as SEV except from greenhouse
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

b. Cooperators and location where trait data was generated

Test	Source	Location	INC	SEV	IND	FDK	ISK	DON	GH	HD	HGT	Extra
NUWWSN	KWS	ILCHA	Y	Y	Y	X	X	X	X	Y	X	
NUWWSN	SYN IN	ILHIG	Y	Y	Y	Y	Y	X	X	X	X	FHB(0-9)
NUWWSN	UIL	ILURB	Y	Y	Y	Y	Y	Y	Y	X	X	
NUWWSN	LIM	INLAF	x	x	x	x	x	x	x	Y	x	Yield, LR, YR, BYDV, INC and SEV on 0-9 scale
NUWWSN	PUR	INWLA	Y	X	X	X	X	X	X	Y	X	
NUWWSN	UKY	KYLEX	Y	Y	Y	Y	Y	Y	X	Y	Y	FHB(0-9)
NUWWSN	MSU	MIELA	Y	Y	Y	X	X	X	X	x	x	
NUWWSN	UMO	MOCOL	Y	Y	Y	Y	Y	Y	Y	Y	Y	% Symptomatic florets
NUWWSN	UNE	NEMEA	Y	Y	Y	y	y	y	X	X	X	Nivalenol
NUWWSN	COR	NYITH	Y	Y	Y	Y	Y	Y	X	Y	X	
NUWWSN	LIM	OHNAP	x	x	x	x	x	x	x	X	x	Yield, lodging
NUWWSN	OSU	OHWOO	X	X	Y	y	y	Y	X	Y	X	
NUWWSN	UGR	ONRID	Y	Y	Y	X	X	X	X	X	X	
NUWWSN	VAT	VABLA	Y	Y	Y	x	x	Y	X	Y	Y	Yield, lodging, test weight, LR, PM
PNUWWSN	KWS	ILCHA	Y	Y	Y	X	X	X	X	Y	X	
PNUWWSN	SYN IN	ILHIG	Y	Y	Y	Y	Y	X	X	X	X	FHB(0-9)
PNUWWSN	UIL	ILURB	Y	Y	Y	Y	Y	Y	Y	X	X	
PNUWWSN	LIM	INLAF	X	X	X	x	x	x	X	Y	X	Yield, LR, YR, BYDV, INC and SEV on 0-9 scale
PNUWWSN	PUR	INWLA	Y	X	X	X	X	X	X	Y	X	
PNUWWSN	UKY	KYLEX	Y	Y	Y	Y	Y	Y	X	Y	Y	FHB(0-9)
PNUWWSN	MSU	MIELA	Y	Y	Y	X	X	X	X	x	x	
PNUWWSN	UMO	MOCOL	Y	Y	Y	Y	Y	Y	Y	Y	Y	
PNUWWSN	LIM	OHNAP	X	X	X	x	x	x	X	x	X	Yield, lodging
PNUWWSN	OSU	OHWOO	X	X	Y	y	y	y	X	Y	X	
PNUWWSN	VAT	VABLA	Y	Y	Y	x	x	Y	X	Y	Y	Yield, lodging, test weight, LR, PM

Table 3. Entries in the 2014-2015 NUWWSN

ENTRY	SOURCE	NAME	PEDIGREE
1	CHECK	TRUMAN	
2	CHECK	ERNIE	
3	CHECK	FREEDOM	
4	CHECK	PIONEER2545	
5	COR	NY99056-161	NY85020-395/PIO25W33(10+6)
6	COR	NY09067-2-69-1097	(OH02-12686/CAL-RES-L)-2/(CAL-RES-L/03179-10)-8
7	COR	NY05152-818	NY7388/PIO25R37
8	COR	NY05152-825	NY7388/PIO25R37
9	COR	NY05152-821	NY7388/PIO25R37
10	KWS	KWS050	SUNBURST/Z00-3554
11	KWS	KWS051	P99840C4-8-4//P25R37/M00-3702
12	KWS	KWS052	ROANE/Y98-912
13	KWS	KWS036	D6206(X1293/CALDWELL)/P2552(PIOW3017/PIOW521)
14	LIM	ES12-3030	VA.99W-200/BW239
15	LIM	ES12-1358	M01-4377/B990133
16	LIM	ES12-1275	B980582/SR30-530
17	MSU	F1014	MSUD6234/W14//MSULINEE0038-1/3/MSULINEE0038-1
18	MSU	E6012	CALEDONIA/PIONEERBRAND25W33
19	OSU	OH09-207-24	M99*3098/OH743
20	OSU	OH09-281-10	OH743/P.984RE1-57-5
21	OSU	OH10-200-49	BRANSON/IL96-24851-1
22	PUR	10641B1-9-11-7	07117B1-29-7-1-1/WHEATEAR//ROANE
23	PUR	0762A1-2-8	981129A1-45-3/99793RE2-3//INW0301/92145E8-7-7-3-57/3/981477A1/981312A1//INW0316
24	PUR	08334A1-31	IL0134159//INW0411/011007A1-14-2
25	PUR	0566A1-3-1-6	INW0412/6/9017C1//92823A1/9218B4/3/P107/4/PATT/5/ACC3130/PATT/7/992060G1-1
26	PUR	10512RA1-8	02444/06265-89-4-26//0570A1-2-32-5/3/0527A1-9-12/0175A1-31-4-3
27	SYNIN	M11-2024#	M00-3904-9/P25R78//W1104
28	SYNIN	M12-3312CW	P99840C4-8-4/X00-1079
29	SYNIN	M12-3301	D01-7017/TRIBUTE
30	SYNIN	M12-2036#	CK9511//P25R62/M05-1172
31	SYNIN	M12-2031#	SY483/BENTON
32	UGR	CA9-72	25R56XE1007R
33	UGR	CA9-76	25R56XE1007R
34	UGR	DH5-15	25R56XEMMIT
35	UGR	CA13-53	25R51XFREEDOM
36	UGR	CA13-63	25R51XFREEDOM
37	UIL	IL10-19464	BESS/IL00-8530//IL00-8530
38	UIL	IL10-21934	IL97-1828/IL03-18438//IL00-8633
39	UIL	IL10-21937	IL97-1828/IL03-18438//IL00-8633
40	UIL	IL11-36131	IL01-34159/IL00-8109
41	UIL	IL11-27667	IL02-18228/IL00-8633//KASKASKIA
42	UKY	KY06C-1195-37-2-5	PEMBROKE08/02JH000014//KY96C-0770-3
43	UKY	KY06C-1201-18-6-3	KY97C-0232-2-2/NC03-11458//KY97C-0299-13-01
44	UKY	KY06C-1107-7-2-5	IL00-8061/FREEDOM//KY96C-0770-3
45	UKY	KY06C-2020-10-5-3	IL99-15867/B990081
46	UKY	KY06C-2020-11-12-1	IL99-15867/B990081
47	UMO	MO122246	081652SPRS
48	UMO	MO130203	000155//ROANE/GOLDFIELD
49	UMO	MO130765	ERNIE/147-2-3//980525
50	UMO	MO131838	ERNIE//ERNIE/92-2-1
51	UNE	NE05548	NE97426(=BRIGANTINA.2*ARAPAHOE)/NE98574
52	UNE	NE10589	OK98697/JAGALENE//CAMELOT
53	UNE	NW13455	SD98W175-1/NW03666
54	UNE	NE13511	CO00016/OVERLAND//NE03458
55	UNE	NE06545	KS92-946-B-15-1=(ABI86*3414/JAG//K92)/ALLIANCE
56	VAT	VA11W-108	PIONEER25R47/JAMESTOWN[VA02W-370=ROANE(VA93-54-429)/PION2691]
57	VAT	VA11W-182	BRANSON/SHIRLEY
58	VAT	VA12W-150	IL99-15867(IL93-2879/P881705A-1-X-60)/JAMESTOWN(VA02W-370)
59	VAT	VA12FHB-4	IL99-15867(IL93-2879/P881705A-1-X-60)/VA04W-433[NING7840/PION2684//96-54-244(CK9803/FREEDOM)]
60	VAT	VA12FHB-55	VA04W-433[NING7840/PION2684//96-54-244(CK9803/FREEDOM)]/BRANSON[M00-3701=PIO2737W/891-4584A(PIKE/FL302)]

Table 4. Entries in the 2014-2015 PNUWWSN

ENTRY	SOURCE	NAME	PEDIGREE
1	CHECK	TRUMAN	
2	CHECK	ERNIE	
3	CHECK	FREEDOM	
4	CHECK	PIONEER2545	
5	KWS	KWS055	BULKSEL
6	KWS	KWS053	SE981059R-13/EBERTS501
7	KWS	KWS054	IL04-8445XM05-1526
8	KWS	KWS037	BULKSEL
9	KWS	KWS041	BULKSEL
10	OSU	OH10-304-71	IL00-8061/M99-2408
11	OSU	OH10-316-20	M99-2408/OH02-12686
12	PUR	1042A1-1-2	99751D8-2-3/96169RE2-3-6-4-1/3/7D(E)//97462A1-21-1-5-1-15/INW0412/4/981477A1-10-2-1/981312A1-6-2-1//INW0316
13	PUR	053A1-2-5-3-5-3	7D(E)//INW0412/98134G4-1W//TRUMAN/INW0303
14	PUR	10565C1-1	BRANSON//07469A1-10-1/0527A1-9-15-1
15	PUR	082A1-3-1	INW0411/961341A3-1-4-6
16	PUR	11405A1-4	07469A1-10-1-18-2/3/BESS//07117B1-29-7-9-9-4/0527A1-9-15-2
17	SYNAR	B12*1792	NA
18	SYNAR	B12-2180NC#	NA
19	SYNAR	B12-2125FHB	NA
20	SYNIN	M12-3189	M03-3616/COKER9511
21	UIL	IL10-12009	IL02-18228/IL03-27312
22	UIL	IL10-23236	IL97-6755/IL03-18438//IL01-6262
23	UIL	IL11-6543	IL97-1828/IL02-18228
24	UIL	IL11-6626	IL97-1828/IL02-18228
25	UIL	IL11-8141	IL00-8061/IL02-7735
26	UKY	KY06C-1178-16-10-3	KY93C-0004-22-1/NC03-11458//KY97C-0519-04-05
27	UKY	KY06C-3058-53-3-3	KY98C-1161-03/IL96-24851-1//PEMBROKE08
28	UKY	KY06C-2020-10-18-3	IL99-15867/B990081
29	UKY	KY05C-1369-14-6-3	KY93C-0004-22-1/VA01W-476//KY98C-1517-01
30	UKY	KY05C-1017-30-6-3	981517A1-1-5-2/KY93C-1238-17-1
31	UMO	MO130651	980525//980725/ROANE
32	UMO	MO130660	050101//CATBIRD/980829
33	UMO	MO130669	TRUMAN*2/JAPAN8
34	UMO	MO130435	TRUMAN*2/PL25R54
35	UMO	MO130906	MO010708/MO980829
36	UMO	MO131378	ERNIE/1645-1/980725
37	VAT	VA13W-56	USG3555"S"(VA02W-559)/SHIRLEY//JAMESTOWN
38	VAT	VA13W-124	12V51(VA05W-251)/AGS2026(GA951231-4E26=GA881130/COKER9134)
39	VAT	VA07MAS4-7417-1-3-3	GA951231-4E25/SS8404//SHIRLEY
40	VAT	VA08MAS1-188-6-4	VA05W-640/VA05W-693//SHIRLEY
41	VAT	VA13FHB-5	IL99-15867(IL93-2879/P881705A-1-X-60)/VA04W-433[NING7840/PION2684//VA96-54-244(CK9803/FREEDOM)]//SS8404

Table 5a and b. Correlation of traits in the 2014-2015 P+NUWWSN. Above diagonal are correlations of means from the NUWWSN. Below diagonal are correlations of entry means from the PNUWWSN.

a. NUWWSN. |r| > 0.25 were significant at p < 0.05

	INC	SEV	IND	FDK	ISK	DON	GH	HD	HGT
INC		0.84	0.86	0.64	0.85	0.45	0.22	0.29	-0.05
SEV	0.84		0.97	0.59	0.88	0.52	0.37	0.23	-0.04
IND	0.86	0.97		0.61	0.90	0.50	0.35	0.26	-0.03
FDK	0.64	0.59	0.61		0.65	0.44	0.24	0.33	-0.08
ISK	0.85	0.88	0.90	0.65		0.55	0.34	0.35	0.04
DON	0.45	0.52	0.50	0.44	0.55		0.21	0.39	-0.03
GH	0.22	0.37	0.35	0.24	0.34	0.21		-0.13	-0.18
HD	0.29	0.23	0.26	0.33	0.35	0.39	-0.13		0.37
HGT	-0.05	-0.04	-0.03	-0.08	0.04	-0.03	-0.18	0.37	

b. PNUWWSN. |r| > 0.30 were significant at p <0.05

	INC	SEV	IND	FDK	ISK	DON	GH	HD	HGT
INC		0.84	0.88	0.56	0.83	0.64	0.44	0.19	-0.29
SEV	0.84		0.97	0.66	0.87	0.68	0.43	0.14	-0.32
IND	0.88	0.97		0.71	0.93	0.75	0.47	0.22	-0.26
FDK	0.56	0.66	0.71		0.89	0.51	0.31	0.14	-0.38
ISK	0.83	0.87	0.93	0.89		0.70	0.44	0.22	-0.33
DON	0.64	0.68	0.75	0.51	0.70		0.48	0.51	0.07
GH	0.44	0.43	0.47	0.31	0.44	0.48		0.29	-0.22
HD	0.19	0.14	0.22	0.14	0.22	0.51	0.29		0.44
HGT	-0.29	-0.32	-0.26	-0.38	-0.33	0.07	-0.22	0.44	

Table 6. Summary of statistics from the ANOVAs of the 2014-2015 P+NUWWSN

NUWWSN	INC	SEV	IND	FDK	ISK	DON
N	11	10	11	7	6	7
r2	0.7	0.76	0.65	0.7	0.68	0.77
CV	22	32.8	46.9	47.6	25.8	51.9
Verror	208	135	112	163	87	12.3
Vgenotype	28	36	41	78	51	9.2
Vgenotype as % total	11.9	21.1	26.8	32.4	37.0	42.8
Verror as % total	88.1	78.9	73.2	67.6	63.0	57.2

PNUWWSN	INC	SEV	IND	FDK	ISK	DON
N	8	7	8	5	5	5
r2	0.71	0.62	0.61	0.61	0.76	0.73
CV	22.2	37.9	51.9	69.7	28.5	59.6
Verror	197	108	99	243	97.8	6.4
Vgenotype	66	78	76	78	71.3	7.4
Vgenotype as % total	25.1	41.9	43.4	24.3	42.2	53.6
Verror as % total	74.9	58.1	56.6	75.7	57.8	46.4

Table 7a. Best (top) and worst (bottom) entries in the 2014-2015 NUWWSN. Summary statistics are over all 60 entries. "l" indicates a value that was not significantly different from the lowest value in that column, "h" indicates a value that was not significantly different from the highest value in that column.

ENTRY	NAME	INC		SEV		IND		FDK		ISK		DON		GHSEV		# ls	#hs
47	MO122246	58.9	l	24.2	l	12.3	l	14.7	l	28.0	l	4.1	l	18.6	l	7	0
50	MO131838	54.4	l	27.4	l	14.5	l	20.4	l	26.3	l	4.6	l	7.2	l	7	0
16	ES12-1275	53.1	l	27.3	l	14.6	l	21.0	l	26.6	l	4.5	l	22.3	l	7	0
40	IL11-36131	55.9	l	24.7	l	15.5	l	11.1	l	24.6	l	3.7	l	23.4	l	7	0
29	M12-3301	64.2	l	29.6	l	15.7	l	16.4	l	28.5	l	5.8	l	30.4	hl	7	1
41	IL11-27667	61.7	l	30.7	l	16.2	l	12.7	l	29.5	l	3.0	l	7.2	l	7	0
46	KY06C-2020-11-12-1	63.7	l	30.9	l	16.2	l	12.9	l	29.0	l	3.1	l	7.9	l	7	0
59	VA12FHB-4	64.0	l	28.4	l	16.2	l	16.5	l	27.8	l	4.6	l	18.6	l	7	0
38	IL10-21934	55.8	l	30.1	l	16.4	l	12.2	l	23.5	l	4.5	l	12.1	l	7	0
21	OH10-200-49	58.7	l	31.2	l	16.9	l	13.8	l	26.0	l	4.5	l	17.5	l	7	0
1	TRUMAN	55.3	l	28.1	l	17.0	l	14.3	l	25.4	l	5.2	l	9.3	l	7	0
60	VA12FHB-55	58.6	l	29.1	l	17.0	l	15.8	l	29.1	l	3.7	l	11.4	l	7	0
39	IL10-21937	58.3	l	27.1	l	17.4	l	14.9	l	23.4	l	4.4	l	25.8	l	7	0
15	ES12-1358	63.0	l	31.5	l	18.8	l	11.7	l	29.0	l	3.0	l	12.2	l	7	0
23	0762A1-2-8	56.7	l	22.8	l	10.3	l	26.4		24.2	l	3.5	l	8.4	l	6	0
22	10641B1-9-11-7	67.2		29.1	l	16.1	l	23.2	l	30.7	l	5.0	l	17.6	l	6	0
43	KY06C-1201-18-6-3	62.7	l	30.5	l	18.5	l	24.7		34.0	l	4.0	l	33.2	hl	6	1
37	IL10-19464	65.9		30.8	l	19.0	l	14.1	l	33.6	l	4.6	l	16.1	l	6	0
30	M12-2036#	55.8	l	24.0	l	12.6	l	33.2		32.5	l	8.7		24.8	l	5	0
28	M12-3312CW	56.5	l	28.3	l	13.7	l	25.9		31.4	l	14.9	h	17.7	l	5	1
31	M12-2031#	58.7	l	29.6	l	15.7	l	32.6		33.1	l	10.8		17.4	l	5	0
36	CA13-63	61.9	l	28.2	l	18.4	l	26.7		34.5		5.8	l	15.1	l	5	0
24	08334A1-31	64.5	l	32.6	l	18.6	l	29.1		36.5		5.0	l	20.9	l	5	0
52	NE10589	79.3	h	52.4	h	41.3	h	47.9	h	58.1	h	10.9		36.5	h	0	6
4	PIONEER2545	84.1	h	58.4	h	45.7	h	59.5	h	61.9	h	15.8	h	40.3	h	0	7
100	AVERAGE	65.8		35.3		22.6		26.6		36.1		7.0		24.0			
101	MINUMUM	53.1		22.8		10.3		11.1		23.4		3.0		7.2			
102	MAXIMUM	84.1		58.4		45.7		59.5		61.9		18.6		58.3			
103	LSD(0.05)	12.3		10.4		9.0		13.7		10.7		3.7		28.8			
	Number of Environments	11		10		11		7		6		7		2			

Table 7b. Best and worst entries in the 2014-2015 PNUWWSN. Summary statistics are from analysis with all 41 entries. “l” indicates a value that was not significantly different from the lowest value in that column, “h” indicates a value that was not significantly different from the highest value in that column.

ENTRY	NAME	INC		SEV		IND		FDK		ISK		DON		GHSEV		# ls	#hs
32	MO130660	49.4	l	15.0	l	7.8	l	15.7	l	21.3	l	2.2	l	37.6	hl	7	1
36	MO131378	47.2	l	16.5	l	8.8	l	17.3	l	26.0	l	3.1	l	7.5	l	7	0
29	KY05C-1369-14-6-3	55.7	l	15.3	l	9.0	l	19.6	l	27.7	l	1.2	l	10.5	l	7	0
22	IL10-23236	51.3	l	18.5	l	9.8	l	17.3	l	26.3	l	1.4	l	16.4	l	7	0
25	IL11-8141	56	l	16.0	l	10.2	l	6.7	l	23.7	l	2.2	l	34.2	hl	7	1
1	TRUMAN	51.3	l	17.7	l	11.0	l	11.2	l	23.1	l	2.4	l	0.0	l	7	0
13	053A1-2-5-3-5-3	59.7	l	20.2	l	12.8	l	14.9	l	30.0	l	1.9	l	16.2	l	7	0
23	IL11-6543	57.8	l	21.6	l	12.8	l	6.4	l	24.8	l	1.9	l	0.0	l	7	0
6	KWS053	56.6	l	19.8	l	13.1	l	23.2	l	31.0	l	3.3	l	23.5	l	7	0
33	MO130669	58.5	l	23.0	l	13.2	l	18.6	l	32.0	l	3.3	l	8.0	l	7	0
21	IL10-12009	49.1	l	24.7	l	13.3	l	14.8	l	26.4	l	2	l	25.3	l	7	0
34	MO130435	51	l	13.9	l	8.2	l	21.1	l	27.2	l	3.3	l	46.3	h	6	1
35	MO130906	52.6	l	19.5	l	10.9	l	29.0		32.1	l	3.5	l	7.9	l	6	0
20	M12-3189	62.8		17.5	l	11.2	l	12.3	l	25.6	l	2.7	l	29.4	hl	6	1
37	VA13W-56	54.1	l	21.9	l	12.3	l	9.3	l	23.5	l	2.9	l	59.1	h	6	1
30	KY05C-1017-30-6-3	54.8	l	26.0		14.3	l	22.9	l	30.6	l	2.8	l	13.6	l	6	0
31	MO130651	64.6		22.3	l	15.2	l	12.3	l	30.3	l	4.2	l	26.1	l	6	0
24	IL11-6626	55.3	l	27.4		15.4	l	7.4	l	22.5	l	2.1	l	6.8	l	6	0
19	B12-2125FHB	65.4		23.5	l	15.5	l	18.3	l	29.6	l	2.4	l	27.6	l	6	0
16	11405A1-4	66.5		24.6	l	16.4	l	20.9	l	32.8	l	2	l	16.9	l	6	0
4	PIONEER2545	86.9	h	54.9	h	52.3	h	58.1	h	66.9	h	9.6		6.0	h	0	6
100	AVERAGE	63.5		27.5		19.3		23.2		34.9		4.2		30.6			
101	MINUMUM	47.2		13.9		7.8		6.4		21.3		1.2		6.8			
102	MAXIMUM	86.9		54.9		52.3		58.1		66.9		13.6		60.0			
103	LSD(0.05)	14.1		11.1		10.0		19.7		12.5		3.2		30.9			

Table 8. Summary of all FHB traits from the 2014-2015 NUWWSN: " h" and "l" indicate means that are not significantly different from the highest (h) or lowest (l) mean in that column.

