A3874

Wisconsin oats and barley performance tests

2010

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The Wisconsin oats and barley performance trials are conducted each year with the producer's needs in mind. Trials include released varieties, experimental lines from Wisconsin and neighboring states, and lines from private seed companies. The primary objective of these trials is to obtain data on how varieties perform in different locations and years. Growers use these data to help choose the best varieties to plant, and breeders use performance data to determine whether or not to release a new variety.

New varieties developed and released in Wisconsin are entered in the Wisconsin Certification Program. These varieties have demonstrated superior production qualities. In addition, highly rated varieties from other states may be recommended and/or certified in the state. As new varieties are released to the public, older varieties with inferior qualities are removed from the recommended list and eventually dropped from the certified list as seed production declines.

Occasionally, varieties are certified without being recommended to Wisconsin growers. Varieties in this category may include commercial varieties developed by private seed companies or varieties where there is a substantial market for Wisconsin-produced seed. Thus, in Wisconsin, recommendation and certification do not mean the same thing. Recommended varieties are those with superior in-state production performance records, while certification provides the assurance of seed purity and seed quality.

VARIETY SELECTION

Factors to consider when selecting oat and barley varieties include grain yield, maturity, straw strength (or resistance to lodging), and disease resistance. Disease ratings are performed by the Department of Agronomy. Barley growers should consider whether a variety is acceptable for malting. Several varieties are also evaluated for forage yield (tables 4 and 7).

How the entries were tested

Varieties included in the trial are selected based upon current demand, availability, and adaptation to Wisconsin's climate. Most of these entries are commercially available. Several commercial and public cultivars were included for comparison.

Tests were conducted at seven locations using conventional tillage practices. All plots were planted at a seeding rate of 2.5–3.0 bushels per acre. Agronomic practices at all locations are listed in table 1. Tests were conducted as a randomized complete block design with four replications.

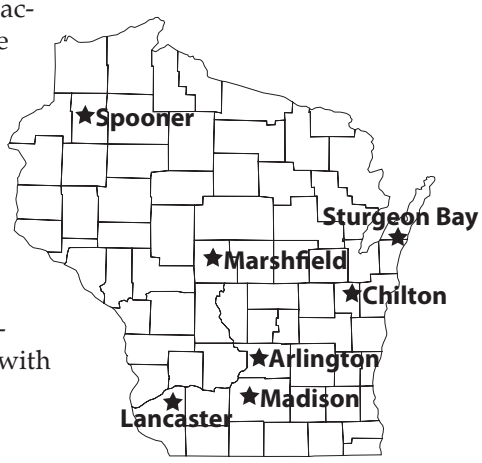

Table 1. Location and agronomics of small grain variety trials in Wisconsin

Location	Cooperators	Soil type	Row spacing (inches)	Average nitrogen applied (lb/a)	Planting date	Harvest date
Arlington	J. Albertson	silt loam	6.0	30*	Apr. 9	Aug.14
Chilton	Kolbe Seeds, M. Glewen	red clay	12.0	70	May 12	Aug. 22
Lancaster	T. Wood	silt loam	7.5	21	Apr. 17	Aug. 4
Madison	J. Mochon, T. Wright	silt loam	6.0	30*	Apr. 24	Aug. 7
Marshfield	M. Bertram	silt loam	6.0	30	Apr. 14	Aug. 6
Spooner	P. Holman	sandy loam	7.3	56	Apr. 17	Aug. 18
Sturgeon Bay	R. Weidman	silt loam	12.0	46	May 11	Aug. 18

**Nitrogen credited from previous alfalfa or soybean.*

Growing conditions

2009 season. In Wisconsin, the number of planted acres of oats was up 40,000 from the previous year to 310,000 acres. There were 195,000 acres harvested for grain, 5,000 acres more than in 2008. Oats in 2009 yielded 68 bushels per acre, an increase of 6 bushels from the previous year. This matches the record yield set in 2000. Production was up 13 percent to a total of 13.3 million bushels. Wisconsin was the highest-producing state for oats this year after being second in 2008.

Wisconsin produced 1.48 million bushels of barley in 2009, a 9 percent decline from the previous year. Area planted to barley increased 2,000 acres from 2008 to 45,000 acres. Area harvested decreased 5,000 acres to 25,000 acres in 2009. Yields were up 5 bushels from the previous year to 59 bushels per acre.

