A3874

Wisconsin oats and barley performance tests—2014

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 using 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, N. Brickl	silt loam	6.0	30*	April 29	July 31
Chilton	Kolbe Seeds, M. Glewen	red clay	12.0	------	------	------
Lancaster	A. Crooks	silt loam	7.5	16.5	May 15	Aug. 13
Madison	J. Mochon, T. Wright	silt loam	6.0	30*	May 2	Aug. 8
Marshfield	J. Cavadini	silt loam	6.0	barley: 50, oats: 40	May15	Aug. 22
Spooner	P. Holman	sandy loam	7.3	53	May 7	Aug. 20
Sturgeon Bay	M. Stasiak	silt loam	12.0	46	June 4	Sept. 4

* Nitrogen credited from previous alfalfa or soybean.

Growing conditions

2013 season. Wisconsin oats production was at 6.83 million bushels produced, down 12% from 2012. This was the lowest production since record keeping began in 1866. The 2013 oat yield was 65.0 bushels per acre, up 5 bushels from the previous year. Planted acres totaled 255,000 in 2013, up 16% from 2012. There were 105,000 acres harvested, a decrease of 25,000 acres from the previous year.

Wisconsin barley production was 784,000 bushels in 2013, up 19% from 2012. Yield was 49 bushels per acre, up 5 bushels from the previous year. Area planted to barley was 33,000 acres, unchanged from last year, and 16,000 acres were harvested, which was an increase of 1,000 acres from 2012.

2012 season. In Wisconsin, oats planted acres totaled 220,000 in 2012, up nearly 5% from 2011. There were 130,000 acres harvested, which was an increase of 15,000 acres from the previous year. The 2012 oats yield was 60.0 bushels per acre, down 2 bushels from the previous year. The increase in acres harvested resulted in a 9% increase in total production compared to last year. At 7.8 million bushels produced, Wisconsin was the second largest oat-producing state in 2012, after Minnesota.

Wisconsin produced 660,000 bushels of barley in 2012, down 6% from 2011 and down 54% from 2010. Area planted to barley, at 33,000 acres, was the same as last year, as was area harvested, at 15,000 acres. Yield was down 3 bushels from the previous year to 44 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 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
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	6-24	31	med	36.9	med	R	R	IR	R	R	yes	yes
Drumlin	Wisconsin	2003	yellow	6-30	35	weak	35.9	med	R	IR	IR	R	R	yes	yes
Esker	Wisconsin	2004	yellow	6-26	34	med	36.2	med	IR	IR	IR	R	R	yes	yes
Excel	Indiana	2006	white	6-26	33	med	35.6	med	R	S	IR	R	R	yes	QA*
Horsepower	S. Dakota	2012	white	6-27	32	med	38.4	med	R	R	IR	R	R	yes	no
Newburg	N. Dakota	2011	white	6-30	40	med	37.3	med	R	R	IR	R	R	yes	no
Rockford	N. Dakota	2008	white	7-2	38	med	38.0	med	R	R	IR	MR	R	yes	no
Shelby427	S. Dakota	2009	white	6-26	36	med	39.4	med/ high	R	MR	IR	MR	R	yes	yes
Vista	Wisconsin	1999	yellow	6-30	37	weak	35.1	low	R	R	MR	R	IR	yes	yes
OTHER VARIETIES															
Dane	Wisconsin	1990	yellow	6-23	33	med	35.8	med	IR	IR	S	R	R	yes	yes
Kame	Wisconsin	2005	yellow	6-25	32	med	34.0	med	IR	IR	MR	R	IR	yes	yes
Ogle	Illinois	1981	yellow	6-27	34	med	35.2	low	IR	S	S	S	R	no	yes

[a] Maturity (month-day) as indicated by heading date in 18 Wisconsin tests conducted 2011–2013. Varieties with generalized ratings indicate the following: early = before June 25, mid = June 25–29, late = after June 29.

[b] Height (inches) at maturity in 19 Wisconsin tests conducted 2011–2013. Varieties with generalized ratings indicate the following:
short = < 33 inches, med = 33–38 inches, tall = > 38 inches.