ENTRY	NAME	INC	SEV	IND	FDK	ISK	DON	GHSEV	# ls	#hs
1	TRUMAN	55.3 l	28.1 l	17.0 l	14.3 l	25.4 l	5.2 l	9.3 l	7	0
2	ERNIE	62.8 l	37.8	21.4	20.6 l	34.2	5.6 l	20.3 l	4	0
3	FREEDOM	70.3	38.2	24.5	37.4	40.7	5.1 l	29.3 l	2	0
4	PIONEER2545	84.1 h	58.4 h	45.7 h	59.5 h	61.9 h	15.8 h	40.3 h	0	7
5	NY99056-161	66.2	36.6	21.5	27.4	35.5	10.7	14.5 l	1	0
6	NY09067-2-69-1097	68.6	38.1	25.0	39.1	44.2	9.1	44.0 h	0	1
7	NY05152-818	61.9 l	36.3	22.3	33.9	39.0	7.9	56.3 h	1	1
8	NY05152-825	62.9 l	32.6 l	21.6	30.1	39.1	6.1 l	12.3 l	4	0
9	NY05152-821	64.2 l	35.6	24.3	33.7	39.5	9.5	18.5 l	2	0
10	KWS050	72.0 h	37.9	26.9	31.0	40.8	7.6	43.0 h	0	2
11	KWS051	64.9 l	41.2	29.2	29.5	40.3	4.8 l	18.6 l	3	0
12	KWS052	64.4 l	39.8	26.2	32.5	40.2	5.3 l	40.5 h	2	1
13	KWS036	71.6	45.9	33.1	36.5	43.6	18.6 h	45.3 h	0	2
14	ES12-3030	66.5	37.7	25.3	24.8	38.5	7.1	51.6 h	0	1
15	ES12-1358	63.0 l	31.5 l	18.8 l	11.7 l	29.0 l	3.0 l	12.2 l	7	0
16	ES12-1275	53.1 l	27.3 l	14.6 l	21.0 l	26.6 l	4.5 l	22.3 l	7	0
17	F1014	73.0 h	39.3	27.9	29.0	38.8	11.0	9.8 l	1	1
18	E6012	68.6	41.6	27.9	26.9	40.8	13.9	9.7 l	1	0
19	OH09-207-24	59.3 l	33.4	20.1	20.0 l	30.8 l	5.3 l	34.9 hl	4	1
20	OH09-281-10	73.9 h	37.3	24.8	41.3	43.2	8.6	21.4 l	1	1
21	OH10-200-49	58.7 l	31.2 l	16.9 l	13.8 l	26.0 l	4.5 l	17.5 l	7	0
22	10641B1-9-11-7	67.2	29.1 l	16.1 l	23.2 l	30.7 l	5.0 l	17.6 l	6	0
23	0762A1-2-8	56.7 l	22.8 l	10.3 l	26.4	24.2 l	3.5 l	8.4 l	6	0
24	08334A1-31	64.5 l	32.6 l	18.6 l	29.1	36.5	5.0 l	20.9 l	5	0
25	0566A1-3-1-6	69.5	36.9	23.4	19.5 l	32.3 l	4.3 l	25.0 l	4	0
26	10512RA1-8	65.1 l	26.1 l	13.9 l	37.5	36.1	7.6	17.2 l	4	0
27	M11-2024#	59.1 l	37.8	23.8	23.0 l	30.7 l	8.9	58.3 h	3	1
28	M12-3312CW	56.5 l	28.3 l	13.7 l	25.9	31.4 l	14.9 h	17.7 l	5	1
29	M12-3301	64.2 l	29.6 l	15.7 l	16.4 l	28.5 l	5.8 l	30.4 hl	7	1
30	M12-2036#	55.8 l	24.0 l	12.6 l	33.2	32.5 l	8.7	24.8 l	5	0
31	M12-2031#	58.7 l	29.6 l	15.7 l	32.6	33.1 l	10.8	17.4 l	5	0
32	CA9-72	76.9 h	46.4	33.6	37.8	48.6	8.9	28.6 l	1	1
33	CA9-76	74.2 h	44.0	30.5	34.6	40.7	7.5	19.6 l	1	1
34	DH5-15	68.7	42.9	28.8	26.4	34.7	9.1	15.1 l	1	0
35	CA13-53	76.5 h	35.5	27.2	38.7	44.3	10.1	10.3 l	1	1
36	CA13-63	61.9 l	28.2 l	18.4 l	26.7	34.5	5.8 l	15.1 l	5	0
37	IL10-19464	65.9	30.8 l	19.0 l	14.1 l	33.6 l	4.6 l	16.1 l	6	0
38	IL10-21934	55.8 l	30.1 l	16.4 l	12.2 l	23.5 l	4.5 l	12.1 l	7	0
39	IL10-21937	58.3 l	27.1 l	17.4 l	14.9 l	23.4 l	4.4 l	25.8 l	7	0
40	IL11-36131	55.9 l	24.7 l	15.5 l	11.1 l	24.6 l	3.7 l	23.4 l	7	0
41	IL11-27667	61.7 l	30.7 l	16.2 l	12.7 l	29.5 l	3.0 l	7.2 l	7	0
42	KY06C-1195-37-2-5	67.7	37.4	23.2	17.2 l	35.4	6.0 l	24.2 l	3	0
43	KY06C-1201-18-6-3	62.7 l	30.5 l	18.5 l	24.7	34.0 l	4.0 l	33.2 hl	6	1
44	KY06C-1107-7-2-5	66.6	37.6	22.7	20.3 l	34.6	5.7 l	14.2 l	3	0
45	KY06C-2020-10-5-3	70.1	40.0	30.1	26.4	40.9	6.1 l	34.6 hl	2	1
46	KY06C-2020-11-12-1	63.7 l	30.9 l	16.2 l	12.9 l	29.0 l	3.1 l	7.9 l	7	0
47	MO122246	58.9 l	24.2 l	12.3 l	14.7 l	28.0 l	4.1 l	18.6 l	7	0
48	MO130203	70.8	36.7	21.9	13.0 l	33.2 l	5.1 l	28.9 l	4	0
49	MO130765	66.7	33.3	20.3	24.8	33.3 l	4.6 l	14.3 l	3	0
50	MO131838	54.4 l	27.4 l	14.5 l	20.4 l	26.3 l	4.6 l	7.2 l	7	0
51	NE05548	77.9 h	49.5 h	37.8 h	43.9	55.4 h	6.9	17.1 l	1	4
52	NE10589	79.3 h	52.4 h	41.3 h	47.9 h	58.1 h	10.9	36.5 h	0	6
53	NW13455	71.3	39.2	25.2	29.5	40.5	12.4	21.6 l	1	0
54	NE13511	70.3	43.3	29.7	37.7	45.2	8.8	27.3 l	1	0
55	NE06545	71.0	37.4	24.6	24.7	37.9	8.1	43.1 h	0	1
56	VA11W-108	72.9 h	41.3	26.2	31.3	43.0	6.0 l	49.2 h	1	2
57	VA11W-182	74.2 h	39.7	28.5	37.1	44.3	7.1	14.7 l	1	1
58	VA12W-150	66.7	39.8	25.8	25.9	40.7	6.4 l	34.5 hl	2	1
59	VA12FHB-4	64.0 l	28.4 l	16.2 l	16.5 l	27.8 l	4.6 l	18.6 l	7	0
60	VA12FHB-55	58.6 l	29.1 l	17.0 l	15.8 l	29.1 l	3.7 l	11.4 l	7	0
100	AVERAGE	65.8	35.3	22.6	26.6	36.1	7.0	24.0		
101	MINUMUM	53.1	22.8	10.3	11.1	23.4	3.0	7.2		
102	MAXIMUM	84.1	58.4	45.7	59.5	61.9	18.6	58.3		
103	LSD(0.05)	12.3	10.4	9.0	13.7	10.7	3.7	28.8		
	Number of Environments	11	10	11	7	6	7	2		

Table 9. Summary of all FHB traits from the 2014-2015 PNUWWSN: " h" and "l" indicate means that are not significantly different from the highest (h) or lowest (l) mean in that column.

ENTRY	NAME	INC		SEV		IND		FDK		ISK		DON		GHSEV		# ls	#hs
1	TRUMAN	51.3	l	17.7	l	11.0	l	11.2	l	23.1	l	2.4	l	0.0	l	7	0
2	ERNIE	67.8		34.7		23.5		15.5	l	36.2		4.5		30.2	hl	2	1
3	FREEDOM	69.4		30.4		26.1		47.5	h	49.1		5		46.9	h	0	2
4	PIONEER2545	86.9	h	54.9	h	52.3	h	58.1	h	66.9	h	9.6		6.0	h	0	6
5	KWS055	72.1		39.6		33.7		35.4		50.4		12.9	h	60.0	h	0	2
6	KWS053	56.6	l	19.8	l	13.1	l	23.2	l	31.0	l	3.3	l	23.5	l	7	0
7	KWS054	63.8		31.8		23.4		38.7	h	42.0		4.3	l	41.9	h	1	2
8	KWS037	70.4		41.3		33.0		34.2		49.7		11.9	h	46.8	h	0	2
9	KWS041	78.1	h	46.4	h	36.7		33.1		46.2		13.6	h	35.9	hl	1	4
10	OH10-304-71	66.6		22.5	l	18.4		18.1	l	36.4		3.9	l	1.0	hl	4	1
11	OH10-316-20	72.8		28.8		22.2		20.6	l	38.1		3.6	l	48.5	h	2	1
12	1042A1-1-2	58.5	l	24.7	l	16.1	l	33.0		37.5		5.4		36.4	hl	4	1
13	053A1-2-5-3-5-3	59.7	l	20.2	l	12.8	l	14.9	l	30.0	l	1.9	l	16.2	l	7	0
14	10565C1-1	81	h	30.3		23.3		19.1	l	37.7		9.1		36.8	hl	2	2
15	082A1-3-1	67.5		30.4		21.2		28.3		36.5		4.2	l	11.6	l	2	0
16	11405A1-4	66.5		24.6	l	16.4	l	20.9	l	32.8	l	2	l	16.9	l	6	0
17	B12*1792	67.8		32.8		24.7		23.2	l	40.7		4.5		49.0	h	1	1
18	B12-2180NC#	73.8	h	31.8		23.2		30.2		39.7		4.8		28.9	l	1	1
19	B12-2125FHB	65.4		23.5	l	15.5	l	18.3	l	29.6	l	2.4	l	27.6	l	6	0
20	M12-3189	62.8		17.5	l	11.2	l	12.3	l	25.6	l	2.7	l	29.4	hl	6	1
21	IL10-12009	49.1	l	24.7	l	13.3	l	14.8	l	26.4	l	2	l	25.3	l	7	0
22	IL10-23236	51.3	l	18.5	l	9.8	l	17.3	l	26.3	l	1.4	l	16.4	l	7	0
23	IL11-6543	57.8	l	21.6	l	12.8	l	6.4	l	24.8	l	1.9	l	0.0	l	7	0
24	IL11-6626	55.3	l	27.4		15.4	l	7.4	l	22.5	l	2.1	l	6.8	l	6	0
25	IL11-8141	56	l	16.0	l	10.2	l	6.7	l	23.7	l	2.2	l	34.2	hl	7	1
26	KY06C-1178-16-10-3	63.8		26.5		19.5		22.8	l	34.7		4	l	28.2	l	3	0
27	KY06C-3058-53-3-3	67.1		23.9	l	17.3	l	25.6	l	37.5		2.9	l	31.1	hl	5	1
28	KY06C-2020-10-18-3	70.3		33.9		24.0		17.2	l	34.1		4.2	l	28.3	l	3	0
29	KY05C-1369-14-6-3	55.7	l	15.3	l	9.0	l	19.6	l	27.7	l	1.2	l	10.5	l	7	0
30	KY05C-1017-30-6-3	54.8	l	26.0		14.3	l	22.9	l	30.6	l	2.8	l	13.6	l	6	0
31	MO130651	64.6		22.3	l	15.2	l	12.3	l	30.3	l	4.2	l	26.1	l	6	0
32	MO130660	49.4	l	15.0	l	7.8	l	15.7	l	21.3	l	2.2	l	37.6	hl	7	1
33	MO130669	58.5	l	23.0	l	13.2	l	18.6	l	32.0	l	3.3	l	8.0	l	7	0
34	MO130435	51	l	13.9	l	8.2	l	21.1	l	27.2	l	3.3	l	46.3	h	6	1
35	MO130906	52.6	l	19.5	l	10.9	l	29.0		32.1	l	3.5	l	7.9	l	6	0
36	MO131378	47.2	l	16.5	l	8.8	l	17.3	l	26.0	l	3.1	l	7.5	l	7	0
37	VA13W-56	54.1	l	21.9	l	12.3	l	9.3	l	23.5	l	2.9	l	59.1	h	6	1
38	VA13W-124	73.7	h	45.3	h	32.3		22.8	l	39.8		4.3	l	44.3	h	2	3
39	VA07MAS4-7417-1-3-3	72.2		44.5	h	30.6		46.3	h	50.3		3.6	l	37.3	hl	1	2
40	VA08MAS1-188-6-4	76.3	h	38.9		28.9		25.2	l	41.8		3.8	l	34.0	hl	2	1
41	VA13FHB-5	64.6		28.3		18.8		35.5		39.1		2.9	l	36.9	hl	1	0
100	AVERAGE	63.5		27.5		19.3		23.2		34.9		4.2		30.6			
101	MINUMUM	47.2		13.9		7.8		6.4		21.3		1.2		6.8			
102	MAXIMUM	86.9		54.9		52.3		58.1		66.9		13.6		60.0			
103	LSD(0.05)	14.1		11.1		10.0		19.7		12.5		3.2		30.9			
	Number of Environments	8		7		8		5		5		5		2			

Table 10. Summary of incidence (INC, %) from 2014-2015 NUWWSN.

ENTRY	NAME	AVG		ILCHA	ILHIG	ILURB	INWLA	KYLEX	MIELA	MOCOL	NEMEA	NYITH	ONRIG	VABLA
1	TRUMAN	55.3	l	60.0	35.0	48.0	40.0	92.5	86.7	65.0	43.3	28.0	85.0	25.0
2	ERNIE	62.8	l	90.0	45.0	88.0	45.0	72.5	75.0	70.0	73.3	27.0	85.0	20.0
3	FREEDOM	70.3		100.0	65.0	93.0	55.0	62.5	70.0	87.5	53.3	77.0	90.3	20.0
4	PIONEER2545	84.1	h	100.0	90.0	97.0	65.0	92.5	95.0	95.0	76.7	50.0	96.7	67.5
5	NY99056-161	66.2		90.0	40.0	42.0	55.0	90.0	75.0	90.0	60.0	44.0	85.0	57.5
6	NY09067-2-69-1097	68.6		85.0	70.0	63.0	35.0	92.5	86.7	80.0	83.3	50.0	93.7	15.0
7	NY05152-818	61.9	l	90.0	40.0	57.0	35.0	90.0	91.7	100.0	26.7	49.0	61.7	40.0
8	NY05152-825	62.9	l	80.0	59.3	60.0	50.0	72.5	93.3	92.5	40.0	23.0	94.2	27.5
9	NY05152-821	64.2	l	85.0	60.0	53.0	35.0	92.5	80.0	100.0	26.7	47.0	94.2	32.5
10	KWS050	72.0	h	100.0	80.0	63.0	55.0	87.5	85.0	70.0	76.7	58.0	91.7	25.0
11	KWS051	64.9	l	100.0	85.0	95.0	50.0	55.0	58.3	70.0	56.7	23.0	93.3	27.5
12	KWS052	64.4	l	100.0	45.0	92.0	45.0	52.5	80.0	67.5	90.0	21.0	85.0	30.0
13	KWS036	71.6		100.0	70.0	87.0	40.0	75.0	85.0	60.0	83.3	56.0	93.3	37.5
14	ES12-3030	66.5		95.0	75.0	48.0	55.0	75.0	71.7	90.0	100.0	21.0	88.3	12.5
15	ES12-1358	63.0	l	90.0	45.0	63.0	30.0	67.5	88.3	85.0	86.3	34.0	86.7	17.5
16	ES12-1275	53.1	l	95.0	29.3	70.0	20.0	27.5	66.7	60.0	83.3	25.0	90.0	17.5
17	F1014	73.0	h	95.0	30.0	73.0	70.0	100.0	96.7	95.0	56.7	63.0	93.3	30.0
18	E6012	68.6		75.0	55.0	87.0	55.0	80.0	91.7	62.5	100.0	26.0	90.0	32.5
19	OH09-207-24	59.3	l	75.0	65.0	77.0	30.0	40.0	70.0	62.5	80.0	29.0	91.7	32.5
20	OH09-281-10	73.9	h	100.0	85.0	82.0	55.0	57.5	88.3	80.0	100.0	53.0	91.7	20.0
21	OH10-200-49	58.7	l	70.0	50.0	48.0	35.0	87.5	65.0	70.0	76.7	24.0	91.7	27.5
22	10641B1-9-11-7	67.2		95.0	75.0	75.0	75.0	20.0	75.0	87.5	80.0	32.0	90.0	35.0
23	0762A1-2-8	56.7	l	100.0	60.0	38.0	35.0	20.0	80.0	80.0	73.3	36.0	86.7	15.0
24	08334A1-31	64.5	l	85.0	50.0	85.0	30.0	52.5	93.3	90.0	83.3	24.0	91.7	25.0
25	0566A1-3-1-6	69.5		100.0	80.0	70.0	55.0	50.0	88.3	77.5	96.7	36.0	93.3	17.5
26	10512RA1-8	65.1	l	80.0	70.0	75.0	30.0	75.0	81.7	90.0	50.0	49.0	90.0	25.0
27	M11-2024#	59.1	l	100.0	60.0	92.0	40.0	32.5	70.0	52.5	83.3	16.0	86.7	17.5
28	M12-3312CW	56.5	l	70.0	40.0	77.0	25.0	40.0	68.3	67.5	86.7	42.0	90.0	15.0
29	M12-3301	64.2	l	85.0	70.0	67.0	45.0	52.5	80.0	72.5	83.3	30.0	88.3	32.5
30	M12-2036#	55.8	l		50.0	53.0	30.0	50.0	91.7	55.0	77.6	28.0	86.7	12.5
31	M12-2031#	58.7	l		45.0	58.0	20.0	82.5	73.3	72.5	66.7	24.0	81.7	40.0
32	CA9-72	76.9	h		70.0	96.0	60.0	67.5	91.7	85.0	100.0	63.0	95.0	17.5
33	CA9-76	74.2	h	100.0	65.0	78.0	40.0	90.0	88.3	70.0	93.3	50.0	91.7	50.0
34	DH5-15	68.7		100.0	75.0	43.0	25.0	70.0	85.0	77.5	96.7	63.0	95.0	25.0
35	CA13-53	76.5	h	100.0	65.0	78.0	75.0	95.0	76.7	100.0	44.3	70.0	90.0	47.5
36	CA13-63	61.9	l	75.0	65.0	32.0	10.0	90.0	95.0	72.5	100.0	30.0	91.7	20.0
37	IL10-19464	65.9		95.0	80.0	80.0	35.0	72.5	65.0	75.0	96.7	16.0	86.7	22.5
38	IL10-21934	55.8	l	85.0	70.0	50.0	40.0	27.5	80.0	65.0	83.3	14.0	86.7	12.5
39	IL10-21937	58.3	l	85.0	70.0	63.0	55.0	32.5	80.0	35.0	96.7	23.0	93.3	7.5
40	IL11-36131	55.9	l	95.0	80.0	73.0	20.0	35.0	76.7	27.5	90.0	18.0	86.7	12.5
41	IL11-27667	61.7	l	85.0	60.0	70.0	40.0	55.0	75.0	77.5	96.7	15.0	85.0	20.0
42	KY06C-1195-37-2-5	67.7		85.0	60.0	70.0	60.0	82.5	81.7	85.0	33.3	61.0	88.3	37.5
43	KY06C-1201-18-6-3	62.7	l	95.0	90.0	72.0	35.0	35.0	75.0	62.5	80.0	18.0	90.0	37.5
44	KY06C-1107-7-2-5	66.6		100.0	70.0	88.0	30.0	50.0	70.0	77.5	80.0	32.0	90.0	45.0
45	KY06C-2020-10-5-3	70.1		100.0	60.0	87.0	30.0	95.0	86.7	55.0	76.7	51.0	96.7	32.5
46	KY06C-2020-11-12-1	63.7	l	85.0	55.0	67.0	30.0	60.0	86.7	77.5	86.7	26.0	87.0	40.0
47	MO122246	58.9	l	90.0	75.0	83.0	30.0	22.5	53.3	87.5	83.3	22.0	86.7	15.0
48	MO130203	70.8		80.0	60.0	87.0	50.0	85.0	75.0	95.0	83.3	55.0	88.3	20.0
49	MO130765	66.7		90.0	39.3	63.0	55.0	92.5	88.3	85.0	63.3	45.0	90.0	22.5
50	MO131838	54.4	l	75.0	40.0	38.0	20.0	85.0	65.0	75.0	53.3	43.0	91.7	12.5
51	NE05548	77.9	h	85.0	65.0	87.0	60.0	95.0	98.3	100.0	96.7	54.0	93.3	22.5
52	NE10589	79.3	h	90.0	80.0	80.0	55.0	95.0	93.3	97.5	96.7	50.0	90.0	45.0
53	NW13455	71.3		85.0	55.0	75.0	40.0	87.5	85.0	95.0	100.0	18.0	93.3	50.0
54	NE13511	70.3		85.0	40.0	68.0	45.0	70.0	85.0	97.5	90.0	55.0	93.3	45.0
55	NE06545	71.0		85.0	85.0	85.0	30.0	70.0	86.7	90.0	100.0	25.0	91.7	32.5
56	VA11W-108	72.9	h	85.0	75.0	88.0	65.0	87.5	93.3	87.5	63.3	27.0	88.3	42.5
57	VA11W-182	74.2	h	85.0	70.0	85.0	45.0	80.0	90.0	70.0	86.7	34.0	93.3	77.5
58	VA12W-150	66.7		85.0	70.0	90.0	45.0	60.0	88.3	75.0	46.7	54.0	95.0	25.0
59	VA12FHB-4	64.0	l	100.0	85.0	73.0	45.0	37.5	75.0	77.5	60.0	49.0	86.7	15.0
60	VA12FHB-55	58.6	l	100.0	65.0	67.0	40.0	37.5	83.3	87.5	33.3	19.0	85.0	27.5
100	AVERAGE	65.8		87.7	63.3	69.9	44.0	67.6	80.5	78.2	73.9	39.9	86.4	29.1
101	MINUMUM	53.1		45.0	29.3	20.0	10.0	20.0	53.3	27.5	24.0	14.0	12.5	7.5
102	MAXIMUM	84.1		100.0	96.0	97.0	82.5	100.0	98.3	100.0	100.0	95.0	96.7	77.5
103	LSD(0.05)	12.3		.	.	.	.	.	.	.	.	.	.	.

