

Report on the 2024-2025 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).

MATERIAL AND METHODS:

The locations that reported data and the traits assessed are listed in Tables 1, 2 and 3. Cooperators collect replicated data and submit either plot level data or 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). Several cooperators scored FHB Index using a 0-9 scale (0=no disease, 9=severe disease). This creates issues with combining IND data over locations. The reported F09 values were multiplied by 10 to provide an IND value.

All data from this test and previous tests are available from Dr. Clay Sneller (sneller.5@osu.edu).

Table 1. Fusarium Head Blight and other traits assessed in 2024-2025 P+NUWWSN.

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	$IND = (SEV \times INC) / 100$ or $F09 \times 10$
FHB(0-9)	FHB Index rated on a 0-9 scale	0= no disease, 9=very severe disease: 0-9 scores were multiplied by 10 to create values that were used in the IND analysis
FDK	Fusarium damaged kernels	Either a visual assessment of the percent infected kernels, or a percent of scabby seed by weight
DON	DON (vomitoxin)	PPM of vomitoxin in grain
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

Table 2. Cooperators in the 2024-2025 P+NUWWSN.

ENV CODE	LOCATION	NUWWSN	PNUWWSN	COOPERATORS	INSTITUTE	CODE
ILCHA	Champaign, IL	yes	yes	Jana Murche	KWS	KWS
ILURB	Urbana, IL	yes	yes	Jessica Rutkoski	University of Illinois	UIL
INWLA	West Lafayette, IN	yes	yes	Mohsen Mohammadi, Tracey Richards	Purdue University	PUR
KYLEX	Lexington, KY	yes	yes	David Van Sanford	University of Kentucky	UKY
MIMAS	Mason, MI	yes	yes	Eric Olson, Amanda Noble	Michigan State University	MSU
NEMEA	Mead, NE	yes	no	Katherine Frels	University of Nebraska	UNE
NYITH	Ithaca, NY	yes	no	Mark Sorrells, Gary Bergstrom	Cornell University	COR
OHWOO	Wooster, Ohio	yes	yes	Clay Sneller, Pierce Paul	The Ohio State University	OSU
VAWAR	Warsaw, VA	yes	yes	Nicholas Santantonio	Virginia Tech	VAT

Table 3. Data collected for the 2024-2025 P+NUWWSN. “Yes” indicates a location where data was collected and used in this report.

NUWWSN								
	FHB(0-9)	INC	SEV	IND	FDK	DON	HGT	HD
ILCHA				Yes			Yes	Yes
ILURB		Yes	Yes	Yes	Yes	Yes		Yes
KYLEX	Yes			Yes	Yes	Yes		Yes
MIMAS								
NELIN		Yes	Yes	Yes				
NYITH		Yes	Yes	Yes				
OHWOO				Yes	Yes	Yes		Yes
VABLA	Yes			Yes	Yes	Yes		Yes
INWLA								
PNUWWSN								
ILCHA				Yes			Yes	Yes
ILURB		Yes	Yes	Yes	Yes	Yes		Yes
KYLEX	Yes			Yes	Yes	Yes		Yes
MIMAS								
OHWOO				Yes				Yes
VABLA	Yes			Yes	Yes	Yes		Yes
INWLA								

Table 4. Entries in the 2024-2025 NUWWSN.

ENTRY	NAME	PEDIGREE
1	TRUMAN	
2	FREEDOM	
3	ERNIE	
4	PIONEER2545	
5	OH20-17-42	0762A1-2-8/OH10-316-20
6	OH20-17-3	0762A1-2-8/OH10-316-20
7	OH19-167-5	0762A1-2-8 / OH07-175-11
8	OH18-65-54	OH10-194-16/0762A1-2-8
9	OH19*102-76	0762A1-2-8 / KY04C-1128-38-1-5
10	MI22R097	MI15R0388/VA09MAS1-12-5-1-3
11	MI22R135	MI16R1172/KY07C-1145-94-12-5
12	MI23R138	MI14W0190//KWS095/NY09125-16-1034
13	MI23R161	MI16R1172/MI14R0009
14	MI23R065	KWS191/13VTK429-3
15	22PU-1081	04719A1/04723A1///99840C4-8/03726A1//99840C4-8-3-6-1/4/INW0412/03705A1/3/INW0412
16	22PU-1031	05247A1-7-3-108-2/05247A1-7-3-120
17	22PU-1250	BESS/10101RA
18	22PU-0108	04620/08334A1-31
19	22PU-1176	0537A1-3-12-1-6-7/104RA
20	KWS578	MD09W272-8-4-14-6 / VA09MAS1-12-8-4
21	KWS625	KWS283 / 14D10219-110
22	NY16056-01-02	NY99059-249(NY87048W-7387/Caledonia) x OH13-79-31
23	NY15173-01-01-11-1887	NY10089-2-02-1271(03179-10/3*AMBASSADOR) x Pio25W36
24	NY15145-01-01-11-1850	MSU F1029 x Towpath
25	NY12397-1-4-13	NY09107-24 x 05158-848 = Pio25w41/Richland/NY7388/Madsen/Va97w-375ws
26	NY12512-1-6-17-1544	NY05158-864 x NY94052-6090B = Va97w-375ws/NY7388/Pio2737w/Harus
27	NE22174	Hdic/Freeman//NI10718W
28	NE22249	NE14421/06BC749-7-21
29	NE22262	NE15440/SD09227
30	NE22287	NW11645/NW07534
31	NHH19668	OK09915C/NH11565
32	19VDH-FHB-MAS05-27	VA13W-174 / Pioneer W050216N2 // 13VTK59-55
33	19VTK15-37	13VTK429-3 / VA17W-75
34	18VTK10-188	KWS122 / 13VTK429-3
35	18VTK10-77	KWS122 / 13VTK429-3
36	VA23W-433	VA09MAS8-34-5-2 / Liberty 5658
37	IL16LCSDH-04-T-2659-3	IL14-28468/IL07-20728
38	IL16LCSDH-06-T-2661-17	IL07-19334/IL07-4415
39	IL16LCSDH-08-T-2663-55	IL07-19334/IL14-28462
40	IL16LCSDH-09-T-2664-20	IL07-20728/IL14-11848
41	IL16LCSDH-09-T-2664-28	IL07-20728/IL14-11848
42	X14-1009-84-4-3	KY03C-1237-32//SYNGENTA W1104/KY04C-1128-4-13-3
43	X14-1035-67-7-1	KY03C-1237-32//GERMPLASM 11-3-10/KY03C-1237-32
44	X11-0039-1-17-5	Pembroke//VA04W-90/KY97C-0508-01-01A-1
45	X16-1021-131-19-1-1	KY06C-2067-16-7-1 // PEMBROKE14/KY06C-2021-22-20-1
46	X16-1082-62-2-5-1	PEMBROKE 16 // KY06C-1166-14-1-5/VA11W-108

Table 5. Entries in the 2024-2025 PNUWWSN.

ENTRY	NAME	PEDIGREE
1	TRUMAN	
2	FREEDOM	
3	ERNIE	
4	PIONEER2545	
5	MI23R081	LES167617/Hilliard
6	MI23R119	MI14W0064/VA09W-75
7	MI23R139	MI16R1172/KY09C-1245-99-12-3
8	MI23W219	NY11014-9-25-1319/KWS095
9	MI23R126	MI16R0898//LES167617//IL13-20616
10	23PU-0001	04606RA1-1-7-1/KY03C-1237-32
11	23PU-0011	053A1-2-5-3-4/VA10W-123
12	23PU-0076	INW0731/08343D1///INW0731/8/02444A1-23-1/6/97395C1-1-4/RSI5//INW0304-1/3/981281A1-4-3-7/4//INW0315/99794RA4-14-1/5//INW0411/3/Chinese Spr ph1b/KS24-2-2(275-4)//Chinese Spr/4/0128A1-36//INW0411/7/02444A1-23-8/3//INW0304//INW0315//981358C1-4-2-13/97462A1-21-1-5-1-15
13	23PU-0042	0762A1-2-8/1042A1-1-23
14	23PU-0074	10100RA/0537A1-3-12-1-6-7
15	KWS657	VA13W-124 / LES15-5593 // P25R46
16	KWS658	KWS213 / P25R50
17	KWS665	KWS270 / KWS283
18	VA23W-33	VA09MAS1-12-5-1-1 / VA09MAS6-122-7-1-1
19	VA23W-43	VA09MAS8-34-5-2 / Liberty 5658
20	20VTK11-7	VA17W-74 / DH15SRW65-53
21	VA23FHB-7	VA13W-174 [SHIRLEY / BRANSON] // JAMESTOWN / CROPLAN 8550 [(Pioneer W050216N2 = 25R62// 25R63/ W990479G1)]
22	20VTK7-15	VA17W-75 / 15VDH-FHB-MAS38-01
23	IL2021-268	12-26004/07-19334
24	IL2021-364	16-27570/07-20728
25	IL2021-439	14-28462/14-11830//14-28468
26	IL2021-223	07-20728/P0762A1-2-8
27	IL2021-194	P0762A1-2-8/14-9542
28	X16-1042-	VA11W-106 // VA10W-21/VA11W-108
29	X16-1022-	KY06C-2067-16-7-1 // KY03C-1002-02/KY06C-2021-22-20-1
30	X15-1091-	KY03C-1002-02//KY03C-1237-05/Shirley
31	X15-1091-	KY03C-1002-02//KY03C-1237-05/Shirley
32	X16-1021-	KY06C-2067-16-7-1 // PEMBROKE14/KY06C-2021-22-20-1