[c] Test weight (pounds/bushel) in 19 Wisconsin tests conducted 2011–2013. 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
2013 yields (bu/a)								
EARLY SEASON								
Badger	102	156	133	115*	-----	31	85*	94
Dane	100	139	127	103	-----	48	84*	101
Kame	104	137	141	106	-----	42	83*	113
MIDSEASON								
Esker	111	147	144*	107	-----	48	101*	118
Excel	116	150	153*	124*	-----	50	97*	120*
Horsepower	126	173	155*	130*	-----	62*	100*	134*
Ogle	107	130	138	110	-----	41	94*	129*
Shelby427	104	139	137	109	-----	43	78	120*
LATE SEASON								
Drumlin	109	144	137	98	-----	54	99*	122*
Newburg	117	152	129	122*	-----	72*	104*	123*
Rockford	109	142	127	106	-----	70*	89*	121*
Vista	105	127	125	109	-----	55	102*	113
Mean	109	145	137	112	-----	51	93	117
LSD (0.05)[a]	6	14	12	19	-----	14	22	15
HISTORIC YIELDS 2011–2013 yields (bu/a)								
EARLY SEASON								
Badger	89	137	113	104	80	52	59	72
Dane	81	117	99	90	73	51	58	77
Kame	84	110	109	86	75	55	70	78
MIDSEASON								
Esker	93	123	120*	96	85	61	74	84
Excel	97	123	124*	99	94*	68	80*	87
Horsepower	106*	152	123*	113*	78	73	81*	101
Ogle	90	109	116*	88	84	58	78*	92
Shelby427	97	135	116*	106*	80	65	78*	87
LATE SEASON								
Drumlin	93	114	115*	91	89*	70	84*	87
Newburg	104*	132	120*	116*	96*	85*	90*	87
Rockford	97	123	118*	98	100*	77*	76	87
Vista	89	100	120*	88	96*	66	78*	81
Mean	93	123	116	98	86	65	76	85
LSD (0.05)[a]	3	7	9	8	12	8	12	8

* 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

Variety	Yield (t/a)			Harvest date June/July	Crude protein (%)	RFQ[a]	Yield (t/a)	Harvest date June
	Madison	Arlington	Mean					
	——————2013——————				——————2011–2013——————			
ForagePlus	2.97	2.65*	2.81	7-4	12.8	123.1*	2.43	27
Rockford	1.82	2.12	1.97	6-29	14.4*	120.8*	1.82	23
Vista	2.36	2.32*	2.34	6-27	14.1*	125.5*	1.97	21
LSD (0.05)	0.57	0.41	0.35		1.09	7.45	0.19	

[a]RFQ= Relative forage quality. Relative forage 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	6-24	30	med	42.7	R	R	R	IR	R	yes	yes
Pinnacle	N. Dakota	2008	Smooth	malt	6-26	28	strong	45.3	R	R	R	--	MR	yes	yes
Quest	Minnesota	2010	Smooth	malt	6-25	30	med	44.5	R	R	R	IR	R	yes	no
Rasmusson	Minnesota	2008	Semi-smooth	malt	6-24	28	med	44.6	R	R	R	IR	R	yes	yes
OTHER VARIETIES															
Stander	Minnesota	1993	Smooth	feed	early	short	med	med	R	R	S	S	R	yes	no

[a] Maturity (month-day) as indicated by heading date in 18 Wisconsin tests conducted 2011–2013. Varieties with generalized ratings indicate the following: early = before June 24, mid = June 24–27, late = after June 27.

[b] Height (inches) at maturity in 19 Wisconsin tests conducted 2011–2013. 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 18 Wisconsin tests conducted 2011–2013. 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
2013 yields (bu /a)								
Kewaunee	68*	98*	62	88*	----	57*	53*	53
Pinnacle	71*	90*	72*	88*	----	58*	50*	70*
Quest	61	95*	66*	74*	----	33	55*	40
Rasmusson	71*	98*	75*	86*	----	54*	56*	59*
Mean	68	95	69	84	----	51	54	56
LSD (0.05)[a]	5	8	12	23	----	9	13	13
HISTORIC YIELDS 2011–2013 yields (bu/a)								
Kewaunee	51	82	45	62*	39*	56*	38*	31
Pinnacle	51	75	50	55*	41*	56*	35	42
Quest	51	87*	51*	55*	41*	47	43*	27
Rasmusson	55	88*	58*	60*	45*	55*	40*	32
Mean	52	83	51	58	41	54	39	33
LSD (0.05)[a]	3	5	7	13	12	6	7	6

* 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	Crude protein (%)	RFQ[a]	Yield (t/a)	Harvest date June
	Madison	Arlington	Mean					
	———2013———				———2011–2013———			
Kewaunee	1.71	1.88*	1.79	21	15.1*	131.7*	1.48*	17
Westford	1.11	1.60*	1.35	28	14.9*	133.6*	1.39*	25
LSD (0.05)	0.57	0.41	0.35		1.09	7.45	0.19	

[a] RFQ=Relative forage quality. Relative forage 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.

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Authors: John Mochon is the small grains program manager and Shawn Conley is a 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.

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