Table 11. Summary of severity (SEV, %) data from the 2014-2015 NUWWSN

ENTRY	NAME	AVG		ILCHA	ILHIG	ILURB	KYLEX	MIELA	MOCOL	NEMEA	NYITH	ONRIG	VABLA
1	TRUMAN	28.1	l	15.0	10.0	33.5	39.0	26.5	65.0	6.0	10.6	66.0	9.1
2	ERNIE	37.8		25.0	65.0	32.0	40.3	31.7	70.0	23.7	10.4	54.0	26.1
3	FREEDOM	38.2		45.0	30.0	43.0	45.1	24.4	87.5	20.7	21.0	55.0	9.8
4	PIONEER2545	58.4	h	85.0	55.0	80.0	60.6	42.7	95.0	29.3	15.4	79.6	41.7
5	NY99056-161	36.6		27.5	45.0	22.7	28.5	27.6	90.0	13.7	15.8	65.0	30.5
6	NY09067-2-69-1097	38.1		40.0	30.0	50.4	41.6	16.7	80.0	25.3	16.8	59.3	21.3
7	NY05152-818	36.3		20.0	20.0	38.4	32.7	20.9	100.0	8.3	13.0	85.3	24.9
8	NY05152-825	32.6	l	15.0	20.0	41.4	39.9	20.8	92.5	11.7	9.6	66.6	8.5
9	NY05152-821	35.6		15.0	15.0	26.5	32.8	34.5	100.0	16.7	9.6	58.6	46.9
10	KWS050	37.9		45.0	30.0	35.3	37.2	21.9	70.0	22.3	19.8	79.0	18.5
11	KWS051	41.2		70.0	45.0	56.1	29.9	19.8	70.0	26.3	14.8	66.0	14.0
12	KWS052	39.8		50.0	45.0	77.6	27.8	22.2	67.5	42.7	16.4	34.7	14.1
13	KWS036	45.9		65.0	30.0	75.3	44.7	33.2	60.0	26.7	22.4	79.0	22.4
14	ES12-3030	37.7		40.0	45.0	34.3	48.5	23.4	90.0	40.3	10.0	34.7	10.5
15	ES12-1358	31.5	l	35.0	30.0	36.5	30.8	20.4	85.0	22.0	7.8	38.0	9.0
16	ES12-1275	27.3	l	22.5	40.0	30.6	17.2	14.2	60.0	18.0	9.0	49.7	11.8
17	F1014	39.3		22.5	10.0	53.6	67.1	26.0	95.0	10.7	13.8	79.0	14.8
18	E6012	41.6		30.0	30.0	76.2	54.6	26.6	62.5	34.7	13.2	65.0	23.5
19	OH09-207-24	33.4		17.5	25.0	37.0	26.3	16.3	62.5	18.3	10.8	78.3	42.0
20	OH09-281-10	37.3		45.0	20.0	36.3	33.4	17.9	80.0	40.7	17.8	70.3	11.4
21	OH10-200-49	31.2	l	22.5	10.0	28.9	37.0	28.5	70.0	11.7	10.2	70.3	22.5
22	10641B1-9-11-7	29.1	l	15.0	35.0	15.7	19.2	14.1	87.5	17.3	11.0	59.7	16.8
23	0762A1-2-8	22.8	l	30.0	10.0	18.1	21.3	13.9	80.0	13.3	11.6	22.7	7.0
24	08334A1-31	32.6	l	20.0	25.0	38.7	35.0	21.4	90.0	22.3	13.4	44.3	15.9
25	0566A1-3-1-6	36.9		35.0	45.0	42.3	22.0	28.6	77.5	37.7	14.0	44.3	22.3
26	10512RA1-8	26.1	l	15.0	10.0	16.5	27.2	19.1	90.0	17.0	10.4	45.7	9.6
27	M11-2024#	37.8		75.0	35.0	61.5	26.3	16.6	52.5	33.7	19.8	44.0	13.5
28	M12-3312CW	28.3	l	15.0	45.0	16.8	26.5	17.5	67.5	13.3	15.8	44.3	20.9
29	M12-3301	29.6	l	20.0	10.0	55.5	37.0	23.6	72.5	18.3	11.6	32.3	15.0
30	M12-2036#	24.0	l		25.0	26.8	23.3	24.5	55.0	12.4	8.2	34.7	9.3
31	M12-2031#	29.6	l		20.0	35.9	28.7	18.4	72.5	13.0	11.0	49.7	20.3
32	CA9-72	46.4			65.0	74.1	29.4	30.5	85.0	35.3	23.0	70.3	8.2
33	CA9-76	44.0		30.0	60.0	43.3	45.5	23.5	70.0	44.3	17.6	79.0	26.4
34	DH5-15	42.9		65.0	35.0	22.6	46.3	31.6	77.5	29.3	15.6	82.0	24.0
35	CA13-53	35.5		27.5	15.0	31.0	38.5	18.1	100.0	21.6	17.2	70.3	15.5
36	CA13-63	28.2	l	25.0	20.0	21.0	30.4	25.9	72.5	19.0	8.6	44.3	15.0
37	IL10-19464	30.8	l	20.0	30.0	34.5	30.5	11.8	75.0	29.3	14.4	48.3	14.7
38	IL10-21934	30.1	l	22.5	25.0	26.1	22.6	17.7	65.0	27.7	19.4	65.0	9.9
39	IL10-21937	27.1	l	20.0	50.0	25.9	17.5	21.0	35.0	32.3	12.4	49.7	7.0
40	IL11-36131	24.7	l	35.0	30.0	23.0	20.2	23.7	27.5	25.3	7.0	38.7	16.4
41	IL11-27667	30.7	l	25.0	35.0	31.8	37.1	22.3	77.5	25.3	9.2	30.7	13.5
42	KY06C-1195-37-2-5	37.4		20.0	25.0	42.0	38.0	21.5	85.0	36.0	13.0	68.7	24.4
43	KY06C-1201-18-6-3	30.5	l	25.0	40.0	30.2	19.1	22.9	62.5	20.3	15.4	40.0	29.9
44	KY06C-1107-7-2-5	37.6		35.0	55.0	30.6	38.5	14.9	77.5	24.0	11.0	63.3	25.8
45	KY06C-2020-10-5-3	40.0		40.0	30.0	80.3	56.6	23.5	55.0	24.0	16.6	55.0	18.6
46	KY06C-2020-11-12-1	30.9	l	15.0	25.0	37.8	36.2	15.9	77.5	17.0	17.8	44.3	23.0
47	MO122246	24.2	l	20.0	20.0	12.1	18.6	11.7	87.5	14.0	16.8	34.7	7.0
48	MO130203	36.7		20.0	30.0	44.7	44.5	26.6	95.0	21.7	12.8	59.3	12.0
49	MO130765	33.3		35.0	10.0	40.8	44.5	26.7	85.0	14.3	12.6	55.3	8.8
50	MO131838	27.4	l	17.5	10.0	19.0	23.1	28.5	75.0	16.7	14.6	60.7	8.8
51	NE05548	49.5	h	60.0	80.0	52.0	41.2	28.4	100.0	27.0	27.2	59.3	19.8
52	NE10589	52.4	h	65.0	45.0	62.7	47.9	34.3	97.5	37.0	23.6	63.0	48.4
53	NW13455	39.2		35.0	30.0	44.4	32.6	32.0	95.0	29.3	10.6	58.7	24.8
54	NE13511	43.3		35.0	50.0	43.7	31.5	31.0	97.5	28.7	17.4	78.3	20.3
55	NE06545	37.4		30.0	15.0	54.0	32.8	19.4	90.0	38.0	17.4	60.7	16.9
56	VA11W-108	41.3		17.5	45.0	70.9	34.5	24.2	87.5	45.0	11.4	44.0	32.9
57	VA11W-182	39.7		27.5	30.0	50.8	41.3	23.4	70.0	40.0	16.8	60.7	36.0
58	VA12W-150	39.8		15.0	50.0	68.7	48.4	18.8	75.0	31.3	17.6	59.3	13.9
59	VA12FHB-4	28.4	l	40.0	25.0	28.3	24.1	15.9	77.5	27.3	12.2	22.7	10.5
60	VA12FHB-55	29.1	l	20.0	20.0	20.1	22.9	14.8	87.5	46.3	7.2	44.3	8.0
100	AVERAGE	35.3		32.2	32.3	39.7	34.5	25.2	75.1	24.6	16.1	54.1	19.1
101	MINUMUM	22.8		15.0	10.0	12.1	17.2	11.7	12.4	6.0	7.0	8.2	7.0
102	MAXIMUM	58.4		85.0	80.0	80.3	67.1	85.0	100.0	46.3	70.3	85.3	48.4
103	LSD(0.05)	10.4		.	.	.	.	.	.	.	.	.	.

Table 12. Summary of index (IND, %) data from the 2014-2015 NUWWSN.

ENTRY	NAME	AVG		ILCHA	ILHIG	ILURB	KYLEX	MIELA	MOCOL	NEMEA	NYITH	OHWOO	ONRIG	VABLA
1	TRUMAN	17.0	l	9.0	3.5	23.9	36.3	23.0	13.3	2.6	3.0	14.4	56.1	2.3
2	ERNIE	21.4		22.5	30.0	29.0	28.9	23.1	13.0	17.4	2.8	15.0	46.6	7.1
3	FREEDOM	24.5		45.0	18.0	40.3	28.3	18.8	24.4	11.0	16.2	16.7	49.2	2.1
4	PIONEER2545	45.7	h	85.0	49.5	77.3	55.9	41.1	19.6	22.5	7.7	38.3	76.9	28.4
5	NY99056-161	21.5		24.8	15.5	9.5	25.7	20.8	33.5	8.2	7.0	17.8	55.7	18.5
6	NY09067-2-69-1097	25.0		32.5	21.0	33.1	38.5	14.7	16.6	21.1	8.4	30.0	55.4	3.6
7	NY05152-818	22.3		18.0	8.0	27.1	29.7	19.0	41.3	2.2	6.4	35.0	48.5	10.3
8	NY05152-825	21.6		12.0	11.7	32.0	30.4	19.6	15.2	4.7	2.2	45.0	62.5	2.5
9	NY05152-821	24.3		13.0	10.0	15.5	30.5	30.8	44.2	4.4	4.5	43.9	54.9	15.5
10	KWS050	26.9		45.0	23.0	24.2	32.4	18.6	9.2	17.1	11.5	37.8	72.4	4.4
11	KWS051	29.2		70.0	37.5	53.6	16.8	12.8	10.4	14.9	3.4	36.7	61.6	3.8
12	KWS052	26.2		50.0	21.5	71.2	15.2	19.9	15.0	38.4	3.4	19.4	29.7	4.2
13	KWS036	33.1		65.0	20.0	65.4	35.1	28.5	9.7	22.2	12.5	21.7	73.7	10.0
14	ES12-3030	25.3		37.5	33.5	37.2	37.0	16.9	20.9	40.3	2.1	20.6	30.6	1.4
15	ES12-1358	18.8	l	31.5	13.5	22.6	22.9	18.5	21.8	19.0	2.7	16.7	35.7	1.6
16	ES12-1275	14.6	l	21.3	11.7	22.2	4.9	9.2	5.9	15.0	2.3	20.0	45.5	2.7
17	F1014	27.9		21.3	3.0	42.3	67.1	25.0	42.2	6.0	8.7	12.8	73.7	4.5
18	E6012	27.9		22.5	16.5	66.5	43.7	24.7	12.5	34.7	3.4	15.8	58.8	7.8
19	OH09-207-24	20.1		13.5	16.5	28.9	10.5	11.2	9.5	14.7	3.1	27.8	72.2	13.7
20	OH09-281-10	24.8		45.0	17.0	29.7	21.9	16.2	15.4	40.7	9.4	10.8	64.4	2.3
21	OH10-200-49	16.9	l	16.5	5.0	13.3	32.0	18.0	10.4	8.9	2.4	9.2	64.6	6.1
22	10641B1-9-11-7	16.1	l	14.5	26.5	12.1	3.8	10.5	17.3	13.9	3.5	15.0	53.7	6.3
23	0762A1-2-8	10.3	l	30.0	6.0	6.9	4.2	11.1	11.1	9.8	4.2	8.9	20.2	1.1
24	08334A1-31	18.6	l	17.0	13.0	32.8	18.3	20.1	17.2	18.6	3.2	19.4	40.7	4.4
25	0566A1-3-1-6	23.4		35.0	36.5	29.6	11.2	26.0	19.5	36.4	5.0	13.3	41.3	3.2
26	10512RA1-8	13.9	l	12.0	7.0	12.2	20.8	15.5	20.0	8.5	5.1	7.8	41.6	2.5
27	M11-2024#	23.8		75.0	20.0	56.3	8.7	12.3	6.7	28.1	3.2	12.2	37.4	2.4
28	M12-3312CW	13.7	l	10.5	17.5	13.9	10.7	12.3	12.0	11.6	6.6	11.7	39.9	3.7
29	M12-3301	15.7	l	17.0	7.0	37.0	19.4	18.7	12.3	15.3	3.5	8.9	28.6	4.9
30	M12-2036#	12.6	l		12.5	14.8	11.7	22.8	5.4	9.6	2.3	8.9	30.5	1.2
31	M12-2031#	15.7	l		11.5	20.9	23.8	13.6	10.8	8.7	2.6	10.6	40.3	7.2
32	CA9-72	33.6			45.5	71.5	19.9	27.8	17.6	35.3	14.5	28.9	66.8	1.4
33	CA9-76	30.5		30.0	38.0	34.7	41.2	21.3	7.6	41.4	8.8	23.3	72.4	16.7
34	DH5-15	28.8		65.0	24.0	10.4	37.6	26.8	10.0	28.4	9.8	20.8	77.9	6.1
35	CA13-53	27.2		27.5	9.5	27.4	36.5	13.5	46.6	9.6	12.0	45.0	63.1	8.9
36	CA13-63	18.4	l	19.0	11.5	7.0	27.3	24.8	11.4	19.0	2.6	34.4	42.2	3.0
37	IL10-19464	19.0	l	19.0	24.0	27.3	22.9	8.3	10.5	28.4	2.3	20.3	42.4	3.5
38	IL10-21934	16.4	l	19.3	17.5	14.3	6.9	14.3	9.8	23.1	2.7	15.0	56.1	1.2
39	IL10-21937	17.4	l	17.0	35.0	17.7	5.7	16.9	3.5	31.3	2.9	15.0	46.1	0.5
40	IL11-36131	15.5	l	33.5	24.0	17.0	7.1	19.1	2.4	22.8	1.3	7.5	34.0	1.9
41	IL11-27667	16.2	l	21.5	21.5	22.2	20.9	17.3	13.2	24.5	1.4	6.7	26.6	2.8
42	KY06C-1195-37-2-5	23.2		17.0	15.5	29.9	33.5	17.8	26.0	12.0	7.9	23.9	61.9	9.4
43	KY06C-1201-18-6-3	18.5	l	24.0	36.0	24.3	6.6	16.6	7.8	16.3	2.8	23.3	35.3	10.6
44	KY06C-1107-7-2-5	22.7		35.0	38.0	26.7	14.4	10.6	12.4	19.2	3.5	19.2	57.0	13.3
45	KY06C-2020-10-5-3	30.1		40.0	19.0	70.4	53.8	20.3	7.5	18.4	8.5	33.3	53.9	5.9
46	KY06C-2020-11-12-1	16.2	l	13.0	16.0	25.1	21.9	14.0	9.0	14.7	4.6	11.7	39.0	8.8
47	MO122246	12.3	l	18.0	15.0	10.0	4.2	6.7	15.2	11.7	3.7	19.4	30.6	1.1
48	MO130203	21.9		16.0	18.0	37.8	37.5	20.0	13.9	18.1	7.0	17.2	53.1	2.4
49	MO130765	20.3		31.0	3.7	26.2	41.0	23.8	11.7	9.1	5.7	18.3	51.0	1.9
50	MO131838	14.5	l	13.0	4.0	7.6	19.6	18.5	11.3	8.9	6.3	11.7	56.0	2.1
51	NE05548	37.8	h	49.5	51.5	45.2	39.8	27.8	58.4	26.1	14.7	41.7	55.3	5.4
52	NE10589	41.3	h	59.0	36.0	50.5	45.5	32.0	57.6	35.8	11.8	47.8	56.7	21.6
53	NW13455	25.2		29.5	16.5	34.0	28.5	27.4	24.5	29.3	1.9	18.9	54.9	11.8
54	NE13511	29.7		30.0	20.0	35.6	25.7	28.0	31.2	25.8	9.6	37.2	73.3	10.7
55	NE06545	24.6		25.5	12.5	45.6	22.4	16.7	23.8	38.0	4.4	20.8	55.7	5.5
56	VA11W-108	26.2		15.0	34.0	62.5	30.5	22.9	21.4	28.5	3.1	17.2	38.5	14.4
57	VA11W-182	28.5		23.3	21.0	43.6	32.9	21.3	10.2	34.7	5.7	34.4	56.5	29.4
58	VA12W-150	25.8		12.8	34.0	61.8	30.8	16.6	14.4	14.6	9.5	28.9	56.4	3.8
59	VA12FHB-4	16.2	l	40.0	21.5	20.9	10.5	12.1	14.7	16.4	6.0	15.0	19.4	1.6
60	VA12FHB-55	17.0	l	20.0	14.5	13.9	8.0	12.4	35.4	15.4	1.4	22.8	40.4	2.3
100	AVERAGE	22.6		29.1	21.0	31.2	25.3	18.6	18.3	19.2	6.1	23.2	48.5	6.8
101	MINUMUM	10.3		9.0	3.0	6.9	3.8	5.4	2.4	2.2	1.3	6.7	1.2	0.5
102	MAXIMUM	45.7		85.0	71.5	77.3	67.1	41.1	58.4	41.4	28.9	66.8	77.9	29.4
103	LSD(0.05)	9.0		.	.	.	.	.	.	.	.	.	.	.

Table 13. Summary of Fusarium Damaged Kernel (FDK, %) data from the 2014-2015 NUWWSN.

ENTRY	NAME	AVG		ILHIG	ILURB	KYLEX	MOCOL	NEMEA	NYITH	OHWOO
1	TRUMAN	14.3	l	15.0	6.7	3.7	12.5	25.0	30.0	7.2
2	ERNIE	20.6	l	4.0	23.3	9.9	35.0	19.0	45.0	8.0
3	FREEDOM	37.4		77.5	21.7	9.5	50.0	25.0	70.0	8.3
4	PIONEER2545	59.5	h	82.5	58.3	23.1	85.0		90.0	19.0
5	NY99056-161	27.4		32.5	21.7	8.3	55.0	30.0	35.0	9.0
6	NY09067-2-69-1097	39.1		67.5	15.0	13.7	62.5	30.0	70.0	15.0
7	NY05152-818	33.9		52.5	11.7	6.4	75.0	29.0	45.0	18.0
8	NY05152-825	30.1		75.0	21.7	8.7	35.0	17.0	30.0	23.0
9	NY05152-821	33.7		27.5	16.7	11.2	87.5	11.0	60.0	22.0
10	KWS050	31.0		27.5	18.3	14.5	60.0	33.0	45.0	19.0
11	KWS051	29.5		27.5	23.3	6.8	45.0	31.0	55.0	18.0
12	KWS052	32.5		62.5	13.3	14.5	42.5	15.0	70.0	10.0
13	KWS036	36.5		70.0	16.7	12.7	50.0	40.0	55.0	11.0
14	ES12-3030	24.8		25.0	26.7	8.2	25.0		55.0	10.0
15	ES12-1358	11.7	l	11.5	8.3	3.3	15.0		25.0	8.0
16	ES12-1275	21.0	l	17.5	6.7	3.6	30.0	14.0	65.0	10.0
17	F1014	29.0		32.5	33.3	15.4	42.5	28.0	45.0	6.0
18	E6012	26.9		35.0	13.3	7.3	40.0	40.0	45.0	8.0
19	OH09-207-24	20.0	l	10.0	10.0	6.7	25.0	24.0	50.0	14.0
20	OH09-281-10	41.3		50.0	38.3	14.7	85.0	26.0	70.0	5.0
21	OH10-200-49	13.8	l	6.5	5.3	7.2	25.0		35.0	5.0
22	10641B1-9-11-7	23.2	l	15.0	38.3	6.4	10.0	30.0	55.0	8.0
23	0762A1-2-8	26.4		40.0	20.0	7.7	17.5		70.0	4.0
24	08334A1-31	29.1		27.5	6.7	8.8	60.0	31.0	60.0	10.0
25	0566A1-3-1-6	19.5	l	25.0	10.0	8.5	22.5		45.0	7.0
26	10512RA1-8	37.5		50.0	30.0	13.4	65.0	30.0	70.0	4.0
27	M11-2024#	23.0	l	14.0	16.7	7.3	40.0		55.0	6.0
28	M12-3312CW	25.9		6.5	11.7	6.8	40.0	65.0	45.0	6.0
29	M12-3301	16.4	l	6.5	8.3	8.2	27.5		45.0	4.0
30	M12-2036#	33.2		73.5	13.3	9.5	70.0		30.0	4.0
31	M12-2031#	32.6		37.5	15.0	13.8	55.0		70.0	5.0
32	CA9-72	37.8		88.5	18.3	15.9	35.0	33.0	60.0	14.0
33	CA9-76	34.6		45.0	11.7	15.0	40.0		85.0	12.0
34	DH5-15	26.4		7.5	18.3	12.6	32.5	29.0	75.0	10.0
35	CA13-53	38.7		35.0	16.7	14.2	80.0	27.0	75.0	23.0
36	CA13-63	26.7		25.0	11.7	7.7	55.0		45.0	17.0
37	IL10-19464	14.1	l	10.0	3.7	8.2	7.5	29.0	30.0	10.0
38	IL10-21934	12.2	l	15.0	5.3	3.3	12.5		30.0	8.0
39	IL10-21937	14.9	l	15.0	5.3	4.8	7.5		50.0	8.0
40	IL11-36131	11.1	l	15.0	3.7	4.2	7.5	18.0	25.0	4.0
41	IL11-27667	12.7	l	7.5	3.7	8.2	45.0		10.0	3.0
42	KY06C-1195-37-2-5	17.2	l	15.0	11.7	5.5	35.0		25.0	12.0
43	KY06C-1201-18-6-3	24.7		50.0	10.0	6.1	35.0	20.0	40.0	12.0
44	KY06C-1107-7-2-5	20.3	l	11.5	13.3	7.6	30.0	30.0	40.0	10.0
45	KY06C-2020-10-5-3	26.4		55.0	8.3	15.8	10.0	29.0	50.0	17.0
46	KY06C-2020-11-12-1	12.9	l	3.0	8.3	7.7	20.0	20.0	25.0	6.0
47	MO122246	14.7	l	27.5	6.7	5.1	15.0		25.0	10.0
48	MO130203	13.0	l	4.0	8.3	5.1	12.5		40.0	9.0
49	MO130765	24.8		39.0	8.3	6.1	40.0	21.0	50.0	9.0
50	MO131838	20.4	l	30.0	5.0	6.9	30.0	20.0	45.0	6.0
51	NE05548	43.9		77.5	18.3	8.6	85.0	32.0	65.0	21.0
52	NE10589	47.9	h	80.0	30.0	16.3	80.0	45.0	60.0	24.0
53	NW13455	29.5		55.0	13.3	10.9	50.0		40.0	9.0
54	NE13511	37.7		75.0	16.7	12.3	55.0	31.0	55.0	19.0
55	NE06545	24.7		25.0	21.7	12.6	25.0		55.0	10.0
56	VA11W-108	31.3		40.0	23.3	11.6	40.0		65.0	9.0
57	VA11W-182	37.1		32.5	26.7	19.3	65.0	29.0	70.0	17.0
58	VA12W-150	25.9		22.5	15.0	10.1	40.0		55.0	14.0
59	VA12FHB-4	16.5	l	7.5	8.3	8.4	12.5		55.0	8.0
60	VA12FHB-55	15.8	l	10.0	5.0	7.4	25.0	17.0	35.0	11.0
100	AVERAGE	26.6		33.8	15.6	9.6	40.3	35.4	35.3	12.2
101	MINUMUM	11.1		3.0	3.7	3.3	7.5	10.0	3.0	4.0
102	MAXIMUM	59.5		88.5	58.3	23.1	87.5	90.0	75.0	24.0
103	LSD(0.05)	13.7		.	.	.	.	.	.	.