Table 6. Summary of all FHB traits from the 2024-2025 NUWWSN: * indicate a mean that is not significantly different from the lowest mean in that column. “Fhb1” indicates resistance at QTL *Fhb1*. PC1 score is the value for the first principal component from a PCA analysis of the five FHB traits (INC, SEV, IND, FDK, DON)

ENTRY	NAME	INC	SIG	SEV	SIG	FHB(0-9)	SIG	IND	SIG	FDK	SIG	DON	SIG	"R" AT Fhb1	PC1 SCORES
1	TRUMAN	24.1	*	9.9	*	1.4	*	8.9	*	22.2	*	9.3	*	NO	-2.39
2	FREEDOM	38.1	*	15.0	*	3.0		22.0	*	41.4		16.9	*	NO	1.65
3	ERNIE	59.8		9.1	*	1.4	*	9.6	*	16.8	*	12.7	*	ND	-1.64
4	PIONEER2545	41.8		15.6	*	4.4		25.5		43.5		19.3		NO	2.43
5	OH20-17-42	34.5	*	10.2	*	1.7	*	10.8	*	20.2	*	7.5	*	YES	-2.24
6	OH20-17-3	25.0	*	8.3	*	1.4	*	8.7	*	23.6	*	12.2	*	YES	-2.32
7	OH19-167-5	32.1	*	10.6	*	1.2	*	9.3	*	17.1	*	6.4	*	YES	-2.62
8	OH18-65-54	33.4	*	11.4	*	1.4	*	11.2	*	38.5		12.4	*	YES	-0.57
9	OH19*102-76	30.3	*	10.6	*	1.5	*	9.4	*	26.3	*	14.4	*	YES	-1.47
10	MI22R097	29.4	*	12.4	*	2.4	*	15.3	*	28.2	*	14.5	*	NO	-0.51
11	MI22R135	48.1		18.1		2.4	*	15.8	*	31.6	*	8.6	*	NO	0.55
12	MI23R138	41.1		11.7	*	2.2	*	15.6	*	24.3	*	7.6	*	NO	-1.16
13	MI23R161	46.3		11.4	*	1.7	*	13.3	*	32.9	*	12.3	*	NO	-0.46
14	MI23R065	34.1	*	12.4	*	1.9	*	13.2	*	39.0		16.8	*	NO	0.16
15	22PU-1081	39.4		11.8	*	1.5	*	10.4	*	33.6	*	15.8	*	NO	-0.49
16	22PU-1031	39.6		15.8	*	1.4	*	11.9	*	29.7	*	19.3		NO	0.40
17	22PU-1250	38.5	*	15.9	*	3.4		21.1	*	35.8	*	10.2	*	YES	0.86
18	22PU-0108	56.6		14.3	*	2.0	*	15.0	*	28.9	*	12.9	*	NO	0.16
19	22PU-1176	43.9		10.4	*	2.0	*	14.9	*	27.3	*	12.3	*	NO	-0.86
20	KWS578	31.8	*	12.9	*	2.5	*	15.2	*	28.7	*	12.6	*	YES	-0.55
21	KWS625	48.4		11.1	*	1.9	*	11.5	*	30.3	*	13.9	*	YES	-0.69
22	NY16056-01-02	46.2		13.9	*	2.2	*	16.2	*	22.9	*	13.9	*	NO	-0.21
23	NY15173-01-01-11-1887	58.5		20.3		2.9		25.3		37.6		24.0		NO	3.59
24	NY15145-01-01-11-1850	11.5	*	6.7	*	1.4	*	7.9	*	30.0	*	24.4		NO	-1.55
25	NY12397-1-4-13	47.7		11.7	*	3.0		22.4	*	24.5	*	15.5	*	YES	0.24
26	NY12512-1-6-17-1544	37.9	*	18.5		3.0		21.6	*	25.0	*	19.9		YES	1.53
27	NE22174	26.3	*	14.6	*	1.9	*	14.1	*	26.1	*	12.6	*	NO	-0.58
28	NE22249	46.2		15.3	*	2.2	*	17.0	*	24.2	*	15.6	*	NO	0.30
29	NE22262	44.5		18.0		2.9		24.6		48.2		25.2		NO	3.54
30	NE22287	60.9		14.7	*	2.9		22.5	*	40.3		27.4		NO	2.84
31	NHH19668	44.3		16.6	*	4.4		28.6		44.6		25.1		NO	3.48
32	19VDH-FHB-MAS05-27	47.3		11.9	*	3.2		22.2	*	33.3	*	10.5	*	NO	0.32
33	19VTK15-37	47.0		11.7	*	2.9		18.0	*	32.6	*	11.1	*	NO	-0.11
34	18VTK10-188	45.6		10.3	*	2.5	*	13.9	*	21.4	*	7.9	*	NO	-1.60
35	18VTK10-77	34.9	*	14.1	*	3.0		18.2	*	18.6	*	7.9	*	NO	-0.94
36	VA23W-433	54.4		17.2		3.5		25.1		35.0	*	13.7	*	NO	1.98
37	IL16LCSDH-04-T-2659-3	62.3		14.5	*	2.5	*	16.0	*	25.1	*	8.0	*	NO	-0.21
38	IL16LCSDH-06-T-2661-17	47.1		11.9	*	1.7	*	11.7	*	17.2	*	7.9	*	NO	-1.79
39	IL16LCSDH-08-T-2663-55	55.8		13.9	*	2.0	*	15.1	*	16.4	*	6.3	*	NO	-1.14
40	IL16LCSDH-09-T-2664-20	50.9		11.4	*	1.4	*	10.8	*	16.8	*	8.0	*	NO	-1.88
41	IL16LCSDH-09-T-2664-28	52.5		14.8	*	1.4	*	11.2	*	18.6	*	7.5	*	NO	-1.18
42	X14-1009-84-4-3	34.8	*	16.1	*	2.7	*	19.9	*	37.7		18.9		NO	1.50
43	X14-1035-67-7-1	28.6	*	14.4	*	2.4	*	12.9	*	30.5	*	6.9	*	YES	-0.90
44	X11-0039-1-17-5	42.9		15.0	*	4.5		28.3		27.6	*	12.7	*	NO	1.20
45	X16-1021-131-19-1-1	45.7		14.6	*	2.9		23.9		42.9		16.6	*	NO	1.95
46	X16-1082-62-2-5-1	29.4	*	11.8	*	3.7		23.8		45.6		17.6	*	NO	1.42
# ENVIRONMENTS		3		3		2		6		4		4			

Table 7. Summary of all FHB traits from the 2024-2025 PNUWWSN: * indicate a mean that is not significantly different from the lowest mean in that column. "Fhb1" indicates resistance at QTL *Fhb1*. PC1 score is the value for the first principal component from a PCA analysis of the five FHB traits (INC, SEV, IND, FDK, DON)

