PROJECT TITLE: Evaluation of spring wheat, durum, and barley varieties under minimum-till, continuous cropping conditions – 2005

PROJECT LEADER:
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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: 2004 - spring wheat, 2003 - safflower, 2002 - small grain plots
Residual soil N to 2 ft: 78 lb N/ac
Residual soil P to 6 in: 64 ppm
Applied fertilizer: None
Herbicides: 1.5 pt/ac Bronate applied June 7
Precipitation April – August, 2005: 9.01 inches
Ave (57 yr) precipitation April – August: 9.45 inches
Precipitation September 2004 – August 2005: 12.95 inches
Ave (57 yr) precipitation September – August: 13.83 inches

Spring wheat: Twenty lines and varieties of spring wheat were tested under dryland recrop conditions (Table 1). Norpro, Nick, and Reeder yielded significantly more than the check variety, McNeal. Alsen yielded significantly lower than the check variety, McNeal. Average yield was 36.2 bu/acre. Five-year summaries for yield, test weight, height, and protein content are shown in Tables 2 through 5.

Durum: Sixteen durum varieties were tested under dryland recrop conditions (Table 6). Grenora, MT01695 and Alkabo yielded significantly more than the check variety, Mountrail. Average yield was 32.9 bu/acre. Five-year summaries for yield, test weight, height, and protein content are shown in Tables 7 through 10.

Barley: Twenty barley lines and varieties were tested under dryland recrop conditions (Table 11). MT970229 and Hays yielded significantly less than the check variety, Haxby. Average yield was 46.8 bu/acre. Five-year summaries for yield, test weight, height, and protein content are shown in Tables 12 through 15.

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. Bromoxynil at a rate of 1.5 pt/acre is used for broadleaf weed control in the small grain, and trifluralin at a rate of 1.5 pt/acre is used in the safflower. This weed control and crop rotation have been effective in controlling weeds in the yield trial plots, but volunteer small grain has been a problem in some years, although was not a severe problem in 2005.

FUTURE PLANS: New varieties will continue to be tested under continuous cropping conditions to identify those which will perform best under these conditions. Closer cooperation with the Williston Research Center 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 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, 2005.
Planted: April 12 Harvested: August 1

entry	heading, days from planting	height, in	protein content	test wt, lb/bu	yield, bu/ac	
NorPro	69.7	25.9	15.29	59.2	42.8	a
Nick	67.7	26.0	11.99	59.3	42.5	a
Reeder	69.0	26.1	16.50	61.8	41.5	a
MT0245	69.7	25.2	16.18	60.5	40.6	
MT0260	71.0	25.7	16.17	60.3	39.8	
Knudson	69.7	26.9	15.31	60.8	39.6	
Freyr	68.0	28.7	14.74	62.3	39.6	
MT0266	68.3	26.5	15.37	57.0	38.0	
SteeleND	71.0	28.0	15.37	60.2	37.8	
Granite	70.7	26.3	16.70	61.8	37.6	
Outlook	69.0	26.3	15.28	59.0	37.0	
Scholar	69.7	28.1	15.04	61.2	35.6	
McNeal	70.0	25.3	15.82	59.8	35.3	
Choteau	68.3	24.6	15.64	60.0	34.8	
MTHW0202	65.3	25.6	15.90	60.0	33.5	
Glenn (ND747)	69.0	27.9	15.56	63.3	32.0	
Hanna	69.0	30.4	13.80	60.7	31.3	
Dapps	69.0	29.8	16.66	60.3	30.0	
Trooper	68.0	24.7	15.24	60.5	29.9	
Alsen	70.0	24.0	17.81	59.3	25.6	x
mean	69.1	26.6	15.52	60.4	36.2	
Probability	<0.001	<0.001	<0.001	<0.001	<0.001	
CV (S/mean)	1.3	5.4	4.3	1.2	9.6	
CV (SE/mean)	0.8	3.1	2.5	0.7	5.6	
LSD 0.05	1.5	6.0	1.11	1.2	5.8	