Table 14. Summary of INC/SEV/FDK (ISK, %) data from the 2014-2015 NUWWSN

ENTRY	NAME	AVG		ILHIG	ILURB	KYLEX	MOCOL	NEMEA	OHWOO
1	TRUMAN	25.4	l	19.5	27.2	40.9	28.5	24.8	11.6
2	ERNIE	34.2		34.6	45.4	37.8	38.9	36.7	12.0
3	FREEDOM	40.7		59.5	49.6	36.1	53.6	32.2	13.3
4	PIONEER2545	61.9	h	76.5	76.3	55.2	68.4		30.7
5	NY99056-161	35.5		38.5	28.0	38.9	59.0	34.1	14.2
6	NY09067-2-69-1097	44.2		57.0	40.1	45.7	54.0	44.6	24.0
7	NY05152-818	39.0		39.0	33.2	39.4	72.4	22.1	28.0
8	NY05152-825	39.1		53.8	39.1	37.2	46.3	22.3	36.0
9	NY05152-821	39.5		33.5	30.6	42.0	78.3	17.4	35.1
10	KWS050	40.8		44.0	36.9	43.2	47.7	42.9	30.2
11	KWS051	40.3		50.0	54.6	28.2	42.1	37.3	29.3
12	KWS052	40.2		52.0	56.1	29.9	41.7	45.8	15.6
13	KWS036	43.6		58.0	55.2	41.0	40.9	49.0	17.3
14	ES12-3030	38.5		46.0	44.3	40.3	43.3		16.4
15	ES12-1358	29.0	l	27.1	33.3	30.8	38.0		13.3
16	ES12-1275	26.6	l	27.8	32.8	14.9	31.8	36.0	16.0
17	F1014	38.8		25.0	51.4	56.3	58.2	31.4	10.2
18	E6012	40.8		39.5	54.2	43.3	38.5	56.4	12.7
19	OH09-207-24	30.8	l	31.0	38.1	22.6	31.6	39.1	22.2
20	OH09-281-10	43.2		51.5	50.7	33.2	62.6	52.6	8.7
21	OH10-200-49	26.0	l	20.6	25.3	40.2	34.1		7.3
22	10641B1-9-11-7	30.7	l	39.0	42.5	14.3	35.4	41.2	12.0
23	0762A1-2-8	24.2	l	37.0	24.9	15.5	34.3		7.1
24	08334A1-31	36.5		33.5	39.8	29.8	56.2	44.1	15.6
25	0566A1-3-1-6	32.3	l	47.5	37.7	25.0	38.1		10.7
26	10512RA1-8	36.1		44.0	39.4	36.0	59.0	32.1	6.2
27	M11-2024#	30.7	l	34.1	52.6	20.6	33.8		9.8
28	M12-3312CW	31.4	l	28.1	32.7	22.7	39.8	56.0	9.3
29	M12-3301	28.5	l	26.6	40.0	30.1	36.5		7.1
30	M12-2036#	32.5	l	51.9	29.4	25.8	46.1		7.1
31	M12-2031#	33.1	l	34.5	34.3	38.9	47.0		8.4
32	CA9-72	48.6		75.9	58.5	35.4	44.8	53.8	23.1
33	CA9-76	40.7		55.5	41.2	46.6	39.3	18.7	.
34	DH5-15	34.7		36.0	27.1	39.9	39.2	49.4	16.7
35	CA13-53	44.3		38.0	39.5	45.7	76.0	30.6	36.0
36	CA13-63	34.5		35.5	20.5	39.2	47.2		27.6
37	IL10-19464	33.6	l	37.0	35.8	34.2	28.7	49.4	16.2
38	IL10-21934	23.5	l	34.5	25.0	16.3	27.4		12.0
39	IL10-21937	23.4	l	42.0	28.9	16.9	14.6		12.0
40	IL11-36131	24.6	l	39.0	30.4	18.3	12.0	41.8	6.0
41	IL11-27667	29.5	l	31.5	32.0	30.9	45.2		5.3
42	KY06C-1195-37-2-5	35.4		31.5	38.3	38.3	47.3		19.1
43	KY06C-1201-18-6-3	34.0	l	59.0	34.6	18.7	35.1	38.1	18.7
44	KY06C-1107-7-2-5	34.6		42.1	41.0	27.1	39.0	43.2	15.3
45	KY06C-2020-10-5-3	40.9		49.0	53.4	51.8	22.8	41.8	26.7
46	KY06C-2020-11-12-1	29.0	l	25.2	34.7	31.9	34.0	39.1	9.3
47	MO122246	28.0	l	39.5	31.3	14.4	36.8		15.6
48	MO130203	33.2	l	28.6	42.7	40.9	37.7		13.8
49	MO130765	33.3	l	30.4	34.6	43.5	45.0	31.7	14.7
50	MO131838	26.3	l	27.0	19.2	35.2	37.9	29.0	9.3
51	NE05548	55.4	h	74.5	48.9	44.3	81.5	49.9	33.3
52	NE10589	58.1	h	69.5	54.8	49.4	78.5	58.1	38.2
53	NW13455	40.5		47.5	41.1	40.4	55.9		15.1
54	NE13511	45.2		57.0	40.3	35.4	60.6	48.0	29.8
55	NE06545	37.9		40.0	50.4	35.9	44.1		16.7
56	VA11W-108	43.0		52.0	57.1	41.2	48.7		13.8
57	VA11W-182	44.3		43.0	51.4	44.1	50.0	49.6	27.6
58	VA12W-150	40.7		45.0	53.6	36.6	42.8		23.1
59	VA12FHB-4	27.8	l	36.0	33.8	21.9	32.7		12.0
60	VA12FHB-55	29.1	l	29.5	28.0	21.1	46.9	30.7	18.2
100	AVERAGE	36.1		41.9	40.1	34.2	44.8	30.1	19.4
101	MINUMUM	23.4		19.5	19.2	14.3	12.0	5.3	6.0
102	MAXIMUM	61.9		76.5	76.3	56.3	81.5	58.1	38.2
103	LSD(0.05)	10.7		.	.	.	.	.	.

Table 15. Summary of deoxynivalenol (DON, ppm) data from the 2014-2015 NUWWSN.

ENTRY	NAME	AVG		ILURB	KYLEX	MOCOL	NEMEA	NYITH	OHWOO	VABLA	Nivalenol NEMEA
1	TRUMAN	5.2	l	4.4	3.6	4.4	15.3	1.9	6.4	0.5	<0.5
2	ERNIE	5.6	l	4.6	8.6	4.2		2.4	4.0	0.3	
3	FREEDOM	5.1	l	2.7	5.1	5.0		4.0	4.0	0.3	
4	PIONEER2545	15.8	h	12.3	11.2	11.1	36.9	8.6	27.2	3.2	<0.5
5	NY99056-161	10.7		4.6	11.0	16.7	12.8	2.9	24.3	2.7	<0.5
6	NY09067-2-69-1097	9.1		2.6	11.4	7.3	30.5	3.1	8.3	0.6	<0.5
7	NY05152-818	7.9		2.9	6.7	9.5	15.2	3.0	16.6	1.1	<0.5
8	NY05152-825	6.1	l	2.9	4.8	5.0		1.2	12.7	0.3	
9	NY05152-821	9.5		3.5	9.0	8.5		3.2	22.0	1.0	
10	KWS050	7.6		4.1	7.2	5.4	15.3	3.7	16.6	0.6	<0.5
11	KWS051	4.8	l	3.8	3.9	4.4		1.2	5.8	0.2	
12	KWS052	5.3	l	2.6	6.3	7.0	13.1	1.1	6.5	0.2	<0.5
13	KWS036	18.6	h	9.9	17.4	27.6	32.9	9.2	31.8	1.1	<0.5
14	ES12-3030	7.1		2.5	5.2	10.5	22.1	3.5	5.8	0.1	<0.5
15	ES12-1358	3.0	l	1.5	1.9	2.8	10.2	1.4	3.0	0.2	<0.5
16	ES12-1275	4.5	l	1.6	5.9	4.8		1.0	4.3	0.1	
17	F1014	11.0		7.8	14.0	9.9	18.9	4.7	21.0	0.6	<0.5
18	E6012	13.9		7.5	14.8	23.8	22.3	4.9	23.3	0.5	<0.5
19	OH09-207-24	5.3	l	2.7	7.3	2.9		1.9	7.1	0.2	
20	OH09-281-10	8.6		2.0	10.7	14.2	21.6	3.7	7.6	0.5	<0.5
21	OH10-200-49	4.5	l	1.5	4.2	5.9	11.5	2.0	6.1	0.3	<0.5
22	10641B1-9-11-7	5.0	l	7.4	6.1	3.9	9.7	1.9	5.6	0.3	<0.5
23	0762A1-2-8	3.5	l	0.7	4.5	2.4	11.9	1.5	3.1	0.2	<0.5
24	08334A1-31	5.0	l	1.7	5.1	5.0		2.2	6.0	0.2	
25	0566A1-3-1-6	4.3	l	2.2	3.3	6.9	11.9	1.1	4.4	0.1	<0.5
26	10512RA1-8	7.6		5.3	9.0	6.9	19.4	2.4	9.6	0.5	<0.5
27	M11-2024#	8.9		6.2	8.6	7.4	21.6	3.7	14.9	0.2	<0.5
28	M12-3312CW	14.9	h	7.5	10.3	34.9	21.6	4.9	24.5	0.4	<0.5
29	M12-3301	5.8	l	1.8	5.8	4.6	21.0	1.4	5.6	0.4	<0.5
30	M12-2036#	8.7		5.6	7.1	10.3	17.4	2.8	17.4	0.3	<0.5
31	M12-2031#	10.8		5.8	8.0	16.0	15.0	3.8	26.7	0.5	<0.5
32	CA9-72	8.9		7.2	7.4	5.8		5.6	17.1	0.9	
33	CA9-76	7.5		4.7	10.6	6.6	14.0	4.7	11.3	0.5	<0.5
34	DH5-15	9.1		3.0	12.0	8.9	19.4	4.9	14.7	0.5	<0.5
35	CA13-53	10.1		2.6	7.4	14.1	22.9	5.7	15.1	2.6	<0.5
36	CA13-63	5.8	l	2.5	3.7	9.5	8.2	2.3	14.0	0.4	<0.5
37	IL10-19464	4.6	l	1.6	5.4	3.7	14.8	2.3	4.6	0.1	<0.5
38	IL10-21934	4.5	l	1.8	2.6	5.3		2.2	5.1	0.2	
39	IL10-21937	4.4	l	2.8	3.6	3.4		2.2	4.8	0.0	
40	IL11-36131	3.7	l	1.5	3.1	3.0		0.9	4.3	0.1	
41	IL11-27667	3.0	l	1.4	5.9	2.6	8.2	0.5	2.0	0.1	<0.5
42	KY06C-1195-37-2-5	6.0	l	3.0	8.7	4.9	14.8	4.2	6.2	0.5	<0.5
43	KY06C-1201-18-6-3	4.0	l	1.8	4.2	4.1	7.8	2.0	7.7	0.3	<0.5
44	KY06C-1107-7-2-5	5.7	l	2.8	6.6	4.5	15.7	3.1	6.6	0.4	<0.5
45	KY06C-2020-10-5-3	6.1	l	2.5	8.2	6.3	16.8	2.4	6.0	0.4	<0.5
46	KY06C-2020-11-12-1	3.1	l	1.0	4.1	3.3	9.8	1.8	1.4	0.3	<0.5
47	MO122246	4.1	l	1.6	2.7	5.2	13.7	1.8	3.5	0.1	<0.5
48	MO130203	5.1	l	2.8	4.2	6.9	14.4	2.6	4.3	0.2	<0.5
49	MO130765	4.6	l	2.3	3.8	6.9	10.9	2.2	6.1	0.2	<0.5
50	MO131838	4.6	l	1.7	3.9	9.1	9.7	2.1	5.3	0.3	<0.5
51	NE05548	6.9		4.4	5.8	6.8	18.9	3.5	7.8	0.8	<0.5
52	NE10589	10.9		7.6	12.7	11.9		4.5	17.6	1.4	<0.5
53	NW13455	12.4		9.0	9.9	20.3	28.7	2.8	14.7	1.3	<0.5
54	NE13511	8.8		3.2	8.0	7.7	25.8	6.5	9.4	0.7	<0.5
55	NE06545	8.1		3.2	6.9	4.8	24.9	4.5	11.1	1.1	<0.5
56	VA11W-108	6.0	l	3.4	6.7	9.1	10.0	2.5	10.0	0.6	<0.5
57	VA11W-182	7.1		5.6	10.4	4.8	16.6	1.1	10.4	0.9	<0.5
58	VA12W-150	6.4	l	3.5	6.7	7.1	12.7	3.4	10.7	0.4	<0.5
59	VA12FHB-4	4.6	l	3.1	3.6	6.3	11.3	3.5	4.0	0.2	<0.5
60	VA12FHB-55	3.7	l	1.9	4.8	2.1		1.7	1.7	0.2	
100	AVERAGE	7.0		3.8	7.0	8.1	13.5	4.4	8.5	0.6	
101	MINUMUM	3.0		0.7	1.9	2.1	0.9	0.5	0.0	0.1	
102	MAXIMUM	18.6		12.3	17.4	34.9	36.9	22.0	31.8	3.2	
103	LSD(0.05)	3.7		.	.	.	.	.	.	.	

Table 16. Summary of greenhouse severity (GHSEV, %) data and data from other FHB related traits from the 2014-2015 NUWWSN.

		GHSEV (%)				MOCOL	ILHIG	KYLEX	INLAF	INLAF
ENTRY	NAME	AVG		ILURB	MOCOL	Symptomatic Florets	FHB (0-9)	FHB (0-9)	INC (0-9)	SEV (0-9
1	TRUMAN	9.3	l		5.7	8.6	1.0	1.5	1	2
2	ERNIE	20.3	l	22.5	18.2	9.0	4.5	7.5	2	3
3	FREEDOM	29.3	l	25.8	32.8	21.7	6.0	8.5	1	4
4	PIONEER2545	40.3	h		36.7	18.7	8.5	9.0	2	3
5	NY99056-161	14.5	l		10.9	30.3	4.0	1.5	1	1
6	NY09067-2-69-1097	44.0	h	60.0	28.1	13.5	5.0	6.5	1	7
7	NY05152-818	56.3	h	100.0	12.6	41.3	3.0	0.5	1	1
8	NY05152-825	12.3	l	12.3	12.4	14.1	2.0	7.5	1	1
9	NY05152-821	18.5	l	27.0	10.1	44.2	3.0	2.0	1	2
10	KWS050	43.0	h	70.5	15.5	6.4	6.5	9.0	1	4
11	KWS051	18.6	l	15.8	21.4	7.4	7.5	4.5	2	5
12	KWS052	40.5	h	38.0	43.0	10.2	5.5	7.5	1	2
13	KWS036	45.3	h		41.7	5.8	8.0	9.0	1	3
14	ES12-3030	51.6	h	64.0	39.2	18.8	8.5	7.0	2	2
15	ES12-1358	12.2	l	7.0	17.4	18.0	5.5	4.5	1	1
16	ES12-1275	22.3	l	19.5	25.0	3.5	4.0	6.5	1	4
17	F1014	9.8	l	7.0	12.5	39.9	2.5	7.5	1	3
18	E6012	9.7	l	7.0	12.3	7.7	5.0	8.5	1	4
19	OH09-207-24	34.9	hl	45.2	24.7	5.9	4.5	4.0	1	3
20	OH09-281-10	21.4	l	17.7	25.2	12.3	5.5	7.0	1	4
21	OH10-200-49	17.5	l		13.9	7.3	3.0	3.5	1	4
22	10641B1-9-11-7	17.6	l	20.0	15.1	15.1	5.0	5.5	2	1
23	0762A1-2-8	8.4	l	9.8	7.0	8.9	4.0	7.0	1	1
24	08334A1-31	20.9	l	20.5	21.3	15.5	5.0	6.5	1	2
25	0566A1-3-1-6	25.0	l	33.7	16.3	14.9	8.5	8.0	1	5
26	10512RA1-8	17.2	l	22.0	12.5	18.0	2.5	6.0	1	1
27	M11-2024#	58.3	h	76.8	39.8	3.5	6.5	7.5	1	3
28	M12-3312CW	17.7	l	15.8	19.5	8.1	3.5	7.0	1	3
29	M12-3301	30.4	hl		26.8	8.9	4.5	7.0	1	1
30	M12-2036#	24.8	l	38.3	11.4	2.9	4.0	7.5	1	3
31	M12-2031#	17.4	l	15.4	19.5	7.8	4.0	8.0	1	4
32	CA9-72	28.6	l	16.3	40.9	15.0	8.5	8.0	2	6
33	CA9-76	19.6	l		16.0	5.3	8.5	8.0	1	2
34	DH5-15	15.1	l		11.5	7.7	7.5	5.0	1	7
35	CA13-53	10.3	l	7.0	13.5	46.7	3.0	3.0	1	3
36	CA13-63	15.1	l		11.5	8.1	3.5	5.0	1	1
37	IL10-19464	16.1	l	19.2	13.0	8.2	6.5	7.0	2	3
38	IL10-21934	12.1	l	9.8	14.4	6.5	7.0	2.5	1	4
39	IL10-21937	25.8	l	27.2	24.4	1.2	7.0	2.5	1	1
40	IL11-36131	23.4	l	34.7	12.1	0.7	6.0	5.5	1	2
41	IL11-27667	7.2	l	7.0	7.5	10.3	6.5	8.0	1	5
42	KY06C-1195-37-2-5	24.2	l	33.5	15.0	22.6	6.0	4.0	1	5
43	KY06C-1201-18-6-3	33.2	hl	35.2	31.2	4.9	7.0	3.5	2	3
44	KY06C-1107-7-2-5	14.2	l	14.0	14.5	9.5	6.5	5.5	1	1
45	KY06C-2020-10-5-3	34.6	hl	33.7	35.5	4.2	7.5	8.0	1	5
46	KY06C-2020-11-12-1	7.9	l	7.0	8.8	6.9	4.5	7.0	1	6
47	MO122246	18.6	l	27.3	10.0	13.3	4.0	5.0	1	6
48	MO130203	28.9	l	43.3	14.5	13.2	5.5	7.0	1	4
49	MO130765	14.3	l		10.7	9.9	2.0	3.5	1	3
50	MO131838	7.2	l	7.0	7.5	8.5	1.0	1.5	1	2
51	NE05548	17.1	l	14.0	20.3	58.3	7.5	1.5	2	5
52	NE10589	36.5	h		32.9	55.5	9.0	5.5	3	7
53	NW13455	21.6	l		18.0	23.3	5.0	7.0	1	4
54	NE13511	27.3	l	23.8	30.7	30.3	6.5	1.0	2	7
55	NE06545	43.1	h	66.8	19.4	21.5	6.5	7.0	2	5
56	VA11W-108	49.2	h	40.4	57.9	18.8	8.5	6.0	1	5
57	VA11W-182	14.7	l	7.0	22.4	7.1	7.0	8.5	1	4
58	VA12W-150	34.5	hl	42.5	26.4	10.9	6.0	7.0	2	1
59	VA12FHB-4	18.6	l	11.7	25.6	11.4	7.0	6.5	1	1
60	VA12FHB-55	11.4	l	14.0	8.8	30.0	3.0	5.0	1	2
	AVERAGE	24.0		26.2	20.6	15.3	5.4	5.8		
	MINUMUM	7.2		5.7	7.0					
	MAXIMUM	58.3		100.0	57.9					
	LSD(0.05)	28.8		.	.					

