

Barley Update for North Dakota

Rich Horsley
 Dept of Plant Sciences
 NDSU



Talk Outline

- What does it take to become a “malting barley”
- Current varieties on the “recommended list”
- Variety comparisons
- New varieties to watch for in the future



American Malting Barley Association, Inc.
GLEANINGS
 January 7, 2008

2008 Recommended Malting Barley Varieties

The American Malting Barley Association, Inc. (AMBA) announces its recommended malting barley varieties for planting in 2008, listed in alphabetical order. When delivered to market in pure ear-lots of sound, bright, plump, low moisture barley in an acceptable protein range, they may command premium prices over feed barley. Growers are encouraged to contact their local elevator, grain handler or processor to gauge market demand for any variety grown in their region prior to seeding. 2007 crop plantings by variety are included at the end of this announcement.

Changes from 2007: Scarlett, a two-row, has been added to the list. B1202, a two-row, and Excel, a six-row, have been dropped from the list.

Recommended Six-Row Malting Barley Varieties

Variety	Year*	Variety	Year*
Diamond	2002	Holmest	1984
Foster	1997	Stander	1995
Lacey	2000	Stellar-ND	2006
Legacy	2004	Tradition	2004

Recommended Two-Row Malting Barley Varieties

Variety	Year*	Variety	Year*
AC Metcalfe	2005	Craft	2007
CLC Copeland	2007	Harrington	1989
Conrad	2000	Merit	2000
Conrad	2007	Scarlett	2008

*Year the variety was first added to the AMBA list of recommended malting barley varieties.

Scarlett, a two-row spring barley developed by Institut Josef Breun für die Heranzüchtung, Germany, was evaluated and listed requested by AMBA members ALDA Sealing and Cargill Malt.

785 North Washington Avenue, Suite 807 • Minneapolis, MN 55407 • (612) 272-8647 • Fax: (612) 272-8033 • <http://www.AMBA.org>



American Malting Barley Association (AMBA)

- Non-profit trade association comprised of:
 - **Four malting companies**
 - Briess Malting Company
 - Cargill Malt
 - MaltEurop
 - Rahr Malting Company
 - **Four brewing companies**
 - Anheuser-Busch, Inc
 - Miller Brewing Company
 - New Belgium Brewing
 - Sierra Nevada Brewing Company



American Malting Barley Association (AMBA)

- AMBA funds applied and basic research related to malting barley varietal development conducted at university and USDA laboratories in the US.
- Evaluates new and potential varieties for malting and brewing potential.



AMBA Pilot Scale Program

- From two locations, 35 pounds of each selected line and corresponding check varieties are sent to AMBA. Seed is distributed to their members for evaluation.
- Only malting quality is evaluated during pilot scale evaluation.
- To pass Pilot Scale Testing, a line must be found satisfactory, as compared to the checks, in two of three years of testing.



AMBA Plant Scale Evaluation

- Approximately 600 acres of an experimental line is grown by local growers.
- Approximately 30,000 bushels of the line are malted by one AMBA maltster.
- To be added to the AMBA list of recommended varieties, a line must be found satisfactory, as compared to the check, in two of three years of testing.



Recommended Midwest Malting Barley Varieties

- | | |
|--------------------|--------------------|
| ▪ <u>Six-rowed</u> | ▪ <u>Two-rowed</u> |
| • Robust | • Conlon |
| • Drummond | • AC Metcalfe |
| • Lacey | • Scarlett |
| • Legacy | |
| • Tradition | |
| • Stellar-ND | |
| • Rasmusson | |



Table 1. Agronomic comparisons of barley cultivars grown in NDSU yield trials across North Dakota and Sidney, MT across two years

Entry	Days to heading (days after 31 May)	Height (inches)	Lodging score (1-9)†	Stem breakage score (1-5)‡	Yield (bu/ac)
Sta. years	13	12	5	3	14
Lacey	22.5	29.9	3.9	2.2	84.5
Legacy	24.1	30.5	4.4	2.9	79.3
Tradition	22.6	30.6	3.3	1.6	86.3
Stellar-ND	22.1	30.0	2.6	2.4	79.9
Conlon	18.7	28.7	2.8	2.4	76.6
Pinnacle	23.8	29.5	2.6	1.4	88.3

†Lodging score of 1=no lodging and 9=severe lodging.

‡Stem breakage score at harvest of 1=no breakage and 5=severe breakage.



Table 2. Mean malt quality of Pinnacle, Conlon, and Lacey barley grown in NDSU yield trials across four years†.

Entry	Barley protein (%)	Plump kernels (%)	Malt extract (%)	Wort protein (%)	S/T (%)	Diastatic power (°ASBC)	Alpha-amylase (20° DU)	Wort beta-glucan (ppm)
Station years	30	30	30	30	30	30	30	30
Pinnacle	12.1	93.7	80.7	5.47	44.4	115	66.5	230
Conlon	13.0	93.3	80.0	5.21	42.0	125	75.8	299
Lacey	13.5	83.0	79.1	5.76	44.4	178	71.4	133

†Data provided by the USDA-ARS Cereal Crops Research Unit, Madison, WI.



Table 3. Results from the WREC (dryland) in 2008†.