ENTRY	NAME	INC	SEV	FHB(0-9)	SIG	IND	SIG	FDK	SIG	DON	SIG	"R" AT Fhb1	PC1 Score
1	TRUMAN	1.24	9.39	1.7	*	11.4	*	23.7	*	4.58	*	NO	-0.48
2	FREEDOM	1.05	7.08	1.5	*	19.2	*	39.5		5.11	*	NO	0.71
3	ERNIE	1.43	2.52	2.4	*	20.6	*	18.3	*	4.22	*		-1.51
4	PIONEER2545	5.17	12.03	3.0		36.2		40.9		7.46		NO	3.66
5	MI23R081	0.42	7.27	2.7		21.0	*	28.9		7.30		NO	0.61
6	MI23R119	1.71	6.97	2.9		27.4		32.2		4.52	*	NO	0.73
7	MI23R139	-0.25	5.97	1.4	*	17.4	*	17.2	*	4.40	*	NO	-1.24
8	MI23W219	4.17	11.81	2.9		23.4	*	25.6	*	9.54		YES	2.20
9	MI23R126	0.19	6.54	1.7	*	15.3	*	14.6	*	3.41	*	NO	-1.61
10	23PU-0001	15.57	14.49	2.2	*	23.1	*	25.1	*	7.90		NO	3.60
11	23PU-0011	0.47	1.82	1.7	*	15.4	*	19.7	*	5.97		NO	-1.44
12	23PU-0076	1.55	7.23	1.4	*	15.8	*	15.0	*	3.71	*	NO	-1.21
13	23PU-0042	1.01	4.75	1.4	*	12.8	*	19.7	*	2.62	*	NO	-1.79
14	23PU-0074	1.34	1.87	1.4	*	10.3	*	16.8	*	4.62	*	YES	-2.11
15	KWS657	7.8	7.63	1.7	*	13.3	*	28.2	*	4.49	*	YES	0.41
16	KWS658	5.31	7.53	2.4	*	18.8	*	29.4		4.31	*	YES	0.48
17	KWS665	1.99	7.28	2.0	*	15.4	*	24.7	*	5.16	*	YES	-0.28
18	VA23W-330	0.58	12.07	4.2		31.9		23.5	*	4.37	*	NO	1.13
19	VA23W-432	2.72	7.4	2.7		25.8	*	38.8		8.24		NO	2.01
20	20VTK11-79	1.98	6.95	3.0		21.1	*	20.6	*	7.72		NO	0.35
21	VA23FHB-70	1.74	6.86	1.7	*	12.8	*	28.0	*	4.23	*	YES	-0.54
22	20VTK7-151	3.69	11.58	4.4		36.2		25.0	*	7.25		NO	2.41
23	IL2021-26834	2.02	6.62	1.7	*	13.0	*	19.5	*	4.37	*	NO	-1.02
24	IL2021-36445	1.94	7.44	1.4	*	10.0	*	14.7	*	1.84	*	NO	-1.93
25	IL2021-43921	1.29	5.24	1.7	*	11.8	*	17.2	*	1.67	*	YES	-2.12
26	IL2021-22316	-0.17	1.82	1.7	*	11.1	*	10.8	*	2.22	*	HET	-3.15
27	IL2021-19401	0.86	7.85	2.7		18.7	*	17.6	*	2.36	*	HET	-1.13
28	X16-1042-128-13-5-1	1.47	6.41	2.5	*	22.9	*	26.3	*	8.18		NO	0.74
29	X16-1022-82-4-1-4	6.11	7.08	1.7	*	24.7	*	29.8		3.36	*	NO	0.70
30	X15-1091-98-18-3	0.29	4.9	1.7	*	17.7	*	20.0	*	4.42	*	HET	-1.15
31	X15-1091-49-2-3	1.73	6.64	4.0		33.0		28.1	*	7.66		YES	1.46
32	X16-1021-131-19-1-1	3.01	11.09	2.7		27.9		32.3		4.38	*	NO	1.53
	# ENVIRONMENTS	1	1	2		5		3		3			

Table 8. Correlations among trait and the eigenvalue of each trait from the PCA.

NUWWSN							
Correlations						Eigenvectors	
	INC	SEV	IND	FDK	DON	Prin1	Prin2
INC	1.00	0.45	0.33	-0.06	-0.08	0.193	0.732
SEV	0.45	1.00	0.66	0.37	0.34	0.469	0.361
IND	0.33	0.66	1.00	0.61	0.49	0.540	0.124
FDK	-0.06	0.37	0.61	1.00	0.72	0.491	-0.382
DON	-0.08	0.34	0.49	0.72	1.00	0.458	-0.415

PNUWWSN							
Correlations						Eigenvectors	
	INC	SEV	IND	FDK	DON	Prin1	Prin2
INC	1.00	0.58	0.25	0.33	0.33	0.367	0.756
SEV	0.58	1.00	0.60	0.47	0.42	0.476	0.346
IND	0.25	0.60	1.00	0.61	0.59	0.482	-0.360
FDK	0.33	0.47	0.61	1.00	0.52	0.457	-0.286
DON	0.33	0.42	0.59	0.52	1.00	0.444	-0.311

Table 9. Summary of incidence (INC, %) from 2024-2025 NUWWSN.

ENTRY	NAME	ALL	SIG	ILURB	NELIN	NYITH
1	TRUMAN	24.1	*	4.1	13.3	65.0
2	FREEDOM	38.1	*	13.0	23.3	96.0
3	ERNIE	59.8		0.5	100.0	79.0
4	PIONEER2545	41.8		13.7	33.3	84.0
5	OH20-17-42	34.5	*	0.3	30.0	71.0
6	OH20-17-3	25.0	*	2.4	16.7	61.0
7	OH19-167-5	32.1	*	2.9	23.3	76.0
8	OH18-65-54	33.4	*	1.5	26.7	74.0
9	OH19*102-76	30.3	*	0.0	26.7	60.0
10	MI22R097	29.4	*	7.7	10.0	98.0
11	MI22R135	48.1		8.1	46.7	81.0
12	MI23R138	41.1		3.1	36.7	81.0
13	MI23R161	46.3		16.9	40.0	83.0
14	MI23R065	34.1	*	5.0	23.3	84.0
15	22PU-1081	39.4		0.5	30.0	95.0
16	22PU-1031	39.6		5.4	43.3	51.0
17	22PU-1250	38.5	*	1.1	26.7	100.0
18	22PU-0108	56.6		3.4	63.3	78.0
19	22PU-1176	43.9		4.0	36.7	94.0
20	KWS578	31.8	*	6.3	16.7	91.0
21	KWS625	48.4		2.5	50.0	78.0
22	NY16056-01-02	46.2		13.7	43.3	76.0
23	NY15173-01-01-11-1887	58.5		22.0	56.7	89.0
24	NY15145-01-01-11-1850	11.5	*	1.2	0.0	45.0
25	NY12397-1-4-13	47.7		12.3	43.3	85.0
26	NY12512-1-6-17-1544	37.9	*	10.1	26.7	88.0
27	NE22174	26.3	*	6.2	10.0	84.0
28	NE22249	46.2		10.7	40.0	89.0
29	NE22262	44.5		11.0	40.0	80.0
30	NE22287	60.9		30.2	63.3	73.0
31	NHH19668	44.3		2.3	40.0	88.0
32	19VDH-FHB-MAS05-27	47.3		8.9	43.3	86.0
33	19VTK15-37	47.0		-0.3	43.3	94.0
34	18VTK10-188	45.6		1.6	43.3	85.0
35	18VTK10-77	34.9	*	2.0	23.3	91.0
36	VA23W-433	54.4		5.6	53.3	95.0
37	IL16LCSDH-04-T-2659-3	62.3		2.0	66.7	98.0
38	IL16LCSDH-06-T-2661-17	47.1		2.9	46.7	81.0
39	IL16LCSDH-08-T-2663-55	55.8		-0.4	56.7	98.0
40	IL16LCSDH-09-T-2664-20	50.9		2.2	50.0	91.0
41	IL16LCSDH-09-T-2664-28	52.5		1.3	53.3	90.0
42	X14-1009-84-4-3	34.8	*	4.4	20.0	98.0
43	X14-1035-67-7-1	28.6	*	0.8	16.7	81.0
44	X11-0039-1-17-5	42.9		12.2	33.3	91.0
45	X16-1021-131-19-1-1	45.7		1.9	40.0	95.0
46	X16-1082-62-2-5-1	29.4	*	2.5	16.7	83.0

Table 10. Summary of severity (SEV, %) data from the 2024-2025 NUWWSN.