Check variety is McNeal with an average yield of 35.3 bu/acre.
a indicates significantly greater yield than check variety, McNeal, at probability of <0.05
x indicates significantly lower yield than check variety, McNeal, at probability of <0.05

Table 2. Relative yields of spring wheat varieties as compared to McNeal when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	2001	2002	2003	2004	2005	Ave	as % of McNeal
Nick	--	--	--	--	42.5	42.5	120.4
MT0245	--	--	--	29.5	40.6	35.1	117.2
Reeder	55.6	20.7	35.2	25.0	41.5	35.6	114.5
Outlook	53.8	19.0	37.7	30.1	37.0	35.5	114.2
MT0260	--	--	--	--	39.8	39.8	112.7
Knudson	--	--	--	--	39.6	39.6	112.2
SteeleND	--	--	32.7	28.1	37.8	32.9	107.4
MT0266	--	--	--	26.0	38.0	32.0	107.0
Freyr	--	--	--	24.4	39.6	32.0	107.0
Scholar	52.2	19.0	34.0	23.1	35.6	32.8	105.4
Norpro	--	--	--	19.8	42.8	31.3	104.7
Granite	--	--	32.4	23.1	37.6	31.0	101.4
Hanna	--	--	--	29.0	31.3	30.2	100.8
McNeal	45.0	18.7	32.0	24.5	35.3	31.1	100.0
Choteau	47.3	16.7	31.1	24.2	34.8	30.8	99.1
MTHW0202	--	--	--	--	33.5	33.5	94.9
Alsen	52.4	15.6	--	--	25.6	31.2	94.5
Glenn	--	--	--	--	32.0	32.0	90.7
Trooper	--	--	--	--	29.9	29.9	84.7
Dapps	--	--	--	18.1	30.0	24.1	80.4

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 as compared to McNeal when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	2001	2002	2003	2004	2005	Ave	as % of McNeal
Granite	--	--	61.3	60.7	61.8	61.3	106.3
Glenn	--	--	--	--	63.3	63.3	105.9
Freyr	--	--	--	60.8	62.3	61.6	105.6
Hanna	--	--	--	60.8	60.7	60.8	104.2
Scholar	61.8	59.0	59.5	59.3	61.2	60.2	103.9
Reeder	61.3	57.5	59.0	60.0	61.8	59.9	103.5
MT0245	--	--	--	59.5	60.5	60.0	102.9
SteeleND	--	--	57.5	60.2	60.2	59.3	102.9
Norpro	--	--	--	60.5	59.2	59.9	102.7
Dapps	--	--	--	59.2	60.3	59.8	102.5
Choteau	60.7	55.3	58.7	59.8	60.0	58.9	101.7
Knudson	--	--	--	--	60.8	60.8	101.7
Alsen	62.7	57.0	--	--	59.3	59.7	101.4
Trooper	--	--	--	--	60.5	60.5	101.2
MT0260	--	--	--	--	60.3	60.3	100.8
MTHW0202	--	--	--	--	60.0	60.0	100.3
Outlook	60.0	56.3	56.8	57.8	59.0	58.0	100.1
McNeal	59.7	57.0	56.3	56.8	59.8	57.9	100.0
Nick	--	--	--	--	59.3	59.3	99.2
MT0266	--	--	--	58.3	57.0	57.7	98.9

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	2001	2002	2003	2004	2005	Ave	as % of McNeal
Hanna	--	--	--	29	30	29.5	118.1
Dapps	--	--	--	26	30	28.1	112.6
Glenn	--	--	--	--	28	28.0	110.9
Freyr	--	--	--	26	29	27.6	110.2
Scholar	32	23	35	23	28	28.1	108.5
SteeleND	--	--	33	26	28	29.0	107.8
Knudson	--	--	--	--	27	26.8	106.3
Outlook	31	21	30	26	26	26.9	104.0
Nick	--	--	--	--	26	26.0	103.1
MT0260	--	--	--	--	26	25.6	101.6
MTHW0202	--	--	--	--	26	25.6	101.6
McNeal	28	21	31	25	25	25.9	100.0
Trooper	--	--	--	--	25	24.8	98.4
Reeder	28	22	28	23	26	25.4	98.2
Alsen	29	19	--	--	24	24.0	97.3
MT0266	--	--	--	22	26	24.2	96.9
Norpro	--	--	--	22	26	24.0	96.1
Granite	--	--	28	22	26	25.5	94.6
MT0245	--	--	--	22	25	23.4	93.7
Choteau	27	18	28	23	24	24.4	92.7

