PROJECT TITLE: Evaluation of malt barley varieties under irrigated and dryland conditions – 2008

PROJECT LEADER:

Tom Blake, MSU Dept Plant Sciences
Stan Bates, MSU Dept Plant Sciences

COOPERATOR:

Joyce Eckhoff, Eastern Ag Research Center, 1501 N Central Ave, Sidney, MT 59270

OBJECTIVE: To select the best adapted experimental lines for release and to determine the best adapted varieties of malt barley for eastern Montana.

MATERIALS AND METHODS:

Dryland site:

Dryland:

Planted: April 14 Harvested: August 1
Soil type: Williams clay loam
Previous crops: 2007 - fallow, 2006 – safflower, 2005 - small grain plots
Residual soil N to 3 ft: 67 lb N/ac
Residual soil P to 6 in: 19 ppm
Applied fertilizer: 200 lb/ac 18-46-0
Herbicides: BroxM (1.5 pt/ac) applied Jun 19

Precipitation April – August, 2008: 4.55 inches
Ave (60 yr) precipitation April – August: 9.39 inches
Precipitation September 2007 – August 2008: 7.13 inches
Ave (60 yr) precipitation September – August: 13.77 inches

Irrigated:

Planted: April 28 Harvested: August 12
Soil type: Savage silty clay
Previous crops: 2007 –sugarbeet, 2006 – barley, 2005 – sugarbeet
Residual soil N to 3 ft: 18 lb N/ac
Residual soil P to 6 in: 24 ppm
Applied fertilizer: 70 lb liquid N/ac, 28-0-0 applied in fall, 2007
Irrigated (flood) on: Jun 18, Jul 2, 3 inches each application
Herbicides: BroxM (1.5 pt/ac) and Axial (1 pt/ac) applied June 6

Precipitation April – August, 2008: 5.21 inches
Ave (59 yr) precipitation April – August: 9.39 inches
Precipitation September 2007 – August 2008: 7.85 inches
Ave (59 yr) precipitation September – August: 13.77 inches

Comments:
Conditions were extremely dry. June was cool, with cool night time temperatures.

RESULTS:

Dryland: Agronomic data from the dryland malt barley yield trial are shown in Table 1. Three lines and varieties yielded significantly more than the check variety, Harrington. Five-year summaries for yield, test weight, protein contents and percent plump seed are shown in Tables 2-5.

Irrigated: Agronomic data from the irrigated malt barley yield trial are shown in Table 6. Eight lines and varieties yielded significantly more than the check variety, Harrington. Five-year summaries of yield, test weight, protein contents, percent plump, and lodging indices are shown in Tables 7-11.

FUTURE PLANS: New experimental lines and varieties of malt barley will continue to be tested under dryland and irrigated conditions to identify those which will perform best under these conditions. Closer cooperation with North Dakota State University will allow testing of experimental lines from North Dakota as well as from Montana, so that when those lines are released as varieties, information will be available as to their performance in this region.

Table 1. Agronomic data obtained from a malt barley yield trial conducted under dryland fallow conditions at the Eastern Agricultural Research Center, Sidney, Montana.