ENTRY	NAME	ALL	SIG	ILURB	NELIN	NYITH
1	TRUMAN	9.9	*	6.1	3.7	13.0
2	FREEDOM	15.0	*	11.7	3.7	33.0
3	ERNIE	9.1	*	12.3	0.0	15.0
4	PIONEER2545	15.6	*	25.8	4.2	20.0
5	OH20-17-42	10.2	*	5.3	4.2	14.0
6	OH20-17-3	8.3	*	5.3	1.7	12.0
7	OH19-167-5	10.6	*	8.2	1.9	20.0
8	OH18-65-54	11.4	*	5.5	4.5	19.0
9	OH19*102-76	10.6	*	6.0	3.5	17.0
10	MI22R097	12.4	*	8.8	2.4	27.0
11	MI22R135	18.1		21.7	8.2	25.0
12	MI23R138	11.7	*	7.3	4.4	19.0
13	MI23R161	11.4	*	9.2	5.2	13.0
14	MI23R065	12.4	*	12.3	2.1	24.0
15	22PU-1081	11.8	*	8.0	3.5	21.0
16	22PU-1031	15.8	*	17.7	7.0	21.0
17	22PU-1250	15.9	*	6.6	3.9	42.0
18	22PU-0108	14.3	*	22.6	3.6	19.0
19	22PU-1176	10.4	*	5.2	1.9	22.0
20	KWS578	12.9	*	13.8	4.1	19.0
21	KWS625	11.1	*	7.1	3.8	18.0
22	NY16056-01-02	13.9	*	29.7	1.9	15.0
23	NY15173-01-01-11-1887	20.3		34.4	3.7	37.0
24	NY15145-01-01-11-1850	6.7	*	1.4	0.0	13.0
25	NY12397-1-4-13	11.7	*	8.0	3.7	20.0
26	NY12512-1-6-17-1544	18.5		36.3	5.9	19.0
27	NE22174	14.6	*	20.9	4.2	20.0
28	NE22249	15.3	*	26.0	4.0	19.0
29	NE22262	18.0		35.4	3.8	24.0
30	NE22287	14.7	*	29.6	1.9	19.0
31	NHH19668	16.6	*	12.4	3.8	40.0
32	19VDH-FHB-MAS05-27	11.9	*	5.7	1.9	29.0
33	19VTK15-37	11.7	*	7.1	0.0	32.0
34	18VTK10-188	10.3	*	6.5	2.0	20.0
35	18VTK10-77	14.1	*	-0.7	5.9	34.0
36	VA23W-433	17.2		21.6	2.1	39.0
37	IL16LCSDH-04-T-2659-3	14.5	*	2.3	10.0	21.0
38	IL16LCSDH-06-T-2661-17	11.9	*	5.4	4.6	21.0
39	IL16LCSDH-08-T-2663-55	13.9	*	5.6	2.2	38.0
40	IL16LCSDH-09-T-2664-20	11.4	*	9.3	4.5	15.0
41	IL16LCSDH-09-T-2664-28	14.8	*	22.3	6.5	13.0
42	X14-1009-84-4-3	16.1	*	10.9	4.3	37.0
43	X14-1035-67-7-1	14.4	*	3.8	5.9	31.0
44	X11-0039-1-17-5	15.0	*	7.1	4.5	35.0
45	X16-1021-131-19-1-1	14.6	*	18.6	1.7	30.0
46	X16-1082-62-2-5-1	11.8	*	12.4	2.1	21.0

Table 12. Summary of Fusarium Damaged Kernel (FDK, %) data from the 2024-2025 NUWWSN.

ENTRY	NAME	ALL	SIG	ILURB	KYLEX	OHWO0	VAWAR
1	TRUMAN	22.2	*	44.9	17.5	18.5	10.0
2	FREEDOM	41.4		64.1	32.5	42.5	32.5
3	ERNIE	16.8	*	13.4	15.0		12.5
4	PIONEER2545	43.5		57.3	45.0	47.5	20.0
5	OH20-17-42	20.2	*	35.9	12.5	25.0	12.5
6	OH20-17-3	23.6	*	45.3	22.5	15.0	10.0
7	OH19-167-5	17.1	*	37.6	12.5	15.0	5.0
8	OH18-65-54	38.5		52.2	37.5	40.0	22.5
9	OH19*102-76	26.3	*	36.2	22.5	30.0	17.5
10	MI22R097	28.2	*	48.3	22.5	37.5	7.5
11	MI22R135	31.6	*	52.7	27.5	30.0	17.5
12	MI23R138	24.3	*	38.8	15.0	42.5	7.5
13	MI23R161	32.9	*	44.4	32.5	47.5	5.0
14	MI23R065	39.0		59.9	47.5	32.5	5.0
15	22PU-1081	33.6	*	27.5	42.5	27.5	25.0
16	22PU-1031	29.7	*	35.5	25.0	37.5	22.5
17	22PU-1250	35.8	*	28.9	42.5	52.5	10.0
18	22PU-0108	28.9	*	46.6	27.5	30.0	10.0
19	22PU-1176	27.3	*	31.3	32.5	27.5	10.0
20	KWS578	28.7	*	43.0	20.0	50.0	7.5
21	KWS625	30.3	*	58.8	17.5	42.5	12.5
22	NY16056-01-02	22.9	*	34.4	12.5	47.5	5.0
23	NY15173-01-01-11-1887	37.6		30.4	32.5	77.5	12.5
24	NY15145-01-01-11-1850	30.0	*	42.4	22.5	52.5	7.5
25	NY12397-1-4-13	24.5	*	34.8	17.5	42.5	7.5
26	NY12512-1-6-17-1544	25.0	*	44.7	15.0	22.5	25.0
27	NE22174	26.1	*	20.4	27.5	20.0	32.5
28	NE22249	24.2	*	25.9	22.5	27.5	20.0
29	NE22262	48.2		65.5	45.0	55.0	27.5
30	NE22287	40.3		46.1	40.0	57.5	15.0
31	NHH19668	44.6		47.9	35.0	75.0	27.5
32	19VDH-FHB-MAS05-27	33.3	*	63.9	35.0	25.0	5.0
33	19VTK15-37	32.6	*	47.6	35.0	37.5	5.0
34	18VTK10-188	21.4	*	19.4	27.5	27.5	2.5
35	18VTK10-77	18.6	*	12.6	25.0	22.5	5.0
36	VA23W-433	35.0	*	72.4	30.0	32.5	7.5
37	IL16LCSDH-04-T-2659-3	25.1	*	22.5	27.5	35.0	10.0
38	IL16LCSDH-06-T-2661-17	17.2	*	35.8	12.5	17.5	5.0
39	IL16LCSDH-08-T-2663-55	16.4	*	14.4	17.5	22.5	7.5
40	IL16LCSDH-09-T-2664-20	16.8	*	13.5	12.5	37.5	5.0
41	IL16LCSDH-09-T-2664-28	18.6	*	12.5	20.0	32.5	5.0
42	X14-1009-84-4-3	37.7		53.4	30.0	55.0	17.5
43	X14-1035-67-7-1	30.5	*	37.3	27.5	47.5	10.0
44	X11-0039-1-17-5	27.6	*	37.7	17.5	45.0	17.5
45	X16-1021-131-19-1-1	42.9		41.7	35.0	75.0	25.0
46	X16-1082-62-2-5-1	45.6		62.6	40.0	52.5	30.0

Table 13. Summary of deoxynivalenol (DON, ppm) data from the 2024-2025 NUWWSN.

ENTRY	NAME	ALL	SIG	ILURB	KYLEX	OHWO0	VAWAR
1	TRUMAN	9.33	*	1.18	11.70	22.20	2.22
2	FREEDOM	16.90	*	7.83	19.10	37.40	3.28
3	ERNIE	12.72	*	1.54	14.05		1.66
4	PIONEER2545	19.33		6.35	17.20	51.40	2.36
5	OH20-17-42	7.49	*	2.33	7.95	18.60	1.08
6	OH20-17-3	12.22	*	4.67	13.35	30.10	0.74
7	OH19-167-5	6.37	*	2.36	6.65	16.20	0.28
8	OH18-65-54	12.41	*	2.25	11.20	34.40	1.80
9	OH19*102-76	14.41	*	2.41	12.75	41.70	0.76
10	MI22R097	14.45	*	5.20	13.10	38.10	1.40
11	MI22R135	8.65	*	3.36	6.10	23.90	1.22
12	MI23R138	7.59	*	2.46	3.95	22.70	1.24
13	MI23R161	12.34	*	3.61	12.20	32.80	0.74
14	MI23R065	16.84	*	6.94	16.00	42.70	1.70
15	22PU-1081	15.78	*	2.98	20.15	33.20	6.78
16	22PU-1031	19.26		4.69	22.10	44.00	6.24
17	22PU-1250	10.19	*	5.07	13.50	21.70	0.50
18	22PU-0108	12.95	*	3.22	17.15	29.70	1.72
19	22PU-1176	12.33	*	2.17	10.05	35.00	2.08
20	KWS578	12.56	*	2.97	12.60	33.40	1.28
21	KWS625	13.94	*	2.57	17.15	34.70	1.34
22	NY16056-01-02	13.86	*	5.50	8.95	38.90	2.08
23	NY15173-01-01-11-1887	23.97		7.28	18.75	62.30	7.56
24	NY15145-01-01-11-1850	24.38		2.78	15.75	60.60	18.38
25	NY12397-1-4-13	15.53	*	3.22	17.45	37.40	4.06
26	NY12512-1-6-17-1544	19.94		5.28	22.10	40.40	11.96
27	NE22174	12.59	*	4.11	15.45	25.10	5.70
28	NE22249	15.63	*	7.31	17.35	33.50	4.36
29	NE22262	25.17		7.83	19.50	69.20	4.16
30	NE22287	27.38		8.77	31.30	65.00	4.46
31	NHH19668	25.09		9.40	13.75	71.90	5.30
32	19VDH-FHB-MAS05-27	10.47	*	4.49	8.90	27.60	0.88
33	19VTK15-37	11.11	*	4.62	16.65	21.10	2.06
34	18VTK10-188	7.87	*	2.32	11.00	17.10	1.04
35	18VTK10-77	7.87	*	2.26	11.00	17.40	0.82
36	VA23W-433	13.75	*	4.41	15.55	32.30	2.72
37	IL16LCSDH-04-T-2659-3	8.04	*	2.16	9.05	19.10	1.86
38	IL16LCSDH-06-T-2661-17	7.92	*	2.10	9.80	18.40	1.38
39	IL16LCSDH-08-T-2663-55	6.27	*	1.15	4.65	18.60	0.68
40	IL16LCSDH-09-T-2664-20	8.02	*	1.49	7.35	22.30	0.94
41	IL16LCSDH-09-T-2664-28	7.47	*	1.02	8.25	19.80	0.80
42	X14-1009-84-4-3	18.92		5.98	19.75	48.30	1.64
43	X14-1035-67-7-1	6.89	*	2.58	6.80	17.50	0.68
44	X11-0039-1-17-5	12.67	*	4.84	10.25	34.30	1.30
45	X16-1021-131-19-1-1	16.63	*	3.32	6.70	55.60	0.88
46	X16-1082-62-2-5-1	17.55	*	5.17	15.25	48.60	1.18

