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Wisconsin winter wheat performance tests—2009

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The Wisconsin Winter Wheat Performance Tests are conducted each year to give growers information to select the best-performing varieties that will satisfy their specific goals. The performance tests are conducted each year at four locations in Wisconsin: Janesville, Lancaster, Chilton, and Arlington. Trials include released varieties, experimental lines from neighboring states, and lines from private seed companies. The primary objective of these trials is to quantify how varieties perform at different locations and across years. Growers can use this data to help select which varieties to plant; breeders use performance data to determine whether to release a new variety.

Year in review

Growing conditions

Wisconsin saw a 14% decline in winter wheat acres planted (300,000) in the 2008–2009 growing season. The estimated yield for the 2009 crop is 63 bu/a, down 7% from last year. The decline in winter wheat acres planted was caused by two factors: delayed corn and soybean harvest due to delayed crop maturity and high nitrogen input prices. The wheat crop that was established in a timely manner looked very good to excellent going into winter dormancy; however, lack of snow cover and driving arctic winds in February led to significant winter injury at our Arlington and Chilton sites. Spring growing conditions were mostly favorable across the state. Cooler-than-normal temperatures in May, June, and July delayed crop maturity, but they also extended the grain fill period for winter wheat.

***Source:** USDA National Agricultural Statistics Service (www.nass.usda.gov)*

Winter wheat yields were variable across our testing locations due to variable rainfalls, winterkill, and disease pressure. Wheat yields at the Lancaster and Janesville locations averaged 77 and 62 bu/a, respectively. Wheat yield at Janesville was reduced due to delayed planting and late leaf rust infection. Adjusted wheat yields at Arlington and Chilton averaged 78 and 77 bu/a, respectively, and were affected by extensive winterkill. Winterkill data is extremely important to Wisconsin growers and is included along with yield data from these sites.*

Diseases

In the winter wheat variety trial plots, Septoria leaf blotch and wheat leaf rust were the predominant diseases (tables 5 and 6). However, powdery mildew, Fusarium head blight, wheat stripe rust, wheat stem rust, and Stagnospora glume blotch were also observed in some locations. There were reports at harvest that some fields had head scab levels testing higher than 2.0 ppm for DON, a vomitoxin, leading to grain dockage.

Table 1. Location and agronomics of winter wheat performance tests in Wisconsin

Location	Cooperators	Soil type	Row spacing (inches)	Nitrogen applied (lb/a)	Date planted (2008)	Date harvested (2009)
Arlington	M. Martinka, J. Gaska	silt loam	7.5	30[a]	Sept. 26	July 30
Chilton	Kolbe Seeds, B. Larson	red clay	7.5	70	Sept. 30	Aug. 5
Janesville	Rock Co. Farm, J. Stute	silt loam	7.5	40[a]	Oct. 13	July 29
Lancaster	T. Wood	silt loam	7.5	20[a]	Sept. 26	Aug. 4

[a] Nitrogen credited from previous soybean or alfalfa.

Table 2. Companies included in the 2009 performance tests

Brand	Company name	Phone	Website
Agripro	Agripro Seeds	(765) 563-3111	www.agriprowheat.com
Diener	BioTown Seeds	(219) 984-6038	www.dienerseeds.com
Dyna-Gro	Crop Production Services	(937) 644-9467	www.uap.com
Growmark	Growmark, Inc.	(309) 557-6399	www.fsseed.com
Jung	Jung Seed Genetics, Inc.	(920) 326-5891	www.jungseedgenetics.com
Kaltenberg	Kaltenberg Seeds	(608) 849-5021 ext. 2313	www.kaltenbergseeds.com
Pioneer	Pioneer Hi-Bred International	(507) 344-2006	www.pioneer.com
PIP	Partners in Production	(877) GRO-SEED	
Pro Seed Genetics	Pro Seed Genetics	(920) 388-2824	
Seed-Link	Seed-Link Inc.	(705) 324-0544	www.seed-link.ca
Welter	Welter Seed	(563) 455-2762	www.welterseed.com
Public	WI Foundation Seeds	(608) 846-9761	www.wisconsinfoundation seeds.wisc.edu/
Public - exp	WI Crop Improvement	(608) 262-0167	www.wcia.wisc.edu

Experimental procedures

At planting

Site details: Summarized in table 1.

Seedbed preparation: Conventional and conservation tillage methods.

Seeding rate: Seeded at a uniform rate of 1.5 million viable seeds per acre.

Seed treatments: Identified in table 3. Fertilizer was applied as indicated by soil tests and herbicides were applied for weed control when necessary.

Planting: A grain drill with cone units was used to plant nine-row plots, 25 feet in length. Each variety was grown in at least four separate plots (replicates) in a randomized complete block design at each location to account for field variability.

Midseason

Diseases: Foliar assessments were made at all trial locations during June between Feekes 10.5.1 and Feekes 11.2. Six stem samples per plot were obtained from non-harvested rows. Disease incidence and disease severity were estimated for all foliar diseases noted. Incidence was defined as the number of stems out of six with a specific disease. Disease severity = (4 x severity on flag leaf) + (3 x severity on flag-1 leaf) + (2 x severity on flag-2 leaf) + (severity on flag-3 leaf). This calculation was used as it emphasizes that disease on the upper leaves has the greatest effect on yield (because disease on the upper leaves reduces the amount of healthy green tissue).

Harvest

Yield: The center seven rows were harvested with a self-propelled combine. Plots were weighed and moisture was determined in the field using electronic equipment on the plot harvester. Reported as bu/a (assuming 60 lb/bu) at 13% moisture content.