Table 17. Summary of heading date (HD, Julian days) and height (HGT, inches) data from the 2014-2015 NUWWSN

		HD											HGT				
ENTRY	NAME	AVG		ILCHA	INLAF	INWLA	KYLEX	MOCOL	NYITH	OHWOO	ONRIG	VABLA	AVG		KYLEX	MOCOL	VABLA
1	TRUMAN	143.5	h	145.0	139	151.0	137.5	147	148	143	151	130	36.5		37.5	36.0	36.0
2	ERNIE	138.1		138.0	135	144.0	130.5	137	145	138	149	126	33.8		36.0	30.5	35.0
3	FREEDOM	138.8		140.5	135	143.5	130.5	138	149	138	149	126	33.8		35.5	32.0	34.0
4	PIONEER2545	139.3		139.5	138	144.0	132.0	138	146	141	147	128	33.7		36.0	31.0	34.0
5	NY99056-161	143.3	h	145.0	138	147.0	137.0	144	150	145	154	130	36.7		38.0	36.0	36.0
6	NY09067-2-69-1097	140.9		141.0	138	146.0	134.0	140	147	143	149	130	35.0		37.5	34.5	33.0
7	NY05152-818	143.2	h	145.0	138	149.5	137.0	146	148	144	151	130	37.2		39.0	36.5	36.0
8	NY05152-825	140.1		140.0	138	145.5	131.5	140	146	142	149	129	33.7		35.5	32.5	33.0
9	NY05152-821	143.2	h	146.0	138	149.0	138.5	146	147	144	150	130	36.2		38.5	37.0	33.0
10	KWS050	139.0		138.5	138	144.5	130.0	138	147	140	148	127	29.0	l	31.0	27.0	29.0
11	KWS051	135.6	l	135.5	134	137.0	126.5	134	144	137	147	125	33.5		36.5	30.0	34.0
12	KWS052	137.8		137.5	138	139.0	129.0	137	146	139	148	127	33.5		36.0	30.5	34.0
13	KWS036	139.7		140.5	138	144.5	129.5	138	148	141	150	128	30.8		32.5	28.0	32.0
14	ES12-3030	137.4		137.0	135	141.5	130.0	135	145	139	148	126	32.8		36.0	28.5	34.0
15	ES12-1358	137.8		137.0	136	139.5	129.0	143	144	139	147	126	36.2		38.0	33.5	37.0
16	ES12-1275	136.2	l	137.0	134	142.0	128.0	133	143	137	147	125	33.7		37.5	27.5	36.0
17	F1014	142.9	h	145.0	139	149.0	138.0	144	149	144	148	130	32.0		34.0	30.0	32.0
18	E6012	139.4		140.0	137	147.5	131.0	140	146	139	147	127	33.8		36.0	31.5	34.0
19	OH09-207-24	137.9		138.0	136	141.5	129.0	138	147	138	147	127	34.3		38.0	30.0	35.0
20	OH09-281-10	138.9		139.0	137	143.5	131.5	140	147	138	147	127	32.7		35.5	28.5	34.0
21	OH10-200-49	139.4		141.0	137	145.5	134.5	141	146	138	147	125	33.5		36.0	32.5	32.0
22	10641B1-9-11-7	137.4		137.0	135	143.0	128.5	138	145	138	147	125	34.2		36.5	32.0	34.0
23	0762A1-2-8	139.0		139.0	137	147.0	129.0	141	146	138	147	127	31.3		32.5	29.5	32.0
24	08334A1-31	138.9		140.0	135	146.0	130.5	141	146	138	147	127	31.2		34.0	28.5	31.0
25	0566A1-3-1-6	137.1		137.0	135	140.0	128.0	137	145	138	148	126	32.8		35.5	29.0	34.0
26	10512RA1-8	139.3		140.5	136	145.0	131.0	141	147	139	147	127	36.2		39.5	32.0	37.0
27	M11-2024#	137.3		137.0	135	140.0	128.5	138	145	138	147	127	31.2		33.5	29.0	31.0
28	M12-3312CW	137.7		138.0	136	143.5	129.0	135	146	138	147	127	35.3		37.0	32.0	37.0
29	M12-3301	139.6		138.5	137	144.5	131.0	141	147	142	147	128	34.3		37.0	31.0	35.0
30	M12-2036#	126.4			137	141.5	129.0	138	146	138	147	127	33.8		36.0	31.5	34.0
31	M12-2031#	127.6			137	144.0	131.5	140	147	141	147	128	33.0		34.0	31.0	34.0
32	CA9-72	126.0			136	140.5	128.5	138	147	138	147	127	32.2		34.5	28.0	34.0
33	CA9-76	138.7		138.0	137	144.0	130.5	138	147	139	148	127	32.5		33.5	31.0	33.0
34	DH5-15	139.3		140.5	137	144.0	132.5	138	147	140	147	128	33.8		36.0	31.5	34.0
35	CA13-53	143.9	h	146.0	140	150.5	136.5	146	150	145	151	130	34.5		35.5	34.0	34.0
36	CA13-63	139.9		140.5	138	144.0	133.0	140	147	141	148	128	38.7		41.0	36.0	39.0
37	IL10-19464	137.2		138.0	135	140.0	130.0	137	144	138	147	126	34.8		37.5	33.0	34.0
38	IL10-21934	136.2	l	137.5	135	140.0	127.0	134	144	137	147	124	35.7		37.5	34.5	35.0
39	IL10-21937	135.6	l	136.5	134	138.0	127.0	133	144	137	147	124	34.5		37.0	32.5	34.0
40	IL11-36131	136.1	l	136.0	134	139.0	128.0	133	145	138	147	125	33.7		35.5	31.5	34.0
41	IL11-27667	137.5		137.0	135	141.0	130.5	138	145	138	147	126	34.0		36.0	32.0	34.0
42	KY06C-1195-37-2-5	140.3		141.0	139	145.0	133.5	140	148	140	149	127	34.5		37.0	30.5	36.0
43	KY06C-1201-18-6-3	137.1		137.5	135	141.0	128.0	136	145	138	147	126	34.7		36.0	33.0	35.0
44	KY06C-1107-7-2-5	138.1		138.5	136	142.5	129.5	138	146	138	147	127	33.7		36.0	30.0	35.0
45	KY06C-2020-10-5-3	139.0		138.5	137	144.5	133.0	138	147	139	147	127	32.8		35.5	30.0	33.0
46	KY06C-2020-11-12-1	138.4		138.5	138	143.5	130.0	138	146	138	147	127	32.3		35.0	29.0	33.0
47	MO122246	137.6		137.0	136	142.0	129.0	135	146	139	147	127	35.8		37.5	33.0	37.0
48	MO130203	139.8		139.5	138	144.5	132.0	141	148	140	148	127	37.0		40.5	33.5	37.0
49	MO130765	140.7		141.0	138	145.0	136.0	141	148	141	147	129	37.5		38.5	36.0	38.0
50	MO131838	141.7		142.5	138	147.5	135.0	141	149	144	148	130	37.7		41.0	36.0	36.0
51	NE05548	141.8		142.0	138	148.0	136.0	146	147	143	148	128	41.0	h	43.5	39.5	40.0
52	NE10589	141.1		143.0	137	147.0	135.0	144	147	141	147	129	38.0		40.0	37.0	37.0
53	NW13455	139.7		140.5	136	145.5	134.0	141	146	140	147	127	36.2		38.5	34.0	36.0
54	NE13511	141.3		141.5	138	146.0	136.5	141	147	143	150	129	35.3		37.0	35.0	34.0
55	NE06545	138.7		140.5	136	142.5	132.5	141	145	138	147	126	35.2		37.0	33.5	35.0
56	VA11W-108	138.8		140.0	137	143.0	130.0	140	146	139	147	127	33.7		36.0	30.0	35.0
57	VA11W-182	138.7		139.0	136	143.5	131.0	138	147	139	148	127	27.8	l	29.0	25.5	29.0
58	VA12W-150	138.4		140.0	138	141.5	129.5	138	147	138	147	127	32.3		34.0	31.0	32.0
59	VA12FHB-4	137.7		139.0	135	141.5	128.5	135	147	139	147	127	33.3		34.5	29.5	36.0
60	VA12FHB-55	138.6		139.5	137	142.0	128.0	142	146	139	147	127	31.2		33.0	27.5	33.0
100	AVERAGE	139.1		139.6	136.9	143.2	131.8	139.7	146.1	140.2	146.5	127.2	34.2		36.3	31.8	34.4
101	MINUMUM	135.6		135.5	134	128.5	126.5	133	138	137	127	124	27.8		29.0	25.5	29.0
102	MAXIMUM	143.9		146.0	144	151.0	140.0	147	150	149	154	130	41.0		43.5	39.5	40.0
103	LSD(0.05)	1.3		.	.	.	.	.	.	.	.	.	2.1		.	.	.

Table 18. Summary of other traits collected on the 2014-2015 NUWWSN

		INLAF	VABLA	INLAF	VABLA	INLAF	OHNAP	VABLA	VABLA	AVERAGE	INLAF	OHNAP	VABLA
ENTRY	NAME	LR (0-9)	LR (0-9)	YR (0-9)	PM (0-9)	BYDV (0-9)	LDG (0-9)	LDG (0-9)	TW	YIELD	YIELD	YIELD	YIELD
1	TRUMAN	8	3	1	1	4	5	2	55.8				98.7
2	ERNIE	2	2	7	3	3	4	1	57.4				98.4
3	FREEDOM	8	2	5	2	3	4	2	57.5				99.4
4	PIONEER2545	8	5	2	2	4	1	0	55.6				102.7
5	NY99056-161	7	4	1	1	7	1	0	55.6	77.0	65.4	75.9	89.8
6	NY09067-2-69-1097	5	3	2	1	5	3	0	56.3	90.7	82.1	84.5	105.6
7	NY05152-818	3	3	2	1	4	1	0	54.8	77.7	71.8	73.1	88.1
8	NY05152-825	1	3	2	1	4	2	0	57.4	92.2	86.8	91.2	98.6
9	NY05152-821	3	6	2	0	6	2	0	54.2	77.2	78.7	67.0	85.8
10	KWS050	1	1	2	0	1	0	0	58.5				111.8
11	KWS051	1	1	2	1	2	4	0	56.7				96.6
12	KWS052	2	2	1	0	3	2	0	57.4				107.7
13	KWS036	1	1	1	1	4	1	0	56.9				115.3
14	ES12-3030	6	1	1	0	4	3	0	59.5	101.0	106.2	94.3	102.6
15	ES12-1358	3	1	2	2	1	2	2	60.2	89.3	88.1	92.0	87.7
16	ES12-1275	4	1	2	1	3	6	0	58.7	95.8	93.2	91.0	103.3
17	F1014	3	1	1	2	2	1	0	54.6				99.1
18	E6012	6	2	1	1	3	5	0	55.9				102.3
19	OH09-207-24	5	2	1	0	4	3	0	57.2	92.7	96.8	88.2	93.1
20	OH09-281-10	8	1	2	1	3	2	0	58.4	99.0	92.1		105.9
21	OH10-200-49	5	1	3	0	1	4	0	56.2	96.0	93.7	97.7	96.7
22	10641B1-9-11-7	1	1	1	1	4	2	0	58.9	85.9	90.5	82.8	84.3
23	0762A1-2-8	2	1	1	1	5	7	0	55.9	94.2	103.5	87.9	91.3
24	08334A1-31	5	2	1	0	3	3	0	56.2	89.3	94.1	80.9	92.9
25	0566A1-3-1-6	4	0	1	1	5	3	0	58	82.3	80.5	77.2	89.3
26	10512RA1-8	5	2	8	1	5	3	0	56.4	76.8	67.3	74.5	88.7
27	M11-2024#	4	1	1	1	2	1	0	59.3				94.9
28	M12-3312CW	3	1	1	0	2	2	0	58.1				95.6
29	M12-3301	7	2	3	1	2	4	0	57.1				88.2
30	M12-2036#	6	5	1	1	4	1	0	56.6				100.7
31	M12-2031#	4	3	1	0	1	2	0	57.2				103.9
32	CA9-72	7	4	1	1	5	5	0	56.9				104.5
33	CA9-76	2	1	9	0	2	4	0	57.5				94.5
34	DH5-15	2	1	2	1	4	3	0	59.2				114.5
35	CA13-53	4	1	3	0	3	1	0	53				101.5
36	CA13-63	3	2	4	1	5	3	1	56.7				103.6
37	IL10-19464	7	5	3	1	5	7	1	59.9	87.6	79.0	91.1	92.7
38	IL10-21934	1	1	6	0	4	6	0	60.1	100.6	94.0	101.3	106.4
39	IL10-21937	2	1	6	1	2	6	2	59.5	100.0	101.6	99.9	98.4
40	IL11-36131	2	1	9	0	1	0	2	59.2	92.9	90.5		95.2
41	IL11-27667	1	0	3	5	1	2	0	58.8	99.7	108.6	89.3	101.2
42	KY06C-1195-37-2-5	2	0	9	3	3	5	0	58.1	98.8	93.4	90.3	112.7
43	KY06C-1201-18-6-3	8	5	9	1	2	2	0	58.6	93.0	96.8	80.1	102.0
44	KY06C-1107-7-2-5	1	0	5	1	6	5	0	58.2	97.6	96.7	94.8	101.4
45	KY06C-2020-10-5-3	1	1	4	1	4	2	0	57.4	101.5	101.7	91.0	111.8
46	KY06C-2020-11-12-1	2	1	3	2	2	3	0	58.1	100.2	95.1	94.3	111.0
47	MO122246	2	2	6	1	1	4	0	60.4				105.7
48	MO130203	5	1	1	2	5	5	0	58.8				87.5
49	MO130765	4	3	1	1	1	5	2	58.3				105.1
50	MO131838	6	2	1	1	3	1	1	57.9				103.4
51	NE05548	2	1	6	0	3	5	5	57.2				87.9
52	NE10589	7	4	2	2	3	4	0	56.7				91.0
53	NW13455	5	2	3	1	5	6	2	58.1				92.3
54	NE13511	3	2	4	2	4	5	0	57.9				88.9
55	NE06545	2	0	1	1	2	5	2	56.5				97.8
56	VA11W-108	1	1	1	0	5	1	0	57.3	99.1	97.0	83.0	117.4
57	VA11W-182	1	0	1	0	4	0	0	55.3	97.9	86.7	91.5	115.5
58	VA12W-150	1	0	2	1	3	3	1	58	94.2	95.2	87.0	100.5
59	VA12FHB-4	2	0	2	1	1	0	0	57.5	99.0	97.6	88.2	111.2
60	VA12FHB-55	1	1	1	0	4	0	1	56.7	101.6	96.0		107.1
	AVERAGE	3.6	1.8	2.8	1.0	3.3	3.0	0.5	57.4	92.9	91.0	87.1	99.7

Table 19. Summary of incidence (INC, %) from 2014-2015 PNUWWSN.

ENTRY	NAME	AVG		ILCHA	ILHIG	ILURB	INWLA	KYLEX	MIELA	MOCOL	VABLA
1	TRUMAN	51.3	l	60.0	35.0	33.0	40.0	67.5	80.0	82.5	12.5
2	ERNIE	67.8		100.0	45.0	77.0	60.0	85.0	82.5	72.5	20.0
3	FREEDOM	69.4		100.0	65.0	63.0	65.0	72.5	72.5	87.5	30.0
4	PIONEER2545	86.9	h	100.0	90.0	98.0	70.0	85.0	95.0	87.5	70.0
5	KWS055	72.1		95.0	53.0	35.0	100.0	95.0	95.0	32.5	.
6	KWS053	56.6	l	90.0	50.0	90.0	40.0	55.0	65.0	47.5	15.0
7	KWS054	63.8		100.0	30.0	75.0	55.0	52.5	92.5	95.0	10.0
8	KWS037	70.4		100.0	50.0	53.0	45.0	100.0	92.5	97.5	25.0
9	KWS041	78.1	h	90.0	90.0	50.0	75.0	90.0	90.0	97.5	42.5
10	OH10-304-71	66.6		80.0	70.0	70.0	35.0	87.5	75.0	85.0	30.0
11	OH10-316-20	72.8		100.0	90.0	67.0	30.0	87.5	77.5	90.0	40.0
12	1042A1-1-2	58.5	l	70.0	50.0	68.0	30.0	82.5	62.5	82.5	22.5
13	053A1-2-5-3-5-3	59.7	l	75.0	50.0	80.0	30.0	60.0	60.0	80.0	42.5
14	10565C1-1	81.0	h	100.0	80.0	78.0	70.0	90.0	87.5	85.0	57.5
15	082A1-3-1	67.5		100.0	70.0	70.0	50.0	55.0	95.0	87.5	12.5
16	11405A1-4	66.5		90.0	90.0	72.0	35.0	47.5	72.5	85.0	40.0
17	B12*1792	67.8		90.0	80.0	95.0	40.0	70.0	65.0	75.0	27.5
18	B12-2180NC#	73.8	h	100.0	80.0	68.0	35.0	87.5	90.0	77.5	52.5
19	B12-2125FHB	65.4		95.0	70.0	48.0	55.0	77.5	82.5	60.0	35.0
20	M12-3189	62.8			60.0	60.0	40.0	52.5	87.5	90.0	27.5
21	IL10-12009	49.1	l	75.0	70.0	20.0	30.0	25.0	65.0	92.5	15.0
22	IL10-23236	51.3	l	75.0	50.0	40.0	30.0	50.0	52.5	95.0	17.5
23	IL11-6543	57.8	l	75.0	60.0	72.0	20.0	62.5	87.5	67.5	17.5
24	IL11-6626	55.3	l	95.0	50.0	40.0	45.0	47.5	70.0	80.0	15.0
25	IL11-8141	56.0	l	60.0	70.0	53.0	20.0	87.5	72.5	60.0	25.0
26	KY06C-1178-16-10-3	63.8		85.0	50.0	85.0	50.0	72.5	85.0	55.0	27.5
27	KY06C-3058-53-3-3	67.1		85.0	80.0	77.0	20.0	65.0	77.5	90.0	42.5
28	KY06C-2020-10-18-3	70.3		100.0	60.0	75.0	50.0	72.5	77.5	77.5	50.0
29	KY05C-1369-14-6-3	55.7	l	75.0	60.0	78.0	20.0	22.5	70.0	92.5	27.5
30	KY05C-1017-30-6-3	54.8	l	90.0	40.0	73.0	25.0	27.5	72.5	95.0	15.0
31	MO130651	64.6		95.0	70.0	67.0	30.0	87.5	55.0	95.0	17.5
32	MO130660	49.4	l	70.0	40.0	23.0	50.0	85.0	70.0	40.0	17.5
33	MO130669	58.5	l	60.0	50.0	53.0	45.0	80.0	70.0	92.5	17.5
34	MO130435	51.0	l	50.0	40.0	33.0	25.0	55.0	75.0	100.0	30.0
35	MO130906	52.6	l	85.0	70.0	43.0	25.0	52.5	55.0	75.0	15.0
36	MO131378	47.2	l	65.0	50.0	60.0	25.0	25.0	57.5	87.5	7.5
37	VA13W-56	54.1	l	65.0	50.0	50.0	60.0	50.0	67.5	60.0	30.0
38	VA13W-124	73.7	h	95.0	60.0	82.0	75.0	85.0	72.5	70.0	50.0
39	VA07MAS4-7417-1-3-3	72.2		100.0	70.0	75.0	60.0	50.0	95.0	92.5	35.0
40	VA08MAS1-188-6-4	76.3	h	100.0	80.0	88.0	45.0	70.0	72.5	90.0	65.0
41	VA13FHB-5	64.6		85.0	80.0	42.0	60.0	55.0	82.5	82.5	30.0
100	AVERAGE	63.5		84.9	62.1	62.4	44.5	67.4	76.2	78.7	29.6
101	MINUMUM	47.2		50.0	30.0	20.0	20.0	22.5	52.5	27.5	7.5
102	MAXIMUM	86.9		100.0	90.0	98.0	100.0	100.0	95.0	100.0	70.0
103	LSD(0.05)	14.1		.	.	.	.	.	.	.	.

Table 20. Summary of severity (SEV, %) data from the 2014-2015 PNUWWSN

ENTRY	NAME	AVG		ILCHA	ILHIG	ILURB	KYLEX	MIELA	MOCOL	VABLA
1	TRUMAN	17.7	l	15.0	10.0	19.3	36.9	21.0	10.5	11.1
2	ERNIE	34.7		30.0	65.0	42.0	39.3	36.9	19.4	10.5
3	FREEDOM	30.4		50.0	30.0	17.8	32.2	42.0	26.5	14.0
4	PIONEER2545	54.9	h	80.0	55.0	76.1	64.4	42.1	42.9	24.1
5	KWS055	39.6		50.0		36.1	61.1	35.6	37.9	10.1
6	KWS053	19.8	l	20.0	30.0	22.2	23.5	22.8	9.5	10.5
7	KWS054	31.8		45.0	30.0	48.4	28.3	27.1	31.3	12.4
8	KWS037	41.3		55.0	70.0	46.9	53.6	29.1	22.2	12.6
9	KWS041	46.4	h	80.0	40.0	33.7	41.2	41.4	58.5	29.7
10	OH10-304-71	22.5	l	20.0	30.0	35.4	37.1	13.9	10.0	11.4
11	OH10-316-20	28.8		35.0	20.0	57.5	37.3	22.5	11.3	17.7
12	1042A1-1-2	24.7	l	30.0	10.0	32.4	39.0	34.7	16.7	9.9
13	053A1-2-5-3-5-3	20.2	l	10.0	30.0	35.0	30.0	13.3	13.4	9.8
14	10565C1-1	30.3		25.0	30.0	56.8	41.8	20.6	21.4	16.6
15	082A1-3-1	30.4		50.0	60.0	15.9	34.3	28.5	16.2	8.2
16	11405A1-4	24.6	l	27.5	30.0	29.2	28.9	29.1	11.9	15.5
17	B12*1792	32.8		25.0	60.0	67.9	34.3	17.2	12.1	12.8
18	B12-2180NC#	31.8		32.5	30.0	37.7	49.4	22.4	19.7	30.6
19	B12-2125FHB	23.5	l	27.5	30.0	28.8	42.4	18.0	6.5	11.2
20	M12-3189	17.5	l		10.0	25.5	19.3	13.9	21.1	12.0
21	IL10-12009	24.7	l	20.0	60.0	25.6	16.9	23.8	17.0	9.3
22	IL10-23236	18.5	l	12.5	20.0	12.6	26.4	22.6	24.7	11.0
23	IL11-6543	21.6	l	15.0	40.0	15.0	35.9	23.2	11.1	11.3
24	IL11-6626	27.4		45.0	50.0	18.9	24.4	33.6	12.7	7.0
25	IL11-8141	16.0	l	12.5	10.0	19.6	27.8	22.7	7.4	11.8
26	KY06C-1178-16-10-3	26.5		25.0	30.0	45.4	35.9	27.6	5.7	15.9
27	KY06C-3058-53-3-3	23.9	l	20.0	30.0	33.1	33.0	17.9	19.0	14.3
28	KY06C-2020-10-18-3	33.9		42.5	30.0	56.5	38.5	28.9	13.2	27.4
29	KY05C-1369-14-6-3	15.3	l	15.0	20.0	8.7	14.2	10.8	24.8	13.8
30	KY05C-1017-30-6-3	26.0		17.5	40.0	38.2	18.0	33.3	19.8	15.2
31	MO130651	22.3	l	30.0	10.0	33.0	32.8	24.5	16.1	9.5
32	MO130660	15.0	l	22.5	10.0	20.0	21.5	16.3	3.4	11.1
33	MO130669	23.0	l	12.5	30.0	45.4	27.3	20.1	16.7	8.8
34	MO130435	13.9	l	10.0	10.0	11.5	21.1	18.1	15.8	10.6
35	MO130906	19.5	l	17.5	20.0	31.0	25.6	20.7	12.3	9.1
36	MO131378	16.5	l	15.0	10.0	38.5	15.3	17.0	9.1	10.5
37	VA13W-56	21.9	l	15.0	30.0	32.5	29.8	21.3	9.9	14.9
38	VA13W-124	45.3	h	70.0	50.0	49.2	58.6	29.2	28.6	31.7
39	VA07MAS4-7417-1-3-3	44.5	h	40.0	70.0	64.5	43.5	22.4	38.1	33.2
40	VA08MAS1-188-6-4	38.9		37.5	50.0	52.7	43.0	25.7	35.9	27.5
41	VA13FHB-5	28.3		27.5	60.0	28.7	34.4	23.6	13.6	10.5
100	AVERAGE	27.5		30.2	34.2	35.7	33.3	25.0	18.0	14.9
101	MINUMUM	13.9		10.0	10.0	8.7	13.9	10.8	3.4	7.0
102	MAXIMUM	54.9		80.0	70.0	76.1	64.4	42.1	58.5	33.2
103	LSD(0.05)	11.1		.	.	.	.	.	.	.

Table 21. Summary of index (IND, %) data from the 2014-2015 PNUWWSN.

