

PROJECT TITLE: Evaluation of spring wheat, durum, and barley varieties under minimum-till, continuous cropping conditions – 2008

PROJECT LEADER:

Joyce Eckhoff, Eastern Agricultural Research Center, 1501 N Central Ave, Sidney, MT 59270
phone: (406)433-2208 e-mail: jeckhoff@sidney.ars.usda.gov

OBJECTIVE: To determine the best adapted varieties of spring wheat, durum, and barley for production under no-till continuous cropping conditions in eastern Montana.

RESULTS:

Soil type: Williams clay loam

Previous crops: 2007 - spring wheat, 2006- safflower, 2005 - small grain plots

Residual soil N to 3 ft: 16 lb N/ac

Residual soil P to 6 in: 54 ppm

Applied fertilizer: 30 lb N/ac applied as liquid 28-0-0

Herbicides: BroxM (1.5 pt/ac) applied Jun 19

Precipitation April – August, 2008: 4.55 inches

Ave (59 yr) precipitation April – August: 9.39 inches

Precipitation September 2007 – August 2008: 7.13 inches

Ave (59 yr) precipitation September – August: 13.77 inches

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

Experiment	Planting date	Harvest date	Plot size
recrop spring wheat	Apr 9	Jul 29	100 ft ² , entire plot harvested.
recrop durum	Apr 9	Jul 29	100 ft ² , entire plot harvested.
recrop barley	Apr 9	Jul 25	100 ft ² , entire plot harvested.

Comments:

Above average precipitation and cool temperatures in May.

Spring wheat: Twenty lines and varieties of spring wheat were tested under dryland recrop conditions (Table 1). Two varieties yielded significantly less than the check variety, McNeal. Five-year summaries for yield, test weight, height, and protein content are shown in Tables 2 through 5.

Durum: Fifteen durum lines and varieties were tested under dryland recrop conditions (Table 6). There was no significant difference in yield among lines. Five-year summaries for yield, test weight, height, protein content, and hard vitreous amber color are shown in Tables 7 through 11.

Barley: Twenty barley lines and varieties were tested under dryland recrop conditions (Table 12). One variety yielded significantly less than the check variety, Haxby, and one yielded significantly more. Five-year summaries for yield, test weight, height, and protein are shown in Tables 13 through 16.

SUMMARY: The experiments reported under this project are all of the replicated small plot type. The three-year crop rotation is commercial small grain, small grain yield trials, safflower.

FUTURE PLANS: New varieties will continue to be tested under continuous cropping conditions to identify those which will perform best under these conditions. Experimental lines from North Dakota as well as from Montana will be tested so that when those lines are released as varieties, information will be available as to their performance under continuous cropping conditions.

Table 1. Agronomic data obtained from a dryland recrop spring wheat yield trial conducted at the Eastern Agricultural Research Center, Sidney, MT.

entry	heading*	height, in	protein content	test wt, lb/bu	yield, bu/ac
Oneal	71.0	19.7	14.82	56.3	8.7
Jedd	69.0	15.5	14.54	59.3	8.5
MTHW0471	70.3	18.8	15.54	58.7	8.5
McNeal	71.0	20.1	15.10	51.7	8.4
Volt	69.7	17.5	15.76	56.0	8.0
PF906-408	68.3	18.1	16.12	56.5	8.0
Reeder	70.0	17.6	17.08	57.0	7.9
Choteau	69.3	17.1	15.39	56.8	7.7
MT0415	69.7	19.6	16.43	56.2	7.3
Briggs	68.7	20.5	15.31	56.5	7.2
Kuntz	70.0	18.1	15.48	56.2	7.2
Explorer	68.3	17.7	16.25	55.0	7.0
Kelby	68.0	19.0	16.65	58.8	6.7
Corbin	70.0	17.8	17.06	56.5	6.7
Granger	70.0	18.9	15.42	54.8	6.7
Howard	70.0	19.2	14.51	54.8	6.7
Outlook	71.0	18.0	14.84	52.0	6.5
Vida	69.0	18.8	15.83	56.0	6.3
Glenn	69.7	18.4	15.86	59.0	5.9 x
Faller	72.0	16.0	15.79	52.2	4.9 x
mean	69.75	18.3	15.69	56.02	7.242
Probability	0.011	0.251	0.002	<0.001	0.103
CV (S/mean)	1.7	10.5	4.8	2.6	18.6
CV (SE/mean)	1.0	6.1	2.8	1.5	10.8
LSD 0.05	1.9	3.2	1.24	2.4	2.2