entry	heading*	heignt, cm	grain protein	test wt, lb/bu	% plump	% regular	yield, bu/ac	
Champion	66.7	64.3	13.11	46.8	47.8	47.3	66.9	a
Boulder	65.7	64.0	14.31	49.2	62.3	35.0	66.7	a
MT020155	63.3	65.7	13.01	47.7	54.0	39.7	65.4	a
MT010158	65.0	61.0	13.62	47.0	53.7	41.7	64.4	
Haxby	65.7	66.3	14.68	50.2	46.7	50.3	62.9	
WPB Xena	67.7	62.3	14.20	46.3	30.0	62.0	61.1	
Geraldine	68.3	55.3	15.87	44.8	37.3	53.0	60.6	
Conrad	68.0	59.3	16.09	45.7	42.7	49.3	60.5	
Tradition	65.0	67.3	13.95	46.5	40.0	50.3	60.4	
Eslick	68.7	58.0	16.01	46.2	31.0	59.0	59.3	
MT020204	65.0	64.3	14.35	48.0	44.3	50.7	58.6	
Craft	65.0	71.7	14.43	47.3	66.3	24.7	57.8	
Hockett	65.0	60.0	14.35	47.0	54.7	37.0	57.1	
Harrington	67.3	64.0	14.98	44.5	49.3	43.3	54.2	
Scarlett	70.0	53.7	14.71	45.7	47.3	42.7	53.9	
Drummond	64.3	71.7	14.45	46.0	42.0	48.7	53.3	
Pinnacle	64.7	62.7	13.63	47.7	74.0	23.0	52.8	
Stellar-ND	64.0	67.3	12.49	45.2	45.7	47.0	52.0	
Legacy	64.7	64.3	13.10	44.7	34.0	53.7	51.9	
Copeland	68.3	64.3	14.47	44.2	45.0	48.3	51.9	
Newdale	66.3	62.3	15.10	45.3	40.0	46.0	49.9	
Metcalfe	65.7	62.7	15.95	45.5	45.7	47.0	49.6	
Merit	69.0	56.3	16.04	44.2	37.7	53.0	44.5	
Average	66.3	62.7	14.44	46.3	45.9	46.3	57.4	
probability	<0.001	<0.001	0.037	<0.001	<0.001	<0.001	0.003	
CV (S/mean)	1.0	6.1	9.2	2.9	23.5	17.2	11.1	
CV (SE/mean)	0.6	3.5	5.3	1.7	13.6	9.9	6.4	
LSD (0.05)	1.1	6.2	2.17	2.2	17.8	13.1	10.5	

*days from planting
a indicates significantly greater yield than check variety, Harrington

Table 2. Relative yielding abilities of malt barley varieties in bu/ac as compared to Harrington when grown under dryland conditions at the EARC, Sidney, Montana.

Variety	2004	2005	2006	2007	2008	Ave	as % of Harrington
Champion	--	--	--	--	66.9	66.9	123.4
MT020155	--	--	--	--	65.4	65.4	120.7
MT010158	--	--	--	--	64.4	64.4	118.8
Conrad	--	77.8	82.3	86.7	60.5	76.8	112.1
Xena	--	76.7	83.4	84.6	61.1	76.5	111.5
Haxby	111.4	84.5	81.1	74.8	62.9	82.9	109.4
Eslick	--	81.9	76.5	81.8	59.3	74.9	109.2
MT020204	--	--	--	--	58.6	58.6	108.1
Boulder	--	67.3	84.7	76.8	66.7	73.9	107.8
Geraldine	--	75.2	76.4	81.8	60.6	73.5	107.2
Legacy	107.5	80.1	85.8	76.8	51.9	80.4	106.1
Stellar-ND	--	83.8	76.0	76.6	52.0	72.1	105.2
Craft	104.0	76.4	90.9	67.0	57.8	79.2	104.5
Tradition	103.0	71.0	90.9	67.6	60.4	78.6	103.6
Metcalfe	103.8	74.5	85.8	75.3	49.6	77.8	102.6
Drummond	101.4	73.1	86.1	73.9	53.3	77.6	102.3
Hockett	107.8	72.7	81.6	67.8	57.1	77.4	102.1
Scarlett	--	--	--	73.9	53.9	63.9	101.4
Harrington	104.9	74.7	73.5	71.8	54.2	75.8	100.0
Pinnacle	--	--	--	--	52.8	52.8	97.4
Copeland	100.6	72.5	68.0	72.4	51.9	73.1	96.4
Merit	98.2	70.2	81.9	66.5	44.5	72.3	95.3
Newdale	--	--	--	--	49.9	49.9	92.1

NOTE: Average yields in this summary should not be compared to each other since they are not grown in the same years. Compare only to the check variety.