2008 season. Oat plantings were considerably delayed due to significant rainfall occurring statewide in March and April. Overall, acreage of oats planted in Wisconsin did not change from 2007 (270,000 acres); however, an additional 30,000 acres of oat was harvested for grain (190,000 acres). Average statewide oat yield was 62 bushels per acre, down 5 bushels from the previous year. Wisconsin ranked as the second-highest-producing oat state, up from third in 2007.

Barley yields were 54 bushels per acre (down 3 bushels from 2007). The area of barley harvested increased 7,000 acres to 30,000 acres in 2008.

Reduced yield of oat and barley was likely due to delayed plantings as well as abnormally dry environmental conditions during the grain-fill period for both crops.

Source: USDA National Agricultural Statistics Service, www.nass.usda.gov.

How performance was measured

Yield: After threshing, grain was weighed and yield was determined using a conversion formula. Yields are reported in bushels (32 and 48 pounds per bushel for oat and barley, respectively) per acre at 8 percent moisture content.

Lodging: Lodging is measured in percent. Values are rounded to whole numbers (1 = none, 100 = severe).

Test weight: Test weights were measured using a Toledo Model 3111 test weighting scale.

Licensed varieties

The Wisconsin Agricultural Experiment Station has granted sole authority to the Wisconsin Crop Improvement Association to issue formal licenses for the production of certified seed of Kewaunee barley; Spooner rye; and Dane, ForagePlus, Gem, and Vista oats. The Wisconsin Alumni Research Foundation has granted sole authority to the Wisconsin Crop Improvement Association to issue formal licenses for the production of certified seed of Drumlin, Esker, Kame, and Moraine oats. These grants of sole authority are intended to reinforce Plant Variety Protection (PVP) regulations and to generate research and development funds for the Wisconsin small-grain breeding program. These varieties are PVP protected and a license is required for seed production. Each bag of seed will have a special red and white PVP/Licensed Variety tag attached or preprinted on the bag.

Testing agencies

The small grain variety tests were conducted by the Department of Agronomy, College of Agricultural and Life Sciences 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. All are updated annually.

- *Wisconsin Winter Wheat Performance Tests* (A3868), available at www.learningstore.uwex.edu
- *Pest Management in Wisconsin Field Crops* (A3646), available at www.learningstore.uwex.edu
- *The Wisconsin Certified Seed Directory*, available 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

Table 2. Oat variety descriptions

Variety	Origin	Year released	Kernel color	Maturity[a] (head date)	Ht[b] (in.)	Lodging (%)	Test wt[c] (lb/bu)	Kernel protein	Disease resistance[d] Crown rust	Stem rust	Septoria	Smut	BYDV[e]	Licensed/ PVP[f]	Wis. cert.
Recommended varieties															
Buckskin	Illinois	2008	tan	6-23	34	med	40.6	med	R	R	—	R	R	yes	yes
Dane	Wisconsin	1990	yellow	6-17	33	med	38.2	med	IR	IR	S	R	IR	yes	yes
Drumlin	Wisconsin	2003	yellow	6-24	35	med	38.2	med	IR	IR	—	R	R	yes	yes
Esker	Wisconsin	2004	yellow	6-21	34	strong	38.6	med	IR	IR	—	R	R	yes	yes
Excel	Indiana	2006	white	6-20	33	med	39.9	med	IR	S	—	R	R	yes	yes
Kame	Wisconsin	2005	yellow	6-19	32	med	37.2	med	R	IR	—	R	IR	yes	yes
Vista	Wisconsin	1999	yellow	6-24	38	med	38.1	low	R	R	—	R	IR	yes	yes
Other varieties															
Baker	Iowa	2006	white	late	med	med	high	high	R	IR	—	R	R	yes	no
Gem	Wisconsin	1996	yellow	late	med	med	high	med	IR	R	—	MR	IR	yes	yes
Moraine	Wisconsin	2001	yellow	mid	med	med	high	med	R	IR	—	R	IR	yes	yes
Ogle	Illinois	1981	yellow	mid	med	med	high	low	MR	S	S	S	R	no	yes
Robust	Indiana	2006	white	late	med	strong	high	med	R	S	—	MR	R	yes	no

[a] *Maturity (month-day) as indicated by heading date in 17 Wisconsin tests conducted 2007–2009. Varieties with generalized ratings indicate the following: early = before June 18, mid = June 18–21, late = after June 21.*

[b] *Height (inches) at maturity in 21 Wisconsin tests conducted 2007–2009. Varieties with generalized ratings indicate the following: short = <33 inches, med = 33–38 inches, tall = >38 inches.*

[c] *Test weight (pounds/bushel) in 21 Wisconsin tests conducted 2007–2009. Varieties with generalized ratings indicate the following: low = <33 lb/bu, med = 33–35 lb/bu, high = >35 lb/bu.*

[d] *Disease resistance: R = excellent resistance, IR = intermediate or very good resistance, MR = moderate or good resistance, S = susceptible or poor resistance.*

[e] *BYDV = Barley yellow dwarf virus or red leaf disease.*

[f] *PVP = Plant variety protection or licensed for seed production. A "yes" indicates that the variety cannot be reproduced and sold as seed without certification.*

— = information not available.