Table 14. Summary of heading date (HD, Julian days) and height data from the 2024-2025 NUWWSN.

ENTRY	NAME	HEADING DATE							HGT
		ALL	SIG	ILCHA	ILURB	KYLEX	OHWO0	VAWAR	ILCHA
1	TRUMAN	138.2		137.0	139.1	138.0	146.0	129.0	41
2	FREEDOM	133.0		135.0	137.2	130.0	138.7	125.0	38
3	ERNIE	128.2	*		131.8	124.5		121.0	
4	PIONEER2545	130.8		132.0	133.9	128.0	137.3	123.0	41
5	OH20-17-42	129.8		131.0	134.9	126.5	136.7	120.5	38
6	OH20-17-3	130.6		134.0	135.1	126.5	137.3	122.0	41
7	OH19-167-5	129.9		130.0	135.7	127.0	137.3	120.0	37
8	OH18-65-54	133.0		135.0	134.8	131.5	138.3	124.5	39
9	OH19*102-76	131.2		134.0	134.8	127.0	138.0	124.0	41
10	MI22R097	133.0		134.0	135.9	131.5	139.7	123.0	38
11	MI22R135	130.3		132.0	134.3	127.5	137.0	121.0	42
12	MI23R138	131.0		133.0	134.4	127.0	139.3	123.0	39
13	MI23R161	129.4	*	131.0	132.5	127.0	136.7	120.0	40
14	MI23R065	130.5		131.0	134.5	127.5	138.0	122.0	36
15	22PU-1081	136.8		138.0	136.4	136.5	144.3	127.0	39
16	22PU-1031	136.0		135.0	135.9	135.5	144.0	127.5	47
17	22PU-1250	127.0	*	129.0	129.3	123.5	134.7	119.5	38
18	22PU-0108	132.5		133.0	135.1	131.0	139.7	123.0	38
19	22PU-1176	132.7		134.0	134.8	131.0	141.7	121.5	42
20	KWS578	132.9		134.0	134.8	131.5	140.0	123.5	36
21	KWS625	132.1		133.0	135.1	129.5	139.7	123.5	37
22	NY16056-01-02	129.8		131.0	134.3	127.0	136.7	120.5	45
23	NY15173-01-01-11-1887	131.7		132.0	134.2	129.0	140.3	123.5	40
24	NY15145-01-01-11-1850	140.7		141.0	140.7	140.5	151.3	128.1	43
25	NY12397-1-4-13	131.9		133.0	135.1	129.0	141.3	121.5	36
26	NY12512-1-6-17-1544	139.2		138.0	139.9	137.0	152.7	128.0	40
27	NE22174	137.0		136.0	136.2	135.5	148.3	128.0	46
28	NE22249	134.2		134.0	134.9	133.0	143.7	124.0	49
29	NE22262	132.4		134.0	136.2	129.5	138.7	124.0	44
30	NE22287	131.8		132.0	135.0	129.5	140.0	122.5	40
31	NHH19668	132.6		133.0	134.7	129.5	144.0	122.5	42
32	19VDH-FHB-MAS05-27	132.4		133.0	135.2	131.0	138.7	123.0	37
33	19VTK15-37	129.8		131.0	134.7	127.0	136.7	120.0	35
34	18VTK10-188	129.5		131.0	133.0	127.0	136.7	120.0	37
35	18VTK10-77	128.9	*	130.0	132.3	126.5	136.0	120.0	36
36	VA23W-433	130.0		131.0	133.6	127.5	138.3	120.0	39
37	IL16LCSDH-04-T-2659-3	127.9	*	129.0	131.3	125.0	135.3	119.5	37
38	IL16LCSDH-06-T-2661-17	129.1	*	130.0	131.7	127.5	135.7	120.0	41
39	IL16LCSDH-08-T-2663-55	127.8	*	129.0	130.5	125.0	135.3	119.5	40
40	IL16LCSDH-09-T-2664-20	129.2	*	130.0	132.5	126.0	136.7	121.5	37
41	IL16LCSDH-09-T-2664-28	129.8		131.0	132.4	128.0	136.7	120.5	39
42	X14-1009-84-4-3	133.0		134.0	135.7	131.5	139.0	124.0	39
43	X14-1035-67-7-1	131.1		132.0	134.1	128.5	139.7	121.5	37
44	X11-0039-1-17-5	131.9		133.0	134.4	129.0	140.0	123.5	37
45	X16-1021-131-19-1-1	129.9		132.0	132.8	127.0	138.0	120.5	39
46	X16-1082-62-2-5-1	132.9		135.0	136.0	130.0	140.0	124.0	40

Table 15. Summary of incidence (INC, %) from 2024-2025 PNUWWSN.

ENTRY	NAME	ILURB
1	TRUMAN	1.24
2	FREEDOM	1.05
3	ERNIE	1.43
4	PIONEER2545	5.17
5	MI23R081	0.42
6	MI23R119	1.71
7	MI23R139	-0.25
8	MI23W219	4.17
9	MI23R126	0.19
10	23PU-0001	15.57
11	23PU-0011	0.47
12	23PU-0076	1.55
13	23PU-0042	1.01
14	23PU-0074	1.34
15	KWS657	7.8
16	KWS658	5.31
17	KWS665	1.99
18	VA23W-330	0.58
19	VA23W-432	2.72
20	20VTK11-79	1.98
21	VA23FHB-70	1.74
22	20VTK7-151	3.69
23	IL2021-26834	2.02
24	IL2021-36445	1.94
25	IL2021-43921	1.29
26	IL2021-22316	-0.17
27	IL2021-19401	0.86
28	X16-1042-128-13-5-1	1.47
29	X16-1022-82-4-1-4	6.11
30	X15-1091-98-18-3	0.29
31	X15-1091-49-2-3	1.73
32	X16-1021-131-19-1-1	3.01

Table 16 Summary of severity (SEV, %) data from the 2024-2025 PNUWWSN.

ENTRY	NAME	ILURB
1	TRUMAN	9.39
2	FREEDOM	7.08
3	ERNIE	2.52
4	PIONEER2545	12.03
5	MI23R081	7.27
6	MI23R119	6.97
7	MI23R139	5.97
8	MI23W219	11.81
9	MI23R126	6.54
10	23PU-0001	14.49
11	23PU-0011	1.82
12	23PU-0076	7.23
13	23PU-0042	4.75
14	23PU-0074	1.87
15	KWS657	7.63
16	KWS658	7.53
17	KWS665	7.28
18	VA23W-330	12.07
19	VA23W-432	7.4
20	20VTK11-79	6.95
21	VA23FHB-70	6.86
22	20VTK7-151	11.58
23	IL2021-26834	6.62
24	IL2021-36445	7.44
25	IL2021-43921	5.24
26	IL2021-22316	1.82
27	IL2021-19401	7.85
28	X16-1042-128-13-5-1	6.41
29	X16-1022-82-4-1-4	7.08
30	X15-1091-98-18-3	4.9
31	X15-1091-49-2-3	6.64
32	X16-1021-131-19-1-1	11.09

Table 17. Summary of index (IND, %) data from the 2024-2025 PNUWWSN.