Lodging: Scores are based on the Belgian Lodging System. Values are rounded to whole numbers (0 = none, 9 = severe).

Test weight: Measured using a Dickey-john GAC2100 AGRI.

Data presentation

Yield: Listed in tables 4–8. Data for both 2008 and 2009 are provided if the variety was entered in the 2008 trials. The 2-year mean yield is calculated using location means as replications.

Due to severe winterkill that affected numerous trial plots at Arlington and Chilton, yields at those sites were adjusted based on an analysis of covariance, where percent survival (for each plot) was used as a covariate. This approach was used since winter wheat yields and the variation in those yields would be affected by the amount of winterkill observed in a given plot. The use of percent survival removes some of the variation in the observed winter wheat yields and improves the sensitivity of the test to differences in yields. However, growers are cautioned against using yield data from these two locations as their sole source of information. Refer also to the 2-year mean yield if the variety was tested last year or the four-site mean yield (table 4) if the variety was new this year.

Least significant difference: Variations in yield and other characteristics occur because of variability in soil and other growing conditions that lower the precision of the results. Statistical analysis makes it possible to determine, with known probabilities of error, whether a difference is real or whether it may have occurred by chance.

Growers can use the appropriate least significant difference (LSD) value at the bottom of the tables to determine true statistical differences. Where the difference between two selected varieties within a column is equal to or greater than the LSD value at the bottom of the column, there is a real difference between the two varieties in nine out of ten instances. If the difference is less than the LSD value, there may still be a real difference, but the experiment has produced no evidence of it.

Using this data to select top-yielding varieties

As with any crop, variety selection is the most important factor to consider in maximizing winter wheat yield and profitability. When choosing a winter wheat variety, several factors must be considered. These include winter survival, insect and disease resistance, heading date, lodging, test weight, and most importantly, yield. Since no variety is ideal for every location, it is important to understand the crop environment and pest complex that affects your specific region to maximize yield.

Yield is based on the genetic potential and environmental conditions in which the crop is grown. Therefore, by diversifying the genetic pool that is planted, a grower can hedge against crop failure. Select those varieties that perform well not only in your area but across experimental sites and years. This will increase the likelihood that, given next year's environment (which you cannot control), the variety you selected will perform well. (Table 4 gives an overview of yields across all locations.)

Test weight is also an important factor to consider when selecting a variety. The minimum test weight to be considered a U.S. #2 soft red winter wheat is 58 lb/bu. Wheat at lower test weights will be discounted. Both environment and pests may greatly affect test weight; therefore, selecting a variety that has a high test weight potential in your region is critical to maximizing economic gain.

Table 3. Wheat class and seed treatment(s) applied to entered varieties

Brand	Variety	Class[a]	Seed treatment
AgriPro	Branson	SR	Dividend Extreme, Cruiser
AgriPro	M 04-4566	SR	Dividend Extreme, Cruiser
AgriPro	W 1377	SR	Dividend Extreme, Cruiser
Diener	D 496 W	SR	Dividend Extreme, Nitro-Shield
Diener	D 502 W	SR	Dividend Extreme, Cruiser
Diener	XW 70	SR	Dividend Extreme, Cruiser
Diener	XW 80	SR	Dividend Extreme, Cruiser
Diener	XW 81	SR	Dividend Extreme, Cruiser
Dyna-Gro	DG 404	SR	Raxil/Thiram
Dyna-Gro	V 9812	SR	Raxil/Thiram
Dyna-Gro	X 9911	SR	Raxil/Thiram
Growmark	FS 628	SR	Dividend Extreme, Cruiser
Growmark	FS 637	SR	Dividend Extreme, Cruiser
Growmark	FS 659	SR	Dividend Extreme, Cruiser
Jung	5804	SR	Raxil XT
Jung	5830	SR	Dividend Extreme, Cruiser
Jung	5988	SR	Raxil XT
Kaltenberg	KW 60	SR	Raxil XT
Kaltenberg	KW 62	SR	Raxil XT
Kaltenberg	KW 63	SR	Raxil XT
Kaltenberg	KW 70	SR	Raxil XT
Kaltenberg	KW 75	SR	Raxil XT
Kaltenberg	XW 7409	SR	Dividend Extreme, Cruiser
Pioneer	25R39	SR	Dividend Extreme, Cruiser
Pioneer	25R47	SR	Dividend Extreme, Cruiser
Pioneer	25R51	SR	Dividend Extreme, Cruiser
Pioneer	25R62	SR	Dividend Extreme, Cruiser
PIP	701	SR	Charter
PIP	702	SR	Charter
PIP	710	SR	Charter
PIP	717	SR	Charter
PIP	718	SR	Charter
PIP	720	SR	Charter
PIP	729	SR	Charter
PIP	760	SR	Charter
Pro Seed Genetics	PRO 200	SR	Dividend Extreme
Pro Seed Genetics	PRO 220	SR	Raxil/Thiram
Pro Seed Genetics	PRO 240	SR	Dividend Extreme
Pro Seed Genetics	PRO Ex260	SR	Dividend Extreme
Pro Seed Genetics	PRO Ex280	SR	Dividend Extreme
Pro Seed Genetics	PRO Ex290	SR	Dividend Extreme, Cruiser
Pro Seed Genetics	PRO Ex300	SR	Raxil/Thiram
Seed-Link	ACS 55001	HR	Dividend Extreme
Welter	Excel 442	SR	Dividend Extreme, Cruiser
Public	Hopewell	SR	Dividend Extreme
Public	Kaskaskia	SR	Dividend Extreme
Public	Malabar	SR	Raxil/Thiram
Public	McCormick	SR	Dividend Extreme
Public	Merl	SR	Raxil/Thiram
Public	Sisson	SR	Dividend Extreme
Public	Sunburst	SR	Raxil/Thiram
Public	Truman	SR	Dividend Extreme
Public - exp	IL 01-11934	SR	Dividend Extreme
Public - exp	IL 04-10729	SR	Dividend Extreme
Public - exp	IL 04-24668	SR	Dividend Extreme
Public - exp	MO-011126	SR	Dividend Extreme
Public - exp	P 02444A1-23-9	SR	Dividend Extreme
Public - exp	P 04287A1-10	SR	Dividend Extreme