OAT Table 3. Oat variety grain yield comparisons in Wisconsin

Variety	Mean	Southern Wisconsin			Northern Wisconsin			
		Arlington	Lancaster	Madison	Chilton	Marshfield	Spooner	Sturgeon Bay
2009 YIELDS		2009 yields (bu/a)						
Early season								
Dane	87	81	52	102	75	162*	39	101*
Kame	95	116	48	126*	63	165*	50	97*
Midseason								
Esker	100	111	58	142*	72	170*	49	95*
Excel	106*	139*	55	132*	80	166*	67	105*
Ogle	111*	128*	75*	130*	80	173*	86	103*
Late season								
Buckskin	99	128*	45	142*	89*	151*	44	94*
Drumlin	104*	117	66*	128*	95*	173*	56	95*
Gem	93	102	58	121	85*	144	63	81
Vista	103	118	62*	127*	95*	172*	69	79
Mean	100	116	58	128	82	164	58	94
LSD (0.05)[a]	7	17	13	21	12	22	16	21
HISTORIC YIELDS		2007–2009 yields (bu/a)						
Early season								
Dane	94	102	80	104	86*	124	62	98
Kame	99	127	81	123	83*	122	63	98
Midseason								
Esker	106	123	96*	131*	86*	134*	66	109
Excel	110*	138*	92*	132*	91*	132	75*	107
Ogle	109*	127	98*	129	88*	130	81*	107
Late season								
Buckskin	109*	133*	92*	141*	85*	132	63	114*
Drumlin	111*	126	98*	137*	89*	144*	71	111
Gem	99	120	71	130*	68	121	59	121*
Vista	105	116	100*	135*	89*	123	69	100
Mean	105	124	90	129	85	129	68	107
LSD (0.05)[a]	3	8	8	11	8	10	8	9

* *Varieties not significantly different from the highest yielding variety in the trial.*

[a] *The LSD (least significant difference) figures listed under the yield columns are a statistical measure of variation within the trial. If the difference in yield of two varieties is equal to or greater than the LSD, the yields are significantly different. If the difference is less than the LSD, the yield difference may have been due to environmental factors.*

Table 4. Forage dry matter yield of spring oat varieties harvested at late boot/early heading **OAT**

Variety	Yield (t/a) Madison	Arlington	Mean	Harvest date (June)	Crude protein (%)	RFQ[a]	Yield (t/a)	Harvest date (June)
	2009				2006–2008		2007–2009	
Buckskin	1.45	1.38	1.42	21	13.4	140.3	1.52	16
Dane	1.36	1.34	1.35	14	14.5*	141.8	1.11	10
Drumlin	1.58	1.63	1.61	22	13.0	140.9	1.62	17
Esker	1.25	1.20	1.23	20	14.1*	138.3	1.22	15
Excel	1.35	1.67	1.51	18	14.1*	141.2	1.39	14
ForagePlus	2.09	2.04	2.07	28	11.9	133.5	2.20	24
Gem	1.42	1.41	1.42	20	14.0	135.0	1.58	19
Kame	1.32	1.43	1.38	17	14.6*	148.7*	1.16	12
Ogle	1.30	1.71	1.51	18	14.4*	150.4*	1.29	14
Vista	1.65	1.68	1.67	22	12.5	133.1	1.77	18
LSD (0.05)	0.27	0.30	0.20		0.57	5.74	0.10	

** Varieties not significantly different from highest yielding variety in the trial.*

[a] *RFQ = Relative feed quality. Relative feed quality can be used to make comparisons among varieties listed in this table, but should not be used to compare with other crops such as alfalfa.*