Table 3. Relative test weights of malt barley varieties in lb/bu as compared to Harrington when grown under dryland conditions at the EARC, Sidney, Montana.

Variety	2004	2005	2006	2007	2008	Ave	as % of Harrington
Boulder	--	51.3	52.0	52.3	49.2	51.2	109.5
Haxby	52.8	50.3	53.0	52.0	50.2	51.7	108.9
MT020204	--	--	--	--	48.0	48.0	107.9
MT020155	--	--	--	--	47.7	47.7	107.2
Pinnacle	--	--	--	--	47.7	47.7	107.2
Craft	51.7	50.7	50.8	51.3	47.3	50.4	106.2
MT010158	--	--	--	--	47.0	47.0	105.6
Hockett	51.0	50.0	50.8	50.7	47.0	49.9	105.2
Champion	--	--	--	--	46.8	46.8	105.2
Geraldine	--	49.7	48.0	50.7	44.8	48.3	103.3
Xena	--	48.5	47.7	50.7	46.3	48.3	103.3
Tradition	49.7	48.3	50.7	49.2	46.5	48.9	103.1
Eslick	--	48.2	49.0	49.3	46.2	48.2	103.0
Metcalfe	50.0	47.7	50.5	50.2	45.5	48.8	102.9
Conrad	--	47.8	48.7	50.0	45.7	48.1	102.7
Drummond	50.0	47.5	50.2	47.8	46.0	48.3	101.9
Newdale	--	--	--	--	45.3	45.3	101.8
Stellar-ND	--	47.5	49.5	47.3	45.2	47.4	101.3
Harrington	50.0	45.8	46.8	50.0	44.5	47.4	100.0
Scarlett	--	--	--	48.8	45.7	47.3	100.0
Legacy	48.7	46.0	49.0	47.8	44.7	47.2	99.6
Copeland	48.5	45.5	46.8	48.5	44.2	46.7	98.5
Merit	45.8	45.5	46.2	48.3	44.2	46.0	97.0

NOTE: Average test weights in this summary should not be compared to each other since they are not grown in the same years. Compare only to the check variety.

Table 4. Relative protein contents of malt barley varieties in percent as compared to Harrington when grown under dryland conditions at the EARC, Sidney, Montana.

Variety	2004	2005	2006	2007	2008	Ave	as % of Harrington
Craft	13.1	11.0	13.3	12.4	14.3	12.8	107.9
Haxby	12.7	10.7	12.8	13.0	14.7	12.8	107.6
Eslick	--	9.9	12.4	12.2	16.0	12.6	106.5
Conrad	--	9.8	12.3	11.9	16.1	12.5	105.7
Metcalfe	12.5	10.5	12.2	11.1	16.0	12.5	104.9
Boulder	--	10.3	12.7	12.0	14.3	12.3	104.0
Geraldine	--	10.2	12.2	10.9	15.9	12.3	103.8
Merit	11.9	10.6	12.0	11.0	16.0	12.3	103.5
Drummond	12.4	10.5	12.4	11.6	14.4	12.3	103.2
Xena	--	10.4	12.7	10.9	14.2	12.1	101.7
Newdale	--	--	--	--	15.1	15.1	100.7
Copeland	12.0	10.1	12.5	10.6	14.5	11.9	100.5
Harrington	12.0	10.1	11.8	10.5	15.0	11.9	100.0
Scarlett	--	--	--	10.8	14.7	12.8	100.0
Tradition	12.6	9.5	11.5	10.8	14.0	11.7	98.3
Hockett	11.6	9.7	11.3	11.3	14.4	11.7	98.1
MT020204	--	--	--	--	14.4	14.4	96.0
Stellar-ND	--	10.0	10.9	11.1	12.5	11.1	93.9
Legacy	11.6	10.2	10.6	10.2	13.1	11.1	93.8
MT010158	--	--	--	--	13.6	13.6	90.7
Pinnacle	--	--	--	--	13.6	13.6	90.7
Champion	--	--	--	--	13.1	13.1	87.3
MT020155	--	--	--	--	13.0	13.0	86.7

NOTE: Average protein percents in this summary should not be compared to each other since they are not grown in the same years. Compare only to the check variety.