[a] Class: SR = soft red winter wheat, HR = hard red winter wheat

Select a variety that has the specific **insect and disease resistance** characteristics that fit your needs. By selecting varieties with the appropriate level of resistance, crop yield loss may be either reduced or avoided without the need of pesticides. Careful management of resistant cultivars through crop and variety rotation is required to ensure that these characteristics are not lost.

Crop height and **lodging potential** are also important varietal characteristics that may be affected by your cropping system. If the wheat crop is intended for grain only, it may be important to select a variety that is short in stature and has a low potential for lodging. This may decrease yield loss due to crop spoilage and harvest loss as well as increase harvest rate. However, if the wheat crop is to be used as silage or is to be harvested as both grain and straw, then selecting a taller variety may be warranted.

Table 4. Combined winter wheat performance test results (2008–2009)

Brand	Entry	2009 means		Janesville		Lancaster		Chilton			Arlington			7-test mean yield (bu/a)
		Yield (bu/a)	Test wt. (lb/bu)	Yield (bu/a)	Test wt. (lb/bu)	Yield (bu/a)	Test wt. (lb/bu)	Adjusted yield[a] (bu/a)	Winter survival (%)	Test wt. (lb/bu)	Adjusted yield[a] (bu/a)	Winter survival (%)	Test wt. (lb/bu)	
AgriPro	Branson	75	56.0	63	56.5	76	53.1	77	26	57.8	*84	27	56.7	*78
	M 04-4566	74	55.0	57	55.9	67	50.4	*92	44	57.5	78	73	56.2	
	W 1377	74	58.2	57	59.3	83	55.7	*78	54	58.3	79	40	59.6	75
Diener	D 496 W	71	53.7	61	54.7	66	49.1	77	46	56.4	79	32	54.4	
	D 502 W	*76	55.5	56	55.2	74	51.9	*91	35	58.1	*83	47	56.8	*79
	XW 70	74	57.1	63	57.5	70	54.8	*88	59	58.5	75	47	57.7	77
	XW 80	*80	56.4	*71	57.5	75	53.1	*78	39	57.0	*96	47	58.2	
	XW 81	*79	55.7	*67	56.4	78	52.3	*83	44	56.5	*89	41	57.7	
Dyna-Gro	DG 404	75	55.6	*66	56.0	81	52.6	73	35	58.0	81	39	55.7	77
	V 9812	74	55.1	64	55.9	80	51.8	*79	45	55.9	72	45	56.7	
	X 9911	*78	57.5	62	58.1	*89	54.2	*80	43	59.5	82	51	58.1	
Growmark	FS 628	*78	55.8	63	55.8	82	52.4	*82	28	58.1	*84	41	57.1	*78
	FS 637	*76	55.6	62	55.5	76	52.3	*88	54	57.7	77	39	57.1	*78
	FS 659	70	54.6	58	55.4	71	51.7	67	16	54.9	*84	45	56.6	73
Jung	5804	*76	56.8	*66	57.8	80	53.1	*92	21	58.7	67	32	57.4	*78
	5830	*82	57.4	62	57.5	*93	54.7	*83	59	59.3	*91	54	58.1	
	5988	*81	57.1	65	57.6	83	54.9	*86	64	58.4	*90	37	57.3	*84
Kaltenberg	KW 60	*80	56.8	*66	56.5	*88	54.8	*80	69	58.2	*86	54	57.7	*82
	KW 62	71	55.6	62	56.3	62	52.2	77	34	58.5	81	34	55.4	74
	KW 63	72	55.1	64	56.5	71	50.9	*85	39	57.8	67	47	55.2	74
	KW 70	*77	56.4	64	55.6	84	54.4	*86	48	58.9	74	46	56.9	*79
	KW 75	69	54.8	62	53.9	65	52.0	70	53	57.5	77	40	55.8	
	XW 7409	73	56.9	60	55.6	*87	55.1	66	44	59.2	78	67	57.9	
Pioneer	25R39	*77	56.2	*69	57.2	79	53.8	*82	35	57.6	78	30	56.1	
	25R47	*79	54.8	*74	56.1	81	52.1	*81	45	56.0	81	47	55.1	*82
	25R51	75	54.8	63	56.1	*87	53.0	70	39	56.3	80	39	53.9	*80
	25R62	72	54.2	62	54.8	74	51.2	77	33	56.5	73	29	54.3	*78
PIP	701	75	55.7	*70	55.8	78	52.6	70	40	57.7	80	42	56.6	75
	702	68	53.8	65	54.9	63	51.1	*80	45	56.6	65	14	52.5	
	710	*78	57.0	59	58.5	86	55.6	*81	60	58.8	*86	35	55.2	
	717	*78	57.2	58	55.7	80	55.9	*85	59	59.3	*90	22	57.9	
	718	71	56.2	63	57.3	71	52.0	76	49	57.7	75	59	57.7	
	720	69	54.3	*66	55.1	79	51.7	62	39	54.8	69	49	55.8	74
	729	*81	57.1	*73	58.4	81	53.4	*87	61	58.1	*84	70	58.4	
	760	*84	56.9	*66	57.3	*95	54.2	*88	61	58.2	*87	68	57.9	*84

* Yield is not significantly different (0.10 level) than the highest yielding cultivar.

