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Preliminary Report 24

**2009 Wheat, Barley and Oat Variety Performance in Minnesota
Preliminary Report**

Preface

Jochum Wiersma

The number of adjectives needed to describe the 2009 growing season strain the English language. It was a year of opposites and extremes that will not quickly be forgotten. It started in 2008 with a very wet fall that caused massive soybean, sugar beet, and corn harvest problems. Ultimately, nearly a third Minn-Dak Farmers Cooperative's beet acreage in the southern Red River Valley was abandoned and a sizable portion of the corn acreage across the whole northwest portion of the State was left standing until early this spring. The wet fall was followed by above average snow fall across the area. Combined, this caused widespread flooding in the southern half of the Red River Valley during the second half of March. Unseasonable cold weather delayed or even halted spring run-off and ultimately prevented widespread flooding downstream.

This unseasonable cold weather continued for much of the month of April and little fieldwork had been completed by the end of the month. Statewide 13% of the spring wheat acres had been planted by April 27, well behind the 5-year average of 23%. Rains in the beginning of May further delayed planting. By May 17th, only one third of the acres had been planted which is well behind last year's progress and the five-year average of 88 and 90%, respectively. Emergence was equally slow with less than 20% of the crop emerged by the middle of May. Nearly 50% of the spring wheat acres were planted in the third week of May. Heavy rains over the Memorial Day weekend delayed progress once more and by the end of the month, 12% of the spring wheat had not been planted yet. Just 65% of the spring wheat had emerged by the end of the May compared to 82% last year. The Memorial Day weekend rain also caused major stand reductions as temporary flooding and/or saturated soil conditions caused germinating seed and emerging seedlings to die.

The cool weather continued for much of June. Consequently, the crops tillered very well. However, the number of spikelets per spike, the second yield component, was less than expected with many fields and varieties not exceeding 13 spikelets per spike. On July 1, the USDA forecasted Minnesota's spring wheat to yield an average of 49 bushels per acre. Ultimately this was adjusted upwards to 54 bushels per acre in the September Small Grain Summary. This is the fourth highest average yield ever recorded and followed the record and near record yields of 2007 and 2008, respectively. Individual reports of yields exceeding 90 bushels per acre were again not uncommon.

Harvest, was like the whole season, well behind last year and the 5 year average. By September 1st, less than 30% of the spring wheat had been harvested. In comparison, last year nearly 90% of the spring wheat harvest had been completed by the same date. There were even a few reports of spring wheat being harvested during the first few days of October.

Disease problems and yield or quality losses due to diseases were minimal. In all likelihood, this was simply a function of the extremely cool conditions that didn't allow diseases other than tan spot to develop to economically damaging levels.

Nonetheless, the overall quality of the crop was disappointing. While test weight was generally excellent and there were little to no concerns about contamination with DON, there were concerns about sprout damage as weather delays pushed back harvest. The biggest problem, however, was the low to very low grain protein percentages that have been reported throughout the region. Consequently, the discounts at harvest were very large. The protein discounts in combination with base prices nearly half of just a year ago forced cash bids at harvest below \$3.00 per bushels, a prices level that is well below both the break-even price ~~and the loan rate~~ for spring wheat.

Overall spring wheat acreage declined 14% to 1.6 million acres planted and 1.55 million acres harvested. This decline was not simply a function of the spring planting delays but also a function of quickly escalated fertilizer input costs in 2008 and early winter of 2009. Winter wheat acreage declined sharply to 55,000 acres. Barley acreage dropped below 100,000 and with only 95,000 planted and 80,000 harvested is the lowest acreage recorded since 1875. Oat acreage slipped 3% to 170,000 acres harvested, the lowest acreage reported since 1867.

Introduction

Successful small grain production begins with selection of the best varieties for a particular farm or field. For that reason, varieties are compared in trial plots on the Minnesota Agricultural Experiment Station (MAES) sites at St. Paul, Rosemount, Waseca, Lamberton, Morris, and Crookston. In addition to the six MAES locations, trials are also planted with a number of farmer cooperators. These plots are handled such that the factors affecting yield and performance are as close to uniform for all entries at each location as possible.

The MAES 2009 Wheat, Barley and Oat Variety Performance in Minnesota Preliminary Report is presented under authority granted by the Hatch Act of 1887 to the Minnesota Agricultural Experiment Station to conduct performance trials on farm crops and interpret data to the public.