ENTRY	NAME	ALL	SIG	ILCHA	ILURB	KYLEX	OHWOO	VAWAR
1	TRUMAN	11.4	*	7	0.1	25	12.9	10
2	FREEDOM	19.2	*	28	0.1	20	43.7	15
3	ERNIE	20.6	*		0.0	30		20
4	PIONEER2545	36.2		45	0.6	35	83.4	30
5	MI23R081	21.0	*	13	0.0	40	35.0	10
6	MI23R119	27.4		28	0.1	40	52.8	15
7	MI23R139	17.4	*	28	0.0	20	38.4	10
8	MI23W219	23.4	*	18	0.5	35	38.6	25
9	MI23R126	15.3	*	8	0.0	25	35.6	10
10	23PU-0001	23.1	*	40	2.3	30	33.3	15
11	23PU-0011	15.4	*	18	0.0	25	26.3	10
12	23PU-0076	15.8	*	18	0.1	20	38.6	10
13	23PU-0042	12.8	*	5	0.0	20	33.8	10
14	23PU-0074	10.3	*	5	0.0	20	18.8	10
15	KWS657	13.3	*	6	0.6	25	24.9	10
16	KWS658	18.8	*	5	0.4	35	39.4	10
17	KWS665	15.4	*	4	0.1	30	30.1	10
18	VA23W-330	31.9		23	0.1	60	45.0	15
19	VA23W-432	25.8	*	28	0.2	40	48.4	10
20	20VTK11-79	21.1	*	10	0.1	45	28.5	10
21	VA23FHB-70	12.8	*	9	0.1	25	19.4	10
22	20VTK7-151	36.2		30	0.4	55	58.6	30
23	IL2021-26834	13.0	*	13	0.1	25	16.9	10
24	IL2021-36445	10.0	*	10	0.1	20	11.4	10
25	IL2021-43921	11.8	*	8	0.1	25	14.2	10
26	IL2021-22316	11.1	*	8	0.0	25	10.3	10
27	IL2021-19401	18.7	*	8	0.1	40	26.0	10
28	X16-1042-128-13-5-1	22.9	*	18	0.1	35	45.8	15
29	X16-1022-82-4-1-4	24.7	*	28	0.4	25	71.3	10
30	X15-1091-98-18-3	17.7	*	8	0.0	25	49.7	10
31	X15-1091-49-2-3	33.0		6	0.1	55	73.8	20
32	X16-1021-131-19-1-1	27.9		33	0.3	40	55.7	10
				Converted to % from 1-9 scoring				

Table 18. Summary of Fusarium Damaged Kernel (FDK, %) data from the 2024-2025 PNUWWSN.

ENTRY	NAME	ALL	SIG	ILURB	KYLEX	VAWAR
1	TRUMAN	23.7	*	52.9	12.5	12.5
2	FREEDOM	39.5		70.8	32.5	17.5
3	ERNIE	18.3	*	18.5	20.0	10.0
4	PIONEER2545	40.9		56.4	42.5	17.5
5	MI23R081	28.9		56.5	25.0	4.7
6	MI23R119	32.2		69.2	22.5	10.0
7	MI23R139	17.2	*	21.7	17.5	7.5
8	MI23W219	25.6	*	35.5	27.5	7.5
9	MI23R126	14.6	*	21.3	10.0	12.5
10	23PU-0001	25.1	*	38.5	20.0	17.5
11	23PU-0011	19.7	*	29.2	20.0	5.0
12	23PU-0076	15.0	*	18.0	15.0	7.5
13	23PU-0042	19.7	*	29.1	20.0	5.0
14	23PU-0074	16.8	*	20.3	17.5	7.5
15	KWS657	28.2	*	73.4	12.5	10.0
16	KWS658	29.4		80.6	12.5	7.5
17	KWS665	24.7	*	44.1	17.5	15.0
18	VA23W-330	23.5	*	54.6	15.0	5.0
19	VA23W-432	38.8		60.8	40.0	10.0
20	20VTK11-79	20.6	*	37.7	15.0	10.0
21	VA23FHB-70	28.0	*	49.8	25.0	7.5
22	20VTK7-151	25.0	*	43.0	22.5	7.5
23	IL2021-26834	19.5	*	35.8	15.0	7.5
24	IL2021-36445	14.7	*	26.7	10.0	7.5
25	IL2021-43921	17.2	*	29.3	15.0	5.0
26	IL2021-22316	10.8	*	18.7	7.5	5.0
27	IL2021-19401	17.6	*	30.9	15.0	5.0
28	X16-1042-128-13-5-1	26.3	*	48.0	17.5	17.5
29	X16-1022-82-4-1-4	29.8		77.0	15.0	7.5
30	X15-1091-98-18-3	20.0	*	40.4	15.0	5.0
31	X15-1091-49-2-3	28.1	*	40.4	30.0	7.5
32	X16-1021-131-19-1-1	32.3		62.0	22.5	17.5

Table 19. Summary of deoxynivalenol (DON, ppm) data from the 2024-2025 PNUWWSN.

ENTRY	NAME	ALL	SIG	ILURB	KYLEX	VAWAR
1	TRUMAN	4.58	*	2.05	10.70	1.00
2	FREEDOM	5.11	*	3.14	11.20	0.98
3	ERNIE	4.22	*	1.90	10.10	0.66
4	PIONEER2545	7.46		5.83	14.50	2.06
5	MI23R081	7.30		4.47	16.10	1.32
6	MI23R119	4.52	*	2.96	9.90	0.70
7	MI23R139	4.40	*	3.17	9.15	0.88
8	MI23W219	9.54		5.07	20.10	3.44
9	MI23R126	3.41	*	1.59	7.35	1.28
10	23PU-0001	7.90		5.02	15.45	3.24
11	23PU-0011	5.97		4.32	12.20	1.38
12	23PU-0076	3.71	*	2.50	7.60	1.04
13	23PU-0042	2.62	*	2.25	5.10	0.50
14	23PU-0074	4.62	*	2.45	11.00	0.42
15	KWS657	4.49	*	5.56	7.40	0.50
16	KWS658	4.31	*	4.50	7.65	0.78
17	KWS665	5.16	*	2.40	11.90	1.18
18	VA23W-330	4.37	*	3.41	8.25	1.46
19	VA23W-432	8.24		5.63	17.00	2.10
20	20VTK11-79	7.72		2.69	19.65	0.82
21	VA23FHB-70	4.23	*	3.23	8.70	0.76
22	20VTK7-151	7.25		7.16	13.20	1.38
23	IL2021-26834	4.37	*	1.95	10.15	1.00
24	IL2021-36445	1.84	*	1.47	3.80	0.24
25	IL2021-43921	1.67	*	1.02	3.70	0.28
26	IL2021-22316	2.22	*	1.68	4.65	0.32
27	IL2021-19401	2.36	*	2.42	4.35	0.32
28	X16-1042-128-13-5-1	8.18		4.02	18.45	2.06
29	X16-1022-82-4-1-4	3.36	*	2.66	6.85	0.56
30	X15-1091-98-18-3	4.42	*	2.40	10.20	0.66
31	X15-1091-49-2-3	7.66		4.16	17.25	1.58
32	X16-1021-131-19-1-1	4.38	*	3.73	8.40	1.02

Table 20. Summary of heading date (HD, Julian days) and height data from the 2024-2025 PNUWWN.

ENTRY	NAME	HEADING DATE						HGT
		ALL	ILCHA	ILURB	KYLEX	OHWOO	VAWAR	ILCHA
1	TRUMAN	137.7	137.0	139.2	136.0	148.7	129.0	44
2	FREEDOM	132.6	135.0	134.5	131.5	140.0	123.0	40
3	ERNIE	124.9		131.6	123.5		121.0	
4	PIONEER2545	132.6	134.0	132.6	126.0	137.7		42
5	MI23R081	129.3	131.0	131.4	127.0	138.0	121.5	38
6	MI23R119	130.1	132.0	132.0	128.0	138.3	122.0	39
7	MI23R139	128.2	131.0	131.7	124.5	137.7	119.5	41
8	MI23W219	128.3	131.0	130.8	125.5	136.0	121.0	43
9	MI23R126	126.6	129.0	129.7	123.5	135.0	119.0	39
10	23PU-0001	134.8	136.0	136.9	132.0	144.3	127.5	41
11	23PU-0011	129.6	132.0	131.0	129.0	136.7	120.0	42
12	23PU-0076	131.7	134.0	133.1	129.0	141.0	124.0	42
13	23PU-0042	130.3	133.0	135.6	127.0	138.7	120.5	37
14	23PU-0074	130.5	132.0	133.1	127.5	139.0	124.0	46
15	KWS657	132.0	135.0	136.2	130.0	139.0	122.0	39
16	KWS658	130.2	133.0	133.0	127.5	138.7	121.5	37
17	KWS665	133.2	134.0	135.9	131.5	142.3	124.0	37
18	VA23W-330	130.6	132.0	135.2	128.0	138.0	122.5	36
19	VA23W-432	130.2	132.0	134.1	128.0	138.0	121.0	38
20	20VTK11-79	128.5	131.0	132.1	125.0	137.3	120.5	36
21	VA23FHB-70	128.9	131.0	132.1	126.5	138.0	119.5	40
22	20VTK7-151	128.2	132.0	132.6	124.0	136.7	120.0	32
23	IL2021-26834	129.1	131.0	132.1	126.5	136.7	121.5	41
24	IL2021-36445	129.6	132.0	132.8	127.0	137.0	122.0	40
25	IL2021-43921	127.5	130.0	130.9	124.5	135.3	120.0	40
26	IL2021-22316	128.3	130.0	132.2	126.0	136.0	119.5	40
27	IL2021-19401	127.7	129.0	132.7	125.0	135.3	119.0	38
28	X16-1042-128-13-5-1	131.6	133.0	134.0	129.5	141.3	122.5	41
29	X16-1022-82-4-1-4	132.8	134.0	135.6	131.0	142.3	123.0	40
30	X15-1091-98-18-3	128.6	131.0	131.4	126.5	136.0	120.0	38
31	X15-1091-49-2-3	131.1	132.0	133.1	129.5	139.3	123.5	37
32	X16-1021-131-19-1-1	128.8	131.0	132.1	126.0	137.0	120.5	40

Table 21. FHB data on 100 lines from the 2025 Big6 trial. Index (IND) are BLUEs from an analysis using heading date as a covariate.