*days from planting

x indicates significantly lower yield than check variety, McNeal, at probability of <0.05

Table 2. Relative yielding abilities of spring wheat varieties in bu/ac as compared to McNeal when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	2004	2005	2006	2007	2008	Ave	as % of McNeal
Explorer	--	--	--	37.5	7.0	22.3	121.6
MT0415	--	--	--	36.1	7.3	21.7	118.6
Vida	29.5	40.6	37.6	38.1	6.3	30.4	115.8
Outlook	30.1	37.0	35.2	40.4	6.5	29.8	113.5
Reeder	25.0	41.5	35.7	35.9	7.9	29.2	111.1
Oneal	--	--	--	--	8.7	8.7	103.6
Howard	--	--	37.7	--	6.7	22.2	102.3
Jedd	--	--	--	--	8.5	8.5	101.2
MTHW0471	--	--	--	--	8.5	8.5	101.2
McNeal	24.5	35.3	35.0	28.2	8.4	26.3	100.0
Choteau	24.2	34.8	35.2	29.5	7.7	26.3	100.0
Volt	--	--	--	--	8.0	8.0	95.2
PF906-408	--	--	--	--	8.0	8.0	95.2
Glenn	--	32.0	34.1	--	5.9	24.0	91.5
Briggs	--	--	--	--	7.2	7.2	85.7
Kuntz	--	--	--	--	7.2	7.2	85.7
Kelby	--	--	--	--	6.7	6.7	79.8
Corbin	--	--	--	--	6.7	6.7	79.8
Granger	--	--	--	--	6.7	6.7	79.8
Faller	--	--	--	--	4.9	4.9	58.3

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 spring wheat varieties in lb/bu as compared to McNeal when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	2004	2005	2006	2007	2008	Ave	as % of McNeal
Jedd	--	--	--	--	59.3	59.3	114.7
Kelby	--	--	--	--	58.8	58.8	113.7
MTHW0471	--	--	--	--	58.7	58.7	113.5
PF906-408	--	--	--	--	56.5	56.5	109.3
Briggs	--	--	--	--	56.5	56.5	109.3
Corbin	--	--	--	--	56.5	56.5	109.3
Oneal	--	--	--	--	56.3	56.3	108.9
Glenn	--	63.3	59.8	--	59.0	60.7	108.7
Kuntz	--	--	--	--	56.2	56.2	108.7
Volt	--	--	--	--	56.0	56.0	108.3
Granger	--	--	--	--	54.8	54.8	106.0
Choteau	59.8	60.0	59.5	62.8	56.8	59.8	104.7
Reeder	60.0	61.8	58.0	62.0	57.0	59.8	104.7
MT0415	--	--	--	61.8	56.2	59.0	104.5
Howard	--	--	57.7	--	54.8	56.3	104.5
Explorer	--	--	--	62.0	55.0	58.5	103.6
Vida	59.5	60.5	57.2	62.0	56.0	59.0	103.4
Faller	--	--	--	--	52.2	52.2	101.0
McNeal	56.8	59.8	56.0	61.2	51.7	57.1	100.0
Outlook	57.8	59.0	55.5	60.5	52.0	57.0	99.8