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Variety Classifications

Varieties are listed in the tables alphabetically. No other distinction or classification is used to group varieties. Seed of tested varieties can be eligible for certification, and use of certified seed is encouraged. However, certification does not imply a recommendation. Registered and certified seed is available from seed dealers or from growers listed in the 'Minnesota Crop Improvement Association

2010 Directory', available through the Minnesota Crop Improvement Association office in St. Paul or online at <http://www.mncia.org/publications.html>.

Interpretation of the Data

The presented data are the preliminary variety trial information for single (2009) and multiple year (2007-2009) comparisons in Minnesota. The yields are reported as a percentage of the location mean, with overall mean (bu/A) listed below. Two-year and especially one-year data are less reliable and should be interpreted with caution. Similarly, averages across multiple environments, whether they are different years and/or locations, provide a more reliable estimate of mean performance. The least significant difference or LSD is a statistical method to determine whether the observed yield difference between any two varieties is due to true, genetic differences between the varieties or to interactions with other variables such as a difference in soil fertility or experimental error. If the difference in yield between two varieties equals or exceeds the LSD value, the higher yielding one was indeed superior in yield. If the difference is less, the yield difference may have been due to chance rather than genetic differences, and we are unable to distinguish between the two varieties. The 5% unit indicates that with 95% confidence, the observed difference is indeed a true difference in performance. Lowering this confidence level will allow more varieties to appear different from each other, but also increases the chances that false conclusions are drawn.

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SPRING WHEAT

James Anderson, Jochum Wiersma, Gary Linkert, Susan Reynolds, Catherine Springer, John Wiersma, George Nelson, Ruth Dill-Macky, James Kolmer, and Yue Jin

The results of the state yield trials are summarized in Tables 1 through 6. The average yield across the southern testing locations (St. Paul, Waseca, Lamberton and Morris) in 2009 was the same as in 2008 with 56 bu/A. The three year-average declines to 57 bu/A across the southern locations. The northern locations (Crookston, Stephen and Roseau) averaged 82 bu/A in 2009 compared to 82 bu/A last year and the three-year average of 77 bu/A.

Tables 2, 3, and 4 present the relative grain yield of tested varieties in 1, 2, and 3-year comparisons. 'Faller', the 2007 release from NDSU, was the top yielding cultivar in both the northern and southern testing locations in 2008. Faller continues to impress across most of the state but once more had a below par performance in St. Paul, further evidence that the variety is not well adapted to the southeastern portion of the State. In the 2-year comparisons Faller shares the high mark for grain yield with 'Traverse'. Based on three years of trial comparisons, 'Albany', 'Faller', 'Howard', 'Samson', 'Sabin' and 'Traverse' are among the top yielding varieties in the trials with Howard and Sabin yielding relatively better in southern testing locations and Samson yielding relatively better in northern testing locations

The varietal characteristics are presented in Tables 1, 5, and 6. Losses and damages due to Fusarium head blight (FHB) were minimal in 2009. Vigilance toward FHB remains paramount while close attention should be given to the leaf rust resistance ratings. Varieties that are rated 4 or better are considered the best hedge against the diseases. Varieties that are rated 7 or higher are likely to suffer significant economic losses under even moderate disease pressure. 'Barlow', 'Briggs', 'Faller', 'Glenn', 'Howard', 'RB07', and 'Steele-ND' maintained a 1 rating for leaf rust. Carefully consider a variety's rating to leaf rust, and plan to use a fungicide if a variety is rated 5 or higher to either leaf rust and disease levels warrant treatment. The foliar disease rating represents the total complex of leaf diseases other than the rusts, and includes the Septoria complex and tan spot. Although varieties may differ for their response to each of those diseases, the rating does not differentiate among them. Exceptions are 'Ada' and 'Hat Trick' which are rated susceptible to powdery mildew. Therefore, the rating should be used as a general indication and only for varietal selection in areas where these diseases historically have been a problem or if the previous crop is wheat or barley. Control of leaf diseases with fungicides may be warranted, even for those varieties with an above average rating. A rating of bacterial leaf streak was added for those varieties that have shown to be either more resistant or more susceptible to this disease. Hat Trick, 'Kelby', and 'Samson' are rated more susceptible to bacterial leaf streak / black chaff, while 'Blade', 'Cromwell', Faller, 'Howard', and 'Knudson' are rated more resistant. At this point there are no effective control options for bacterial leaf streak / black chaff other than avoiding the use of infected seed. The extent to which seed born inoculum contributes to disease problems the next season, however, is unknown.