Table 5. Relative percent plump of malt barley varieties as compared to Harrington when grown under dryland conditions at the EARC, Sidney, Montana.

Variety	2004	2005	2006	2007	2008	Ave	as % of Harrington
Pinnacle	--	--	--	--	74	74.0	151.0
Boulder	--	94	87	89	62	83.0	111.4
MT020155	--	--	--	--	54	54.0	110.2
MT010158	--	--	--	--	54	54.0	110.2
Craft	94	89	84	89	66	84.4	108.5
Hockett	95	94	87	88	55	83.8	107.7
Metcalfe	92	88	89	87	47	80.6	103.6
Stellar-ND	--	86	90	83	46	76.3	102.3
Conrad	--	92	81	88	43	76.0	102.0
Harrington	91	86	74	89	49	77.8	100.0
Tradition	89	88	91	79	40	77.4	99.5
Copeland	94	86	73	85	48	77.2	99.2
Champion	--	--	--	--	48	48.0	98.0
Scarlett	--	--	--	88	47	67.5	97.8
Merit	88	89	75	90	38	76.0	97.7
Haxby	91	85	73	82	47	75.6	97.2
Drummond	86	80	87	77	42	74.4	95.6
Newdale	--	--	--	--	46	46.0	93.9
Legacy	80	66	79	73	54	70.4	90.5
MT020204	--	--	--	--	44	44.0	89.8
Eslick	--	79	70	75	31	63.8	85.6
Geraldine	--	80	60	76	37	63.3	84.9
Xena	--	84	53	85	30	63.0	84.6

NOTE: Average plump percents in this summary should not be compared to each other since they are not grown in the same years. Compare only to the check variety.

Table 6. Agronomic data obtained from a malt barley yield trial conducted under flood irrigated conditions at the Eastern Agricultural Research Center, Sidney, Montana.

entry	heading*	height, cm	lodging index	grain protein %	test wt, lb/bu	% plump	% regular	yield, bu/ac	
Champion	61.7	79.3	0.33	11.42	53.2	93.7	6.3	150.9	a
Geraldine	62.7	77.3	0.33	12.34	53.2	91.7	7.3	139.4	a
Baronesse	60.7	74.0	0.00	11.59	52.8	91.7	6.7	138.5	a
WPB Xena	61.7	80.7	0.00	12.51	52.3	93.0	6.3	137.8	a
Boulder	61.3	79.0	0.33	10.87	53.8	94.0	5.7	136.8	a
Hockett	58.0	76.0	0.67	12.13	52.2	91.0	7.3	132.5	a
MT020204	59.7	77.7	0.67	13.24	52.5	89.7	8.3	130.0	a
Legacy	61.3	78.7	0.00	10.29	50.7	88.7	10.0	128.1	a
Craft	60.0	83.3	0.33	12.72	53.3	94.0	5.0	123.7	
Eslick	62.0	80.7	0.00	10.33	53.5	93.0	6.0	122.6	
MT020155	55.7	78.3	0.67	10.06	52.5	94.3	5.0	122.4	
Haxby	60.0	80.3	0.00	12.23	54.3	94.3	4.7	122.1	
MT010158	58.7	77.3	2.00	11.47	51.7	91.0	8.3	120.9	
Stellar-ND	60.7	75.7	0.33	10.66	52.7	94.3	5.3	119.6	
Conrad	62.7	75.7	0.33	11.51	51.7	93.3	5.3	119.4	
Copeland	63.0	81.3	0.67	9.88	51.3	96.0	3.7	115.3	
Metcalfe	62.3	75.7	0.00	11.27	51.8	91.7	7.3	115.2	
Tradition	59.7	80.0	0.33	10.19	51.0	92.7	6.7	114.3	
Scarlett	63.3	67.3	0.00	10.36	52.0	96.3	3.3	114.2	
Harrington	62.3	79.3	0.33	11.37	51.0	88.7	9.7	110.0	
Pinnacle	61.3	76.3	0.00	10.35	53.0	95.7	2.0	109.1	
Drummond	58.0	81.7	1.00	11.13	51.0	89.3	9.3	102.2	
Newdale	62.0	72.0	0.67	10.90	50.3	88.3	9.7	97.7	
Merit	64.7	73.3	0.00	10.55	49.2	79.7	17.3	97.1	
Average	61.0	77.5	0.38	11.22	52.1	91.9	6.9	121.7	
probability	<0.001	0.429	0.452	0.080	<0.001	0.004	<0.001	<0.001	
CV (S/mean)	2.5	7.7	206.5	11.3	1.3	4.2	43.0	8.6	
CV (SE/mean)	1.4	4.5	119.2	6.5	0.8	2.4	24.8	4.9	
LSD (0.05)	2.5	9.8	1.27	2.08	1.2	6.3	4.9	17.1	