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 heights of spring wheat varieties in inches as compared to McNeal when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	2004	2005	2006	2007	2008	Ave	as % of McNeal
Glenn	--	28	30	--	18	25.3	107.0
Outlook	26	26	28	30	18	25.6	102.4
Howard	--	--	28	--	19	23.5	102.2
MT0415	--	--	--	30	20	25.0	102.0
McNeal	25	25	26	29	20	25.0	100.0
Oneal	--	--	--	--	20	20.0	100.0
Briggs	--	--	--	--	20	20.0	100.0
Vida	22	25	27	30	19	24.6	98.4
Reeder	23	26	26	28	18	24.2	96.8
MTHW0471	--	--	--	--	19	19.0	95.0
Kelby	--	--	--	--	19	19.0	95.0
Granger	--	--	--	--	19	19.0	95.0
Choteau	23	24	26	28	17	23.6	94.4
Explorer	--	--	--	28	18	23.0	93.9
Volt	--	--	--	--	18	18.0	90.0
PF906-408	--	--	--	--	18	18.0	90.0
Kuntz	--	--	--	--	18	18.0	90.0
Corbin	--	--	--	--	18	18.0	90.0
Jedd	--	--	--	--	16	16.0	80.0
Faller	--	--	--	--	16	16.0	80.0

NOTE: Average heights 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 protein contents of spring wheat varieties in percent as compared to McNeal when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	2004	2005	2006	2007	2008	Ave	as % of McNeal
MT0415	--	--	--	15.6	16.4	16.0	121.2
Reeder	17.2	16.5	15.1	15.7	17.1	16.3	117.4
Vida	16.8	16.2	15.3	15.0	15.8	15.8	113.8
Corbin	--	--	--	--	17.1	17.1	113.2
Explorer	--	--	--	13.1	16.2	14.7	111.0
Kelby	--	--	--	--	16.6	16.6	109.9
PF906-408	--	--	--	--	16.1	16.1	106.6
Outlook	14.4	15.3	15.0	14.1	14.8	14.7	105.9
Glenn	--	15.6	15.5	--	15.9	15.7	105.9
Volt	--	--	--	--	15.8	15.8	104.6
Faller	--	--	--	--	15.8	15.8	104.6
Choteau	15.0	15.6	13.3	12.4	15.4	14.3	103.2
MTHW0471	--	--	--	--	15.5	15.5	102.6
Kuntz	--	--	--	--	15.5	15.5	102.6
Granger	--	--	--	--	15.4	15.4	102.0
Briggs	--	--	--	--	15.3	15.3	101.3
McNeal	13.8	15.8	13.5	11.3	15.1	13.9	100.0
Howard	--	--	13.8	--	14.5	14.2	99.0
Oneal	--	--	--	--	14.8	14.8	98.0
Jedd	--	--	--	--	14.5	14.5	96.0

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

Table 6. Agronomic data obtained from a dryland recrop durum yield trial conducted at the Eastern Agricultural Research Center, Sidney, MT.

entry	heading*	height, in	percent protein	HVAC	test wt, lb/bu	yield, bu/ac
Alkabo	69.3	19.3	13.76	66.4	58.7	8.5
Cimmyt#8	70.0	18.5	14.48	50.5	55.2	8.0
Alzada	68.0	19.6	14.77	72.4	56.7	7.9
Cimmyt#5	70.0	16.1	14.42	58.7	54.7	7.8
Divide	71.0	19.6	14.53	66.9	56.5	7.3
MT03012	66.7	15.7	15.13	71.0	55.7	6.9
MT02DH55	69.7	17.2	15.24	63.5	55.5	6.7
Strongfield	70.3	19.2	15.50	69.5	56.2	6.6
Pierce	70.0	18.2	14.82	74.0	57.5	6.5
Mountrail	70.0	17.2	15.67	66.3	54.8	6.5
MT02525	68.7	16.4	14.86	63.2	56.5	6.3
Grenora	71.3	18.2	14.94	72.1	56.0	5.8
MT04174	67.7	18.1	15.76	75.4	56.2	5.7
Dilse	71.0	15.9	15.98	74.4	53.7	5.4
Cimmyt#11	70.0	16.8	15.86	49.6	51.5	5.4
mean	69.58	17.7	15.05	66.27	55.68	6.76
probability	<0.001	0.100	0.012	<0.001	<0.001	0.126
CV (S/mean)	1.2	10.0	4.4	7.4	2.2	19.6
CV (SE/mean)	0.7	5.8	2.5	4.3	1.3	11.3
LSD 0.05	1.4	3.0	1.11	8.2	2.0	ns