Leading varieties in Minnesota, based on acres planted in 2009, include Faller, RB07, Glenn, Knudson, and Oklee with approx. 21%, 19, 7, 6 and 6% respectively. 'Brogan' was the only new entry in the trials, while testing of 'Alsen' and 'Rush' was discontinued.

As the 2009 growing season illustrated once more, variety selection for 2010 continues to be a balance between yield potential, disease responses, and grain quality. Faller and Glenn are proven varieties that provide some the best available genetic resistance to FHB. Other varieties with a 4 or better scab rating and above-average yield include Albany and Sabin. All-around varieties that are well suited for Minnesota include Briggs, Howard, Knudson, RB07, and Steele-ND. Samson's impressive yield and

agronomic characteristics are offset with its poor rating for FHB while Traverse's poor agronomic characteristics and grain protein content are a major drawback for this variety.

BARLEY

**Kevin Smith, John Wiersma, Ruth Dill-Macky, Jochum Wiersma,
Brian Steffenson, and Ed Schiefelbein**

Yield averages for barley in Minnesota were 62 Bu/A compared to 65 Bu/A last year resulting in a production just short of 5.0 million bushels. Growing conditions were generally good across the four of the five test locations for barley variety trials in Minnesota. Due to the extremely wet spring, the Roseau location was not planted. Also, the Saint Paul location was excluded due to high variability among the replicates in the trial. The highest yields were in Crookston and Stephen and the lowest in Morris (Table 7). Fusarium head blight (FHB) was essentially absent.

The yield data in Table 7 were collected from advanced yield trials that contain the important varieties for the region planted in five locations in the state. Yield data is presented as percent of the mean of the varieties listed in the table. The mean of the varieties is presented in bu/A. Lacey and Rasmusson, were the highest yielding varieties based on three year state averages (Table 7). Lacey, Rasmusson, and Stellar-ND are the most lodging resistant of the group (Table 8). The two-rowed variety Conlon had the plumpest grain while Rasmusson was a little thinner than the other varieties.

Table 9 describes the reaction of the currently grown varieties to the five major diseases in the region. Disease reaction is based on at least three years of data and scored from 1 – 9 where 1 is most resistant and 9 is most susceptible. While there are some small differences among the varieties for resistance to some of these diseases, these differences are small and should not be the primary basis for selection among the different varieties.

OATS

**Deon Stuthman, Roger Caspers, Ruth Dill-Macky,
Martin Carson, and Jochum Wiersma**

Harvested oat acreage again declined 3% to 170,000 acres across the state, lowest since 1867. The cooler growing conditions favored crop development and yield potential, although a dry second half of the summer reduced rust infection. The average yield across the 5 primary test sites was 117 bu/acre, 10 bushels better than last years average of 107.

Rockford (ND) was the only cultivar in the top 15 entries for yield in this years 40 entry trial (Table 12). It was also at least acceptable for reactions to the three most threatening diseases, crown rust, smut and barley yellow dwarf virus or red leaf (Table 13). Because of reduced rainfall in the last half of the oat growing season, lodging was generally not a major issue this year. Two Wisconsin selections joined 12 Minnesota selections to complete the top 15 entries in the trial.

Table 1. Origin and agronomic characteristics of Hard Red Spring Wheat varieties in Minnesota in single year (2009) and multiple year comparisons (2007-2009).

<i>Variety</i>	<i>Agent/Origin</i> ¹	<i>Year of Release</i>	<i>Days to Heading</i> ²	<i>Plant Height</i> ²	<i>Straw Strength</i> ³
			-- days -	-- inches --	
Ada	MN	2006	53.5	30.5	4
Albany	Trigen	2009	55.8	30.0	5
Barlow	NDSU	2009	51.7	32.7	6
Bigg Red	WestBred	2004	54.7	33.9	6
Blade	WestBred	2007	53.8	31.0	4
Breaker	WestBred	2008	53.1	31.2	3
Brennan	AgriPro	2009	55.6	30.4	4
Brick	NDSU	2009	48.1	32.9	5
Briggs	SDSU	2002	49.7	32.3	7
Brogan	Westbred	2009	53.1	29.4	3
Cromwell	Thunder Seed	2007	54.3	31.0	5
Faller	NDSU	2007	54.1	31.8	5
Freyr	AgriPro	2004	51.9	33.5	6
Glenn	NDSU	2005	50.6	33.4	4
Granger	SDSU	2004	51.5	34.8	7
Hat Trick	Trigen	2006	53.1	30.5	5
Howard	NDSU	2006	52.1	33.0	7
Jenna	AgriPro	2009	55.2	30.6	4
Kelby	AgriPro	2006	50.5	27.8	4
Knudson	AgriPro	2001	52.5	30.4	5
Kuntz	AgriPro	2007	52.7	29.0	4
Marshall	MN	1982	55.2	29.2	4
Oklee	MN	2003	50.3	30.8	6
RB07	MN	2007	50.4	29.8	5
Sabin	MN	2009	53.4	30.0	6
Samson	WestBred	2007	52.6	28.3	2
Steele-ND	NDSU	2004	53.1	32.5	7
Tom	MN	2008	51.7	32.2	6
Traverse	SDSU	2006	51.1	33.6	6
Vantage	WestBred	2007	56.5	30.0	2
Mean			52.7	31.2	

