A3874

Wisconsin oats and barley performance tests—2012

John Mochon and Shawn Conley

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	20	May 3	August 11
Chilton	Kolbe Seeds, M. Glewen	red clay	12.0	125	May 12	August 16
Lancaster	T. Wood	silt loam	7.5	15	May 6	August 3
Madison	J. Mochon, T. Wright	silt loam	6.0	30*	May 6	August 4
Marshfield	M. Bertram	silt loam	6.0	40	May 27	August 30
Spooner	P. Holman	sandy loam	7.3	41	April 25	August 12
Sturgeon Bay	R. Weidman	silt loam	12.0	69	May 19	August 16

* Nitrogen credited from previous alfalfa or soybean.

Growing conditions

2011 season. In Wisconsin, oats planted acres totaled 210,000 in 2011, down 32% from 2010. There were 115,000 acres harvested, 55,000 acres less than last year. The 2011 oats yield was 62.0 bushels per acre, up 4 bushels from the previous year. Despite the higher yield, the fewer harvested acres resulted in a 28% decrease in production from 2010, to a total of 7.13 million bushels. Wisconsin was the top oats producing state in 2011, above Minnesota, which was the top producer last year.

Wisconsin produced 705,000 bushels of barley in 2011, down 51% from 2010. Area planted to barley, at 33,000 acres, was down 27% from last year, while area harvested, at 15,000 acres, was down 50%. Yield was down 1 bushel from the previous year to 47 bushels per acre.

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 2009, to a total of 9.9 million bushels. Wisconsin was the second highest-producing state for oats in 2010, 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 2009, 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.

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 learningstore.uwex.edu
- *Pest Management in Wisconsin Field Crops* (A3646), available at 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]					Licensed/ PVP[f]	Wis. cert.
									Crown rust	Stem rust	Septoria	Smut	BYDV[e]		
RECOMMENDED VARIETIES															
Badger	Wisconsin	2010	yellow	6-20	33	med	37.9	med	R	-	-	R	R	yes	yes
Drumlin	Wisconsin	2003	yellow	6-27	36	med	35.7	med	IR	IR	-	R	R	yes	yes
Esker	Wisconsin	2004	yellow	6-23	35	med	37.1	med	IR	IR	-	R	R	yes	yes
Excel	Indiana	2006	white	6-23	35	med	36.6	med	IR	S	-	R	R	yes	QA*
Rockford	N. Dakota	2008	white	6-29	41	strong	39.9	med	R	R	-	MR	R	yes	no
Shelby427	S. Dakota	2009	white	6-23	38	med	40.3	med/ high	R	MR	-	MR	S	yes	no
Vista	Wisconsin	1999	yellow	6-26	40	weak	36.8	low	R	R	-	R	IR	yes	yes
OTHER VARIETIES															
Buckskin	Illinois	2008	tan	late	med	weak	high	med	R	R	-	R	R	yes	yes
Dane	Wisconsin	1990	yellow	6-19	35	med	36.8	med	IR	IR	S	R	R	yes	yes
Kame	Wisconsin	2005	yellow	6-21	34	med	34.3	med	IR	IR	-	R	IR	yes	yes
Moraine	Wisconsin	2001	yellow	mid	med	med	high	med	R	IR	-	R	IR	yes	yes
Ogle	Illinois	1981	yellow	6-23	35	med	36.4	low	IR	S	S	S	R	no	yes

[a] Maturity (month-day) as indicated by heading date in 18 Wisconsin tests conducted 2009-2011. Varieties with generalized ratings indicate the following: early = before June 21, mid = June 21–24, late = after June 24.

[b] Height (inches) at maturity in 21 Wisconsin tests conducted 2009-2011. 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 2009-2011. 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 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 these varieties can't be grown and sold as seed without certification.

* QA= Quality Assurance

(-) = Information not available.

Table 3. Oat variety grain yield comparisons in Wisconsin

Variety	Mean	—Southern—			—Northern—			
		Arlington	Lancaster	Madison	Chilton	Marshfield	Spooner	Sturgeon Bay
2011 yields (bu/a)								
EARLY SEASON								
Badger	84	134	99	123*	80	34	47*	69
Dane	70	100	83	87	73	26	40	79*
Kame	69	88	83	79	75	32	53*	74
MIDSEASON								
Esker	80	103	102	104	85	32	55*	81*
Excel	84	102	95	89	94*	57	58*	93*
Ogle	76	85	95	81	84	36	60*	94*
Shelby427	98*	151	101	135*	80	65*	70*	84*
LATE SEASON								
Drumlin	86	101	103	101	89*	66*	68*	77
Rockford	101*	137	125*	129*	100*	81*	68*	67
Vista	89	99	122*	107	96*	67*	63*	71
Mean	84	110	101	104	86	50	58	79
LSD (0.05)[a]	6	10	17	12	12	16	24	15
Historic yields 2009-2011 yields (bu/a)								
EARLY SEASON								
Badger	89	124*	83	109	76	78	55	98
Dane	76	90	74	87	70	78	35	98
Kame	81	103	72	97	67	81	48	99
MIDSEASON								
Esker	88	104	89*	111	71	83	55	103
Excel	92	117	77	101	84	93*	61	109
Ogle	91	104	84	97	75	85	74*	115
Shelby427	94	130*	80	121*	77	86	65*	101
LATE SEASON								
Drumlin	92	104	83	105	81	102*	70*	100
Rockford	103	131*	96*	128*	99	97*	75*	94
Vista	92	107	86	108	80	97*	74*	93
Mean	90	111	82	106	78	88	61	101
LSD (0.05)[a]	4	8	9	9	9	12	12	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 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

