A3874

Wisconsin oats and barley performance tests

2011

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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 University of Wisconsin–Madison 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*	Mar. 31	July 27
Chilton	Kolbe Seeds, M. Glewen	red clay	12.0	100	Apr. 21	Aug. 17
Lancaster	T. Wood	silt loam	7.5	30*	Apr. 14	July 26
Madison	J. Mochon, T. Wright	silt loam	6.0	30*	Apr. 15	Aug. 6
Marshfield	M. Bertram	silt loam	6.0	30	Apr. 14	Aug. 17
Spooner	P. Holman	sandy loam	7.3	79	Apr. 8	Aug. 3
Sturgeon Bay	R. Weidman	silt loam	12.0	69	Apr. 27	Aug. 10

* Nitrogen credited from previous alfalfa or soybean.

Growing conditions

2010 season. In Wisconsin, the number of planted acres of oats in 2010 was 310,000, unchanged from the previous year. There were 170,000 acres harvested, 25,000 acres less than 2009. Oats in 2010 yielded 58.0 bushels per acre, a decrease of 10 bushels from the previous year. Fewer acres harvested and a lower yield led production to be down 26% from last year, to a total of 9.9 million bushels. Wisconsin was the second highest-producing state for oats this year, behind Minnesota, after being first in 2009.

Wisconsin produced 1.44 million bushels of barley in 2010, a slight decline from the previous year. Area planted to barley was unchanged from last year, at 45,000 acres, while area harvested increased 5,000 acres to 30,000 acres in 2010. Yields were down 11 bushels from the previous year to 48 bushels per acre.

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 68.0 bushels per acre, an increase of 6 bushels from the previous year. This matches the record yield set in 2000. Production was up 13% to a total of 13.3 million bushels. Wisconsin was the highest-producing state for oats in 2009 after being second in 2008.

Wisconsin produced 1.48 million bushels of barley in 2009, a 9% 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.

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 per acre at 8% moisture content. There are 32 and 48 pounds per bushel for oat and barley, respectively.

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 and/or the UW–Madison Department of Agronomy 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 Badger, 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, University of Wisconsin–Madison, 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															
Badger	Wisconsin	2010	yellow	6-18	33	med	38.4	med	R	—	—	R	R	yes	yes
Buckskin	Illinois	2008	tan	6-23	36	weak	39.9	med	R	R	—	R	R	yes	yes
Drumlin	Wisconsin	2003	yellow	6-25	37	med	36.8	med	IR	IR	—	R	R	yes	yes
Esker	Wisconsin	2004	yellow	6-21	36	strong	38.0	med	IR	IR	—	R	R	yes	yes
Excel	Indiana	2006	white	6-22	35	med	38.1	med	IR	S	—	R	R	yes	QA[g]
Kame	Wisconsin	2005	yellow	6-20	34	med	35.7	med	R	IR	—	R	IR	yes	yes
Vista	Wisconsin	1999	yellow	6-24	41	weak	37.5	low	R	R	—	R	IR	yes	yes
Other varieties															
Dane	Wisconsin	1990	yellow	6-17	35	med	37.8	med	IR	IR	S	R	R	yes	yes
Gem	Wisconsin	1996	yellow	6-23	38	weak	37.2	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	6-21	36	med	37.1	low	R	S	S	S	R	no	yes

[a] Maturity (month-day) as indicated by heading date in 17 Wisconsin tests conducted 2008–2010. 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 2008–2010. 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 2008–2010. 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, MR = moderate or good, S = susceptible or poor.

[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.

[g] QA = Quality Assurance.

— = information not available.

OAT Table 3. Oat variety grain yield comparisons in Wisconsin (bushels/acre)

Variety	Mean	Southern Wisconsin			Northern Wisconsin			
		Arlington	Lancaster	Madison	Chilton	Marshfield	Spooner	Sturgeon Bay
2010 YIELDS		2010						
Early season								
Badger	88*	116*	97*	96*	72*	36	80*	114
Dane	71	90	86	73	60	45*	26	115
Kame	78	105*	84	86*	61	47*	40	125*
Midseason								
Esker	84*	99	106*	87*	55	47*	60	133*
Excel	85*	111*	81	81	79*	55*	58	128*
Ogle	85*	100	82	79	60	45*	78*	148*
Late season								
Buckskin	81*	90	60	73	85*	67*	75*	115
Drumlin	86*	95	79	85*	60	67*	86*	129*
Gem	71	89	57	73	55	52*	71*	99
Vista	84*	103*	75	89*	49	51*	90*	130*
Mean	81	100	81	82	64	51	66	124
LSD (0.05)[a]	8	14	18	14	23	26	23	27
HISTORIC YIELDS		2008–2010						
Early season								
Badger	95	126*	77*	112*	77	102	54	116*
Dane	83	93	70	95	74	101	37	111
Kame	91	116	72	110	71	106	48	114
Midseason								
Esker	95	111	85*	118*	70	109	52	121*
Excel	101*	129*	75	118*	85*	112*	63	123*
Ogle	100*	117	83*	114*	74	107	76*	127*
Late season								
Buckskin	96	115	68	120*	82	113*	59	118*
Drumlin	101*	114	83*	123*	77	122*	68*	121*
Gem	87	101	69	109	70	99	64	99
Vista	96	111	81*	118*	94*	105	71*	112
Mean	95	113	76	114	77	108	59	116
LSD (0.05)[a]	4	8	9	11	10	12	10	12