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 as compared to McNeal when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	2001	2002	2003	2004	2005	Ave	as % of McNeal
Dapps	--	--	--	18.0	16.7	17.4	117.2
Alsen	14.0	15.4	--	--	17.8	15.7	114.8
Reeder	14.2	15.4	17.6	17.2	16.5	16.2	112.8
MT0245	--	--	--	16.8	16.2	16.5	111.5
Granite	--	--	18.4	16.2	16.7	17.1	110.6
Norpro	--	--	--	16.9	15.3	16.1	108.8
MT0266	--	--	--	16.6	15.4	16.0	108.1
Scholar	12.9	15.4	17.2	16.2	15.0	15.3	107.0
Freyr	--	--	--	15.9	14.7	15.3	103.4
Choteau	12.4	14.6	16.4	15.0	15.6	14.8	103.2
MT0260	--	--	--	--	16.2	16.2	102.5
Outlook	12.3	14.6	16.1	14.4	15.3	14.5	101.4
MTHW0202	--	--	--	--	15.9	15.9	100.6
SteeleND	--	--	16.4	14.7	15.4	15.5	100.2
McNeal	10.9	14.4	16.8	13.8	15.8	14.3	100.0
Hanna	--	--	--	15.5	13.8	14.7	99.0
Glenn	--	--	--	--	15.6	15.6	98.7
Knudson	--	--	--	--	15.3	15.3	96.8
Trooper	--	--	--	--	15.2	15.2	96.2
Nick	--	--	--	--	12.0	12.0	75.9

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, 2005.
Planted: April 12 Harvested: August 1

entry	heading, days from planting	height, in	HVA color	protein content	test wt, lb/bu	yield, bu/ac	
Grenora	71.0	26.4	92.5	15.45	58.8	37.2	a
MT01695	70.3	24.1	89.7	14.23	62.0	36.2	a
Alkabo	71.0	27.4	98.0	13.81	61.2	34.6	a
MT01617	71.7	25.3	85.9	16.04	59.0	34.5	
Plaza	71.0	24.4	90.9	16.14	60.2	34.3	
Alzada	68.3	26.4	86.4	15.08	59.7	33.7	
Dilse	72.0	27.7	92.9	16.35	61.0	33.5	
Avonlea	70.7	31.1	93.3	16.67	59.7	33.1	
Maier	70.7	28.0	94.2	15.68	61.2	32.4	
Lebsock	70.3	26.6	92.7	14.63	61.8	32.4	
Divide	71.3	28.6	92.7	16.97	59.2	31.8	
Kyle	72.3	28.9	84.2	16.97	59.8	31.5	
Pierce	70.7	28.7	89.6	15.89	60.8	31.3	
MT02DH56	71.0	26.6	96.8	16.75	60.5	30.5	
MT02DH61	71.7	29.0	93.8	16.47	60.3	29.8	
Mountrail	72.0	26.0	89.3	17.76	58.0	29.7	
mean	71.0	27.2	91.4	15.93	60.2	32.9	
probability	<0.001	<0.001	0.047	0.007	0.001	0.122	
CV (S/mean)	1.0	5.9	5.1	7.0	1.7	8.9	
CV (SE/mean)	0.6	3.4	2.9	4.0	1.0	5.1	
LSD 0.05	1.2	6.8	7.7	1.86	1.7	4.9	

Mountrail is the check variety with an average yield on 29.7 bu/ac
a indicates significantly greater yield than check variety, Mountrail, at probability <0.05