¹ Abbreviations: MN = Minnesota Agricultural Expt. Station; NDSU = North Dakota State University Research foundation; SDSU = South Dakota Agricultural Expt. Station.; Trigen = Trigen Seed Services LLC.

² 2009 data.

³ 1-9 scale in which 1 is the strongest straw and 9 is the weakest. Based on 2005-2009 data. The rating of newer entries may change by as much as one rating point as more data is collected.

Table 2. Relative grain yield of Hard Red Spring Wheat varieties in southern locations in Minnesota in single year (2009) and multiple year comparisons (2007-2009).

Variety	<i>Lamberton</i>			<i>Morris</i> ¹			<i>St. Paul</i>			<i>Waseca</i>		
	1 yr.	2 yr.	3 yr.	1 yr.	2 yr.	3 yr.	1 yr.	2 yr.	3 yr.	1 yr.	2 yr.	3 yr.
	----- % of mean-----											
Ada	89	87	93	110	107		109	91	87	93	98	94
Albany	136	109	120	112	111		108	107	103	133	128	129
Barlow	95	97	–	102	–		95	100	–	99	101	–
Bigg Red	97	104	100	103	101		111	105	104	111	101	100
Blade	97	102	104	95	99		98	99	101	99	97	97
Breaker	111	105	–	101	–		102	102	–	106	105	–
Brennan	112	113	–	108	–		113	110	–	113	111	–
Brick	90	101	101	89	98		93	99	101	89	90	85
Briggs	92	96	105	95	101		94	102	105	94	89	83
Brogan	105	–	–	116	–		106	–	–	100	–	–
Cromwell	98	93	91	100	99		87	93	95	98	94	90
Faller	123	114	120	111	116		96	92	97	120	106	106
Freyr	109	104	103	97	100		100	102	105	98	96	91
Glenn	99	95	98	75	80		105	103	102	86	87	87
Granger	93	111	114	117	115		100	99	99	112	94	96
Hat Trick	77	86	95	94	98		69	73	75	108	101	110
Howard	109	113	112	107	102		122	117	117	93	104	109
Jenna	107	112	–	109	–		101	106	–	123	115	–
Kelby	87	93	96	86	90		105	113	120	85	91	87
Knudson	101	112	117	107	110		92	92	90	98	103	109
Kuntz	96	91	95	108	107		89	97	98	103	99	96
Marshall	101	80	75	96	83		89	81	78	73	69	59
Oklee	108	98	95	100	97		101	106	108	103	101	102
RB07	100	100	102	98	93		96	103	105	99	105	103
Sabin	98	109	110	98	106		114	110	110	98	108	120
Samson	101	99	102	107	106		113	110	108	93	101	106
Steele-ND	97	99	104	97	102		110	107	109	87	102	110
Tom	102	101	99	81	89		98	101	104	102	94	86
Traverse	115	122	120	111	112		103	100	100	104	110	120
Vantage	112	103	101	109	103		95	97	91	90	95	100
Mean (bu/A)	65.5	52.7	50.8	49.6	61.8		58.1	63.5	62.4	54.0	57.1	55.6
LSD (0.05)	14.1	15.8	18.1	19.1	14.3		18.2	13.4	12.3	20.1	18.9	18.6

¹ The Morris 2008 trial was abandoned due to herbicide drift damage. The 2-year data is from 2007-2009.

Table 3. Relative grain yield of Hard Red Spring Wheat varieties in northern locations in Minnesota in single year (2009) and multiple year comparisons (2007-2009).