* 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)			Harvest date (June)	Crude protein (%)	RFQ[a]	Yield (t/a)	Harvest date (June)
	Madison	Arlington	Mean					
	2010				2008–2010			
Buckskin	1.86	1.37	1.61	13	13.5	130.8*	1.68	17
Esker	1.74	1.11	1.42	9	14.5*	135.9*	1.33	15
Excel	1.91	1.25	1.58	10	13.6	136.2*	1.53	15
ForagePlus	2.47	2.40	2.43	23	12.4	126.5	2.44	26
Kame	1.45	1.04	1.24	9	14.3*	133.8*	1.29	13
Ogle	1.58	0.97	1.28	10	14.2*	136.0*	1.37	14
Vista	1.88	1.91	1.89	15	12.8	123.3	1.90	19
LSD (0.05)	0.32	0.37	0.24		0.68	7.26	0.12	

* Varieties not significantly different from the 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]					Licensed/ PVP[f]	Wis. cert.
									Crown rust	Stem rust	Loose smut	Powd. mildew	Spot blotch		
Recommended varieties															
Kewaunee	Wisconsin	1997	smooth	feed	6-18	31	med	44.9	R	R	—	IR	R	yes	yes
Quest	Minnesota	2010	smooth	malt	6-18	31	med	45.8	—	R	—	IR	R	yes	no
Rasmusson	Minnesota	2008	semi-smooth	malt	6-18	28	med	46.6	—	R	—	IR	R	yes	yes
Other varieties															
Drummond	N. Dakota	2001	smooth	malt	6-17	31	med	45.7	—	R	S	MR	R	yes	no
Hazen	N. Dakota	1984	smooth	feed	early	med	strong	med	S	S	S	MR	R	no	no
Lacey	Minnesota	2000	smooth	malt	early	med	med	high	—	R	S	MR	R	yes	yes
Stander	Minnesota	1993	smooth	feed	6-17	29	med	46.3	—	R	S	S	R	yes	no

[a] Maturity (month-day) as indicated by heading date in 17 Wisconsin tests conducted 2008–2010. 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 2008–2010. 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 20 Wisconsin tests conducted 2008–2010. 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, MR = moderate or good, S = susceptible or poor.

[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.

BARLEY **Table 6. Barley variety grain yield comparisons in Wisconsin (bushels/acre)**

Variety	Mean	Southern Wisconsin			Northern Wisconsin			
		Arlington	Lancaster	Madison	Chilton[a]	Marshfield	Spooner	Sturgeon Bay
2009 YIELDS		2010						
Kewaunee	59*	72*	74*	73*	—	49*	39*	45*
Quest	59*	70*	75*	67*	—	51*	45*	48*
Rasmusson	62*	70*	85*	71*	—	45*	47*	52*
Mean	60	71	78	70	—	48	44	48
LSD (0.05)[b]	3.5	12	12	9	—	12	11	9
HISTORIC YIELDS		2008–2010						
Kewaunee	59	87*	47	77*	53	70*	38*	41*
Quest	60*	85*	51*	75*	59*	69*	38*	41*
Rasmusson	62*	86*	55*	79*	58*	69*	41*	44*
Mean	60	86	51	77	57	69	39	42
LSD (0.05)[b]	2	6	5	8	5	7	7	5

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

[a] Historic yields for Chilton are for 2008 and 2009 only.

[b] 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					
	2010				2008–2010			
Kewaunee	1.71*	1.62*	1.66*	7	14.0*	129.3*	1.57	12
Rasmusson	1.43*	1.22	1.33	6	14.3*	135.2*	1.33	11
Westford	1.63*	1.74*	1.69*	14	11.7	122.7	1.79	19
LSD (0.05)	0.32	0.37	0.24		0.68	7.26	0.12	

* 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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