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

Cultivar	2001	2002	2003	2004	2005	Ave	as % of Mountrail
MT01695	--	--	--	22.6	36.2	29.4	130.4
Grenora	--	--	--	--	37.2	37.2	125.3
Alkabo	--	--	--	--	36.4	36.4	122.6
Alzada	--	--	--	--	33.7	33.7	113.5
MT01617	--	--	--	15.8	34.5	25.2	111.5
Dilse	--	22.2	32.9	16.0	33.5	26.2	107.3
Divide	--	--	--	--	31.8	31.8	107.1
Plaza	55.2	22.2	29.7	17.0	34.3	31.7	104.8
Maier	52.6	22.7	29.6	18.7	32.4	31.2	103.2
MT02DH56	--	--	--	--	30.5	30.5	102.7
Lebsock	51.3	22.9	33.5	14.2	32.4	30.9	102.1
AC Avonlea	43.0	24.2	31.7	19.7	33.1	30.3	100.4
MT02DH61	--	--	--	--	29.8	29.8	100.3
Mountrail	53.6	21.3	31.1	15.4	29.7	30.2	100.0
Pierce	49.2	21.4	30.0	17.4	31.3	29.9	98.8
Kyle	50.4	21.6	32.7	8.4	31.5	28.9	95.7

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 as compared to Mountrail when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	2001	2002	2003	2004	2005	Ave	as % of Mountrail
Alkabo	--	--	--	--	61.2	61.2	105.5
MT02DH56	--	--	--	--	60.5	60.5	104.3
MT02DH61	--	--	--	--	60.3	60.3	104.0
MT01695	--	--	--	58.0	62.0	60.0	103.4
Dilse	--	57.8	61.2	58.5	61.0	59.6	103.1
Lebsock	62.0	59.2	61.0	58.5	61.8	60.5	103.1
Alzada	--	--	--	--	59.7	59.7	102.9
Maier	61.5	58.3	60.0	59.2	61.2	60.0	102.3
Divide	--	--	--	--	59.2	59.2	102.1
Pierce	62.5	57.0	60.0	59.0	60.8	59.9	102.0
Kyle	62.8	59.3	60.2	56.5	59.8	59.7	101.7
MT01617	--	--	--	59.1	59.0	59.1	101.7
Grenora	--	--	--	--	58.8	58.8	101.4
Plaza	60.7	58.2	59.2	58.9	60.2	59.4	101.3
AC Avonlea	60.5	58.8	59.2	57.8	59.7	59.2	100.9
Mountrail	62.2	56.5	58.7	58.1	58.0	58.7	100.0

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	2001	2002	2003	2004	2005	Ave	as % of Mountrail
Kyle	38	23	34	30	29	30.8	118.5
Divide	--	--	--	--	29	29.0	111.5
MT02DH61	--	--	--	--	29	29.0	111.5
AC Avonlea	31	22	32	26	31	28.4	109.2
Alkabo	--	--	--	--	27	27.0	103.8
MT02DH56	--	--	--	--	27	27.0	103.8
Pierce	31	21	28	24	29	26.6	102.3
Dilse	--	19	30	22	28	24.8	102.1
Lebsock	30	20	30	24	27	26.2	100.8
Maier	31	20	29	23	28	26.2	100.8
Mountrail	33	20	29	22	26	26.0	100.0
Grenora	--	--	--	--	26	26.0	100.0
Alzada	--	--	--	--	26	26.0	100.0
MT01695	--	--	--	20	24	22.0	91.7
MT01617	--	--	--	17	25	21.0	87.5
Plaza	25	18	25	21	24	22.6	86.9