* days from planting

x indicates significantly lower yield than check variety, Mountrail, at probability <0.05

Table 7. Relative yields of durum varieties in bu/ac as compared to Mountrail when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	2004	2005	2006	2007	2008	Ave	as % of Mountrail
Cimmyt#8	--	--	--	--	8.0	8.0	123.1
Cimmyt#5	--	--	--	--	7.8	7.8	120.0
Alkabo	--	36.4	33.4	48.5	8.5	31.7	113.4
MT02525	--	--	32.3	46.6	6.3	28.4	103.8
Grenora	--	37.2	30.6	41.4	5.8	28.8	102.9
Alzada	--	33.7	32.4	39.9	7.9	28.5	101.9
Mountrail	15.4	29.7	32.0	43.6	6.5	25.4	100.0
MT02DH55	--	--	31.4	43.4	6.7	27.2	99.3
Divide	--	31.8	31.9	38.8	7.3	27.5	98.2
Pierce	17.4	31.3	29.1	40.2	6.5	24.9	97.9
MT03012	--	--	31.4	36.4	6.9	24.9	91.0
MT04174	--	--	--	--	5.7	5.7	87.7
Cimmyt#11	--	--	--	--	5.4	5.4	83.1
Dilse	--	--	--	--	5.4	5.4	83.1
Strongfield	--	--	29.3	28.7	6.6	21.5	78.7

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.

Table 8. Relative test weights of durum varieties in lb/bu as compared to Mountrail when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	2004	2005	2006	2007	2008	Ave	as % of Mountrail
Alkabo	--	61.2	59.2	63.2	58.7	60.6	104.2
MT02525	--	--	59.3	63.8	56.5	59.9	102.9
Pierce	59.0	60.8	59.0	62.2	57.5	59.7	102.7
MT04174	--	--	--	--	56.2	56.2	102.6
Divide	--	59.2	58.7	62.2	56.5	59.2	101.7
Strongfield	--	--	58.8	62.2	56.2	59.1	101.5
Alzada	--	59.7	58.3	61.2	56.7	59.0	101.4
MT03012	--	--	58.0	63.0	55.7	58.9	101.2
Grenora	--	58.8	57.0	62.8	56.0	58.7	100.9
Cimmyt#8	--	--	--	--	55.2	55.2	100.7
Mountrail	58.1	58.0	57.8	62.0	54.8	58.1	100.0
Cimmyt#5	--	--	--	--	54.7	54.7	99.8
MT02DH55	--	--	56.8	61.3	55.5	57.9	99.4
Dilse	--	--	--	--	53.7	53.7	98.0
Cimmyt#11	--	--	--	--	51.5	51.5	94.0

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

Table 9. Relative heights of durum varieties in inches as compared to Mountrail when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	2004	2005	2006	2007	2008	Ave	as % of Mountrail
Pierce	24	29	29	35	18	27.0	108.0
Cimmyt#8	--	--	--	--	18	18.0	105.9
MT04174	--	--	--	--	18	18.0	105.9
Divide	--	29	28	32	20	27.3	105.8
Alkabo	--	27	28	32	19	26.5	102.9
Mountrail	22	26	29	31	17	25.0	100.0
Cimmyt#11	--	--	--	--	17	17.0	100.0
Strongfield	--	--	28	29	19	25.3	98.7
Alzada	--	26	26	29	20	25.3	98.1
Grenora	--	26	26	29	18	24.8	96.1
MT02DH55	--	--	28	29	17	24.7	96.1
Cimmyt#5	--	--	--	--	16	16.0	94.1
Dilse	--	--	--	--	16	16.0	94.1
MT02525	--	--	24	26	16	22.0	85.7
MT03012	--	--	24	26	16	22.0	85.7