ENTRY	NAME	AVG		ILCHA	ILHIG	ILURB	KYLEX	MIELA	MOCOL	OHWOO	VABLA
1	TRUMAN	11.0	l	9.0	3.5	6.6	24.9	18.0	8.6	14.2	3.3
2	ERNIE	23.5		30.0	30.0	33.9	32.9	31.7	14.1	13.3	2.1
3	FREEDOM	26.1		50.0	18.0	11.3	22.5	31.5	23.2	47.8	4.2
4	PIONEER2545	52.3	h	80.0	49.5	74.4	55.7	40.1	37.5	65.0	16.5
5	KWS055	33.7		47.5		19.5	61.1	33.9	36.0	31.7	3.5
6	KWS053	13.1	l	18.0	15.0	20.0	13.1	14.9	4.5	17.5	1.6
7	KWS054	23.4		45.0	9.0	36.1	13.9	25.9	29.8	25.8	1.9
8	KWS037	33.0		55.0	35.0	25.0	53.6	26.9	21.6	43.9	3.4
9	KWS041	36.7		72.0	36.0	16.9	37.2	37.2	57.1	24.4	12.6
10	OH10-304-71	18.4		16.0	21.0	24.4	32.5	10.5	8.5	30.6	3.5
11	OH10-316-20	22.2		35.0	18.0	38.1	32.8	17.3	10.1	19.2	7.4
12	1042A1-1-2	16.1	l	21.0	5.0	21.8	32.1	21.9	13.8	10.8	2.1
13	053A1-2-5-3-5-3	12.8	l	7.5	15.0	28.4	17.6	8.0	10.7	11.1	4.4
14	10565C1-1	23.3		25.0	24.0	44.9	37.6	18.0	18.2	8.9	9.5
15	082A1-3-1	21.2		50.0	42.0	11.2	18.7	27.0	14.2	5.6	1.1
16	11405A1-4	16.4	l	24.8	27.0	21.5	12.2	22.6	10.1	6.7	6.2
17	B12*1792	24.7		23.0	48.0	64.1	24.1	11.2	9.0	14.4	3.8
18	B12-2180NC#	23.2		32.5	24.0	26.9	43.1	20.2	15.3	5.6	17.7
19	B12-2125FHB	15.5	l	26.0	21.0	17.6	32.5	15.1	3.9	3.9	3.9
20	M12-3189	11.2	l		6.0	15.9	10.7	12.2	19.0	2.8	3.4
21	IL10-12009	13.3	l	15.0	42.0	6.0	4.8	14.6	15.8	6.7	1.4
22	IL10-23236	9.8	l	9.5	10.0	4.7	14.4	11.7	23.5	2.2	2.2
23	IL11-6543	12.8	l	11.0	24.0	10.0	23.9	20.1	7.5	3.9	2.3
24	IL11-6626	15.4	l	43.0	25.0	7.9	11.9	22.7	10.2	1.7	1.1
25	IL11-8141	10.2	l	7.5	7.0	10.5	24.3	17.0	4.5	7.2	3.2
26	KY06C-1178-16-10-3	19.5		21.0	15.0	39.0	26.2	23.5	3.1	23.9	4.4
27	KY06C-3058-53-3-3	17.3	l	17.0	24.0	25.3	21.7	14.2	17.1	13.3	6.0
28	KY06C-2020-10-18-3	24.0		42.5	18.0	42.0	28.0	21.7	10.3	15.6	13.6
29	KY05C-1369-14-6-3	9.0	l	11.3	12.0	6.9	3.4	7.6	22.9	4.4	3.7
30	KY05C-1017-30-6-3	14.3	l	15.8	16.0	29.4	4.8	24.4	18.8	2.8	2.3
31	MO130651	15.2	l	28.5	7.0	22.1	28.8	13.4	15.3	5.0	1.6
32	MO130660	7.8	l	15.8	4.0	5.7	18.2	11.4	1.3	3.9	1.9
33	MO130669	13.2	l	7.8	15.0	24.2	22.4	12.7	15.5	6.7	1.6
34	MO130435	8.2	l	5.0	4.0	3.6	11.1	13.9	15.8	8.9	3.2
35	MO130906	10.9	l	15.0	14.0	16.4	14.6	10.9	9.2	5.6	1.6
36	MO131378	8.8	l	9.5	5.0	23.8	4.9	8.9	7.9	10.0	0.7
37	VA13W-56	12.3	l	10.0	15.0	16.5	19.5	18.0	5.9	8.9	4.4
38	VA13W-124	32.3		66.5	30.0	41.3	49.8	20.9	20.0	13.9	15.9
39	VA07MAS4-7417-1-3-3	30.6		40.0	49.0	49.2	22.3	21.5	35.2	13.3	14.0
40	VA08MAS1-188-6-4	28.9		37.5	40.0	46.0	29.6	18.8	32.3	8.9	18.2
41	VA13FHB-5	18.8		23.3	48.0	11.8	22.4	20.5	11.2	10.0	3.2
100	AVERAGE	19.3		27.5	22.0	25.3	24.1	19.5	15.8	13.5	5.4
101	MINUMUM	7.8		5.0	3.5	3.6	3.4	7.6	1.3	1.7	0.7
102	MAXIMUM	52.3		80.0	49.5	74.4	55.7	40.1	57.1	65.0	18.2
103	LSD(0.05)	10.0		.	.	.	.	.	.	.	.

Table 22. Summary of Fusarium Damaged Kernel (FDK, %) data from the 2014-2015 PNUWWSN.

ENTRY	NAME	AVG		ILHIG	ILURB	KYLEX	MOCOL	OHWOO
1	TRUMAN	11.2	l	15.0	11.7	4.7	17.5	7.0
2	ERNIE	15.5	l	4.0	20.0	16.4	30.0	7.0
3	FREEDOM	47.5	h	77.5	31.7		67.5	24.0
4	PIONEER2545	58.1	h	82.5	61.7	25.8	87.5	33.0
5	KWS055	35.4			19.0	14.0	80.0	16.0
6	KWS053	23.2	l	60.0	21.7	8.0	17.5	9.0
7	KWS054	38.7	h	75.0	18.3	14.6	72.5	13.0
8	KWS037	34.2		95.0	10.0	13.9	30.0	22.0
9	KWS041	33.1		60.0	18.3	12.5	62.5	12.0
10	OH10-304-71	18.1	l	25.0	11.7	13.7	25.0	15.0
11	OH10-316-20	20.6	l	10.0	10.0	13.0	60.0	10.0
12	1042A1-1-2	33.0		20.0	36.7	21.0	82.5	5.0
13	053A1-2-5-3-5-3	14.9	l	25.0	16.7	9.5	17.5	6.0
14	10565C1-1	19.1	l	20.0	15.0	16.3	40.0	4.0
15	082A1-3-1	28.3		80.0	23.3	15.1	20.0	3.0
16	11405A1-4	20.9	l	10.0	28.3	13.1	50.0	3.0
17	B12*1792	23.2	l	25.0	31.7	12.3	40.0	7.0
18	B12-2180NC#	30.2		25.0	28.3	19.8	75.0	3.0
19	B12-2125FHB	18.3	l	50.0	11.7	12.8	15.0	2.0
20	M12-3189	12.3	l	10.0	21.7	9.0	20.0	1.0
21	IL10-12009	14.8	l	40.0	10.0	3.4	17.5	3.0
22	IL10-23236	17.3	l	40.0	10.0	10.6	25.0	1.0
23	IL11-6543	6.4	l	5.0	15.0	4.8	5.0	2.0
24	IL11-6626	7.4	l	10.0	11.7	6.8	7.5	1.0
25	IL11-8141	6.7	l	3.0	10.0	9.0	7.5	4.0
26	KY06C-1178-16-10-3	22.8	l	25.0	16.7	10.3	50.0	12.0
27	KY06C-3058-53-3-3	25.6	l	40.0	18.3	7.9	55.0	7.0
28	KY06C-2020-10-18-3	17.2	l	10.0	21.7	19.0	27.5	8.0
29	KY05C-1369-14-6-3	19.6	l	60.0	20.0	3.5	12.5	2.0
30	KY05C-1017-30-6-3	22.9	l	25.0	13.3	10.0	65.0	1.0
31	MO130651	12.3	l	25.0	10.0	8.6	15.0	3.0
32	MO130660	15.7	l	40.0	10.0	8.8	17.5	2.0
33	MO130669	18.6	l	50.0	13.3	6.6	20.0	3.0
34	MO130435	21.1	l	40.0	10.0	6.6	45.0	4.0
35	MO130906	29.0		40.0	11.7	10.4	80.0	3.0
36	MO131378	17.3	l	40.0	15.0	6.5	20.0	5.0
37	VA13W-56	9.3	l	5.0	10.0	9.9	17.5	4.0
38	VA13W-124	22.8	l	10.0	21.7	20.5	55.0	7.0
39	VA07MAS4-7417-1-3-3	46.3	h	90.0	31.7	13.0	90.0	7.0
40	VA08MAS1-188-6-4	25.2	l	5.0	16.7	15.3	85.0	4.0
41	VA13FHB-5	35.5		50.0	26.7	10.8	85.0	5.0
100	AVERAGE	23.2		35.1	18.7	14.7	39.1	6.4
101	MINUMUM	6.4		3.0	10.0	3.4	5.0	1.0
102	MAXIMUM	58.1		95.0	61.7	80.0	90.0	33.0
103	LSD(0.05)	19.7		.	.	.	.	.

Table 23. Summary of INC/SEV/FDK (ISK, %) data from the 2014-2015 PNUWWSN

ENTRY	NAME	AVG		ILHIG	ILURB	KYLEX	MOCOL	OHWOO
1	TRUMAN	23.1	l	19.5	20.5	33.2	31.1	11.3
2	ERNIE	36.2		34.6	43.6	43.8	48.1	10.7
3	FREEDOM	49.1		59.5	37.0		61.2	38.2
4	PIONEER2545	66.9	h	76.5	76.9	55.2	74.1	52.0
5	KWS055	50.4			34.4	53.9	79.3	25.3
6	KWS053	31.0	l	48.0	42.3	26.7	24.1	14.0
7	KWS054	42.0		48.0	44.4	30.1	66.9	20.7
8	KWS037	49.7		74.0	34.1	51.6	53.9	35.1
9	KWS041	46.2		63.0	32.4	44.3	71.8	19.6
10	OH10-304-71	36.4		40.0	36.3	42.9	38.5	24.4
11	OH10-316-20	38.1		37.0	41.3	42.6	54.4	15.3
12	1042A1-1-2	37.5		26.0	44.9	44.9	63.2	8.7
13	053A1-2-5-3-5-3	30.0	l	34.0	41.2	30.8	35.0	8.9
14	10565C1-1	37.7		41.0	46.5	46.0	47.9	7.1
15	082A1-3-1	36.5		71.0	35.1	32.8	39.1	4.4
16	11405A1-4	32.8	l	40.0	41.6	28.2	49.1	5.3
17	B12*1792	40.7		52.0	61.4	36.2	42.1	11.6
18	B12-2180NC#	39.7		43.0	43.1	49.0	59.2	4.4
19	B12-2125FHB	29.6	l	50.0	27.8	41.1	25.9	3.1
20	M12-3189	25.6	l	25.0	34.3	25.2	41.3	2.2
21	IL10-12009	26.4	l	55.0	17.7	13.9	39.9	5.3
22	IL10-23236	26.3	l	37.0	19.8	27.2	45.9	1.8
23	IL11-6543	24.8	l	32.0	32.0	31.4	25.6	3.1
24	IL11-6626	22.5	l	34.0	22.3	24.3	30.8	1.3
25	IL11-8141	23.7	l	25.2	25.9	38.2	23.2	5.8
26	KY06C-1178-16-10-3	34.7		34.0	45.8	36.6	38.2	19.1
27	KY06C-3058-53-3-3	37.5		49.0	40.3	32.6	54.7	10.7
28	KY06C-2020-10-18-3	34.1		31.0	48.1	40.9	38.2	12.4
29	KY05C-1369-14-6-3	27.7	l	48.0	34.1	12.4	40.5	3.6
30	KY05C-1017-30-6-3	30.6	l	34.0	38.8	17.6	60.4	2.2
31	MO130651	30.3	l	34.0	33.9	39.5	39.9	4.0
32	MO130660	21.3	l	31.0	17.0	35.5	20.0	3.1
33	MO130669	32.0	l	44.0	34.9	34.8	41.0	5.3
34	MO130435	27.2	l	31.0	17.5	25.5	54.9	7.1
35	MO130906	32.1	l	43.0	27.0	27.6	58.4	4.4
36	MO131378	26.0	l	34.0	35.5	14.7	37.8	8.0
37	VA13W-56	23.5	l	26.0	28.7	27.9	28.0	7.1
38	VA13W-124	39.8		37.0	47.9	51.3	51.6	11.1
39	VA07MAS4-7417-1-3-3	50.3		78.0	54.5	33.2	75.2	10.7
40	VA08MAS1-188-6-4	41.8		41.0	49.0	40.0	71.8	7.1
41	VA13FHB-5	39.1		62.0	31.8	31.1	62.8	8.0
100	AVERAGE	34.9		42.8	37.6	36.1	45.6	10.3
101	MINUMUM	21.3		19.5	17.0	12.4	20.0	1.3
102	MAXIMUM	66.9		78.0	76.9	79.3	75.2	52.0
103	LSD(0.05)	12.5		.	.	.	.	.

Table 24. Summary of deoxynivalenol (DON, ppm) data from the 2014-2015 PNUWWSN.

ENTRY	NAME	AVG		ILURB	KYLEX	MOCOL	OHWOO	VABLA
1	TRUMAN	2.4	l	1.4	1.6	5.1	3.5	0.2
2	ERNIE	4.5		2.9	10.2	3.3	5.4	0.7
3	FREEDOM	5.0		4.2	7.6	7.1	5.3	0.6
4	PIONEER2545	9.6		10.7	10.5	10.1	15.3	1.3
5	KWS055	12.9	h	7.3	13.4	23.3	19.3	1.0
6	KWS053	3.3	l	4.3	3.5	4.7	3.7	0.1
7	KWS054	4.3	l	5.0	5.0	5.6	5.9	0.2
8	KWS037	11.9	h	4.7	12.8	20.1	20.2	1.6
9	KWS041	13.6	h	7.7	13.8	25.1	20.6	0.6
10	OH10-304-71	3.9	l	1.5	7.3	4.5	5.8	0.3
11	OH10-316-20	3.6	l	2.6	5.8	4.4	5.0	0.2
12	1042A1-1-2	5.4		5.4	6.6	8.4	6.0	0.4
13	053A1-2-5-3-5-3	1.9	l	1.8	3.1	2.1	2.4	0.2
14	10565C1-1	9.1		5.9	11.0	15.2	12.5	0.8
15	082A1-3-1	4.2	l	3.8	6.4	2.1	8.5	0.3
16	11405A1-4	2.0	l	1.9	2.9	1.9	3.1	0.3
17	B12*1792	4.5		3.7	6.8	4.9	6.8	0.3
18	B12-2180NC#	4.8		2.1	8.1	5.5	7.9	0.6
19	B12-2125FHB	2.4	l	0.9	5.3	2.1	3.2	0.3
20	M12-3189	2.7	l	2.2	2.6	5.2	3.3	0.2
21	IL10-12009	2.0	l	0.9	2.0	3.9	3.4	0.0
22	IL10-23236	1.4	l	0.7	2.7	2.4	1.4	0.0
23	IL11-6543	1.9	l	1.4	3.2	2.6	2.0	0.1
24	IL11-6626	2.1	l	1.3	4.3	2.4	2.6	0.1
25	IL11-8141	2.2	l	1.0	4.2	2.5	3.0	0.2
26	KY06C-1178-16-10-3	4.0	l	3.0	9.6	3.1	3.6	0.5
27	KY06C-3058-53-3-3	2.9	l	1.8	5.0	4.7	3.1	0.1
28	KY06C-2020-10-18-3	4.2	l	1.9	11.2	2.9	4.4	0.5
29	KY05C-1369-14-6-3	1.2	l	1.3	1.3	2.6	0.5	0.1
30	KY05C-1017-30-6-3	2.8	l	1.6	4.7	4.3	3.0	0.3
31	MO130651	4.2	l	1.7	6.2	7.5	5.4	0.3
32	MO130660	2.2	l	1.6	3.0	2.5	3.7	0.1
33	MO130669	3.3	l	2.1	2.3	4.6	7.0	0.3
34	MO130435	3.3	l	2.0	4.3	5.1	4.6	0.3
35	MO130906	3.5	l	1.9	4.2	8.2	3.3	0.1
36	MO131378	3.1	l	2.8	2.1	5.7	4.7	0.2
37	VA13W-56	2.9	l	1.3	4.8	4.7	3.5	0.4
38	VA13W-124	4.3	l	2.8	8.7	5.9	3.8	0.2
39	VA07MAS4-7417-1-3-3	3.6	l	4.4	3.7	5.4	4.0	0.3
40	VA08MAS1-188-6-4	3.8	l	2.7	4.8	6.2	4.6	0.6
41	VA13FHB-5	2.9	l	2.6	5.7	2.9	3.1	0.4
100	AVERAGE	4.2		2.9	5.9	6.1	5.8	0.4
101	MINUMUM	1.2		0.7	1.3	1.9	0.5	0.0
102	MAXIMUM	13.6		10.7	13.8	25.1	20.6	1.6
103	LSD(0.05)	3.2		.	.	.	.	.

Table 25. Summary of greenhouse severity (GHSEV, %) data and data on other FHB-related traits data from the 2014-2015 PNUWWSN.

		GHSEV (%)				INLAF	INLAF	ILHIG	KYLEX
ENTRY	NAME	AVG		ILURB	MOCOL	INC (0-9)	SEV (0-9)	FHB (0-9)	FHB (0-9)
1	TRUMAN	7.7	l		7.7	1	3		0.0
2	ERNIE	30.2	hl	48.2	12.2	2	3		5.0
3	FREEDOM	46.9	h	60.0	33.7	1	2		7.5
4	PIONEER2545	37.4	h		37.4	2	6		9.0
5	KWS055	60.0	h	100.0	20.0	1	3		8.0
6	KWS053	23.5	l	30.8	16.2	3	2	6	3.0
7	KWS054	41.9	h	64.5	19.4	1	3	5	6.5
8	KWS037	46.8	h	62.8	30.8	2	5	8	9.0
9	KWS041	35.9	hl	32.5	39.3	2	6	7	5.0
10	OH10-304-71	18.9	hl		18.9	1	3	5	6.5
11	OH10-316-20	48.5	h	72.5	24.4	1	5	6	7.0
12	1042A1-1-2	36.4	hl	49.8	23.1	1	1	3	8.0
13	053A1-2-5-3-5-3	16.2	l	15.8	16.7	1	7	4	3.0
14	10565C1-1	36.8	hl	50.0	23.7	1	4	5	7.0
15	082A1-3-1	11.6	l	15.3	8.0	1	5	7	5.5
16	11405A1-4	16.9	l	20.3	13.5	2	4	7	5.5
17	B12*1792	49.0	h	82.2	15.7	2	7	8	4.5
18	B12-2180NC#	28.9	l	39.7	18.2	1	3	7	8.5
19	B12-2125FHB	27.6	l	44.3	11.0	1	3	4	9.0
20	M12-3189	29.4	hl	52.3	6.6	1	3	2	4.0
21	IL10-12009	25.3	l	38.0	12.7	1	6		2.0
22	IL10-23236	16.4	l	14.0	18.9	1	4		7.0
23	IL11-6543	12.2	l		12.2	1	2	4	4.0
24	IL11-6626	6.8	l	7.0	6.7	2	2	7	4.5
25	IL11-8141	34.2	hl	53.5	14.9	2	1	3	7.0
26	KY06C-1178-16-10-3	28.2	l	38.0	18.5	1	4	2	4.5
27	KY06C-3058-53-3-3	31.1	hl	50.3	11.9	2	6	7	6.5
28	KY06C-2020-10-18-3	28.3	l	49.3	7.4	1	3	3	7.5
29	KY05C-1369-14-6-3	10.5	l	7.0	13.9	1	3	6	1.0
30	KY05C-1017-30-6-3	13.6	l	19.8	7.4	1	4	3	2.5
31	MO130651	26.1	l	39.8	12.4	1	2	3	4.5
32	MO130660	37.6	hl	60.0	15.2	2	1	1	6.0
33	MO130669	8.0	l	7.0	9.0	1	4	2	1.0
34	MO130435	46.3	h	80.0	12.7	1	4	2	0.0
35	MO130906	7.9	l	11.7	4.1	1	3	6	5.5
36	MO131378	7.5	l	8.2	6.7	1	2	2	3.5
37	VA13W-56	59.1	h	71.7	46.5	1	5	3	3.0
38	VA13W-124	44.3	h	69.0	19.6	1	5	6	8.5
39	VA07MAS4-7417-1-3-3	37.3	hl	50.4	24.2	2	5	8	5.0
40	VA08MAS1-188-6-4	34.0	hl	34.2	33.8	1	6	8	6.0
41	VA13FHB-5	36.9	hl	47.5	26.2	1	6	8	8.0
	AVERAGE	30.6		40.8	17.7			5	5.3
	MINUMUM	6.8		7.0	4.1				
	MAXIMUM	60.0		100.0	46.5				
	LSD(0.05)	30.9		.	.				