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 as compared to Mountrail when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	2001	2002	2003	2004	2005	Ave	as % of Mountrail
Mountrail	12.9	16.3	17.2	16.9	17.8	16.2	100.0
AC Avonlea	14.6	15.4	17.3	16.9	16.7	16.2	99.8
Kyle	13.6	16.5	16.4	16.8	17.0	16.1	99.0
Maier	14.2	16.5	16.9	16.3	15.7	15.9	98.2
Pierce	13.4	16.6	17.1	16.1	15.9	15.8	97.5
Dilse	--	16.6	16.4	16.9	16.4	16.6	97.2
Divide	--	--	--	--	17.0	17.0	95.5
Plaza	13.2	15.6	16.1	15.9	16.1	15.4	94.8
MT02DH56	--	--	--	--	16.8	16.8	94.4
Lebsock	12.9	15.4	16.2	16.2	14.6	15.1	92.8
MT02DH61	--	--	--	--	16.5	16.5	92.7
MT01617	--	--	--	15.8	16.0	15.9	91.6
Grenora	--	--	--	--	15.4	15.4	86.5
MT01695	--	--	--	15.6	14.2	14.9	85.9
Alzada	--	--	--	--	15.1	15.1	84.8
Alkabo	--	--	--	--	13.8	13.8	77.5

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. Agronomic data obtained from a dryland recrop barley yield trial conducted at the Eastern Agricultural Research Center, Sidney, MT.
Planted: April 12 Harvested: July 29

Variety	heading, days from planting	Height, in	Protein content	Test wt, lb/bu	Yield bu/acre	
Metcalfe	69.3	28.7	11.23	49.3	53.4	
Haxby	70.3	28.5	10.82	48.8	52.6	
Tradition	68.7	26.0	11.87	47.0	52.4	
Xena	71.0	25.2	13.18	49.5	51.4	
Robust	67.0	30.8	13.01	46.7	51.4	
Eslick	71.3	23.9	12.03	49.3	49.9	
Legacy	67.7	27.2	9.99	47.2	49.2	
Hockett	69.7	25.1	11.45	48.2	48.1	
Kendall	71.3	25.2	10.56	47.0	47.2	
Conrad	72.7	24.8	9.91	49.0	47.0	
Harrington	71.7	24.7	10.17	47.2	46.8	
Copeland	71.0	27.7	11.77	47.2	46.3	
Baronesse	72.3	24.1	10.85	48.7	46.2	
Boulder	71.3	24.7	11.63	50.8	45.7	
Merit	72.3	24.4	11.35	47.0	44.4	
Geraldine	72.0	24.4	11.06	50.2	44.1	
Drummond	66.7	26.9	10.86	47.2	44.0	
Craft	68.7	29.2	10.97	50.7	42.8	
MT970229	71.7	27.2	12.64	49.3	40.4	x
Hays	71.7	22.7	12.82	46.2	32.5	x
mean	70.4	26.1	11.41	48.3	46.8	
probability	<0.001	0.003	0.014	0.006	0.045	
CV (S/mean)	1.3	8.4	9.7	3.2	13.2	
CV (SE/mean)	0.8	4.8	5.6	1.8	7.6	
$LSD_{0.05}$	1.5	9.2	1.83	2.5	10.2	

Check variety is Haxby with an average yield of 52.6 bu/acre.
x indicates significantly lower yield than check variety, Haxby, at probability of <0.05

Table 12. Relative yields of barley varieties compared to Haxby when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	2001	2002	2003	2004	2005	Ave	as % of Haxby
Haxby	63.3	35.4	51.8	31.8	52.6	47.0	100.0
Robust	--	--	--	--	51.4	51.4	97.7
Tradition	--	--	--	28.1	52.4	40.3	95.4
Xena	67.7	28.6	45.9	--	51.4	48.4	95.3
Baronesse	72.0	26.1	52.9	24.9	46.2	44.4	94.6
Eslick	71.8	28.9	46.6	22.8	49.9	44.0	93.7
Legacy	--	--	--	--	49.2	49.2	93.5
Metcalfe	--	--	--	23.9	53.4	38.7	91.6
Craft	62.9	29.5	52.2	27.5	42.8	43.0	91.5
Hockett	--	--	--	27.9	48.1	38.0	90.0
Kendall	--	--	--	--	47.2	47.2	89.7
Conrad	--	--	--	--	47.0	47.0	89.4
Boulder	--	--	--	--	45.7	45.7	86.9
Merit	--	--	--	--	44.4	44.4	84.4
Harrington	60.8	27.1	44.1	19.2	46.8	39.6	84.3
Drummond	--	--	--	--	44.0	44.0	83.7
MT970229	--	27.6	48.6	25.2	40.4	35.5	82.6
Geraldine	--	23.5	46.8	--	44.1	38.1	81.8
Copeland	--	--	--	22.3	46.3	34.3	81.3
Hays	--	--	45.8	27.2	32.5	35.2	77.5