*days from planting
a indicates significantly greater yield than check variety, Harrington

Table 7. Relative yielding abilities of malt barley varieties in bu/ac as compared to Harrington grown under irrigation at the Eastern Agricultural Research Center, Sidney, Montana.

Cultivar	2004	2005	2006	2007	2008	Ave	as % of Harrington
Champion	--	--	--	--	150.9	150.9	137.2
MT020204	--	--	--	--	130.0	130.0	118.2
Xena	--	125.3	103.9	58.4	137.8	106.4	115.6
Geraldine	--	128.5	98.8	56.8	139.4	105.9	115.1
Eslick	--	125.2	105.0	69.8	122.6	105.7	114.9
Conrad	--	129.3	109.2	62.0	119.4	105.0	114.1
Legacy	151.2	117.6	110.4	43.8	128.1	110.2	111.3
MT020155	--	--	--	--	122.4	122.4	111.3
Boulder	--	121.0	104.7	44.6	136.8	101.8	110.7
MT010158	--	--	--	--	120.9	120.9	109.9
Haxby	144.4	120.8	97.6	59.0	122.1	108.8	109.8
Tradition	141.8	113.2	113.6	55.5	114.3	107.7	108.7
Copeland	126.9	128.7	104.2	62.3	115.3	107.5	108.5
Hockett	127.9	115.0	98.9	52.1	132.5	105.3	106.3
Craft	128.1	113.5	99.9	59.6	123.7	105.0	106.0
Drummond	138.2	118.4	111.6	46.4	102.2	103.4	104.4
Stellar-ND	--	123.2	103.0	36.6	119.6	95.6	103.9
Metcalfe	122.2	120.8	94.1	52.0	115.2	100.9	101.8
Harrington	127.3	97.2	93.5	67.2	110.0	99.0	100.0
Pinnacle	--	--	--	--	109.1	109.1	99.2
Merit	139.4	108.4	91.5	54.3	97.1	98.1	99.1
Scarlett	--	--	--	61.3	114.2	87.8	99.0
Newdale	--	--	--	--	97.7	97.7	88.8

NOTE: Average yields in this summary should not be compared to each other since they are not grown in the same years. Compare yields only to the check variety.
Hail in 2007 damaged crop, particularly early maturing varieties.

Table 8. Relative test weights of malt barley varieties in lb/bu as compared to Harrington grown under irrigation at the Eastern Agricultural Research Center, Sidney, Montana.