Table 26. Summary of other traits collected on the 2014-2015 PNUWWSN

ENTRY	NAME	INLAF LR (0-9)	VABLA LR (0-9)	INLAF YR (0-9)	VABLA PM (0-9)	INLAF BYDV (0-9	VABLA LDG (0-9)	OHNAP LDG (0-9)	AVG YIELD	OHNOP YIELD	INLAF YIELD	VABLA YIELD	VABLA TW
1	TRUMAN	8	2	2	0	4	0.0	2.0				98.8	56.0
2	ERNIE	1	2	3	1	5	1.0	4.0				95.7	57.7
3	FREEDOM	1	3	4	0	3	2.0	1.0				102.5	56.3
4	PIONEER2545	3	7	2	1	2	1.0	2.0				101.2	55.9
5	KWS055	1	0	9	2	2	0.0	5.0				96.0	55.0
6	KWS053	1	0	1	1	3	0.0	3.0				100.0	59.9
7	KWS054	1	1	2	1	1	0.0	4.0				115.4	58.8
8	KWS037	1	0	1	1	1	1.0	2.0				101.9	55.3
9	KWS041	1	0	1	0	3	6.0	2.0				108.4	59.6
10	OH10-304-71	1	1	1	1	2	1.0	2.0	96.6	82.3	96.7	110.8	58.4
11	OH10-316-20	1	1	1	1	4	0.0	5.0	94.3	86.0	94.4	102.7	58.2
12	1042A1-1-2	1	0	1	1	1	0.0	1.0	87.4	73.5	88.9	99.8	56.0
13	053A1-2-5-3-5-3	1	3	1	1	1	0.0	4.0	88.8	86.2	85.2	94.9	56.8
14	10565C1-1	2	1	7	1	1	0.0	2.0	82.5	80.4	77.0	90.2	57.7
15	082A1-3-1	1	1	2	1	3	0.0	5.0	82.8	80.7	80.1	87.6	57.6
16	11405A1-4	3	2	3	3	2	2.0	5.0	90.2	73.2	103.9	93.4	57.4
17	B12*1792	1	1	1	1	3	0.0	0.0				104.7	59.1
18	B12-2180NC#	1	0	1	0	1	0.0	1.0				100.2	57.1
19	B12-2125FHB	1	2	2	1	2	0.0	7.0				102.2	59.4
20	M12-3189	1	1	2	0	4	4.0	6.0				103.2	59.2
21	IL10-12009	7	3	1	0	2	4.0	5.0	86.3	80.9	89.2	88.7	58.3
22	IL10-23236	1	5	1	2	1	4.0	9.0	88.9	89.0	90.7	86.9	58.8
23	IL11-6543	2	1	2	2	4	3.0	6.0	93.4	89.3	91.7	99.1	61.0
24	IL11-6626	8	1	3	0	5	0.0	5.0	89.6	81.0	96.6	91.3	60.0
25	IL11-8141	2	1	2	2	2	4.0	0.0			93.3	96.0	58.7
26	KY06C-1178-16-10-3	4	2	2	1	3	0.0	1.0	104.1	91.8	104.4	116.1	57.8
27	KY06C-3058-53-3-3	3	5	5	1	1	0.0	1.0	102.6	91.8	111.3	104.8	58.9
28	KY06C-2020-10-18-3	1	1	2	1	1	0.0	2.0	99.5	85.6	104.6	108.4	58.0
29	KY05C-1369-14-6-3	6	3	2	0	3	0.0	4.0	91.3	87.9	95.0	91.0	60.7
30	KY05C-1017-30-6-3	1	2	1	4	3	1.0	4.0	87.3	96.9	77.0	88.0	59.6
31	MO130651	2	2	1	1	4	0.0	3.0				94.8	58.6
32	MO130660	1	3	1	1	2	0.0	3.0				85.9	58.6
33	MO130669	8	4	2	1	4	1.0	4.0				97.8	56.4
34	MO130435	1	2	2	0	5	1.0	3.0				92.3	58.4
35	MO130906	6	1	1	0	2	1.0	6.0				92.1	58.1
36	MO131378	1	1	1	8	2	4.0	4.0				79.9	57.7
37	VA13W-56	1	1	1	0	2	0.0	3.0	93.1	76.2	93.9	109.1	60.3
38	VA13W-124	1	0	1	0	1	0.0	2.0	101.7	87.5	109.4	108.2	57.4
39	VA07MAS4-7417-1-3-3	1	0	2	0	4	0.0	3.0	97.1	86.1	92.3	112.8	57.6
40	VA08MAS1-188-6-4	2	0	2	0	4	0.0	0.0	101.6	86.7	98.2	120.0	58.1
41	VA13FHB-5	1	0	2	1	3	0.0	2.0	94.3	80.9	88.7	113.3	59.5
	AVERAGE	2.2	1.6	2.0	1.0	2.6	1.0	3.2	93.0	84.5	93.7	99.7	58.1

Table 27. Summary of heading date (HD, Julian days) and height (HGT, inches) data from the 2014-2015 PNUWWN

		HD									HGT				
ENTRY	NAME	AVG		ILCHA	INLAF	INWLA	KYLEX	MOCOL	OHWOO	VABLA	AVG		KYLEX	MOCOL	VABLA
1	TRUMAN	141.7	h	145.0	138	151.0	137.5	146.0	144.7	130	36.7	h	38.5	36.5	35
2	ERNIE	135.6		137.5	135	144.0	129.0	139.5	138.0	126	35.2		37.5	32.0	36
3	FREEDOM	138.7		141.0	138	146.5	132.5	141.0	142.7	129	35.0		36.0	34.0	35
4	PIONEER2545	137.3		138.5	138	144.0	132.0	139.5	141.3	128	33.7		35.0	33.0	33
5	KWS055	141.0	h	145.0	141	150.0	135.0	141.0	145.3	130	33.8		36.5	34.0	31
6	KWS053	132.6	l	136.0	134	137.0	127.0	133.0	137.3	124	34.3		37.5	31.5	34
7	KWS054	134.4		137.0	135	140.5	128.0	135.0	138.0	127	31.7	l	34.5	29.5	31
8	KWS037	140.9	h	145.5	139	149.5	135.0	141.0	146.3	130	33.8		36.0	33.5	32
9	KWS041	139.0		143.0	137	147.0	134.5	141.0	142.7	128	38.5	h	40.5	35.0	40
10	OH10-304-71	136.4		138.5	138	141.0	131.5	138.0	141.0	127	35.8		37.0	33.5	37
11	OH10-316-20	137.0		139.0	138	143.5	131.5	138.0	141.3	128	34.7		35.5	33.5	35
12	1042A1-1-2	136.7		140.5	136	140.5	132.5	141.0	139.7	127	31.0	l	31.5	28.5	33
13	053A1-2-5-3-5-3	135.7		138.5	137	142.0	130.5	138.0	138.0	126	34.7		36.5	31.5	36
14	10565C1-1	137.9		140.0	138	145.5	133.5	141.0	140.3	127	34.5		35.0	32.5	36
15	082A1-3-1	134.4		137.0	135	139.5	128.5	138.0	137.7	125	32.8		33.5	31.0	34
16	11405A1-4	135.0		138.0	135	141.0	129.0	138.0	138.3	126	34.2		36.0	32.5	34
17	B12*1792	134.7		137.5	135	138.5	129.0	138.0	138.7	126	33.0		34.5	30.5	34
18	B12-2180NC#	137.1		140.5	138	143.5	131.5	139.5	140.0	127	30.0	l	31.0	29.0	30
19	B12-2125FHB	136.8		140.5	135	145.0	131.0	138.0	141.0	127	34.3		35.0	33.0	35
20	M12-3189	137.8			137	145.0	132.0	141.0	141.7	127	37.0	h	40.0	35.0	36
21	IL10-12009	132.9	l	136.5	134	138.0	126.0	135.0	137.0	124	34.0		37.0	30.0	35
22	IL10-23236	133.9	l	136.5	135	138.5	128.5	135.0	138.0	126	32.0	l	36.0	28.0	32
23	IL11-6543	134.9		137.0	136	140.0	130.0	136.5	138.0	127	35.7		36.5	35.5	35
24	IL11-6626	134.1		137.0	135	138.5	128.0	136.5	138.0	126	34.3		36.0	33.0	34
25	IL11-8141	135.1		138.0	135	139.5	131.5	138.0	138.0	126	34.7		36.0	33.0	35
26	KY06C-1178-16-10-3	137.1		141.0	138	145.0	131.5	138.0	139.3	127	34.5		36.5	32.0	35
27	KY06C-3058-53-3-3	135.4		140.0	135	141.5	130.0	136.5	138.0	127	31.7	l	34.0	30.0	31
28	KY06C-2020-10-18-3	137.2		140.0	138	144.0	132.0	138.0	140.3	128	33.7		35.5	31.5	34
29	KY05C-1369-14-6-3	133.2	l	138.5	134	137.5	127.0	135.0	136.7	124	34.2		36.5	31.0	35
30	KY05C-1017-30-6-3	134.3		138.5	135	141.0	127.0	135.0	137.7	126	34.2		36.5	32.0	34
31	MO130651	137.3		141.0	135	144.0	135.0	141.0	138.3	127	35.8		37.5	35.0	35
32	MO130660	136.8		140.5	137	145.5	131.0	138.0	138.7	127	34.2		35.0	32.5	35
33	MO130669	140.6	h	144.5	138	148.0	137.0	143.5	143.0	130	36.8	h	37.5	37.0	36
34	MO130435	141.6	h	145.5	138	150.5	138.0	146.0	143.0	130	38.3	h	40.0	38.0	37
35	MO130906	135.0		139.0	135	143.5	128.5	136.5	137.7	125	34.3		36.5	30.5	36
36	MO131378	137.4		140.5	137	146.0	131.5	141.0	139.0	127	38.3	h	39.5	37.5	38
37	VA13W-56	136.5		140.0	136	147.5	130.0	138.0	138.3	126	34.0		37.0	30.0	35
38	VA13W-124	137.2		141.0	137	147.5	131.0	139.5	138.3	126	33.2		35.0	29.5	35
39	VA07MAS4-7417-1-3-3	135.1		138.5	135	146.0	128.0	135.0	138.0	125	31.0	l	33.0	27.0	33
40	VA08MAS1-188-6-4	134.9		136.5	135	142.5	130.0	135.0	138.0	127	31.0	l	34.0	29.0	30
41	VA13FHB-5	136.3		138.5	135	148.0	129.0	138.0	138.3	127	31.7	l	33.5	28.5	33
100	AVERAGE	136.5		139.6	136.5	143.3	131.2	138.6	139.3	126.9	34.2		36.0	32.2	34.4
101	MINUMUM	132.6		136.0	134	132.0	126.0	133.0	127.0	124	30.0		31.0	27.0	30
102	MAXIMUM	141.7		145.5	145	151.0	141.0	146.0	146.3	130	38.5		40.5	38.0	40
103	LSD(0.05)	1.5		.	.	.	.	.	.	.	2.2		.	.	.

Table 28. Presence or absence of FHB QTL in the 2014-2015 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. , Raleigh NC.

Entry	Sample Name	Fhb1	Fhb_Massey_3BL	Fhb_2DL_Wuhan/W14	Fhb_5A
1	Truman	no	no	no	no
2	Ernie	no	**Fhb_Massey_3BL het**	no	**Fhb_5A_Ernie**
3	Freedom	**Fhb1 het**	**Fhb_Massey_3BL het**	no	**Fhb_5A_Ernie het**
4	Pioneer2545	no	no	no	no
5	NY9905-161	no	no	no	**Fhb_5A_Ernie**
6	NY09067-2-69-1097	**Fhb1**	no	no	**Fhb_5A_Ning7840?**
7	NY05152-818	**Fhb1**	no	no	no
8	NY05152-825	**Fhb1**	no	no	no
9	NY05152-821	**Fhb1**	no	no	no
10	KWS050	no	no	no	no
11	KWS051	no	no	no	no
12	KWS052	no	no	no	no
13	KWS036	no	no	no	no
14	ES12-3030	no	no	no	no
15	ES12-1358	no	no	no	no
16	ES12-1275	no	no	no	no
17	F1014	**Fhb1**	no	no	no
18	E6012	no	no	no	**Fhb_5A_Ernie**
19	OH09-207-24	no	no	no	no
20	OH09-281-10	no	no	no	**Fhb_5A_Ernie het**
21	OH10-200-49	**Fhb1 het**	**Fhb_Massey_3BL**	no	no
22	10641B1-9-11-7	**Fhb1**	no	no	**Fhb_5A_Ernie**
23	0762SA1-2-8_1plnt	**Fhb1**	no	no	**Fhb_5A_Ernie**
24	08334A1-31	no	no	no	**Fhb_5A_Ernie het**
25	0566A1-3-1-6	no	no	no	no
26	10512RA1-8	**Fhb1**	no	no	**Fhb_5A_Ernie**
27	M11-2024_	no	**Fhb_Massey_3BL**	no	no
28	M12-3312CW	no	no	no	no
29	M12-3301	no	no	no	no
30	M12-2036_	no	no	no	no
31	M12-2031_	no	**Fhb_Massey_3BL**	no	**Fhb_5A_Ernie**
32	CA9-72	no	no	no	no
33	CA9-76	no	no	no	no
34	DH5-15	no	no	no	no
35	CA13-53	**Fhb1**	no	no	no
36	CA13-63	**Fhb1**	no	no	no
37	IL10-19464	no	no	no	no
38	IL10-21934	no	no	no	no
39	IL10-21937	no	no	no	**Fhb_5A_Ernie het**
40	IL11-36131	no	no	no	no
41	IL11-27667	no	no	no	no
42	KY06C-1195-37-2-5	**Fhb1 het**	no	no	no
43	KY06C-1201-18-6-3	no	no	no	no
44	KY06C-1107-7-2-5	no	no	no	no
45	KY06C-2020-10-5-3	no	no	no	no
46	KY06C-2020-11-12-1	no	no	no	no
47	MO122246	no	no	no	no
48	MO130203	no	no	no	no
49	MO130765	no	no	no	no
50	MO131838	no	no	no	no
51	NE05548	no call	no	no	no
52	NE10589	no call	no	no	no
53	NW13455	no	no	no	no
54	NE13511	no	no	no	no
55	NE06545	no	no	no	no
56	VA11W-108	no	no	no	no
57	VA11W-182	no	**Fhb_Massey_3BL**	no	no
58	VA12W-150	no	no	no	no
59	VA12FHB-4	no	no	no	no
60	VA12FHB-55	**Fhb1**	no	no	no

Table 29. Presence or absence of FHB QTL in the 2014-2015 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, Raleigh NC.

Entry	Sample Name	Fhb1	Fhb_Massey_3BL	Fhb_2DL_Wuhan/W14	Fhb_5A
1	Truman	no	no	no	no
2	Ernie	no	**Fhb_Massey_3BL het**	no	**Fhb_5A_Ernie het**
3	Freedom	no	**Fhb_Massey_3BL**	no	no
4	Pioneer2545	no	no	no	no
5	KWS055	no	no	no	no
6	KWS053	no	no	no	no
7	KWS054	no	no	no	no
8	KWS037	no	no	no	no
9	KWS041	no	**Fhb_Massey_3BL**	no	no
10	OH10-304-71	no	no	no	no
11	OH10-316-20	no	no	no	no
12	1042A1-1-2	no	**Fhb_Massey_3BL het**	no	**Fhb_5A_Ernie**
13	053A1-2-5-3-5-3	**Fhb1**	no	no	**Fhb_5A_Ernie**
14	10565C1-1	**Fhb1**	**Fhb_Massey_3BL het**	no	no
15	082A1-3-1	no	no	no	no
16	11405A1-4	no	no	no	**Fhb_5A_Ernie het**
17	B12_1792	no	no	no	no
18	B12-2180NC_	no	no	no	no
19	B12-2125FHB	no	no	no	no
20	M12-3189	no	no	no	**Fhb_5A_Ernie**
21	IL10-12009	no	no	no	no
22	IL10-23236	**Fhb1**	no	no	no
23	IL11-6543	no	no	no	no
24	IL11-6626	no	no	no	no
25	IL11-8141	no	no	no	no
26	KY06C-1178-16-10-3	**Fhb1 het**	no	no	no
27	KY06C-3058-53-3-3	**Fhb1**	no	no	no
28	KY06C-2020-10-18-3	no	no	no	no
29	KY05C-1369-14-6-3	no	no	no	no
30	KY05C-1017-30-6-3	no	no	no	no
31	MO130651	no	no	no	no
32	MO130660	no	no	**2DL_Wuhan/**	no
33	MO130669	no	no	no	no
34	MO130435	no	no	no	no
35	MO130906	no	no	no	no
36	MO131378	no	no	no	**Fhb_5A_Ernie het**
37	VA13W-56	no	**Fhb_Massey_3BL**	no	no
38	VA13W-124	no	**Fhb_Massey_3BL**	no	no
39	VA07MAS4-7417-1-3-3	no	no	no	no
40	VA08MAS1-188-6-4	no	no	no	**Fhb_5A_Ernie het**
41	VA13FHB-5	no	no	no	no

Table 30a and b. Quality parameters for the 2014-2015 NUWWSN. Data is from the USDA Soft Wheat Quality Lab. Additional analytical data is available in an excel file from sneller.5@osu.edu.

	*Entry highlighted in RED is the check used for this evaluation					*For highlighted entries, please see the notes in line 77					
Entry Number	Entry	Test Weight (LB/BU)	NIR Kernel Protein (at 12%)	SKCS Kernel Hardness	SKCS Kernel Diameter (mm)	SKCS Kernel Weight (mg)	Adjusted Flour Yield (%)	Softness Equivalent (%)	Flour Protein (at 14%)	Lactic Acid SRC (%)	Sodium Carbonate SRC (%)
1	TRUMAN	56.0	10.7	-1.6	2.4	30.3	67.6	65.3	8.6	121.9	70.1
2	ERNIE	57.8	11.8	0.5	2.8	36.5	67.8	57.8	9.4	132.2	67.4
3	FREEDOM	58.0	12.0	0.6	2.8	35.8	67.2	57.1	9.6	134.9	67.2
4	PIONEER2545	55.6	11.0	15.8	2.6	31.7	65.3	59.7	9.5	121.3	70.6
5	NY99056-161	55.8	10.9	15.3	2.6	31.2	67.3	60.9	9.2	134.3	69.6
6	NY09067-2-69-1097	57.0	10.9	9.5	2.7	34.1	68.9	62.0	9.2	109.9	67.5
7	NY05152-818	55.6	11.2	4.4	2.5	31.8	64.1	64.6	9.2	109.0	78.3
8	NY05152-825	57.5	11.6	4.1	2.5	30.4	66.1	63.4	9.4	100.8	71.8
9	NY05152-821	55.8	12.1	11.1	2.6	30.5	63.2	64.1	10.0	110.9	80.0
10	KWS050	59.0	10.3	26.8	2.6	31.9	66.8	57.1	9.0	121.8	73.3
11	KWS051	57.3	10.9	18.3	2.7	35.5	67.8	56.2	9.1	132.5	69.4
12	KWS052	57.7	10.8	9.6	2.6	31.9	68.8	58.7	9.0	115.0	67.8
13	KWS036	57.2	11.0	4.6	2.7	37.9	70.0	60.8	9.0	98.1	64.8
14	ES12-3030	59.7	11.4	16.0	2.7	34.0	66.3	53.4	9.7	137.4	66.7
15	ES12-1358	61.2	11.4	8.8	2.7	37.8	67.5	61.9	9.6	150.1	71.0
16	ES12-1275	59.2	12.0	13.3	2.8	34.7	66.7	54.0	10.2	151.4	66.4
17	F1014	55.3	10.8	16.6	2.6	30.1	67.1	59.2	8.8	90.3	68.3
18	E6012	56.0	10.6	2.0	2.7	33.3	69.1	64.2	8.7	134.2	69.0
19	OH09-207-24	57.8	10.9	8.1	2.7	34.0	68.8	59.2	8.9	124.3	67.2
20	OH09-281-10	58.7	10.6	20.9	2.8	33.8	69.9	54.8	8.7	119.8	65.3
21	OH10-200-49	56.0	10.4	-0.3	2.5	28.7	67.2	68.6	10.0	130.6	71.9
22	Jamestown	60.2	11.9	11.4	2.8	32.5	67.4	57.5	9.5	133.3	70.4
23	Shirley	55.9	10.3	-2.4	2.6	34.7	69.3	60.5	8.2	104.8	67.5
24	10641B1-9-11-7	59.4	12.7	34.6	2.9	35.5	67.7	44.6	10.8	134.7	75.7
25	0762A1-2-8	56.4	10.4	9.3	2.8	35.4	67.0	58.1	9.0	126.7	65.7
26	08334A1-31	57.0	10.4	3.4	2.8	38.9	68.7	64.4	8.4	126.6	66.6
27	0566A1-3-1-6	58.0	11.3	12.2	2.8	35.7	66.7	57.6	9.1	126.8	66.4
28	10512RA1-8	56.7	11.2	9.5	2.8	35.3	66.6	58.1	9.3	122.0	72.2
29	M11-2024#	60.0	11.7	17.3	2.8	36.0	68.1	50.4	10.3	88.6	66.1
30	M12-3312CW	58.5	11.1	26.9	2.7	31.6	66.5	53.2	9.3	111.6	65.2
31	M12-3301	57.0	9.3	4.4	2.5	31.7	70.0	65.2	7.8	110.8	63.7
32	M12-2036#	56.8	9.8	6.0	2.6	32.2	70.5	64.4	8.0	140.6	65.2
33	M12-2031#	57.3	10.3	19.6	2.7	32.5	66.3	56.4	8.6	94.9	63.9
34	CA9-72	57.7	10.1	15.4	2.8	35.0	66.6	58.0	8.3	106.6	67.5
35	CA9-76	57.6	10.7	7.1	2.8	33.4	68.1	60.8	8.7	117.7	65.9
36	DH5-15	60.1	11.1	14.1	2.7	34.1	67.2	57.4	9.2	109.4	63.0
37	CA13-53	53.9	10.8	10.6	2.7	35.6	65.7	61.8	9.3	102.3	72.1
38	CA13-63	56.9	10.1	11.6	2.7	38.1	65.6	58.9	8.6	109.2	69.6
39	IL10-19464	60.3	11.0	3.6	2.8	37.7	69.6	56.1	9.3	130.5	64.1
40	IL10-21934	60.2	10.6	10.0	2.7	33.7	67.1	54.8	9.2	132.6	63.6
41	IL10-21937	60.0	11.1	8.9	2.8	34.7	65.9	52.1	9.3	131.2	64.1
42	IL11-36131	59.9	11.6	4.2	2.7	36.2	68.5	59.2	9.7	150.6	65.0
43	IL11-27667	59.2	10.4	7.3	2.6	30.9	69.3	60.1	8.6	130.7	66.3
44	USG 3120	60.5	10.9	4.0	2.8	40.2	70.0	58.1	9.0	117.6	67.6
45	Branson	57.3	10.8	0.3	2.6	33.5	69.5	63.7	8.7	135.7	66.0
46	KY06C-1195-37-2-5	59.0	10.4	6.4	2.8	35.8	67.9	58.5	8.7	123.6	67.5
47	KY06C-1201-18-6-3	59.3	10.6	14.1	2.6	32.0	68.7	57.9	8.7	138.7	69.3
48	KY06C-1107-7-2-5	58.8	11.0	17.0	2.7	35.5	66.1	55.1	9.1	111.3	73.1
49	KY06C-2020-10-5-3	57.8	10.6	-3.4	2.6	32.4	69.1	62.3	8.7	148.1	64.8
50	KY06C-2020-11-12-1	58.6	10.9	0.8	2.6	30.3	68.9	62.3	9.0	143.2	65.5
51	MO122246	60.9	11.2	20.3	2.8	33.3	66.6	56.9	9.3	139.3	67.6
52	MO130203	59.2	11.4	1.5	2.7	30.6	71.0	61.9	9.4	141.5	64.9
53	MO130765	58.3	10.5	7.0	2.5	31.0	67.2	62.1	8.7	127.0	66.9
54	MO131838	58.2	10.2	6.6	2.5	29.4	67.5	63.1	8.4	117.7	67.2
55	NE05548	57.3	11.6	47.9	2.7	32.4	71.4	47.9	10.5	147.3	74.2
56	NE10589	56.9	10.9	58.7	2.7	30.1	69.3	43.4	9.6	138.7	77.1
57	NW13455	58.0	10.2	44.2	2.9	35.3	68.6	49.7	8.7	137.1	75.4
58	NE13511	58.1	10.6	58.3	2.6	28.9	67.9	45.2	9.0	146.8	80.3
59	NE06545	56.7	10.2	33.1	2.8	33.3	70.1	61.2	8.2	147.7	77.7
60	VA11W-108	58.5	10.4	8.1	2.7	33.7	67.6	63.5	8.5	133.8	71.4
61	VA11W-182	55.4	10.4	-1.4	2.5	30.1	68.9	65.5	8.2	114.8	69.2
62	VA12W-150	58.7	10.5	10.1	2.6	29.1	68.7	59.6	8.4	127.8	68.7
63	VA12FHB-4	57.5	10.9	2.3	2.7	34.5	67.2	59.4	9.1	104.6	67.7
64	VA12FHB-55	56.8	10.2	8.6	2.6	34.5	69.1	60.2	8.3	110.2	68.8
	Average	57.9	10.9	12.4	2.7	33.5	67.9	58.6	9.1	124.6	68.8
	Standard Deviation	1.6	0.6	13.2	0.1	2.6	1.6	5.1	0.6	15.7	4.1
= favorable quality trait value											
= marginal quality trait value											