[a] Reported wheat yields were adjusted based on a mixed model statistical analysis that includes the percent survival as a covariate to estimate the effect of winterkill on wheat productivity. See Experimental Procedures on page 2 for further explanation.

Table 4. continued

Brand	Entry	2009 means		Janesville		Lancaster		Chilton			Arlington			7-test mean yield (bu/a)
		Yield (bu/a)	Test wt. (lb/bu)	Yield (bu/a)	Test wt. (lb/bu)	Yield (bu/a)	Test wt. (lb/bu)	Adjusted yield[a] (bu/a)	Winter survival (%)	Test wt. (lb/bu)	Adjusted yield[a] (bu/a)	Winter survival (%)	Test wt. (lb/bu)	
Pro Seed Genetics	PRO 200	75	56.8	64	57.4	73	53.5	*79	49	58.0	*84	80	58.2	77
	PRO 220	74	57.7	60	58.4	81	56.3	*78	55	57.2	75	60	59.0	71
	PRO 240	*77	55.4	65	54.6	77	52.5	*80	56	57.8	*84	46	56.7	77
	PRO Ex260	*77	56.8	*67	57.8	78	53.7	*90	50	58.5	74	61	57.1	76
	PRO Ex280	*76	57.6	59	58.4	73	55.4	*88	40	59.5	*84	32	57.2	77
	PRO Ex290	*76	56.2	60	57.1	78	53.4	*81	35	57.6	*86	41	56.8	
	PRO Ex300	*76	55.8	58	55.6	82	53.9	*83	35	58.9	82	44	55.0	
Seed-Link	ACS 55001	65	55.7	55	56.7	70	53.3	69	50	57.9	64	26	54.7	67
Welter	Excel 442	*83	56.3	*66	56.2	*95	53.6	*82	46	58.3	*90	48	57.2	*83
Public	Hopewell	73	55.3	63	53.0	71	53.3	*81	44	58.7	76	65	56.2	69
	Kaskaskia	74	57.8	58	58.6	78	55.6	*85	16	58.7	76	57	58.4	73
	Malabar	65	55.7	52	56.0	63	52.8	*79	35	58.1	67	60	55.9	67
	McCormick	70	57.4	58	57.9	74	54.8	76	41	58.9	71	42	58.0	
	Merl	66	57.6	60	58.6	59	53.4	70	36	59.7	75	40	58.5	
	Sisson	69	55.6	58	56.9	74	53.1	71	30	56.5	74	41	55.9	
	Sunburst	73	57.2	64	57.2	*90	56.5	75	54	59.5	64	31	55.5	76
	Truman	68	56.6	56	58.3	76	54.4	66	11	56.2	72	46	57.6	68
Public - exp	IL 01-11934	*78	57.0	61	56.7	*88	55.2	*82	46	59.2	82	39	56.9	*80
	IL 04-10729	72	58.1	60	58.9	75	55.5	69	46	59.1	*84	39	59.0	
	IL 04-24668	*76	58.1	62	58.2	84	56.0	76	58	59.2	80	64	59.0	
	MO-011126	73	56.1	61	57.0	68	53.4	*83	50	58.3	81	37	55.6	
	P 02444A1-23-9	63	55.4	48	55.1	54	52.6	74	44	58.1	77	51	55.8	
	P 04287A1-10	74	56.0	57	56.0	75	54.0	76	34	58.3	*86	31	55.9	
Mean		74	56.2	62	56.6	77	53.4	78	43	57.9	79	44	56.7	76
LSD(.10)[b]		8	1.0	8	1.5	8	1.7	14	27	2.0	13	21	2.8	6

* Yield is not significantly different (0.10 level) than the highest yielding cultivar.

[a] Reported wheat yields were adjusted based on a mixed model statistical analysis that includes the percent survival as a covariate to estimate the effect of winterkill on wheat productivity. See Experimental Procedures on page 2 for further explanation.

[b] The LSD (least significant difference) figures are a statistical measure of variation within the trial. If the difference between two varieties is equal to or greater than the LSD, then the values are significantly different. If the difference is less than the LSD, then the value difference may have been due to other factors. See Experimental Procedures on page 2 for further explanation.

Table 5. Janesville site—winter wheat performance details (2008–2009)