Variety	Crookston			Roseau			Stephen			On-Farm		
	1 yr.	2 yr.	3 yr.	1 yr.	2 yr. ¹	3 yr.	1 yr.	2 yr.	3 yr.	1 yr.	2 yr.	3 yr.
----- % of mean-----												
Ada	97	98	97		98		98	99	98	96	98	98
Albany	114	113	119		96		106	97	106	112	112	-
Barlow	105	99	-		-		110	107	-	96	100	-
Bigg Red	92	92	92		89		90	89	90	99	97	93
Blade	101	101	101		104		96	94	98	102	100	101
Breaker	104	103	-		-		99	103	-	97	99	-
Brennan	98	99	-		-		98	101	-	96	99	-
Brick	83	92	98		98		96	101	100	100	103	-
Briggs	99	98	99		112		104	95	97	94	96	98
Brogan	98	-	-		-		97	-	-	101	-	-
Cromwell	103	102	102		110		98	97	97	98	98	100
Faller	124	119	123		125		119	111	116	115	110	112
Freyr	99	102	104		99		97	96	98	101	99	101
Glenn	88	91	94		100		94	100	97	89	93	95
Granger	90	93	93		99		94	89	90	103	103	102
Hat Trick	87	94	93		96		111	105	109	103	101	102
Howard	111	105	103		105		104	99	103	105	101	99
Jenna	108	104	-		-		97	102	-	101	106	-
Kelby	86	94	96		112		93	100	99	90	93	93
Knudson	109	105	106		103		103	102	105	105	104	106
Kuntz	94	100	104		100		98	102	101	95	99	102
Marshall	96	96	88		81		87	86	85	91	85	79
Oklee	98	96	96		104		98	100	98	90	96	96
RB07	102	104	106		90		100	106	106	107	104	105
Sabin	98	101	101		99		99	97	98	105	104	104
Samson	120	115	114		111		114	111	113	100	102	105
Steele-ND	100	98	99		99		97	97	96	100	99	102
Tom	93	96	99		105		107	113	107	96	100	100
Traverse	104	104	106		115		114	116	115	115	108	111
Vantage	106	98	99		104		97	94	98	99	94	94
Mean (bu/A)	85.8	92.3	97.9		59.3		79.0	79.1	76.3	88.5	90.1	86.4
LSD (0.05)	11.6	10.7	8.8		17.9		10.3	12.4	10.7	6.4	11.9	9.8

¹ The Roseau site was not planted in 2009 due to excessive wetness. 2-year data is 2007-2008 average.

Table 4. Relative grain yield of Hard Red Spring Wheat varieties in Minnesota in single year (2009) and multiple year comparisons (2007-2009).

Variety	State			North			South		
	1 yr.	2 yr.	3 yr.	1 yr.	2 yr.	3 yr.	1 yr.	2 yr.	3 yr.
<i>No. Environments</i>	6	12	19	2	5	8	4	7	11
	----- % of mean -----								
Ada	99	96	96	98	97	98	100	95	94
Albany	118	109	113	110	103	108	122	114	116
Barlow	101	100	–	107	102	–	98	100	–
Bigg Red	101	99	97	91	93	91	105	103	101
Blade	98	99	100	99	98	101	97	99	100
Breaker	104	104	–	102	103	–	105	104	–
Brennan	107	107	–	98	101	–	111	111	–
Brick	90	96	97	90	96	99	90	96	96
Briggs	96	96	100	101	96	102	94	95	98
Brogan	104	–	–	98	–	–	107	–	–
Cromwell	97	97	97	100	100	102	96	94	93
Faller	116	110	114	122	117	121	113	105	109
Freyr	100	99	100	98	98	101	101	100	100
Glenn	91	94	95	91	97	97	91	92	93
Granger	101	99	100	92	91	93	106	104	105
Hat Trick	91	93	97	99	100	100	87	88	94
Howard	107	107	108	107	102	103	107	111	111
Jenna	108	108	–	102	104	–	110	111	–
Kelby	90	98	100	89	98	101	91	97	99
Knudson	102	103	106	106	102	105	99	103	106
Kuntz	98	99	100	96	102	102	99	97	98
Marshall	90	84	78	92	91	85	90	80	73
Oklee	101	101	100	98	99	99	103	102	101
RB07	99	102	102	101	103	102	98	102	102
Sabin	101	104	107	99	98	99	102	107	112
Samson	108	107	108	117	112	113	103	104	105
Steele-ND	98	100	103	99	96	98	98	102	106
Tom	97	99	99	100	104	104	96	96	95
Traverse	108	110	112	109	110	112	108	111	113
Vantage	102	100	99	102	100	100	101	100	99
Mean (bu/A)	65.0	67.7	65.5	82.4	82.1	76.4	55.9	56.0	56.9
LSD (0.05)	9.8	6.5	5.7	10.6	7.6	6.7	11.5	10.0	8.6

Table 5. Grain quality characteristics of Hard Red Spring Wheat varieties in Minnesota in single year (2009) and multiple year comparisons (2007-2009).