Variety	Yield (t/a)			Harvest date June/July	Crude protein (%)	RFQ[a]	Yield (t/a)	Harvest date June
	Madison	Arlington	Mean					
	——————2011——————				——————2009-2011——————			
ForagePlus	2.08	2.65	2.36	7-4	13.2*	127.5*	2.29	28
Vista	1.56	1.69	1.62	6-27	13.3*	124.0*	1.73	21
LSD (0.05)	0.42	0.66	0.38		0.96	9.65	0.16	

[a] RFQ= Relative feed quality. Relative feed quality values 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.

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

Table 5. Barley variety descriptions

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															
Kewaunee	Wisconsin	1997	Smooth	feed	6-20	31	med	44.0	R	R	--	IR	R	yes	yes
Quest	Minnesota	2010	Smooth	malt	6-21	31	med	45.2	--	R	--	IR	R	yes	no
Rasmusson	Minnesota	2008	Semi-smooth	malt	6-20	29	med	45.8	--	R	--	IR	R	yes	yes
OTHER VARIETIES															
Drummond	N. Dakota	2001	Smooth	malt	early	med	med	med	--	R	S	MR	R	yes	no
Stander	Minnesota	1993	Smooth	feed	6-20	29	med	45.5	--	R	S	S	R	yes	no

[a] Maturity (month-day) as indicated by heading date in 18 Wisconsin tests conducted 2009–2011. 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 2009–2011. 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 19 Wisconsin tests conducted 2009–2011. 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 resistance.

[f] PVP = Plant Variety Protection or licensed for seed production. A "yes" indicates that these varieties cannot be reproduced and sold as seed without certification.

(--) = Information not available.

Table 6. Barley variety grain yield comparisons in Wisconsin

Variety	Mean	Southern			Northern			
		Arlington	Lancaster	Madison	Chilton	Marshfield	Spooner	Sturgeon Bay
2011 YIELDS	2011 yields (bu /a)							
Kewaunee	54*	100	30	64*	39*	----	36*	----
Quest	56*	108	35	57*	41*	----	39*	----
Rasmusson	57*	100	51*	59*	45*	----	32*	----
Stander	54*	94	47*	59*	39*	----	29*	----
Mean	55	101	41	60	41	----	34	----
LSD (0.05)[a]	5	7	12	33	12	----	12	----
HISTORIC YIELDS	2009–2011 yields (bu /a)							
Kewaunee	54	82*	44	72*	46*	62*	39*	34*
Quest	56*	85*	48*	70*	50*	60	39*	37*
Rasmusson	56*	82*	54*	72*	51*	58	41*	37*
Stander	57*	79	51*	73*	48*	65*	42*	38*
Mean	56	82	49	72	49	61	40	37
LSD (0.05)[a]	2	5	6	12	5	4	8	4

* 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.

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

Variety	Yield (t/a)			Harvest date June/July	Crude protein (%)	RFQ[a]	Yield (t/a)	Harvest date June
	Madison	Arlington	Mean					
	2011				2009–2011			
Kewaunee	1.15*	1.44*	1.29*	6-26	14.6	134.0*	1.47*	16
Westford	1.28*	1.86*	1.57*	7-5	13.6	125.8*	1.62*	24
LSD (0.05)	0.42	0.66	0.38		0.96	9.65	0.16	

[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.

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

Authors: John Mochon is the small grains program manager and Shawn Conley is an associate professor in agronomy, College of Agricultural and Life Sciences, University of Wisconsin–Madison. Dr. Conley also holds an appointment with UW-Extension, Cooperative Extension. Cooperative Extension Publications are subject to peer review.

University of Wisconsin-Extension, Cooperative Extension, in cooperation with the U.S. Department of Agriculture and Wisconsin counties, publishes this information to further the purpose of the May 8 and June 30, 1914 Acts of Congress. An EEO/AA employer, the University of Wisconsin-Extension, Cooperative Extension provides equal opportunities in employment and programming, including Title IX and ADA requirements. If you need this information in an alternative format, contact Equal Opportunity and Diversity Programs, University of Wisconsin-Extension, 432 N. Lake St., Rm. 501, Madison, WI 53706, diversity@uwex.edu, phone: (608) 262-0277, fax: (608) 262-8404, TTY: 711 Wisconsin Relay.

This publication is available from your county UW-Extension office (www.uwex.edu/ces/cty) or from Cooperative Extension Publishing. To order, call toll-free: 1-877-WIS-PUBS (1-877-947-7827) or visit our website: learningstore.uwex.edu.