A3874

Wisconsin oats and barley performance tests

2009

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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.

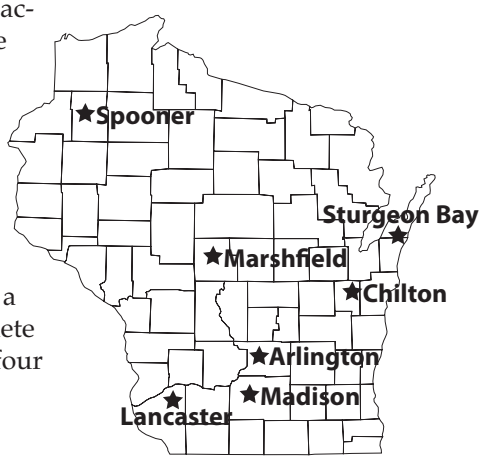

Table 1. Location and agronomics of small grain variety trials in Wisconsin

Location	Cooperators	Soil type	Row spacing (inches)	Average nitrogen applied (lb/a)	Planting date	Harvest date
Arlington	J. Albertson	silt loam	6.0	30*	April 15	August 3
Chilton	Kolbe Seeds, M. Glewen	red clay	12.0	120	May 9	August 18
Lancaster	T. Wood	silt loam	7.5	30*	May 1	August 7
Madison	J. Mochon, T. Wright	silt loam	6.0	30*	April 24	July 31
Marshfield	M. Bertram	silt loam	6.0	30	May 20	August 18
Spooner	P. Holman	sandy loam	7.3	80	May 9	August 25
Sturgeon Bay	R. Weidman	silt loam	12.0	58	May 7	August 12

**Nitrogen credited from previous alfalfa or soybean.*

Growing conditions

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; 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.

2007 season. Oat acres in Wisconsin declined 100,000 acres from 2006. Overall there were 270,000 acres planted, and 160,000 acres of oats harvested for grain. Oats yielded 67 bushels per acre, an increase of 4 bushels from 2006. Wisconsin was the third-highest-producing state for oats this year, down from first place in 2006.

Barley yields increased 3 bushels from the previous year to 57 bushels per acre. Area of barley harvested fell 7,000 acres to 23,000 acres in 2007.

Source: USDA National Agricultural Statistics Service, http://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/bushel, respectively for oat and barley) 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 procedures are intended to reinforce Plant Variety Protection 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)
—learningstore.uwex.edu

Pest Management in Wisconsin Field Crops (A3646)
—learningstore.uwex.edu

The Wisconsin Certified Seed Directory
—www.wisc.edu/wcia

For information on seed availability of public varieties, contact the Wisconsin Crop Improvement Association, 554 Moore Hall, 1575 Linden Drive, Madison, WI 53706, (608) 262-1341, www.wisc.edu/wcia.

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]	PVP[f]	Wis. cert.
Recommended varieties															
Baker	Iowa	2006	white	6-21	35	med	38.3	high	IR	IR	—	R	R	yes	no
Dane	Wisconsin	1990	yellow	6-15	33	strong	37.1	med	IR	IR	S	R	IR	yes	yes
Drumlin	Wisconsin	2003	yellow	6-22	35	weak	37.4	med	IR	IR	—	R	R	yes	yes
Esker	Wisconsin	2004	yellow	6-19	34	med	37.7	med	IR	IR	—	R	IR	yes	yes
Excel	Indiana	2006	white	6-17	34	med	39.4	med	IR	S	—	R	IR	yes	no
Kame	Wisconsin	2005	yellow	6-17	32	med	36.5	med	R	IR	—	R	MR	yes	yes
Moraine	Wisconsin	2001	yellow	6-18	36	weak	38.3	med	R	IR	—	R	MR	yes	yes
Vista	Wisconsin	1999	yellow	6-22	38	weak	36.9	low	R	R	—	R	MR	yes	yes
Other varieties															
Gem	Wisconsin	1996	yellow	late	med	weak	high	med	IR	R	—	MR	R	yes	yes
Leonard	Minnesota	2003	yellow	late	tall	med	med	med	IR	S	—	R	R	yes	no
Ogle	Illinois	1981	yellow	med	med	strong	high	low	MR	S	S	S	IR	no	yes
Richard	Minnesota	2000	yellow	late	tall	strong	high	med	IR	S	—	IR	IR	yes	yes
Robust	Indiana	2006	white	late	med	strong	high	med	R	S	—	MR	R	yes	no
Sesqui	Minnesota	2001	yellow	late	tall	med	high	med	MR	S	—	R	IR	yes	no
Wabasha	Minnesota	2001	white	late	tall	med	high	med	MR	S	—	R	MR	yes	yes
Winona	Minnesota	2005	yellow	early	med	strong	high	med	R	—	—	R	IR	no	no

[a] *Maturity (month-day) as indicated by heading date in 17 Wisconsin tests conducted 2006–2008. Varieties with generalized ratings indicate the following: early = before June 18, med = June 18–21, late = after June 21.*