NAME	Wooster Ohio				NAME	Wooster Ohio			
	FDK	DON	IND	HD		FDK	DON	IND	HD
TRUMAN	15.0	26.6	-5.7	151.0	NY15080-01-01-01-1775	90.0	54.7	63.9	143.5
FREEDOM	45.0	30.0	34.2	141.0	NY15083-02-01-09-1786	70.0	59.4	49.8	143.0
PIO2545	70.0	58.0	58.9	138.1	NY15145-01-01-11-1850	60.0	47.8	8.5	153.5
IL2021-14925	30.0	14.9	0.5	141.0	NY15148-01-01-10-1860	60.0	41.1	51.5	143.0
IL2021-15134	40.0	18.4	7.3	136.5	NY15150-01-01-05-1868	90.0	72.2	72.5	141.0
IL2021-15254	15.0	11.1	10.5	134.5	NY15150-01-01-12-1870	97.5	122.5	78.3	141.5
IL2021-16415	25.0	13.2	11.0	135.0	NY15158-01-01-10-1873	80.0	63.8	68.4	138.0
IL2021-18451	55.0	23.1	16.8	136.5	NY15158-01-01-11-1874	65.0	37.3	55.9	138.0
IL2021-18457	30.0	15.1	17.8	134.5	NY15201-01-01-01-1898	87.5	84.7	61.0	141.0
IL2021-19401	30.0	18.4	16.8	136.5	NY16061-01-10-1904	50.0	44.2	34.9	143.5
IL2021-22316	30.0	13.0	3.3	136.5	TOWPATH	75.0	66.5	-2.2	155.0
IL2021-26834	25.0	19.6	11.4	138.5	OH13-88-61	60.0	34.5	59.4	139.5
IL2021-28712	30.0	17.3	20.8	136.0	OH15-191-52	40.0	17.4	13.3	141.5
IL2021-28826	30.0	17.9	10.1	136.0	OH18-65-54	55.0	25.9	32.8	143.0
IL2021-29425	25.0	16.1	17.8	136.0	OH19*102-76	50.0	38.3	3.3	141.0
IL2021-32902	30.0	15.3	19.0	135.0	OH19-167-5	35.0	24.1	23.2	139.5
IL2021-36445	40.0	16.2	8.0	137.5	OH20-17-3	60.0	47.6	5.3	143.0
IL2021-36639	45.0	21.4	9.1	136.0	OH20-17-42	35.0	22.8	12.2	138.5
IL2021-39253	40.0	16.9	7.1	136.0	OH20-98-32	55.0	24.5	10.8	137.0
IL2021-42522	35.0	14.1	9.3	136.0	OH21*111-93	75.0	26.0	22.6	136.0
IL2021-43877	30.0	16.3	17.1	136.0	OH21*117-94	65.0	17.2	19.1	139.5
IL2021-43921	20.0	10.9	4.3	136.0	OH21-115-96	40.0	15.9	7.2	138.5
IL2021-46842	30.0	11.9	7.8	136.0	OH21-117-101	40.0	32.9	19.3	141.5
MI22R057	60.0	44.5	56.3	137.0	OH21-117-111	55.0	27.2	20.0	141.5
MI22R097	50.0	50.3	19.4	144.0	OH21-2-74	20.0	13.1	8.6	136.5
MI22R135	55.0	33.0	36.2	138.0	OH21-8-3	40.0	24.3	24.6	137.0
MI23R020	42.5	35.2	13.2	138.0	OH21-91-64	87.5	28.5	34.5	142.5
MI23R032	60.0	28.2	27.2	143.5	OH21-92-54	25.0	18.4	24.0	137.5
MI23R065	60.0	45.8	39.1	140.5	PIONEER25R64	70.0	62.9	24.5	141.5
MI23R071	55.0	26.2	18.1	136.0	SYN100	60.0	34.9	17.3	143.0
MI23R081	50.0	37.9	38.4	138.0	X15-1071-40-17-5-8	55.0	41.8	29.1	145.0
MI23R090	45.0	25.0	4.1	136.0	X15-1085-56-15-3-2	60.0	35.8	37.2	139.0
MI23R099	40.0	20.4	19.1	136.0	X15-1085-57-3-5-5	65.0	29.9	28.9	143.0
MI23R119	55.0	29.4	64.3	137.5	X17-1079-87-13-5-4	85.0	35.7	58.4	139.5
MI23R126	60.0	21.9	25.7	135.5	X17-1096-113-1-1-6	45.0	37.2	37.5	143.0
MI23R134	92.5	43.9	61.9	139.5	X17-1162-100-20-1-10	50.0	25.4	29.1	141.0
MI23R138	70.0	35.1	46.9	138.5	X17-1307-49-17-5-10	80.0	74.2	49.4	140.0
MI23R153	45.0	22.8	23.9	140.0	X17-1338-120-1-1-5	35.0	22.2	6.8	138.5
MI23R161	60.0	36.1	33.0	137.5	X17-1340-138-1-1-12	47.5	44.7	4.4	144.0
MI23R181	77.5	53.2	35.8	137.5	X17-1413-42-2-5-10	55.0	30.1	36.1	141.0
MI23R233	60.0	41.7	24.3	136.5	X17-1414-102-18-1-1	45.0	27.6	33.0	137.5
NY12311-1-30-10-1452	55.0	31.3	18.2	144.0	X17-1414-103-1-1-10	55.0	53.5	3.3	143.0
NY12325-1-10-12-1476	65.0	46.6	42.0	153.5	X17-1414-103-1-1-7	55.0	32.8	11.4	144.0
NY12325-1-10-18-1477	45.0	34.1	23.8	152.5	X17-1535-28-19-5-5	92.5	35.6	68.0	137.5
NY12351-1-14-20-1484	80.0	53.9	55.8	143.0	X17-1558-97-15-1-8	55.0	45.6	2.7	144.0
NY12397-1-4-13	50.0	25.2	52.4	140.0	X17-1584-7-17-5-8	70.0	46.4	30.4	144.0
NY12398-2-16-07-03W-1580	75.0	34.4	38.5	146.5	X17-1601-103-11-5-1	55.0	27.5	17.3	136.5
NY12512-1-6-05-1542	65.0	52.1	27.5	152.0	X17-1625-128-1-3-2	45.0	29.3	1.7	143.0
NY12512-1-6-17-1544	40.0	57.3	8.3	153.0	X17-1640-114-17-5-7	65.0	43.5	61.9	140.5
NY12513-1-16-06-1545	45.0	32.8	5.3	155.0	X17-1673-29-3-5-1	50.0	17.2	33.6	137.0

Table 22. Summary of FHB marker data for the NUWWSN and PNUWWSN. Data is from the USDA Eastern Regional Small Grains Genotyping Lab.