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

Table 10. Relative protein contents of durum varieties in percent as compared to Mountrail when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	2004	2005	2006	2007	2008	Ave	as % of Mountrail
Dilse	--	--	--	--	16.0	16.0	101.9
Cimmyt#11	--	--	--	--	15.9	15.9	101.3
MT04174	--	--	--	--	15.8	15.8	100.6
Mountrail	16.9	17.8	15.0	13.6	15.7	15.8	100.0
MT03012	--	--	15.2	13.4	15.1	14.6	98.6
MT02DH55	--	--	14.7	13.3	15.2	14.4	97.5
Divide	--	17.0	14.0	14.2	14.5	14.9	96.1
Pierce	16.1	15.9	14.5	14.2	14.8	15.1	95.6
Strongfield	--	--	14.2	12.6	15.5	14.1	95.5
Grenora	--	15.4	14.6	13.5	14.9	14.6	94.0
Cimmyt#8	--	--	--	--	14.5	14.5	92.4
Alzada	--	15.1	13.8	13.6	14.8	14.3	92.3
MT02525	--	--	13.9	12.0	14.9	13.6	92.1
Cimmyt#5	--	--	--	--	14.4	14.4	91.7
Alkabo	--	13.8	14.1	13.9	13.8	13.9	89.5

NOTE: Average protein contents 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 11. Relative hard vitreous amber color of durum varieties in percent as compared to Mountrail when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	2004	2005	2006	2007	2008	Ave	as % of Mountrail
MT04174	--	--	--	--	75.4	75.4	113.7
Dilse	--	--	--	--	74.4	74.4	112.2
MT03012	--	--	84.7	87.6	71.0	81.1	110.1
Alkabo	--	98.0	74.9	84.9	66.4	81.1	104.5
Grenora	--	92.5	76.2	82.8	72.1	80.9	104.3
Pierce	78.7	89.6	78.5	85.3	74.0	81.2	104.0
Alzada	--	86.4	75.1	85.7	72.4	79.9	103.0
Mountrail	80.2	89.3	76.4	78.3	66.3	78.1	100.0
Divide	--	92.7	66.1	84.5	66.9	77.6	100.0
Strongfield	--	--	80.1	69.1	69.5	72.9	99.0
MT02DH55	--	--	73.9	74.6	63.5	70.7	95.9
MT02525	--	--	71.1	69.0	63.2	67.8	92.0
Cimmyt#5	--	--	--	--	58.7	58.7	88.5
Cimmyt#8	--	--	--	--	50.5	50.5	76.2
Cimmyt#11	--	--	--	--	49.6	49.6	74.8

NOTE: Average hard vitreous amber color 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 12. Agronomic data obtained from a dryland recrop barley yield trial conducted at the Eastern Agricultural Research Center, Sidney, MT.