Brand	Entry	— 2009 means —							2008 yield (bu/a)	2-yr mean yield (bu/a)
		Yield (bu/a)	Winter survival (%)	Test wt. (lb/bu)	Height (in.)	Lodging[a] (0–9)	Septoria[b] (1–6.9)	Leaf rust[b] (1–6.9)		
AgriPro	Branson	63	100	56.5	28	0	2.7	3.0	80	72
	M 04-4566	57	100	55.9	32	0	3.8	2.8		
	W 1377	57	100	59.3	30	0	2.9	2.7	72	65
Diener	D 496 W	61	100	54.7	28	0	3.3	3.3		
	D 502 W	56	100	55.2	30	0	3.4	2.9	81	69
	XW 70	63	100	57.5	30	0	3.0	3.0	82	73
	XW 80	*71	100	57.5	30	0	1.8	2.9		
	XW 81	*67	100	56.4	29	0	3.5	3.9		
Dyna-Gro	DG 404	*66	100	56.0	30	0	2.7	2.9	76	71
	V 9812	64	100	55.9	28	0	3.5	2.7		
	X 9911	62	100	58.1	27	0	2.8	3.6		
Growmark	FS 628	63	100	55.8	31	0	1.7	2.9	79	71
	FS 637	62	100	55.5	28	0	3.1	2.6	70	66
	FS 659	58	100	55.4	29	0	2.4	3.1	72	65
Jung	5804	*66	100	57.8	29	0	3.6	3.6	84	*75
	5830	62	100	57.5	27	0	3.4	3.5		
	5988	65	100	57.6	31	0	3.1	4.2	*98	*82
Kaltenberg	KW 60	*66	100	56.5	32	0	4.1	4.2	*98	*82
	KW 62	62	100	56.3	31	0	3.6	3.0	79	71
	KW 63	64	100	56.5	29	0	3.0	3.7	72	68
	KW 70	64	100	55.6	29	0	2.8	3.0	85	*75
	KW 75	62	100	53.9	27	0	3.0	3.0		
	XW 7409	60	100	55.6	28	0	1.9	2.6		
Pioneer	25R39	*69	100	57.2	30	0	2.7	4.0		
	25R47	*74	100	56.1	27	0	3.1	3.0	87	*81
	25R51	63	100	56.1	29	0	3.4	2.5	88	*76
	25R62	62	100	54.8	28	0	2.5	3.2	74	68
PIP	701	*70	100	55.8	32	0	2.4	3.4	77	74
	702	65	100	54.9	27	0	1.9	3.6		
	710	59	100	58.5	29	0	2.9	3.4		
	717	58	100	55.7	27	0	4.3	4.6		
	718	63	100	57.3	32	0	3.4	1.3		
	720	*66	100	55.1	28	0	3.9	2.8	71	69
	729	*73	100	58.4	31	0	2.1	3.4		
	760	*66	100	57.3	30	1	2.9	3.6	*94	*80

* Yield is not significantly different (0.10 level) than the highest yielding cultivar.

[a] Lodging rankings are based on the Belgian Lodging System. Values are rounded to whole numbers (0 = none, 9 = severe).

[b] Both Septoria and leaf rust are based on a weighted disease severity score: Severity = (4 x flag leaf severity) + (3 x flag-1 leaf severity) + (2 x flag-2 leaf severity) + (flag-3 leaf severity). A natural log transformation was used.

Table 5. continued

Brand	Entry	— 2009 means —							2008 yield (bu/a)	2-yr mean yield (bu/a)
		Yield (bu/a)	Winter survival (%)	Test wt. (lb/bu)	Height (in.)	Lodging[a] (0–9)	Septoria[b] (1–6.9)	Leaf rust[b] (1–6.9)		
Pro Seed Genetics	PRO 200	64	100	57.4	30	0	3.5	3.6	84	74
	PRO 220	60	100	58.4	30	0	3.0	3.8	75	68
	PRO 240	65	100	54.6	34	0	3.3	3.5	74	70
	PRO Ex260	*67	100	57.8	31	0	2.6	3.0	75	71
	PRO Ex280	59	100	58.4	31	0	2.3	2.8	86	73
	PRO Ex290	60	100	57.1	29	0	3.5	3.4		
	PRO Ex300	58	100	55.6	29	0	3.6	3.2		
Seed-Link	ACS 55001	55	100	56.7	31	0	4.3	2.7	75	65
Welter	Excel 442	*66	100	56.2	32	0	3.0	3.4	83	*75
Public	Hopewell	63	100	53.0	30	0	3.9	3.4	65	64
	Kaskaskia	58	100	58.6	33	0	4.4	3.3	85	72
	Malabar	52	100	56.0	30	0	3.8	3.8	66	59
	McCormick	58	100	57.9	26	0	2.7	3.4		
	Merl	60	100	58.6	27	0	3.6	3.3		
	Sisson	58	100	56.9	26	0	3.7	4.2		
	Sunburst	64	100	57.2	26	0	5.1	3.7	77	71
	Truman	56	100	58.3	32	0	3.7	3.5	69	63
Public - exp	IL 01-11934	61	100	56.7	26	0	4.4	4.3	88	*75
	IL 04-10729	60	100	58.9	31	0	4.3	3.2		
	IL 04-24668	62	100	58.2	29	0	2.9	3.7		
	MO-011126	61	100	57.0	28	0	2.4	3.0		
	P 02444A1-23-9	48	100	55.1	30	0	1.8	4.1		
	P 04287A1-10	57	100	56.0	31	0	3.1	3.7		
Mean		62	100	56.6	29	0	3.2	3.3	78	71
LSD(.10)[c]		8	ns	1.5	2	0.2	1.3	1.0	8	7

* Yield is not significantly different (0.10 level) than the highest yielding cultivar.

[a] Lodging rankings are based on the Belgian Lodging System. Values are rounded to whole numbers (0 = none, 9 = severe).

[b] Both Septoria and leaf rust are based on a weighted disease severity score: Severity = (4 x flag leaf severity) + (3 x flag-1 leaf severity) + (2 x flag-2 leaf severity) + (flag-3 leaf severity). A natural log transformation was used.

[c] The LSD (least significant difference) figures are a statistical measure of variation within the trial. If the difference between two varieties is equal to or greater than the LSD, then the values are significantly different. If the difference is less than the LSD, then the value difference may have been due to other factors. ns = not significant. See Experimental Procedures on page 2 for further explanation.

