A3874

Wisconsin oats and barley performance tests—2015

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. These varieties 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 randomized 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, P. LeMahieu	silt loam	6.0	30*	April 23	Aug. 8
Chilton	Kolbe Seeds, M. Glewen	red clay	12.0	------	May 23	------
Lancaster	A. Crooks, B. Meyers	silt loam	7.5	barley: 5, oats: 8	April 22	Aug. 6
Madison	J. Mochon, T. Wright	silt loam	6.0	30*	May 6	------
Marshfield	J. Cavadini	silt loam	6.0	barley: 50, oats: 40	May 19	Aug. 21
Spooner	P. Holman	sandy loam	7.3	74	May 7	Aug. 25
Sturgeon Bay	M. Stasiak	silt loam	12.0	82	May 27	Aug. 27

* Nitrogen credited from previous alfalfa or soybean.

Growing conditions

2014 season. Wisconsin oats production is estimated at 8.68 million bushels, up 27% from last year's record low. Area seeded to oats, at 255,000 acres, and harvested area, at 140,000 acres, continue the overall downward trend in oats acreage. The last four years have seen the lowest planted and harvested acreage totals on record. Oats yield, at 62 bushels per acre, is down three bushels from last year.

Wisconsin barley production, at 752 thousand bushels, is down 4% from last year and the third lowest on record. Planted acreage, at 26,000, is the lowest in more than 30 years. Barley harvested area, at 16,000 acres, is unchanged from last year. Barley yield, at 47 bushels per acre, is down two bushels from last year.

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 five 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 five bushels from the previous year. Area planted to barley was 33,000 acres, unchanged from last year, while 16,000 acres were harvested, which was an increase of 1,000 acres from 2012.

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 oats 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, Moraine, and Ron 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	6-23	32	med	35.9	med	R	R	IR	R	R	yes	yes
Deon	Minnesota	2013	yellow	7-1	38	med	38.1	med	R	-	R	R	R	yes	no
Drumlin	Wisconsin	2003	yellow	6-30	36	weak	36.6	med	R	IR	IR	R	R	yes	yes
Esker	Wisconsin	2004	yellow	6-26	35	med	36.7	med	R	IR	IR	R	R	yes	yes
Excel	Indiana	2006	white	6-26	35	weak	36.3	med	R	S	IR	R	R	yes	QA*
Horsepower	S. Dakota	2012	white	6-26	33	weak	38.5	med	R	R	IR	R	R	yes	no
Newburg	N. Dakota	2011	white	6-30	41	weak	37.8	med	R	R	IR	R	R	yes	no
Ron	Wisconsin	2014	yellow	6-29	37	med	37.6	high	R	-	R	R	R	yes	yes
Rockford	N. Dakota	2008	white	7-1	39	med	38.0	med	R	R	IR	MR	R	yes	yes
Shelby427	S. Dakota	2009	white	6-25	38	weak	39.1	med/ high	R	MR	IR	MR	R	yes	yes
Vista	Wisconsin	1999	yellow	6-30	38	weak	35.9	low	R	R	MR	R	IR	yes	yes
OTHER VARIETIES															
Dane	Wisconsin	1990	yellow	6-23	34	weak	35.6	med	IR	IR	S	R	R	yes	yes
Kame	Wisconsin	2005	yellow	6-25	34	weak	34.4	med	R	IR	MR	R	IR	yes	yes
Ogle	Illinois	1981	yellow	6-26	36	weak	35.5	low	IR	S	S	S	R	no	yes

[a] Maturity (month-day) as indicated by heading date in 18 Wisconsin tests conducted 2012–2014. 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 18 Wisconsin tests conducted 2012–2014. Varieties with generalized ratings indicate the following:

short = <33 inches, med = 33–38 inches, tall = >38 inches.