Cultivar	2004	2005	2006	2007	2008	Ave	as % of Harrington
Haxby	53.7	51.2	49.8	49.5	54.3	51.7	106.8
Boulder	--	51.0	50.8	50.0	53.8	51.4	106.5
Craft	52.5	50.7	50.2	49.0	53.3	51.1	105.7
Eslick	--	50.3	48.7	49.0	53.5	50.4	104.4
Champion	--	--	--	--	53.2	53.2	104.3
Geraldine	--	50.8	48.0	49.2	53.2	50.3	104.2
Pinnacle	--	--	--	--	53.0	53.0	103.9
Hockett	52.0	50.8	48.3	46.5	52.2	50.0	103.2
MT020204	--	--	--	--	52.5	52.5	102.9
MT020155	--	--	--	--	52.5	52.5	102.9
Conrad	--	51.0	48.8	46.8	51.7	49.6	102.7
Metcalfe	51.3	50.2	47.8	47.3	51.8	49.7	102.6
Xena	--	49.7	47.7	47.3	52.3	49.3	102.1
Scarlett	--	--	--	48.2	52.0	50.1	101.9
MT010158	--	--	--	--	51.7	51.7	101.4
Copeland	49.2	49.3	46.8	46.8	51.3	48.7	100.6
Tradition	48.8	49.0	48.0	45.8	51.0	48.5	100.2
Harrington	49.0	47.0	47.7	47.3	51.0	48.4	100.0
Drummond	48.8	47.5	46.2	45.3	51.0	47.8	98.7
Newdale	--	--	--	--	50.3	50.3	98.6
Legacy	48.0	48.3	45.7	45.3	50.7	47.6	98.3
Stellar-ND	--	47.3	44.5	44.3	52.7	47.2	97.8
Merit	49.0	47.7	44.8	45.0	49.2	47.1	97.4

NOTE: Average test weights in this summary should not be compared to each other since they are not grown in the same years. Compare test weights only to the check variety.
Hail in 2007 damaged crop, particularly early maturing varieties.

Table 9. Relative protein contents of malt barley varieties in percent as compared to Harrington grown under irrigation at the Eastern Agricultural Research Center, Sidney, Montana.

Cultivar	2004	2005	2006	2007	2008	Ave	as % of Harrington
MT020204	--	--	--	--	13.2	13.2	115.8
Craft	12.0	14.2	13.2	13.4	12.7	13.1	112.9
Haxby	11.7	14.0	12.0	12.4	12.2	12.5	107.4
Geraldine	--	13.3	11.8	13.3	12.3	12.7	106.3
Boulder	--	14.2	12.3	13.3	10.9	12.7	106.3
Conrad	--	13.3	12.4	13.2	11.5	12.6	105.7
Drummond	11.5	14.4	12.0	11.9	11.1	12.2	105.0
Metcalfe	10.9	12.8	12.2	13.1	11.3	12.1	104.0
Xena	--	13.1	11.8	11.8	12.5	12.3	103.1
Hockett	10.6	13.2	10.9	11.9	12.1	11.7	101.2
Merit	10.9	12.7	12.3	12.1	10.6	11.7	101.0
MT010158	--	--	--	--	11.5	11.5	100.9
Legacy	10.6	14.1	10.7	12.7	10.3	11.7	100.7
Tradition	11.6	14.2	11.2	11.1	10.2	11.7	100.5
Eslick	--	13.6	11.7	12.3	10.3	12.0	100.4
Scarlett	--	--	--	13.7	10.4	12.1	100.4
Harrington	10.3	12.7	11.0	12.6	11.4	11.6	100.0
Champion	--	--	--	--	11.4	11.4	100.0
Stellar-ND	--	13.4	11.0	11.5	10.7	11.7	97.7
Copeland	11.1	12.1	11.5	11.6	9.9	11.2	96.9
Newdale	--	--	--	--	10.9	10.9	95.6
Pinnacle	--	--	--	--	10.4	10.4	91.2
MT020155	--	--	--	--	10.1	10.1	88.6

NOTE: Average protein contents in this summary should not be compared to each other since they are not grown in the same years. Compare protein contents only to the check variety.
Hail in 2007 damaged crop, particularly early maturing varieties.