Variety	Test Weight		Protein ¹		Baking Quality ²	Pre-Harvest Sprouting ³
	1 yr.	2 yr.	1 yr.	2 yr.		
	---- lbs/bu ----		---- % ----			
Ada	62.3	62.1	14.5	14.3	med.	2
Albany	61.4	60.5	13.7	13.7	low-med.	4
Barlow	62.3	62.1	15.4	15.1	–	1
Bigg Red	62.6	62.9	14.1	14.0	med.-low	4
Blade	62.6	62.5	15.3	14.9	med.-high	5
Breaker	62.8	62.7	15.2	14.8	–	–
Brennan	60.6	60.3	15.3	14.6	–	–
Brick	62.6	62.4	15.1	14.9	med.	2
Briggs	61.9	61.5	15.1	14.8	med.	2
Brogan	61.6	-	14.5	-	–	–
Cromwell	62.2	62.1	15.2	14.9	med.-high	3
Faller	61.4	61.1	14.4	14.4	med.	2
Freyr	61.3	60.6	15.1	14.7	med.	2
Glenn	64.0	63.8	15.7	15.5	high	1
Granger	61.0	61.0	14.9	14.9	med.	4
Hat Trick	61.8	61.9	14.9	14.5	med.-low	4
Howard	62.9	61.9	15.2	14.9	med.-high	1
Jenna	60.4	61.0	14.6	14.5	–	–
Kelby	60.9	61.2	15.5	15.0	med.	1
Knudson	61.3	61.2	14.4	14.0	med.-high	3
Kuntz	60.5	60.5	14.7	14.3	med.	2
Marshall	60.1	59.2	14.3	14.0	low	2
Oklee	62.1	62.1	15.4	15.2	low-med.	3
RB07	61.3	61.1	15.2	14.8	med.-high	2
Sabin	60.9	60.5	14.8	14.6	med.-high	4
Samson	60.6	60.4	14.0	13.9	med.-high	4
Steele-ND	62.2	61.9	15.4	15.1	high	2
Tom	61.5	61.4	15.0	14.6	med.	1
Traverse	59.1	59.0	14.1	14.0	low	4
Vantage	62.8	62.7	15.7	15.5	med.	2
Mean	61.4	61.1	14.4	14.5		

¹ 12% moisture basis.

² 2004-2008 crop years.

³ 1-9 scale in which 1 is best and 9 is worst. Values of 1-3 should be considered as resistant.

Table 6. Disease reactions¹ of Hard Red Spring Wheat varieties in Minnesota in multiple year comparisons (2007-2009).

<i>Variety</i>	<i>Leaf Rust</i>	<i>Stem Rust²</i>	<i>Other Leaf Diseases³</i>	<i>Scab</i>
Ada	5	2	5 ⁴	6
Albany	3	3	5	4
Barlow	1	1	–	4
Bigg Red	8	2	7	3
Blade	2	2	3 ⁶	4
Breaker	3	2	3	–
Brennan	2	2	–	–
Brick	2	2	7	3
Briggs	1	2	5	5
Brogan	–	–	–	–
Cromwell	4	1	4 ⁶	4
Faller	1	1	3 ⁶	4
Freyr	4	4	4	4
Glenn	1	1	4	3
Granger	3	1	4	5
Hat Trick	5	4	5 ^{4,5}	4
Howard	1	1	4 ⁶	6
Jenna	3	2	–	–
Kelby	2	1	4 ⁵	5
Knudson	2	3	3 ⁶	6
Kuntz	3	1	4	6
Marshall	8	1	7	7
Oklee	4	1	5	5
RB07	1	1	5	5
Sabin	3	1	6	4
Samson	5	1	6 ⁵	7
Steele-ND	1	1	4	6
Tom	4	1	5	4
Traverse	5	2	5	5
Vantage	5	3	6	5

¹ 1-9 scale where 1=most resistant, 9=most susceptible.

² Stem rust levels have been very low in production fields in recent years, even on susceptible varieties.

³ Includes tan spot, septoria, bacterial leaf blight, and powdery mildew.

⁴ These varieties are more susceptible to powdery mildew.

⁵ This variety was more susceptible to bacterial leaf stripe based on three environments with this disease from 2007 and 2009.

⁶ This variety was more resistant to bacterial leaf stripe based on the three environments with these disease from 2007 and 2009.