Variety	Days to heading (after seeding)	Plant height (in)	Test weight (lbs/bu)	Grain protein (%)	% Plump kernels (>6/64")	Yield – 2008 (bu/ac)	Yield - 2 yr ave (bu/ac)
<u>Six-rowed</u>							
Lacey	62	25	47.0	15.7	25	64	80
Legacy	65	27	44.5	15.6	16	60	76
Tradition	61	27	48.0	15.7	33	67	85
Stellar-ND	63	25	45.0	14.0	27	58	76
<u>Two-rowed</u>							
Conlon	56	24	51.0	14.4	86	74	87
Haxby	65	23	49.0	15.2	31	69	85
Rawson	61	24	49.0	13.0	84	71	83
Pinnacle	63	23	46.0	14.6	61	66	81
Scarlett	68	20	47.5	15.5	34	66	82

†Data courtesy of the NDSU Williston Research Extension Center



Table 4. Results from the WREC (irrigated) in 2008†.

Variety	Days to heading (after seeding)	Plant height (in)	Test weight (lbs/bu)	Grain protein (%)	% Plump kernels (>6/64")	Yield – 2008 (bu/ac)	Yield - 2 yr ave (bu/ac)
<u>Six-rowed</u>							
Lacey	59	39	49.5	13.8	55	116	110
Legacy	60	40	47.0	13.6	43	111	112
Tradition	59	39	50.5	12.8	60	130	119
Stellar-ND	60	39	48.5	13.1	61	117	103
<u>Two-rowed</u>							
Conlon	54	37	53.0	13.6	95	113	103
Haxby	60	37	50.5	13.0	89	132	117
Pinnacle	59	37	50.5	11.9	85	127	112
Scarlett	63	33	48.5	14.0	71	111	103

†Data courtesy of the NDSU Williston Research Extension Center



Table 3. Results from the NCREC in 2008†.

Variety	Days to heading (after seeding)	Plant height (in)	Test weight (lbs/bu)	Grain protein (%)	% Plump kernels (>6/64")	Yield - 2008 (bu/ac)	Yield - 2 yr ave (bu/ac)
<u>Six-rowed</u>							
Lacey	64	35	49.5	12.7	95	128	95
Legacy	67	36	47.5	12.4	95	119	84
Tradition	64	38	48.5	12.8	95	127	88
Stellar-ND	64	36	47.0	12.2	94	120	80
<u>Two-rowed</u>							
Conlon	60	34	51.5	12.7	98	99	70
Haxby	64	33	51.0	12.3	95	150	92
Rawson	61	34	49.5	11.5	99	122	93
Pinnacle	63	35	50.0	11.3	98	134	89
Scarlett	68	29	49.5	12.0	96	127	81

†Data courtesy of the NDSU North Central Research Extension Center



Up and Coming Varieties

Six-rowed Barley

- Rasmusson
- Celebration
- Two experimental lines with improved FHB resistance

Two-rowed Barley

- Pinnacle
- Craft
- Eslick
- Hockett



Pinnacle Two-rowed Barley

- Experimental number: 2ND21863
- Pedigree: 2ND18172/2ND19130
- Awn type: semi-rough
- Rachilla hairs: Long
- Aleurone color: White



Unique Features of Pinnacle

- May be suitable for malting as grown in ND.
- High grain yields.
- Plump seed with some drought resistance.
- Good lodging resistance.
- DON accumulation similar to Conlon.
- Low grain protein.
- Good malt extract values.



Status of Pinnacle in Industry Testing

- Is currently in it's first year of Plant Scale evaluation.
 - Malting is being done by Rahr and MaltEurop
 - Brewing will be done by Miller Brewing
- Anheuser-Busch is conducting one more year of Pilot Scale evaluation.



Rasmusson Six-rowed Barley

- Developed at the University of Minnesota
- Experimental number: M109
- Pedigree: Lacey/M95
- Awn type: Semi-smooth
- Rachilla hairs: Short
- Aleurone color: White



Table 5. Agronomic comparisons of Rasmusson barley to cultivars grown in NDSU yield trials across North Dakota and Sidney, MT across four years.

Entry	Days to heading	Height	Lodging score	Stem breakage score	Yield	Test weight
	(days after 31 May)	(inches)	(1-9) [†]	(1-5) [‡]	(bu/ac)	(lb/bu)
Sta. years	31	29	10	7	31	7
Rasmusson	25.3	28.9	3.8	2.5	85.7	49.7
Robust	25.9	31.7	4.1	2.9	76.6	49.3
Lacey	25.9	29.8	3.3	2.3	84.8	50.4
Legacy	27.6	30.7	4.5	3.0	79.9	48.4
Tradition	26.1	30.7	3.6	2.2	83.9	49.3
Stellar-ND	25.8	30.1	3.0	2.3	82.3	48.7

[†]Lodging score of 1=no lodging and 9=severe lodging.

[‡]Stem breakage score at harvest of 1=no breakage and 5=severe breakage.



Table 6. Malt quality comparisons of Rasmusson barley and six-rowed cultivars grown in NDSU yield trials across three years[†].

Entry	Protein	Plump kernels	Extract	Wort protein	S/T	Diastatic power	Alpha-amylase	Wort Beta-glucan
	(%)	(%)	(%)	(%)	(%)	(°ASBC)	(20° DU)	(ppm)
Sta. years	9	9	9	9	9	9	9	9
Rasmusson	13.4	81.2	79.9	5.82	45.4	184	71.7	146
Robust	13.8	80.2	78.9	5.69	42.6	183	61.6	245
Legacy	13.3	76.9	79.1	6.10	47.1	188	89.5	225
Lacey	13.8	84.9	79.3	5.72	43.3	181	70.0	140
Tradition	13.5	87.2	79.1	5.31	40.9	207	72.3	158
Stellar-ND	13.5	88.0	79.7	5.81	45.2	203	77.2	106

[†]Data provided by the USDA-ARS Cereal Crops Research Unit, Madison, WI.



Take Home Message

- Keep in touch with your malt barley buyer to learn which varieties they are purchasing.
- Their needs can quickly change.