Table 10. Relative plump percent of malt barley varieties as compared to Harrington grown under irrigation at the Eastern Agricultural Research Center, Sidney, Montana.

Cultivar	2004	2005	2006	2007	2008	Ave	as % of Harrington
Scarlett	--	--	--	93	96	94.5	109.9
Pinnacle	--	--	--	--	96	96.0	107.9
Champion	--	--	--	--	94	94.0	105.6
MT020155	--	--	--	--	94	94.0	105.6
Conrad	--	95	89	87	93	91.0	104.9
Boulder	--	93	89	85	94	90.3	104.0
Metcalfe	95	94	87	84	92	90.4	103.4
Tradition	94	96	90	78	93	90.2	103.2
Hockett	97	95	87	81	91	90.2	103.2
Craft	95	92	86	84	94	90.2	103.2
Copeland	94	90	80	89	96	89.8	102.7
MT010158	--	--	--	--	91	91.0	102.2
Eslick	--	89	83	88	93	88.3	101.7
MT020204	--	--	--	--	90	90.0	101.1
Haxby	96	91	76	81	94	87.6	100.2
Harrington	90	85	90	83	89	87.4	100.0
Drummond	94	94	78	80	89	87.0	99.5
Stellar-ND	--	97	80	74	94	86.3	99.4
Newdale	--	--	--	--	88	88.0	98.9
Xena	--	89	78	82	93	85.5	98.6
Geraldine	--	84	79	81	92	84.0	96.8
Legacy	87	97	71	77	89	84.2	96.3
Merit	87	90	81	82	80	84.0	96.1

NOTE: Average protein contents in this summary should not be compared to each other since they are not grown in the same years. Compare protein contents only to the check variety.
Hail in 2007 damaged crop, particularly early maturing varieties.

Table 11. Relative lodging indices of malt barley varieties as compared to Harrington grown under irrigation at the Eastern Agricultural Research Center, Sidney, Montana.

Cultivar	2004	2005	2006	2007	2008	Ave	as % of Harrington
MT010158	--	--	--	--	2.0	2.0	666.7
MT020204	--	--	--	--	0.7	0.7	233.3
MT020155	--	--	--	--	0.7	0.7	233.3
Newdale	--	--	--	--	0.7	0.7	233.3
Harrington	0.7	6.0	0.3	0.0	0.3	1.5	100.0
Champion	--	--	--	--	0.3	0.3	100.0
Legacy	2.3	0.0	3.0	0.0	0.0	1.1	72.6
Copeland	0.0	1.3	1.3	0.0	0.7	0.7	45.2
Craft	0.0	1.3	0.7	0.0	0.3	0.5	31.5
Drummond	0.0	0.0	1.0	0.0	1.0	0.4	27.4
Tradition	1.3	0.0	0.0	0.0	0.3	0.3	21.9
Eslick	--	1.3	0.0	0.0	0.0	0.3	19.7
Stellar-ND	--	0.0	0.7	0.0	0.3	0.3	15.2
Geraldine	--	0.7	0.0	0.0	0.3	0.3	15.2
Merit	0.0	1.0	0.0	0.0	0.0	0.2	13.7
Hockett	0.0	0.3	0.0	0.0	0.7	0.2	13.7
Conrad	--	0.3	0.0	0.0	0.3	0.2	9.1
Boulder	--	0.0	0.0	0.0	0.3	0.1	4.5
Metcalfe	0.0	0.3	0.0	0.0	0.0	0.1	4.1
Haxby	0.0	0.0	0.3	0.0	0.0	0.1	4.1
Xena	--	0.0	0.0	0.0	0.0	0.0	0.0
Scarlett	--	--	--	0.0	0.0	0.0	0.0
Pinnacle	--	--	--	--	0.0	0.0	0.0

NOTE: Average protein contents in this summary should not be compared to each other since they are not grown in the same years. Compare protein contents only to the check variety.
Hail in 2007 damaged crop, particularly early maturing varieties.