Table 7. Relative grain yield (percent of the mean of the trial) of barley varieties at several locations in Minnesota in single year (2009) and multiple year comparisons (2007-2009).

Variety	Crookston		Morris		Stephen		St. Paul	Roseau	State Mean	
	1 yr.	3 yr.	1 yr.	2 yr. ¹	1 yr.	3 yr.	2 yr. ²	2 yr. ²	2009	3 yr.
----- % of mean -----										
Conlon ³	113	95	--	96	100	89	81	91	106	90
Lacey	98	103	110	111	97	106	105	106	102	106
Rasmusson ⁴	106	104	113	112	100	105	103	113	106	106
Robust	90	94	95	94	77	84	96	99	87	93
Stellar ND	101	100	92	91	109	106	98	102	101	100
Tradition	92	96	111	104	102	101	101	100	102	100
Mean (bu/A)	106	111	71	75	111	111	111	113	98	105
LSD (0.05)	20	8	31	12	17	8	8	8	12	5

¹ Only two years of data, 2007 and 2009.

² Only two years of data, 2007 and 2008.

³ Only one year of data available at Morris.

⁴ Only one year of data available at Roseau.

Table 8. Agronomic characteristics of barley varieties in Minnesota in multiple year comparisons (2004-2009).

Variety	Type	Use	Heading Date	Plant Height	Lodging	Plump	Grain Protein
			-- days --	-- inches--		-- % --	-- % --
<i>No. of Environments</i>			18	16	15	14	14
Conlon	2-row	Malt	55	30.9	med.	93	13.5
Lacey	6-row	Malt	58	31.9	strong	87	14.0
Rasmusson	6-row	Malt	58	30.2	strong	82	13.2
Robust	6-row	Malt	58	34.0	med.	86	13.8
Stellar ND	6-row	Malt	58	31.8	strong	86	13.0
Tradition	6-row	Malt	59	32.2	med.	85	13.3

Table 9. Disease reaction¹ of barley varieties in Minnesota in multiple year comparisons.

Variety	<i>Fusarium</i>	<i>Net</i>	<i>Septoria</i>	<i>Spot</i>	<i>Stem</i>
	<i>Head Blight</i>	<i>Blotch</i>	<i>Speckled Leaf Blotch</i>	<i>Blotch</i>	<i>Rust</i> ²
Conlon	7	5	9	3	1
Lacey	8	8	9	2	1
Rasmusson	8	9	9	2	1
Robust	8	8	9	2	1
Stellar ND	8	7	9	2	1
Tradition	8	7	9	2	1

¹ 1-9 scale where 1=most resistant, 9=most susceptible.

² Reaction to the dominant strain of the stem rust pathogen.

Table 10. Relative grain yield of oat varieties in Minnesota in multiple year comparisons (2007-2009).

Variety	<i>Rosemount</i>		<i>Waseca</i>		<i>Lamberton</i>		<i>Morris</i>		<i>Crookston</i>		<i>State</i>	
	1 yr.	3 yr.	1 yr.	3 yr.	1 yr.	3 yr.	1 yr.	3 yr. ¹	1 yr.	3 yr.	1 yr.	3 yr.
----- % of mean -----												
Badger	95	93	104	88	97	120	70	99	85	121	91	105
Beach	102	93	103	96	104	121	123	134	97	126	105	112
Buckskin	107	96	89	84	105	120	105	124	91	128	100	109
Colt	81	-	79	-	89	-	83	-	69	-	81	-
Esker	97	100	85	94	108	124	78	102	94	120	93	109
Excel	103	101	79	90	95	122	86	117	101	123	93	110
Jerry	88	-	84	-	60	-	109	-	76	-	82	-
Jim	95	-	67	-	83	-	77	-	86	-	82	-
Kame	87	88	65	79	88	113	76	99	93	110	82	98
Morton	82	79	77	85	91	108	118	119	86	116	91	100
Rockford ²	109	109	115	122	104	104	119	-	113	113	112	113
Souris	106	101	109	100	106	118	78	102	117	131	104	111
Spurs ³	99	100	80	86	103	104	86	95	110	100	96	97
Stallion	106	104	104	96	100	121	99	127	103	120	102	113
Streaker	77	-	67	-	62	-	77	-	78	-	72	-
Tack	83	-	82	-	90	-	83	-	89	-	86	-
Winona	76	86	74	74	89	102	59	89	82	95	77	89
Mean (bu/A)	109	98	116	95	141	116	108	114	113	123	117	109
LSD (0.05)	9.1	6.5	8.4	6.7	11.9	7.5	20.2	8.1	9.8	5.8	5.5	3.3

¹ 2007 and 2009 data only.