Table 6. Lancaster site—winter wheat performance details (2008–2009)

Brand	Entry	— 2009 means —							2008 yield (bu/a)	2-yr mean yield (bu/a)
		Yield (bu/a)	Winter survival (%)	Test wt. (lb/bu)	Height (in.)	Lodging[a] (0–9)	Septoria[b] (1–6.9)	Leaf rust[b] (1–6.9)		
AgriPro	Branson	76	100	53.1	34	0	2.7	2.6	70	73
	M 04-4566	67	100	50.4	42	0	3.3	2.3		
	W 1377	83	100	55.7	35	2	1.5	3.0	65	74
Diener	D 496 W	66	100	49.1	36	0	2.6	3.1		
	D 502 W	74	100	51.9	38	0	2.9	2.3	65	70
	XW 70	70	100	54.8	36	0	1.0	2.6	67	69
	XW 80	75	100	53.1	36	1	1.5	2.3		
	XW 81	78	100	52.3	36	0	2.4	2.7		
Dyna-Gro	DG 404	81	100	52.6	38	0	2.2	3.0	59	70
	V 9812	80	100	51.8	36	0	2.6	1.4		
	X 9911	*89	100	54.2	36	1	2.0	2.7		
Growmark	FS 628	82	100	52.4	38	0	2.5	2.0	65	74
	FS 637	76	100	52.3	37	0	1.7	3.0	68	72
	FS 659	71	100	51.7	36	2	2.7	2.8	63	67
Jung	5804	80	100	53.1	36	1	2.5	3.3	67	74
	5830	*93	100	54.7	34	2	2.3	3.0		
	5988	83	100	54.9	37	1	3.3	2.4	62	73
Kaltenberg	KW 60	*88	100	54.8	38	2	1.8	2.8	63	76
	KW 62	62	100	52.2	37	0	2.5	1.8	60	61
	KW 63	71	100	50.9	34	0	1.6	1.9	69	70
	KW 70	84	100	54.4	35	0	2.1	2.9	69	77
	KW 75	65	100	52.0	35	1	2.2	2.8		
	XW 7409	*87	100	55.1	36	0	2.9	3.4		
Pioneer	25R39	79	100	53.8	36	0	1.7	3.8		
	25R47	81	100	52.1	33	0	2.3	2.5	72	77
	25R51	*87	100	53.0	33	0	1.9	2.2	*79	*83
	25R62	74	100	51.2	34	3	2.6	2.5	71	73
PIP	701	78	100	52.6	38	0	2.3	2.4	61	70
	702	63	100	51.1	34	1	2.8	4.4		
	710	86	100	55.6	35	1	0.9	2.4		
	717	80	100	55.9	34	2	2.5	3.8		
	718	71	100	52.0	38	1	1.9	2.4		
	720	79	100	51.7	37	0	2.3	2.8	*76	*78
	729	81	100	53.4	36	0	1.5	3.0		
	760	*95	100	54.2	39	1	2.2	3.4	67	*81

* Yield is not significantly different (0.10 level) than the highest yielding cultivar.

[a] Lodging rankings are based on the Belgian Lodging System. Values are rounded to whole numbers (0 = none, 9 = severe).

[b] Both Septoria and leaf rust are based on a weighted disease severity score: Severity = (4 x flag leaf severity) + (3 x flag-1 leaf severity) + (2 x flag-2 leaf severity) + (flag-3 leaf severity). A natural log transformation was used.

Table 6. continued

Brand	Entry	— 2009 means — Yield (bu/a)	Winter survival (%)	Test wt. (lb/bu)	Height (in.)	Lodging[a] (0–9)	Septoria[b] (1–6.9)	Leaf rust[b] (1–6.9)	2008 yield (bu/a)	2-yr mean yield (bu/a)
Pro Seed Genetics	PRO 200	73	100	53.5	38	3	3.2	3.9	62	68
	PRO 220	81	100	56.3	36	1	2.4	2.9	56	69
	PRO 240	77	100	52.5	38	0	2.2	2.6	66	72
	PRO Ex260	78	100	53.7	39	0	1.4	3.3	63	71
	PRO Ex280	73	100	55.4	35	0	0.6	2.7	68	71
	PRO Ex290	78	100	53.4	35	0	2.4	4.1		
	PRO Ex300	82	100	53.9	36	0	2.4	3.2		
Seed-Link	ACS 55001	70	100	53.3	35	1	4.5	2.9	62	66
Welter	Excel 442	*95	100	53.6	41	1	2.6	3.0	*73	*84
Public	Hopewell	71	100	53.3	37	0	2.1	3.4	54	63
	Kaskaskia	78	100	55.6	36	3	3.1	3.1	63	71
	Malabar	63	100	52.8	40	2	3.4	4.1	63	63
	McCormick	74	100	54.8	34	6	2.5	3.8		
	Merl	59	100	53.4	34	0	2.5	3.2		
	Sisson	74	100	53.1	32	1	1.9	3.5		
	Sunburst	*90	100	56.5	34	0	2.9	4.2	69	*80
	Truman	76	100	54.4	38	1	2.5	3.7	55	66
Public - exp	IL 01-11934	*88	100	55.2	35	2	3.1	3.9	70	*79
	IL 04-10729	75	100	55.5	36	2	2.7	3.0		
	IL 04-24668	84	100	56.0	36	1	1.1	3.1		
	MO-011126	68	100	53.4	35	2	2.5	3.3		
	P 02444A1-23-9	54	100	52.6	37	2	3.8	4.7		
	P 04287A1-10	75	100	54.0	36	0	2.1	3.2		
Mean		77	100	53.4	36	1	2.4	3.0	66	72
LSD(.10)[c]		8	ns	1.7	3	1	1.1	0.9	6	6

* Yield is not significantly different (0.10 level) than the highest yielding cultivar.