[c] Test weight (pounds/bushel) in 17 Wisconsin tests conducted 2012–2014. 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
2014 yields (bu/a)								
EARLY SEASON								
Badger	89	138	95	-----	-----	108	63	40
Dane	81	134	74	-----	-----	77	70	50
Kame	88	128	99	-----	-----	94	59	59
MIDSEASON								
Esker	106*	149*	112*	-----	-----	87	103*	80
Excel	94	139	110*	-----	-----	108	46	68
Horsepower	113*	159*	113*	-----	-----	107	92*	96
Ogle	105	136	112*	-----	-----	87	89*	101*
Ron	-----	-----	111*	-----	-----	132	101*	85
Shelby427	100	155*	100	-----	-----	102	75	67
LATE SEASON								
Deon	-----	-----	125*	-----	-----	166	96*	115*
Drumlin	100	125	100	-----	-----	104	67	103*
Newburg	-----	-----	117*	-----	-----	144	103*	102*
Rockford	113*	131	114*	-----	-----	133	70	118*
Vista	112*	132	109*	-----	-----	110	102*	109*
Mean	100	139	107	-----	-----	111	81	85
LSD (0.05)[a]	7	16	24	-----	-----	19	21	18
HISTORIC YIELDS 2012–2013 yields (bu/a)								
EARLY SEASON								
Badger	92	138	120	94*	----	61	66	74
Dane	88	126	106	91	----	63	67	76
Kame	93	121	123	89	----	66	78	80
MIDSEASON								
Esker	100	134	129*	91	----	75*	83	86
Excel	104	134	138*	103*	----	74*	91*	84
Horsepower	109	148	132*	105*	----	78*	88*	105*
Ogle	98	121	127	91	----	69	87*	92
Ron	103	131	128*	105*	----	72*	100*	81
Shelby427	96	127	123	91	----	65	83	88
LATE SEASON								
Deon	100	119	119	88	----	76*	99*	96*
Drumlin	97	120	120	85	----	72*	91*	93
Newburg	103	124	120	98*	----	80	100*	97*
Rockford	94	115	115	83	----	74*	80	98*
Vista	89	100	119	79	----	65	86*	86
Mean	97	126	123	92	----	71	86	88
LSD (0.05)[a]	4	9	10	11	----	9	14	10

* 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.

(-----) = information not available

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					
	——————2014——————				——————2012–2014——————			
ForagePlus	2.60	2.90	2.73	7-2	12.9	124.4	2.55	6-27
Horsepower	1.37	1.81	1.59	6-20	13.9*	138.8	1.42	6-15
Newburg	1.88	2.25	2.06	6-26	13.5*	121.4	1.90	6-21
Rockford	2.02	2.20	2.11	6-26	14.1*	123.7	1.91	6-22
Vista	1.76	2.14	1.95	6-24	14.0*	119.7	2.08	6-20
LSD (0.05)	0.36	0.47	0.29		0.83	5.26	0.17	

[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	32	med	43.7	R	R	R	IR	R	yes	yes
Pinnacle	N. Dakota	2008	Smooth	malt	6-26	31	strong	46.4	R	R	R	--	MR	yes	yes
Quest	Minnesota	2010	Smooth	malt	6-25	32	med	45.6	R	R	R	IR	R	yes	no
Rasmusson	Minnesota	2008	Semi-smooth	malt	6-24	30	med	45.5	R	R	R	IR	R	yes	yes

[a] Maturity (month-day) as indicated by heading date in 18 Wisconsin tests conducted 2012–2014. 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 18 Wisconsin tests conducted 2012–2014. 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 17 Wisconsin tests conducted 2012–2014. 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
2014 yields (bu/a)								
Kewaunee	75*	96*	56*	75*	-----	-----	69*	79*
Pinnacle	71*	80	53*	69*	-----	-----	72*	82*
Quest	75*	94*	42*	83*	-----	-----	79*	75*
Rasmusson	72*	95*	47*	63	-----	-----	77*	75*
Mean	73	91	49	73	-----	-----	74	78
LSD (0.05)[a]	6	9	15	15	-----	-----	20	18
HISTORIC YIELDS 2012–2014 yields (bu/a)								
Kewaunee	60*	80	54*	65*	-----	56*	49*	52
Pinnacle	58	72	54*	60*	-----	56*	47	61*
Quest	59*	82*	53*	64*	-----	47	57*	47
Rasmusson	62*	87*	56*	61*	-----	55*	55*	53*
Mean	60	80	54	62	-----	53	52	53
LSD (0.05)[a]	3	5	7	9	-----	6	8	8

* 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.

(-----) = information not available

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					
	————2014————				————2012–2014————			
Celebration	1.32	2.18*	1.75	21	14.8	130.0*	1.59*	16
Kewaunee	1.59*	2.07*	1.83	20	14.7	128.0*	1.66*	15
Westford	1.75*	2.22*	1.98	26	14.4	131.0*	1.53*	22
LSD (0.05)	0.36	0.47	0.29		0.83	5.26	0.17	

[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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