² 3 year data is 2008-09 only, adjusted for 3 years.

³ 3 year data is 2007 and 2009 only, adjusted for 3 years.

Table 11. Relative grain yield of oat varieties in Minnesota in a single year (2009) comparison at off-station locations.

<i>Variety</i>	<i>Stephen</i>	<i>Winona</i>
	----- % mean -----	
Badger	100	127
Beach	97	-
Buckskin	107	-
Colt	95	81
Esker	122	125
Excel	96	114
Jerry	83	61
Jim	80	99
Kame	96	87
Morton	91	-
Rockford	113	-
Souris	112	-
Spurs	105	135
Stallion	106	72
Streaker	89	-
Tack	105	-
Winona	103	100
Mean (bu/A)	139	91
LSD (0.05)	13.1	26.4

Table 12. Agronomic characteristics of oat varieties in Minnesota in multiple year comparisons (2007-2009).

	<i>Days to Heading</i>		<i>Plant Height</i>		<i>Lodging¹</i>		<i>Test Weight</i>		<i>Groat</i>	
	<i>1 yr.</i>	<i>3 yr.</i>	<i>1 yr.</i>	<i>3 yr.</i>	<i>1 yr.</i>	<i>3 yr.</i>	<i>1 yr.</i>	<i>3 yr.¹</i>	<i>1 yr.</i>	<i>3 yr.</i>
	-- days --		-- inches --				-- lbs/bu --		--- % ---	
Badger	60	57	29	28	1.3	2.0	42.4	41.5	71.5	70.9
Beach	66	64	39	37	1.3	1.7	45.6	44.2	73.8	73.6
Buckskin	64	61	34	32	1.4	1.8	44.4	43.4	73.8	72.5
Colt	59	-	31	-	2.6	-	43.7	-	72.8	-
Esker	62	59	32	31	1.3	2.0	42.3	41.6	74.2	73.2
Excel	62	59	31	31	2.3	2.2	41.1	40.8	69.2	69.2
Jerry	63	-	35	-	2.8	-	43.1	-	71.6	-
Jim	60	-	32	-	2.3	-	42.5	-	73.8	-
Kame	60	58	30	30	3.1	2.2	38.2	39.0	72.4	72.2
Morton	66	64	37	36	1.4	1.9	42.1	41.3	71.8	71.5
Rockford ²	66	64	38	36	1.4	1.5	45.3	44.5	74.9	74.3
Souris	65	63	33	32	1.2	1.5	44.5	43.3	75.1	74.6
Spurs ³	61	61	31	28	1.3	1.4	43.6	43.6	72.9	71.5
Stallion	65	63	37	36	1.7	2.4	43.2	42.8	72.4	72.3
Streaker	62	-	34	-	2.5	-	54.4	-	-	-
Tack	61	-	30	-	1.9	-	44.2	-	73.2	-
Winona	60	58	32	31	2.1	1.9	42.1	42.0	73.3	73.3
Mean	64	62	35	33	1.6	1.8	43.8	42.4	73.6	72.4

¹ 1=Erect, 5=Flat.

² 2008-09 data, adjusted for 3 years.

³ 2007-09 data, adjusted for 3 years.

Table 13 Disease reactions of oat varieties in Minnesota in single year (2009).

	<i>Crown Rust</i> ¹	<i>Smut Score</i> ²	<i>BYDV Score</i> ³
Badger	MS	R	6
Beach	S	MR	5
Buckskin	S	S	4
Colt	S	R	6
Esker	S	R	4
Excel	S	MS	3
Jerry	S	S	6
Jim	S	R	6
Kame	S	R	6
Morton	S	R	6
Rockford	MS	MR	3
Souris	S	R	3
Spurs	S	MR	4
Stallion	MS	MS	5
Streaker	S	R	4
Tack	S	S	2
Winona	S	R	4

¹ R=resistant, MR=moderately resistant, MS=moderately susceptible and S=susceptible

² Artificially inoculated, R=resistant, MR=moderately resistant, MS=moderately susceptible and S=susceptible

³ Barley Yellow Dwarf Virus scores from University of Illinois with 1=no symptoms and 9=dead

Updated: [11/5/2009 8:11 a11/p1110/30/2009 7:10 a10/p1010/29/2009 11:10 a10/p1010/29/2009 8:10 a10/p10](#)