[a] Lodging rankings are based on the Belgian Lodging System. Values are rounded to whole numbers (0 = none, 9 = severe).

[b] Both Septoria and leaf rust are based on a weighted disease severity score: Severity = (4 x flag leaf severity) + (3 x flag-1 leaf severity) + (2 x flag-2 leaf severity) + (flag-3 leaf severity). A natural log transformation was used.

[c] The LSD (least significant difference) figures are a statistical measure of variation within the trial. If the difference between two varieties is equal to or greater than the LSD, then the values are significantly different. If the difference is less than the LSD, then the value difference may have been due to other factors. ns = not significant. See Experimental Procedures on page 2 for further explanation.

Table 7. Chilton site—winter wheat performance details (2008–2009)

Brand	Entry	2009 means					2008 yield (bu/a)	2-yr mean yield (bu/a)
		Adjusted yield[a] (bu/a)	Winter survival (%)	Test wt. (lb/bu)	Height (in.)	Lodging[b] (0–9)		
AgriPro	Branson	77	26	57.8	28	0	*98	*88
	M 04-4566	*92	44	57.5	34	0		
	W 1377	*78	54	58.3	28	0	94	*86
Diener	D 496 W	77	46	56.4	31	0		
	D 502 W	*91	35	58.1	35	0	*100	*96
	XW 70	*88	59	58.5	28	0	93	*91
	XW 80	*78	39	57.0	29	0		
	XW 81	*83	44	56.5	30	0		
Dyna-Gro	DG 404	73	35	58.0	31	0	*102	*88
	V 9812	*79	45	55.9	30	0		
	X 9911	*80	43	59.5	29	0		
Growmark	FS 628	*82	28	58.1	32	0	88	*85
	FS 637	*88	54	57.7	30	0	*106	*97
	FS 659	67	16	54.9	30	0	*97	82
Jung	5804	*92	21	58.7	29	0	93	*93
	5830	*83	59	59.3	29	0		
	5988	*86	64	58.4	32	0	*104	*95
Kaltenberg	KW 60	*80	69	58.2	32	0	93	*87
	KW 62	77	34	58.5	33	0	*98	*88
	KW 63	*85	39	57.8	29	0	90	*88
	KW 70	*86	48	58.9	29	0	88	*87
	KW 75	70	53	57.5	28	0		
	XW 7409	66	44	59.2	27	0		
Pioneer	25R39	*82	35	57.6	30	0		
	25R47	*81	45	56.0	26	0	*99	*90
	25R51	70	39	56.3	28	0	*96	83
	25R62	77	33	56.5	28	0	*112	*95
PIP	701	70	40	57.7	31	0	92	81
	702	*80	45	56.6	28	0		
	710	*81	60	58.8	29	0		
	717	*85	59	59.3	29	0		
	718	76	49	57.7	32	0		
	720	62	39	54.8	30	0	94	78
	729	*87	61	58.1	32	0		
	760	*88	61	58.2	34	0	94	*91

* Yield is not significantly different (0.10 level) than the highest yielding cultivar.

[a] Reported wheat yields were adjusted based on a mixed model statistical analysis that includes the percent survival as a covariate to estimate the effect of winterkill on wheat productivity. See Experimental Procedures on page 2 for further explanation.

[b] Lodging rankings are based on the Belgian Lodging System. Values are rounded to whole numbers (0 = none, 9 = severe).

Table 7. continued

Brand	Entry	2009 means					2008 yield (bu/a)	2-yr mean yield (bu/a)
		Adjusted yield[a] (bu/a)	Winter survival (%)	Test wt. (lb/bu)	Height (in.)	Lodging[b] (0–9)		
Pro Seed Genetics	PRO 200	*79	49	58.0	31	0	91	*85
	PRO 220	*78	55	57.2	32	0	74	76
	PRO 240	*80	56	57.8	32	0	92	*86
	PRO Ex260	*90	50	58.5	32	0	88	*89
	PRO Ex280	*88	40	59.5	29	0	84	*86
	PRO Ex290	*81	35	57.6	29	0	94	*88
	PRO Ex300	*83	35	58.9	30	0	93	*88
Seed-Link	ACS 55001	69	50	57.9	33	0	77	73
Welter	Excel 442	*82	46	58.3	31	0	92	*87
Public	Hopewell	*81	44	58.7	32	0	76	79
	Kaskaskia	*85	16	58.7	30	0	69	77
	Malabar	*79	35	58.1	34	0	77	78
	McCormick	76	41	58.9	27	0		
	Merl	70	36	59.7	30	0		
	Sisson	71	30	56.5	25	0		
	Sunburst	75	54	59.5	26	0	*96	*86
	Truman	66	11	56.2	32	0	84	75
Public - exp	IL 01-11934	*82	46	59.2	28	0	92	*87
	IL 04-10729	69	46	59.1	28	0		
	IL 04-24668	76	58	59.2	31	0		
	MO-011126	*83	50	58.3	29	0		
	P 02444A1-23-9	74	44	58.1	31	0		
	P 04287A1-10	76	34	58.3	32	0		
Mean		78	43	57.9	30	0	89	86
LSD (.10)[c]		14	27	2.0	2	ns	16	12

* Yield is not significantly different (0.10 level) than the highest yielding cultivar.

[a] Reported wheat yields were adjusted based on a mixed model statistical analysis that includes the percent survival as a covariate to estimate the effect of winterkill on wheat productivity. See Experimental Procedures on page 2 for further explanation.

[b] Lodging rankings are based on the Belgian Lodging System. Values are rounded to whole numbers (0 = none, 9 = severe).