[b] *Height (inches) at maturity in 21 Wisconsin tests conducted 2006–2008. 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 2006–2008. 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. A "yes" indicates that the variety cannot be reproduced and sold as seed by variety name 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
2008 YIELDS		2008 yields (bu/a)						
Early maturing								
Dane	91	109	71	111	86*	96	44	117
Kame	100	127*	83	120	89*	106	53	121
Moraine	99	105	93*	130	86*	103	48	126*
Excel	111*	137*	90	141*	96*	114*	65*	136*
Midseason								
Esker	102	124*	91	126	83*	111	47	134*
Ogle	104	122	91	133	83*	102	65*	130*
Mid to late-season								
Baker	112*	133*	101*	146*	87*	111	67*	136*
Drumlin	113*	132*	104*	157*	75	125*	62*	139*
Gem	97	112	92	134	71	101	56*	116
Robust	100	111	84	141*	88*	95	59*	123
Vista	102	112	107*	138*	84*	92	54	127*
Mean	103	120	92	134	84	105	56	128
LSD (0.05)[a]	5	13	14	19	17	12	12	15
HISTORIC YIELDS		2006–2008						
Early maturing								
Dane	97	120	79	111	72	113	68*	117
Kame	102	142*	85	128	79*	102	68*	111
Moraine	101	113	94*	128	79*	112	63	117
Excel	108	145*	90	134*	80*	114	73*	120
Midseason								
Esker	112*	139*	102*	131	80*	123*	70*	137*
Ogle	107	131	95*	139*	80*	106	74*	125
Mid to late-season								
Baker	112*	137	100*	146*	82*	108	70*	141*
Drumlin	114*	135	98*	143*	81*	125*	74*	143*
Gem	99	128	75	141*	55	110	61	123
Robust	106	133	85	135*	86*	109	68*	129
Vista	104	119	102*	143*	76	94	66*	130
Mean	106	131	91	134	77	111	69	126
LSD (0.05)[a]	4	7	9	14	9	9	8	11

**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 **OAT**

Variety	Yield (t/a) Madison	Arlington	Mean	Harvest date (June)	Crude protein (%)	RFQ[a]	Yield (t/a)	Harvest date (June)
	2008				2005–2007		2006–2008	
Baker	1.66	1.87	1.76	17	13.3	153.4*	1.56	13
Dane	1.08	1.19	1.14	13	14.2*	146.0	1.14	8
Drumlin	1.98	1.77	1.88	19	13.2	146.7	1.71	15
Esker	1.19	1.49	1.34	16	13.8*	141.2	1.43	12
Excel	1.47	1.56	1.51	16	13.1	141.8	1.32	12
ForagePlus	2.51	3.16	2.83	27	11.8	136.1	2.31	23
Gem	1.88	1.59	1.74	18	14.0*	140.9	1.87	16
Kame	1.18	1.29	1.24	14	13.9*	152.5*	1.19	10
Moraine	0.98	1.28	1.13	14	13.6*	148.3*	1.19	11
Ogle	1.20	1.43	1.32	15	14.0*	150.9*	1.29	12
Robust	2.06	1.85	1.95	19	12.5	140.5	1.69	15
Vista	2.19	2.11	2.15	20	12.2	137.1	1.88	16
LSD (0.05)	0.24	0.32	0.2		0.64	5.8	0.12	

**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	PVP[f]	Wis cert.
Recommended varieties															
Drummond	N. Dakota	2001	smooth	malt	6-15	29	strong	46	—	R	S	MR	R	yes	no
Hazen	N. Dakota	1984	smooth	feed	6-16	31	med	45	S	S	S	MR	R	no	yes
Kewaunee	Wisconsin	1997	smooth	feed	6-15	31	med	45	R	R	—	IR	R	yes	yes
Robust	Minnesota	1983	smooth	malt	6-16	31	med	46	S	IR	S	S	R	yes	no
Stander	Minnesota	1993	smooth	feed	6-15	29	strong	46	—	R	S	S	R	yes	no`
Other varieties															
Bounty	Canada	1989	smooth	feed	med	med	med	med	MR	MR	S	R	S	yes	no
Chilton	Wisconsin	1990	smooth	feed	med	med	med	high	R	R	—	R	R	yes	no
Excel	Minnesota	1990	smooth	malt	early	med	med	med	S	R	S	S	R	yes	no
Lacey	Minnesota	2000	smooth	malt	early	med	med	high	—	R	S	—	R	yes	yes
MNBrite	Minnesota	1998	smooth	—	early	med	med	med	R	R	S	S	R	yes	no

[a] Maturity (month-day) as indicated by heading date in 17 Wisconsin tests conducted 2006–2008. Varieties with generalized ratings indicate the following: early = before June 21, med = June 21–25, late = after June 25.

[b] Height (inches) at maturity in 20 Wisconsin tests conducted 2006–2008. 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 2006–2008. 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.

[d] 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. 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
2008 YIELDS		2008 yields (bu/a)						
Drummond	65*	112*	43*	81*	58*	80*	36*	47
Hazen	62*	111*	39*	67	56*	91*	35*	34
Kewaunee	63*	114*	41*	80*	53*	86*	34*	35
Robust	58	97	43*	75*	50*	77	35*	28
Stander	62*	103	46*	82*	59*	77	34*	30
Mean	62	108	42	77	55	82	35	35
LSD (0.05)[a]	4	9	8	11	12	11	7	10
HISTORIC YIELDS		2006–2008			2007–2008	2006–2008		
Drummond	63*	92*	49	75*	59*	74*	39*	55
Hazen	61*	93*	50	74*	52*	74*	40*	42
Kewaunee	63*	95*	51	79*	52*	79*	40*	42
Robust	58	87	48	72*	48	70	40*	36
Stander	63*	92*	61	79*	53*	71*	39*	39
Mean	62	92	52	76	53	74	40	43
LSD (0.05)[a]	2	5	6	8	8	8	5	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.

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					
	2008				2005–2007		2006–2008	
Hazen	1.32*	1.79*	1.55*	14	13.4*	142.7*	1.34*	10
Kewaunee	1.47*	1.72*	1.60*	14	13.3*	140.4*	1.46*	9
LSD (0.05)	0.24	0.32	0.20		0.64	5.80	0.12	

**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.

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