		# R Loci	Fhb1 Sumai 3	Fhb_3B Massey	Fhb_2D J15265	Fhb_1B Jamesto wn	Fhb_1A Neuse	Fhb_4A Neuse	Fhb_6A Neuse	Fhb_2B Bess	Fhb_3B Bess	Fhb7_7E :7B	Fhb7_7E :7D	Fhb_5A GP80
	Freq of Res		0.26	0.07	0.00	0.47	0.49	0.14	0.27	0.12	0.06	0.00	0.00	0.00
NUWWSN	1 TRUMAN	4	NO	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	NO
NUWWSN	2 FREEDOM	2	NO	YES	NO	HET	YES	NO	NO	NO	-	NO	NO	NO
NUWWSN	3 ERNIE-NOSEED	-	-	-	-	-	-	-	-	-	-	-	-	-
NUWWSN	4 PIONEER2545	0	NO	HET	NO	HET	HET	HET	NO	HET	HET	NO	NO	NO
NUWWSN	5 OH20-17-42	2	YES	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO
NUWWSN	6 OH20-17-3	1	YES	NO	NO	HET	NO	NO	NO	NO	NO	NO	NO	NO
NUWWSN	7 OH19-167-5	2	YES	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO
NUWWSN	8 OH18-65-54	2	YES	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO
NUWWSN	9 OH19*102-76	1	YES	NO	NO	HET	NO	NO	NO	NO	NO	NO	NO	NO
NUWWSN	10 MI22R097	1	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO
NUWWSN	11 MI22R135	0	NO	NO	-	-	-	-	-	-	NO	NO	NO	ND
NUWWSN	12 MI23R138	1	NO	NO	NO	YES	NO	HET	NO	NO	NO	NO	NO	NO
NUWWSN	13 MI23R161	1	NO	NO	NO	YES	NO	NO	NO	NO	HET	NO	NO	NO
NUWWSN	14 MI23R065	0	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
NUWWSN	15 22PU-1081	1	NO	NO	NO	NO	YES	NO	-	NO	NO	NO	NO	NO
NUWWSN	16 22PU-1031	0	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
NUWWSN	17 22PU-1250	2	YES	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO
NUWWSN	18 22PU-0108	2	NO	NO	NO	YES	YES	NO	NO	NO	NO	NO	NO	NO
NUWWSN	19 22PU-1176	3	NO	NO	NO	YES	NO	NO	YES	YES	NO	NO	NO	NO
NUWWSN	20 KWS578	1	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
NUWWSN	21 KWS625	1	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
NUWWSN	22 NY16056-01-02	2	NO	YES	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO
NUWWSN	23 NY15173-01-01-11-1887	0	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
NUWWSN	24 NY15145-01-01-11-1850	0	NO	NO	NO	NO	NO	HET	NO	NO	NO	NO	NO	NO
NUWWSN	25 NY12397-1-4-13	1	YES	NO	NO	NO	HET	-	NO	NO	NO	NO	NO	NO
NUWWSN	26 NY12512-1-6-17-1544	1	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
NUWWSN	27 NE22174	1	NO	NO	NO	NO	YES	NO	-	-	NO	NO	NO	NO
NUWWSN	28 NE22249	2	NO	NO	NO	NO	YES	YES	NO	NO	NO	NO	NO	NO
NUWWSN	29 NE22262	2	NO	NO	NO	NO	YES	YES	NO	NO	NO	NO	NO	NO
NUWWSN	30 NE22287	1	NO	NO	NO	NO	YES	-	NO	-	NO	NO	NO	NO
NUWWSN	31 NHH19668	1	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO
NUWWSN	32 19VDH-FHB-MAS05-27	3	NO	NO	NO	YES	YES	NO	YES	NO	NO	NO	NO	NO
NUWWSN	33 19VT K15-37	1	NO	HET	NO	HET	HET	NO	YES	NO	NO	NO	NO	NO
NUWWSN	34 18VT K10-188	3	NO	NO	NO	YES	YES	NO	YES	NO	NO	NO	NO	NO
NUWWSN	35 18VT K10-77	3	NO	NO	NO	YES	YES	NO	YES	NO	NO	NO	NO	NO
NUWWSN	36 VA23W-433	0	NO	NO	NO	HET	NO	-	NO	NO	NO	NO	NO	NO
NUWWSN	37 IL16LCS DH-04-T-2659-3	2	NO	NO	NO	YES	NO	NO	NO	NO	YES	NO	NO	NO
NUWWSN	38 IL16LCS DH-06-T-2661-17	2	NO	NO	NO	YES	YES	NO	NO	NO	NO	NO	NO	NO
NUWWSN	39 IL16LCS DH-08-T-2663-55	3	NO	NO	NO	YES	YES	NO	NO	YES	NO	NO	NO	NO
NUWWSN	40 IL16LCS DH-09-T-2664-20	2	NO	NO	NO	YES	NO	NO	YES	NO	NO	NO	NO	NO
NUWWSN	41 IL16LCS DH-09-T-2664-28	2	NO	NO	NO	YES	NO	NO	YES	NO	NO	NO	NO	NO
NUWWSN	42 X14-1009-84-4-3	0	NO	NO	NO	HET	NO	HET	NO	NO	NO	NO	NO	NO
NUWWSN	43 X14-1035-67-7-1	2	YES	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO
NUWWSN	44 X11-0039-1-17-5	2	NO	NO	NO	YES	NO	YES	NO	NO	NO	NO	NO	NO
NUWWSN	45 X16-1021-131-19-1-1	0	NO	NO	NO	NO	NO	HET	NO	-	NO	NO	NO	NO
NUWWSN	46 X16-1082-62-2-5-1	3	NO	NO	NO	YES	NO	-	YES	YES	NO	NO	NO	NO
PNUWWSN	1 TRUMAN	4	NO	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	NO
PNUWWSN	2 FREEDOM	1	NO	HET	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO
PNUWWSN	3 ERNIE-NOSEED	-	-	-	-	-	-	-	-	-	-	-	-	-
PNUWWSN	4 PIONEER2545	0	NO	HET	NO	NO	HET	HET	NO	NO	NO	NO	NO	NO
PNUWWSN	5 MI23R081	0	NO	NO	NO	NO	NO	HET	-	NO	NO	NO	NO	NO
PNUWWSN	6 MI23R119	2	NO	NO	NO	YES	YES	NO	NO	NO	NO	NO	NO	NO
PNUWWSN	7 MI23R139	2	NO	NO	NO	YES	YES	NO	NO	NO	NO	NO	NO	NO
PNUWWSN	8 MI23W219	1	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
PNUWWSN	9 MI23R126	0	NO	NO	NO	NO	HET	NO	NO	NO	NO	NO	NO	NO
PNUWWSN	10 23PU-0001	2	NO	NO	NO	YES	NO	NO	NO	YES	NO	NO	NO	NO
PNUWWSN	11 23PU-0011	1	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO
PNUWWSN	12 23PU-0076	3	NO	NO	NO	YES	YES	YES	HET	NO	NO	NO	NO	NO
PNUWWSN	13 23PU-0042	2	NO	NO	NO	NO	NO	YES	YES	NO	NO	NO	NO	NO
PNUWWSN	14 23PU-0074	3	YES	NO	NO	NO	YES	NO	YES	NO	-	NO	NO	NO
PNUWWSN	15 KWS657	2	YES	NO	NO	NO	YES	-	-	-	NO	NO	NO	NO
PNUWWSN	16 KWS658	2	YES	NO	NO	NO	YES	-	NO	NO	NO	NO	NO	NO
PNUWWSN	17 KWS665	1	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
PNUWWSN	18 VA23W-330	2	NO	NO	NO	NO	YES	NO	YES	NO	NO	NO	NO	NO
PNUWWSN	19 VA23W-432	2	NO	YES	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO
PNUWWSN	20 20VT K11-79	3	NO	NO	NO	YES	YES	NO	YES	NO	NO	NO	NO	NO
PNUWWSN	21 VA23FHB-70	3	YES	NO	NO	NO	YES	NO	YES	NO	NO	NO	NO	NO
PNUWWSN	22 20VT K7-151	3	NO	NO	NO	YES	YES	NO	YES	NO	NO	NO	NO	NO
PNUWWSN	23 IL2021-26834	2	NO	NO	NO	YES	YES	NO	NO	NO	NO	NO	NO	NO
PNUWWSN	24 IL2021-36445	2	NO	NO	NO	YES	NO	-	YES	NO	NO	NO	NO	NO
PNUWWSN	25 IL2021-43921	1	YES	NO	NO	HET	NO	HET	HET	HET	HET	NO	NO	NO
PNUWWSN	26 IL2021-22316	1	HET	NO	NO	HET	YES	NO	HET	HET	NO	NO	NO	NO
PNUWWSN	27 IL2021-19401	1	HET	NO	NO	HET	YES	NO	HET	NO	NO	NO	NO	NO
PNUWWSN	28 X16-1042-128-13-5-1	1	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO
PNUWWSN	29 X16-1022-82-4-1-4	1	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO
PNUWWSN	30 X15-1091-98-18-3	2	HET	NO	NO	YES	NO	-	NO	YES	NO	NO	NO	NO
PNUWWSN	31 X15-1091-49-2-3	1	HET	NO	NO	YES	NO	-	NO	-	NO	NO	NO	NO
PNUWWSN	32 X16-1021-131-19-1-1	0	NO	NO	NO	NO	NO	-	NO	NO	NO	NO	NO	NO