Variety	heading*	Height, in	Protein content	Test wt, lb/bu	Yield bu/acre	
Hockett	70.3	17.2	12.27	46.0	10.7	a
Champion	71.0	16.9	10.86	47.5	9.8	
Craft	69.3	17.6	13.05	48.5	9.4	
Eslick	70.7	15.4	11.72	47.5	9.1	
Boulder	69.3	15.6	12.50	47.0	8.9	
Conrad	70.3	16.3	10.87	47.5	8.9	
MT020204	69.7	17.8	10.23	46.0	8.9	
Baronesse	70.3	18.9	10.88	46.0	8.6	
WPB Xena	71.0	17.1	11.66	46.5	8.5	
MT020155	68.3	17.8	11.50	46.0	8.4	
Tradition	71.0	20.1	10.21	44.5	8.3	
Drummond	68.7	18.9	13.00	42.5	8.2	
Haxby	69.7	17.3	13.50	50.5	8.1	
MT010158	69.7	16.3	11.51	47.0	7.8	
Geraldine	72.7	15.5	13.03	47.0	7.6	
Legacy	69.7	17.2	9.53	43.0	7.5	
Harrington	72.0	16.5	12.30	43.5	7.4	
Merit	73.0	14.8	12.26	44.5	6.9	
Metcalf	69.3	18.2	12.67	45.0	6.4	
Stellar-ND	70.3	15.9	11.56	42.5	3.8	x
mean	70.3	43.4	11.76	45.9	8.2	
probability	<0.001	0.014	0.047		<0.001	
CV (S/mean)	1.2	9.0	11.6		14.1	
CV (SE/mean)	0.7	5.2	6.7		8.1	
LSD _{0.05}	1.4	2.6	2.26		1.9	

*days from planting

a indicates significantly greater yield than check variety, Haxby, at probability of <0.05

x indicates significantly lower yield than check variety, Haxby, at probability of <0.05

Table 13. Relative yields of barley varieties in bu/ac compared to Haxby when grown under dryland recrop conditions at the EARC, Sidney, Montana.

Cultivar	2004	2005	2006	2007	2008	Ave	as % of Haxby
Champion	--	--	--	--	9.8	9.8	121.0
MT020204	--	--	--	--	8.9	8.9	109.9
MT020155	--	--	--	--	8.4	8.4	103.7
Haxby	31.8	52.6	59.1	40.8	8.1	38.5	100.0
MT010158	--	--	--	--	7.8	7.8	96.3
Tradition	28.1	52.4	54.4	41.1	8.3	36.9	95.8
Xena	--	51.4	53.3	39.9	8.5	38.3	95.3
Legacy	--	49.2	52.6	41.1	7.5	37.6	93.6
Eslick	22.8	49.9	54.2	41.8	9.1	35.6	92.4
Metcalfe	23.9	53.4	54.0	39.9	6.4	35.5	92.3
Stellar	--	--	59.7	34.0	3.8	32.5	90.3
Conrad	--	47.0	47.6	41.4	8.9	36.2	90.2
Hockett	27.9	48.1	53.0	33.5	10.7	34.6	90.0
Boulder	--	45.7	50.9	37.7	8.9	35.8	89.2
Drummond	--	44.0	53.2	37.2	8.2	35.7	88.8
Craft	27.5	42.8	53.9	34.9	9.4	33.7	87.6
Baronesse	24.9	46.2	--	--	8.6	26.6	86.2
Harrington	19.2	46.8	51.4	36.5	7.4	32.3	83.8
Merit	--	44.4	42.6	38.0	6.9	33.0	82.1
Geraldine	--	44.1	44.9	33.7	7.6	32.6	81.1

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.

Table 14. Relative test weights of barley varieties in lb/bu compared to Haxby when grown under dryland recrop conditions at the EARC, Sidney, Montana.

Cultivar	2004	2005	2006	2007	2008	Ave	as % of Haxby
Haxby	50.5	48.8	49.3	51.8	50.5	50.2	100.0
Boulder	--	50.8	50.3	51.8	47.0	50.0	99.8
Craft	47.3	50.7	48.8	50.2	48.5	49.1	97.8
Geraldine	--	50.2	46.2	50.5	47.0	48.5	96.8
Xena	--	49.5	45.7	50.0	46.5	47.9	95.7
Conrad	--	49.0	45.0	49.7	47.5	47.8	95.4
Hockett	46.8	48.2	46.3	51.3	46.0	47.7	95.1
Eslick	45.3	49.3	45.8	50.5	47.5	47.7	95.0
Baronesse	46.3	48.7	--	--	46.0	47.0	94.1
Metcalfe	46.3	49.3	44.7	50.8	45.0	47.2	94.1
Champion	--	--	--	--	47.5	47.5	94.1
Tradition	47.0	47.0	47.0	50.0	44.5	47.1	93.9
MT010158	--	--	--	--	47.0	47.0	93.1
Legacy	--	47.2	45.8	49.3	43.0	46.3	92.5
Drummond	--	47.2	47.0	48.5	42.5	46.3	92.4
Merit	--	47.0	42.8	49.2	44.5	45.9	91.6
Harrington	44.2	47.2	44.0	50.0	43.5	45.8	91.2
MT020204	--	--	--	--	46.0	46.0	91.1
MT020155	--	--	--	--	46.0	46.0	91.1
Stellar	--	--	46.5	48.7	42.5	45.9	90.8