Table 5. Barley variety descriptions **BARLEY**

Variety	Origin	Year released	Awns	Quality	Maturity[a] (head date)	Ht[b] (in.)	Lodging[c] (%)	Test wt[d] (lb/bu)	Disease resistance[e] Crown rust	Stem rust	Loose smut	Powd. mildew	Spot blotch	Licensed/ PVP[f]	Wis. cert.
Recommended varieties															
Hazen	N. Dakota	1984	smooth	feed	6-18	31	strong	46	S	S	S	MR	R	no	no
Kewaunee	Wisconsin	1997	smooth	feed	6-18	30	strong	45	R	R	—	IR	R	yes	yes
Rasmusson	Minnesota	2008	semi-smooth	malt	6-18	27	strong	47	—	R	—	IR	R	yes	yes
Other varieties															
Drummond	N. Dakota	2001	smooth	malt	early	short	strong	high	—	R	S	MR	R	yes	no
Lacey	Minnesota	2000	smooth	malt	early	med	med	high	—	R	S	MR	R	yes	yes
Robust	Minnesota	1983	smooth	malt	early	med	med	med	S	R	S	S	R	yes	no
Stander	Minnesota	1993	smooth	feed	early	short	strong	high	—	R	S	S	R	yes	no

[a] *Maturity (month-day) as indicated by heading date in 17 Wisconsin tests conducted 2007–2009. Varieties with generalized ratings indicate the following: early = before June 21, mid = June 21–25, late = after June 25.*

[b] *Height (inches) at maturity in 21 Wisconsin tests conducted 2007–2009. Varieties with generalized ratings were included in other tests and indicate the following: short = <30 inches, med = 30–36 inches, tall = >36 inches.*

[c] *Lodging: strong = <15%, med = 15–35%, weak = >35%.*

[d] *Test weight (pounds/bushel) in 21 Wisconsin tests conducted 2007–2009. Varieties with generalized ratings were included in other tests and indicate the following: low = <42 lb/bu, med = 42–46 lb/bu, high = >46 lb/bu.*

[e] *Disease resistance: R = excellent resistance, IR = intermediate or very good resistance, MR = moderate or good resistance, S = susceptible or poor resistance.*

[f] *PVP = Plant variety protection or licensed for seed production. A "yes" indicates that the variety cannot be reproduced and sold as seed by variety name without certification.*

— = Information not available.

BARLEY Table 6. Barley variety grain yield comparisons in Wisconsin

Variety	Mean	Southern Wisconsin			Northern Wisconsin			
		Arlington	Lancaster	Madison	Chilton	Marshfield	Spooner	Sturgeon Bay
2009 YIELDS		2009 yields (bu/a)						
Hazen	57*	72*	25*	90*	47*	73*	39*	48*
Kewaunee	56*	74*	27*	80*	52*	76*	41*	43*
Rasmusson	59*	77*	27*	87*	57*	71*	44*	47*
Mean	57	74	26	86	52	73	41	46
LSD (0.05)[a]	5	10	5	18	14	11	18	7
HISTORIC YIELDS		2007–2009 yields (bu/a)						
Hazen	60	85*	44	75*	50	80*	42*	40*
Kewaunee	60	87*	46	76*	52	81*	42*	37*
Rasmusson	63	90*	54	79*	60	79*	42*	38*
Mean	61	87	48	77	54	80	42	38
LSD (0.05)[a]	2	5	4	8	7	7	7	5

* *Varieties not significantly different from highest yielding variety in the trial.*

[a] *The LSD (least significant difference) figures listed under the yield columns are a statistical measure of variation within the trial. If the difference in yield of two varieties is equal to or greater than the LSD, then the yields are significantly different. If the difference is less than the LSD, then the yield difference may have been due to environmental factors.*

BARLEY Table 7. Forage dry matter yield of spring barley varieties harvested at late boot/early heading

Variety	Yield (t/a)			Harvest date (June)	Crude protein (%)	RFQ[a]	Yield (t/a)	Harvest date (June)
	Madison	Arlington	Mean					
	2009				2006–2008		2007–2009	
Hazen	1.47*	1.38*	1.43*	16	14.0	143.2*	1.36*	12
Kewaunee	1.47*	1.43*	1.45*	15	13.8	139.7	1.36*	12
Rasmusson	1.36*	1.02	1.19	14	14.6	148.0*	1.21	11
LSD (0.05)	0.27	0.30	0.20		0.57	5.74	0.10	

* *Varieties not significantly different from the highest yielding variety in the trial.*

[a] *RFQ=Relative feed quality. Relative feed quality values can be used to make comparisons among varieties but should not be used to compare with other crops such as alfalfa.*

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