[c] The LSD (least significant difference) figures are a statistical measure of variation within the trial. If the difference between two varieties is equal to or greater than the LSD, then the values are significantly different. If the difference is less than the LSD, then the value difference may have been due to other factors. ns = not significant. See Experimental Procedures on page 2 for further explanation.

Table 8. Arlington site—winter wheat performance details (2009)

Brand	Entry	2009 means				
		Adjusted yield[a] (bu/a)	Winter survival (%)	Test wt. (lb/bu)	Height (in.)	Lodging[b] (0–9)
AgriPro	Branson	*84	27	56.7	29	0
	M 04-4566	78	73	56.2	39	0
	W 1377	79	40	59.6	32	0
Diener	D 496 W	79	32	54.4	31	0
	D 502 W	*83	47	56.8	36	0
	XW 70	75	47	57.7	33	0
	XW 80	*96	47	58.2	33	0
	XW 81	*89	41	57.7	34	0
Dyna-Gro	DG 404	81	39	55.7	35	0
	V 9812	72	45	56.7	31	0
	X 9911	82	51	58.1	34	0
Growmark	FS 628	*84	41	57.1	36	0
	FS 637	77	39	57.1	31	0
	FS 659	*84	45	56.6	32	0
Jung	5804	67	32	57.4	30	0
	5830	*91	54	58.1	34	0
	5988	*90	37	57.3	39	0
Kaltenberg	KW 60	*86	54	57.7	38	0
	KW 62	81	34	55.4	32	0
	KW 63	67	47	55.2	31	0
	KW 70	74	46	56.9	31	0
	KW 75	77	40	55.8	30	0
	XW 7409	78	67	57.9	32	0
Pioneer	25R39	78	30	56.1	32	0
	25R47	81	47	55.1	29	0
	25R51	80	39	53.9	33	0
	25R62	73	29	54.3	30	0
PIP	701	80	42	56.6	35	0
	702	65	14	52.5	31	0
	710	*86	35	55.2	31	0
	717	*90	22	57.9	31	0
	718	75	59	57.7	35	0
	720	69	49	55.8	31	0
	729	*84	70	58.4	34	0
	760	*87	68	57.9	37	0

* Yield is not significantly different (0.10 level) than the highest yielding cultivar.

[a] Reported wheat yields were adjusted based on a mixed model statistical analysis that includes the percent survival as a covariate to estimate the effect of winterkill on wheat productivity. See Experimental Procedures on page 2 for further explanation.

[b] Lodging rankings are based on the Belgian Lodging System. Values are rounded to whole numbers (0 = none, 9 = severe).

Table 8. Arlington site—winter wheat performance details (2009)

Brand	Entry	2009 means				
		Adjusted yield[a] (bu/a)	Winter survival (%)	Test wt. (lb/bu)	Height (in.)	Lodging[b] (0–9)
Pro Seed Genetics	PRO 200	*84	80	58.2	36	0
	PRO 220	75	60	59.0	37	0
	PRO 240	*84	46	56.7	36	0
	PRO Ex260	74	61	57.1	36	0
	PRO Ex280	*84	32	57.2	32	0
	PRO Ex290	*86	41	56.8	33	0
	PRO Ex300	82	44	55.0	31	0
Seed-Link	ACS 55001	64	26	54.7	35	0
Welter	Excel 442	*90	48	57.2	36	0
Public	Hopewell	76	65	56.2	35	0
	Kaskaskia	76	57	58.4	37	0
	Malabar	67	60	55.9	35	0
	McCormick	71	42	58.0	31	0
	Merl	75	40	58.5	33	0
	Sisson	74	41	55.9	28	0
	Sunburst	64	31	55.5	29	0
	Truman	72	46	57.6	34	0
Public - exp	IL 01-11934	82	39	56.9	31	0
	IL 04-10729	*84	39	59.0	34	0
	IL 04-24668	80	64	59.0	34	0
	MO-011126	81	37	55.6	32	0
	P 02444A1-23-9	77	51	55.8	34	0
	P 04287A1-10	*86	31	55.9	33	0
Mean		79	44	56.7	33	0
LSD(.10)[c]		13	21	2.8	3	ns

* Yield is not significantly different (0.10 level) than the highest yielding cultivar.

[a] Reported wheat yields were adjusted based on a mixed model statistical analysis that includes the percent survival as a covariate to estimate the effect of winterkill on wheat productivity. See Experimental Procedures on page 2 for further explanation.

[b] Lodging rankings are based on the Belgian Lodging System. Values are rounded to whole numbers (0 = none, 9 = severe).

[c] The LSD (least significant difference) figures are a statistical measure of variation within the trial. If the difference between two varieties is equal to or greater than the LSD, then the values are significantly different. If the difference is less than the LSD, then the value difference may have been due to other factors. ns = not significant. See Experimental Procedures on page 2 for further explanation.

Testing agencies

The Wisconsin Winter Wheat Performance Tests were conducted by the Departments of Agronomy and Plant Pathology, College of Agricultural and Life Sciences and the University of Wisconsin-Extension in cooperation and with support from the Wisconsin Crop Improvement Association.

Additional information

Check the following publications for additional information on small grain production and seed availability. Both are updated annually.

Pest Management in Wisconsin Field Crops (A3646) at learningstore.uwex.edu

The Wisconsin Certified Seed Directory at www.wcia.wisc.edu

For information on seed availability of public varieties, contact:
Wisconsin Crop Improvement Association
554 Moore Hall
1575 Linden Drive
Madison, WI 53706
(608) 262-1341, www.wcia.wisc.edu

To access crop performance testing information electronically, visit: www.coolbean.info.

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