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.

Table 15. Relative heights of barley varieties in inches compared to Haxby when grown under dryland recrop conditions at the EARC, Sidney, Montana.

Cultivar	2004	2005	2006	2007	2008	Ave	as % of Haxby
Craft	20	29	27	24	18	23.6	106.3
Tradition	20	26	27	25	20	23.6	106.3
MT020204	--	--	--	--	18	18.0	105.9
MT020155	--	--	--	--	18	18.0	105.9
Legacy	--	27	28	25	17	24.3	104.3
Metcalfe	20	29	26	22	18	23.0	103.6
Drummond	--	27	25	24	19	23.8	102.2
Stellar	--	--	25	25	16	22.0	101.5
Haxby	18	28	26	22	17	22.2	100.0
Champion	--	--	--	--	17	17.0	100.0
Baronesse	18	24	--	--	19	20.3	96.8
Harrington	18	25	25	22	16	21.2	95.5
MT010158	--	--	--	--	16	16.0	94.1
Xena	--	25	24	21	17	21.8	93.5
Hockett	17	25	24	20	17	20.6	92.8
Boulder	--	25	24	21	16	21.5	92.5
Eslick	18	24	24	21	15	20.4	91.9
Conrad	--	25	24	20	16	21.3	91.4
Merit	--	24	24	21	15	21.0	90.3
Craft	20	29	27	24	18	23.6	106.3

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

Table 16. Relative protein contents as percent of barley varieties compared to Haxby when grown under dryland recrop conditions at the EARC, Sidney, Montana.

Cultivar	2004	2005	2006	2007	2008	Ave	as % of Haxby
Craft	13.5	11.0	12.0	11.0	13.0	12.1	105.6
Eslick	12.8	12.0	11.7	9.9	11.7	11.6	101.4
Drummond	--	10.9	10.6	11.7	13.0	11.6	100.7
Xena	--	13.2	10.6	10.6	11.7	11.5	100.4
Metcalfe	12.4	11.2	12.3	8.9	12.7	11.5	100.3
Haxby	11.4	10.8	10.7	10.9	13.5	11.5	100.0
Geraldine	--	11.1	11.4	10.4	13.0	11.5	100.0
Boulder	--	11.6	10.6	11.0	12.5	11.4	99.6
Harrington	12.8	10.2	10.9	9.9	12.3	11.2	97.9
Tradition	12.8	11.9	10.1	10.2	10.2	11.0	96.3
Hockett	11.3	11.4	10.7	9.3	12.3	11.0	96.0
Merit	--	11.4	11.0	9.3	12.3	11.0	95.9
Conrad	--	9.9	11.9	10.9	10.9	10.9	95.0
Baronesse	10.8	11.9	--	--	10.9	11.2	94.1
Stellar	--	--	10.0	9.4	11.6	10.3	88.3
MT020155	--	--	--	--	11.5	11.5	85.2
MT010158	--	--	--	--	11.5	11.5	85.2
Legacy	--	10.0	9.8	8.9	9.5	9.6	83.2
Champion	--	--	--	--	10.9	10.9	80.7
MT020204	--	--	--	--	10.2	10.2	75.6

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.