Entry Number	Entry	Test Weight (LB/BU)	NIR Kernel Protein (at 12%)	SKCS Kernel Hardness	SKCS Kernel Diameter (mm)	SKCS Kernel Weight (mg)	Adjusted Flour Yield (%)	Softness Equivalent (%)	Flour Protein (at 14%)	Lactic Acid SRC (%)	Sodium Carbonate SRC (%)	Total T-Score	Total T-Score Rank
1	TRUMAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	35
2	ERNIE	1.2	1.8	0.2	3.9	2.4	0.1	-1.5	1.4	0.7	-0.7	0.11	30
3	FREEDOM	1.3	2.0	0.2	3.7	2.1	-0.3	-1.6	1.7	0.8	-0.7	-0.02	36
4	PIONEER2545	-0.2	0.5	1.3	1.6	0.5	-1.5	-1.1	1.6	0.0	0.1	-0.93	60
5	NY99056-161	-0.1	0.3	1.3	1.4	0.3	-0.2	-0.9	1.1	0.8	-0.1	-0.33	49
6	NY09067-2-69-1097	0.7	0.3	0.8	2.6	1.4	0.8	-0.6	1.1	-0.8	-0.6	0.38	15
7	NY05152-818	-0.3	0.7	0.5	0.9	0.6	-2.2	-0.1	1.1	-0.8	2.0	-1.37	63
8	NY05152-825	1.0	1.4	0.4	1.2	0.1	-0.9	-0.4	1.4	-1.3	0.4	-0.41	51
9	NY05152-821	-0.1	2.2	1.0	1.5	0.1	-2.8	-0.2	2.5	-0.7	2.4	-1.73	64
10	KWS050	1.9	-0.8	2.2	2.2	0.6	-0.5	-1.6	0.7	0.0	0.8	-0.52	53
11	KWS051	0.9	0.3	1.5	3.0	2.0	0.1	-1.8	0.9	0.7	-0.2	-0.20	44
12	KWS052	1.1	0.1	0.8	1.7	0.6	0.7	-1.3	0.8	-0.4	-0.5	0.30	21
13	KWS036	0.8	0.5	0.5	2.6	2.9	1.5	-0.9	0.7	-1.5	-1.3	0.80	6
14	ES12-3030	2.4	1.1	1.3	2.6	1.4	-0.8	-2.3	2.0	1.0	-0.8	-0.28	46
15	ES12-1358	3.3	1.2	0.8	2.9	2.9	-0.1	-0.7	1.8	1.8	0.2	0.25	25
16	ES12-1275	2.1	2.2	1.1	3.3	1.7	-0.5	-2.2	2.7	1.9	-0.9	-0.17	41
17	F1014	-0.4	0.1	1.4	1.7	0.0	-0.3	-1.2	0.3	-2.0	-0.4	-0.42	52
18	E6012	0.0	-0.1	0.3	2.5	1.1	0.9	-0.2	0.2	0.8	-0.3	0.38	16
19	OH09-207-24	1.2	0.2	0.7	2.8	1.4	0.7	-1.2	0.5	0.2	-0.7	0.36	17
20	OH09-281-10	1.7	-0.2	1.7	3.5	1.3	1.5	-2.0	0.3	-0.1	-1.2	0.60	12
21	OH10-200-49	0.0	-0.6	0.1	0.4	-0.6	-0.3	0.6	2.4	0.6	0.4	-0.10	40
22	Jamestown	2.7	1.9	1.0	3.6	0.8	-0.1	-1.5	1.5	0.7	0.1	0.02	33
23	Shirley	0.0	-0.8	-0.1	1.9	1.7	1.1	-0.9	-0.6	-1.1	-0.6	0.43	14
24	10641B1-9-11-7	2.2	3.2	2.7	4.2	2.0	0.1	-4.0	3.7	0.8	1.4	-0.79	58
25	0762A1-2-8	0.3	-0.6	0.8	3.9	1.9	-0.4	-1.4	0.7	0.3	-1.1	-0.17	42
26	08334A1-31	0.7	-0.5	0.4	3.6	3.3	0.7	-0.2	-0.3	0.3	-0.8	0.50	13
27	0566A1-3-1-6	1.3	0.9	1.0	3.7	2.1	-0.6	-1.5	1.0	0.3	-0.9	-0.18	43
28	10512RA1-8	0.5	0.8	0.8	3.7	1.9	-0.6	-1.4	1.2	0.0	0.5	-0.57	54
29	M11-2024#	2.6	1.7	1.4	3.9	2.2	0.3	-2.9	2.9	-2.1	-1.0	0.12	29
30	M12-3312CW	1.6	0.6	2.2	2.4	0.5	-0.7	-2.3	1.2	-0.7	-1.2	-0.37	50
31	M12-3301	0.6	-2.3	0.5	1.1	0.5	1.5	0.0	-1.2	-0.7	-1.5	0.95	3
32	M12-2036#	0.5	-1.6	0.6	2.1	0.7	1.8	-0.2	-0.9	1.2	-1.2	0.96	2
33	M12-2031#	0.9	-0.7	1.6	2.6	0.9	-0.8	-1.7	0.1	-1.7	-1.5	-0.30	48
34	CA9-72	1.1	-1.0	1.3	3.3	1.8	-0.6	-1.4	-0.5	-1.0	-0.6	-0.29	47
35	CA9-76	1.0	0.0	0.7	3.7	1.2	0.3	-0.9	0.3	-0.3	-1.0	0.29	23
36	DH5-15	2.6	0.6	1.2	3.2	1.4	-0.3	-1.5	1.1	-0.8	-1.7	0.28	24
37	CA13-53	-1.3	0.1	0.9	3.0	2.0	-1.2	-0.7	1.3	-1.2	0.5	-0.96	61
38	CA13-63	0.6	-1.0	1.0	3.2	3.0	-1.3	-1.2	0.1	-0.8	-0.1	-0.68	56
39	IL10-19464	2.7	0.4	0.4	3.4	2.8	1.3	-1.8	1.3	0.5	-1.4	0.90	4
40	IL10-21934	2.7	-0.1	0.9	2.8	1.3	-0.3	-2.0	1.0	0.7	-1.6	0.22	27
41	IL10-21937	2.5	0.7	0.8	3.3	1.7	-1.1	-2.6	1.2	0.6	-1.4	-0.22	45
42	IL11-36131	2.5	1.5	0.4	2.9	2.3	0.6	-1.2	1.8	1.8	-1.2	0.63	11
43	IL11-27667	2.1	-0.6	0.7	1.6	0.2	1.1	-1.0	0.0	0.6	-0.9	0.71	9
44	USG 3120	2.9	0.2	0.4	3.9	3.8	1.5	-1.4	0.8	-0.3	-0.6	0.90	5
45	Branson	0.8	0.1	0.1	1.5	1.2	1.2	-0.3	0.2	0.9	-1.0	0.76	7
46	KY06C-1195-37-2-5	1.9	-0.6	0.6	3.8	2.1	0.2	-1.3	0.3	0.1	-0.6	0.23	26
47	KY06C-1201-18-6-3	2.1	-0.2	1.2	1.7	0.6	0.7	-1.4	0.3	1.1	-0.2	0.31	20
48	KY06C-1107-7-2-5	1.8	0.4	1.4	3.0	2.0	-0.9	-2.0	0.9	-0.7	0.7	-0.68	57
49	KY06C-2020-10-5-3	1.1	-0.1	-0.1	2.0	0.8	1.0	-0.6	0.2	1.7	-1.3	0.75	8
50	KY06C-2020-11-12-1	1.7	0.3	0.2	1.7	0.0	0.8	-0.6	0.8	1.4	-1.1	0.69	10
51	MO122246	3.1	0.7	1.7	3.3	1.2	-0.6	-1.6	1.2	1.1	-0.6	-0.08	39
52	MO130203	2.0	1.1	0.2	2.3	0.1	2.1	-0.7	1.3	1.3	-1.3	1.29	1
53	MO130765	1.5	-0.3	0.6	1.2	0.3	-0.3	-0.6	0.2	0.3	-0.8	0.11	31
54	MO131838	1.4	-0.8	0.6	0.9	-0.3	0.0	-0.4	-0.3	-0.3	-0.7	0.20	28
55	NE05548	0.8	1.4	3.8	2.4	0.8	2.4	-3.4	3.3	1.6	1.0	0.02	34
56	NE10589	0.6	0.3	4.6	2.7	-0.1	1.1	-4.3	1.7	1.1	1.7	-0.92	59
57	NW13455	1.3	-0.8	3.5	4.1	1.9	0.6	-3.0	0.3	1.0	1.3	-0.61	55
58	NE13511	1.4	-0.1	4.5	2.2	-0.5	0.2	-3.9	0.7	1.6	2.5	-1.24	62
59	NE06545	0.5	-0.9	2.6	3.4	1.2	1.6	-0.8	-0.5	1.6	1.8	-0.05	38
60	VA11W-108	1.6	-0.6	0.7	2.3	1.3	0.0	-0.3	-0.1	0.8	0.3	0.07	32
61	VA11W-182	-0.3	-0.6	0.0	0.6	-0.1	0.8	0.0	-0.6	-0.4	-0.2	0.33	19
62	VA12W-150	1.7	-0.4	0.9	2.2	-0.4	0.7	-1.1	-0.2	0.4	-0.3	0.35	18
63	VA12FHB-4	1.0	0.3	0.3	2.8	1.6	-0.2	-1.1	0.8	-1.1	-0.6	-0.03	37
64	VA12FHB-55	0.5	-0.8	0.8	2.1	1.6	0.9	-1.0	-0.5	-0.7	-0.3	0.29	22

Table 31a and b. Quality parameters for the 2014-2015 PNUWWSN. Data is from the USDA Soft Wheat Quality Lab. Additional analytical data is available in an excel file from sneller.5@osu.edu.

Entry Number	Entry	Test Weight (LB/BU)	NIR Kernel Protein (at 12%)	SKCS Kernel Hardness	SKCS Kernel Diameter (mm)	SKCS Kernel Weight (mg)	Adjusted Flour Yield (%)	Softness Equivalent (%)	Flour Protein (at 14%)	Lactic Acid SRC (%)	Sodium Carbonate SRC (%)
65	TRUMAN	56.2	9.8	1.0	2.4	30.7	67.8	65.7	7.9	116.5	69.4
66	ERNIE	57.9	11.0	0.7	2.9	36.7	67.6	58.3	8.8	128.3	66.8
67	FREEDOM	56.9	10.3	7.5	2.6	32.6	67.7	59.3	8.4	113.0	66.4
68	PIONEER2545	56.2	10.6	15.1	2.6	32.4	65.8	60.4	9.0	117.9	70.2
69	KWS055	55.2	10.2	2.4	2.6	31.9	68.7	66.9	8.4	128.3	67.2
70	KWS053	60.4	11.3	11.0	2.8	38.9	67.5	53.4	9.4	141.4	65.4
71	KWS054	58.9	10.7	-2.5	2.7	33.1	69.0	62.7	8.9	138.4	67.2
72	KWS037	55.8	10.6	4.9	2.6	30.7	68.7	65.1	8.6	135.0	67.1
73	KWS041	59.5	11.3	17.9	2.7	34.2	66.6	55.5	9.1	148.8	69.2
74	OH10-304-71	58.9	11.0	13.5	2.8	34.1	69.6	56.3	9.2	133.9	64.6
75	OH10-316-20	59.3	10.7	14.9	2.7	33.3	69.6	56.1	9.1	132.0	65.6
76	1042A1-1-2	56.3	11.0	6.3	2.7	31.3	67.3	63.6	8.8	125.5	72.6
77	053A1-2-5-3-5-3	57.2	12.1	8.1	2.7	33.8	68.3	59.2	9.6	97.7	67.9
78	10565C1-1	58.2	11.1	9.2	2.7	34.2	67.6	60.3	9.1	121.1	67.9
79	082A1-3-1	57.8	10.7	5.7	2.7	33.5	67.6	61.3	8.7	132.1	70.3
80	11405A1-4	58.0	11.4	14.8	2.9	34.8	67.8	52.8	9.1	93.7	65.5
81	B12*1792	59.3	10.9	12.0	2.7	35.6	68.0	56.9	9.2	142.8	65.4
82	B12-2180NC#	58.0	11.4	21.1	2.5	28.0	67.4	58.2	9.3	134.7	69.3
83	B12-2125FHB	60.3	10.5	19.4	2.7	32.7	69.0	56.2	8.4	113.5	65.7
84	M12-3189	59.3	11.3	8.7	2.6	30.1	69.8	57.3	9.3	126.4	63.2
85	Jamestown	60.5	11.7	11.2	2.8	31.8	67.1	57.5	9.4	135.8	70.6
86	Shirley	56.6	10.4	-0.1	2.6	35.3	69.1	59.3	8.2	101.9	66.9
87	IL10-12009	58.3	11.0	14.3	2.7	31.6	66.4	54.4	9.1	127.2	65.8
88	IL10-23236	59.2	10.5	11.8	2.6	31.7	65.9	59.3	8.8	132.4	65.6
89	IL11-6543	61.2	10.8	0.7	2.7	33.1	67.9	59.4	9.3	136.0	65.6
90	IL11-6626	60.4	11.7	17.3	2.8	33.8	67.1	53.9	9.6	130.9	64.1
91	IL11-8141	59.0	10.5	4.9	2.6	31.4	71.2	57.9	8.7	134.7	62.9
92	KY06C-1178-16-10-3	58.5	10.6	-0.1	2.7	38.2	68.9	60.1	8.5	136.5	66.3
93	KY06C-3058-53-3-3	59.5	10.9	16.8	2.7	33.2	67.3	58.2	8.9	151.6	67.8
94	KY06C-2020-10-18-3	58.6	10.9	5.0	2.7	31.2	67.5	61.4	8.7	138.0	65.4
95	KY05C-1369-14-6-3	61.2	12.5	14.3	2.8	35.0	67.3	53.2	10.5	145.7	67.0
96	KY05C-1017-30-6-3	60.0	11.2	21.5	2.6	32.3	68.7	55.7	9.4	123.2	64.7
97	MO 130651	59.4	9.9	-5.0	2.6	33.4	69.1	63.8	8.0	113.9	66.6
98	MO 130660	58.8	11.4	48.4	2.6	30.3	66.6	39.7	10.1	110.4	75.7
99	MO 130669	57.0	10.0	0.9	2.5	31.0	68.3	65.1	8.1	119.4	69.1
100	MO 130435	58.9	11.7	3.4	2.5	31.7	66.9	59.3	9.5	125.0	67.2
101	MO 130906	58.9	11.7	19.3	2.6	32.0	64.8	58.1	9.6	129.0	73.0
102	MO 131378	57.9	11.2	2.3	2.5	30.2	67.5	61.6	9.4	139.4	70.0
103	VA13W-56	60.8	12.0	14.1	2.9	34.1	67.0	52.2	9.9	127.1	65.0
104	VA13W-124	58.1	10.1	19.1	2.8	36.5	68.2	55.3	8.8	127.1	67.7
105	VA07MAS4-7417-1-3-3	58.2	11.5	6.7	2.8	37.5	67.4	54.8	9.2	122.3	68.6
106	VA08MAS1-188-6-4	58.5	11.9	-0.2	2.7	35.2	67.2	55.8	9.3	123.4	71.3
107	VA13FHB-5	59.9	12.3	16.2	2.9	37.7	67.5	51.8	9.9	112.1	66.1
108	USG 3120	60.2	10.8	5.7	2.8	40.5	69.5	57.6	9.1	116.8	67.5
109	Branson	57.4	10.5	0.4	2.6	32.8	69.3	65.0	8.7	135.5	66.1
	Average	58.6	11.0	9.8	2.7	33.4	67.9	58.1	9.0	127.0	67.4
	Standard Deviation	1.5	0.6	9.2	0.1	2.6	1.2	4.7	0.5	12.6	2.6
	= favorable quality trait value										
	= marginal quality trait value										

Entry Number	Entry	Test Weight (LB/BU)	NIR Kernel Protein (at 12%)	SKCS Kernel Hardness	SKCS Kernel Diameter (mm)	SKCS Kernel Weight (mg)	Adjusted Flour Yield (%)	Softness Equivalent (%)	Flour Protein (at 14%)	Lactic Acid SRC (%)	Sodium Carbonate SRC (%)	Total T-Score	Total T-Score Rank
65	TRUMAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	25
66	ERNIE	1.2	1.9	0.0	3.7	2.3	-0.2	-1.6	1.6	0.9	-1.0	0.06	22
67	FREEDOM	0.5	0.8	0.7	1.6	0.7	-0.1	-1.3	0.8	-0.3	-1.2	0.01	24
68	PIONEER2545	0.0	1.2	1.5	1.2	0.7	-1.7	-1.1	2.0	0.1	0.3	-1.06	43
69	KWS055	-0.7	0.7	0.2	1.5	0.5	0.7	0.3	0.9	0.9	-0.9	0.39	14
70	KWS053	2.9	2.3	1.1	3.3	3.2	-0.3	-2.6	2.6	2.0	-1.5	0.13	19
71	KWS054	1.8	1.4	-0.4	2.4	0.9	1.0	-0.6	1.7	1.7	-0.9	0.80	7
72	KWS037	-0.3	1.3	0.4	1.5	0.0	0.8	-0.1	1.2	1.5	-0.9	0.39	15
73	KWS041	2.3	2.3	1.8	2.1	1.3	-1.0	-2.1	2.2	2.6	-0.1	-0.54	42
74	OH10-304-71	1.9	1.9	1.3	2.9	1.3	1.5	-2.0	2.3	1.4	-1.8	0.81	6
75	OH10-316-20	2.1	1.5	1.5	2.7	1.0	1.5	-2.0	2.2	1.2	-1.5	0.77	8
76	1042A1-1-2	0.1	1.9	0.6	2.1	0.2	-0.4	-0.4	1.6	0.7	1.2	-0.51	41
77	053A1-2-5-3-5-3	0.7	3.7	0.8	2.7	1.2	0.4	-1.4	3.1	-1.5	-0.6	0.10	20
78	10565C1-1	1.4	2.1	0.9	2.6	1.3	-0.2	-1.1	2.1	0.4	-0.6	0.00	26
79	082A1-3-1	1.1	1.4	0.5	2.1	1.1	-0.2	-0.9	1.4	1.2	0.3	-0.17	34
80	11405A1-4	1.2	2.5	1.5	3.8	1.6	0.0	-2.7	2.2	-1.8	-1.5	-0.07	28
81	B12*1792	2.2	1.8	1.2	2.6	1.9	0.2	-1.8	2.3	2.1	-1.6	0.31	16
82	B12-2180NC#	1.2	2.5	2.2	0.2	-1.1	-0.3	-1.6	2.5	1.4	0.0	-0.40	38
83	B12-2125FHB	2.8	1.1	2.0	1.9	0.8	1.0	-2.0	0.9	-0.2	-1.4	0.60	11
84	M12-3189	2.1	2.4	0.8	1.5	-0.2	1.6	-1.8	2.5	0.8	-2.4	1.10	2
85	Jamestown	2.9	3.0	1.1	2.9	0.4	-0.6	-1.7	2.7	1.5	0.4	-0.26	35
86	Shirley	0.3	1.0	-0.1	1.8	1.8	1.1	-1.3	0.5	-1.2	-1.0	0.48	13
87	IL10-12009	1.5	1.9	1.4	2.1	0.3	-1.1	-2.4	2.1	0.8	-1.4	-0.46	40
88	IL10-23236	2.1	1.2	1.2	1.4	0.4	-1.6	-1.3	1.6	1.3	-1.5	-0.36	37
89	IL11-6543	3.4	1.6	0.0	2.4	0.9	0.1	-1.3	2.5	1.5	-1.5	0.66	10
90	IL11-6626	2.9	3.0	1.8	2.8	1.2	-0.6	-2.5	3.1	1.1	-2.1	0.07	21
91	IL11-8141	1.9	1.2	0.4	1.1	0.3	2.8	-1.6	1.4	1.4	-2.5	1.64	1
92	KY06C-1178-16-10-3	1.6	1.3	-0.1	2.7	2.9	0.9	-1.2	1.0	1.6	-1.2	0.67	9
93	KY06C-3058-53-3-3	2.3	1.8	1.7	2.3	1.0	-0.4	-1.6	1.7	2.8	-0.6	-0.10	32
94	KY06C-2020-10-18-3	1.6	1.8	0.4	2.1	0.2	-0.3	-0.9	1.4	1.7	-1.5	0.27	17
95	KY05C-1369-14-6-3	3.4	4.3	1.4	3.2	1.7	-0.4	-2.6	4.8	2.3	-0.9	0.01	23
96	KY05C-1017-30-6-3	2.6	2.2	2.2	1.6	0.6	0.7	-2.1	2.7	0.5	-1.8	0.49	12
97	MO 130651	2.2	0.2	-0.6	1.4	1.1	1.0	-0.4	0.1	-0.2	-1.1	0.97	3
98	MO 130660	1.8	2.5	5.1	1.6	-0.2	-1.0	-5.5	3.9	-0.5	2.4	-1.93	45
99	MO 130669	0.6	0.4	0.0	0.3	0.1	0.4	-0.1	0.3	0.2	-0.1	0.24	18
100	MO 130435	1.8	3.0	0.3	0.8	0.4	-0.7	-1.3	2.8	0.7	-0.8	-0.07	30
101	MO 130906	1.9	3.0	2.0	1.5	0.5	-2.5	-1.6	3.0	1.0	1.4	-1.44	44
102	MO 131378	1.2	2.2	0.1	0.3	-0.2	-0.3	-0.9	2.7	1.8	0.2	-0.11	33
103	VA13W-56	3.1	3.5	1.4	3.9	1.3	-0.7	-2.8	3.5	0.8	-1.7	-0.04	27
104	VA13W-124	1.3	0.5	2.0	2.7	2.3	0.3	-2.2	1.6	0.8	-0.7	-0.07	29
105	VA07MAS4-7417-1-3-3	1.4	2.7	0.6	3.1	2.6	-0.3	-2.3	2.3	0.5	-0.3	-0.27	36
106	VA08MAS1-188-6-4	1.6	3.4	-0.1	2.1	1.7	-0.5	-2.1	2.5	0.5	0.7	-0.42	39
107	VA13FHB-5	2.5	4.0	1.6	4.1	2.7	-0.3	-2.9	3.6	-0.3	-1.3	-0.08	31
108	USG 3120	2.7	1.6	0.5	3.4	3.8	1.4	-1.7	2.2	0.0	-0.7	0.82	5
109	Branson	0.8	1.2	-0.1	1.1	0.8	1.3	-0.1	1.4	1.5	-1.3	0.88	4