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 13. Relative test weights of barley varieties compared to Haxby when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	2001	2002	2003	2004	2005	Ave	as % of Haxby
Boulder	--	--	--	--	50.8	50.8	104.1
Conrad	--	--	--	--	49.0	49.0	100.4
Haxby	49.8	47.3	49.5	50.5	48.8	49.2	100.0
MT970229	--	46.8	51.0	47.0	49.3	48.5	99.0
Geraldine	--	46.2	47.2	--	50.2	47.9	98.6
Craft	48.7	47.8	47.8	47.3	50.7	48.5	98.5
Legacy	--	--	--	--	47.2	47.2	96.7
Drummond	--	--	--	--	47.2	47.2	96.7
Xena	46.7	45.7	46.3	--	49.5	47.1	96.3
Kendall	--	--	--	--	47.0	47.0	96.3
Merit	--	--	--	--	47.0	47.0	96.3
Metcalfe	--	--	--	46.3	49.3	47.8	96.3
Baronesse	48.5	45.2	47.7	46.3	48.7	47.3	96.1
Robust	--	--	--	--	46.7	46.7	95.7
Hockett	--	--	--	46.8	48.2	47.5	95.7
Eslick	47.8	45.2	46.7	45.3	49.3	46.9	95.3
Tradition	--	--	--	47.0	47.0	47.0	94.7
Harrington	47.0	43.8	45.5	44.2	47.2	45.5	92.6
Hays	--	--	46.2	44.3	46.2	45.6	91.9
Copeland	--	--	--	44.0	47.2	45.6	91.8

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 14. Relative heights of barley varieties in inches compared to Haxby when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	2001	2002	2003	2004	2005	Ave	as % of Haxby
Robust	--	--	--	--	31	31.0	110.7
Craft	28	22	26	20	29	25.0	107.8
Metcalfe	--	--	--	20	29	24.5	106.5
Copeland	--	--	--	20	28	24.0	104.3
Haxby	25	20	25	18	28	23.2	100.0
Tradition	--	--	--	20	26	23.0	100.0
Legacy	--	--	--	--	27	27.0	96.4
Drummond	--	--	--	--	27	27.0	96.4
Xena	26	20	23	--	25	23.5	95.9
Harrington	25	18	25	18	25	22.2	95.7
MT970229	--	19	23	18	27	21.8	95.6
Eslick	25	19	23	18	24	21.8	94.0
Hockett	--	--	--	17	25	21.0	91.3
Baronesse	23	17	23	18	24	21.0	90.5
Kendall	--	--	--	--	25	25.0	89.3
Conrad	--	--	--	--	25	25.0	89.3
Boulder	--	--	--	--	25	25.0	89.3
Hays	--	--	21	17	23	20.3	85.9
Merit	--	--	--	--	24	24.0	85.7
Geraldine	--	16	21	--	24	20.3	83.6

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 15. Relative protein contents of barley varieties compared to Haxby when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	2001	2002	2003	2004	2005	Ave	as % of Haxby
Robust	--	--	--	--	13.0	13.0	120.4
Geraldine	--	16.6	12.3	--	11.1	13.3	112.7
MT970229	--	16.6	12.1	11.4	12.6	13.2	112.4
Xena	8.8	14.2	13.3	--	13.2	12.4	111.7
Craft	9.7	15.7	12.2	13.5	11.0	12.4	111.5
Tradition	--	--	--	12.8	11.9	12.4	111.3
Eslick	8.5	14.5	12.3	12.8	12.0	12.0	107.9
Boulder	--	--	--	--	11.6	11.6	107.4
Baronesse	10	13.8	13.0	11.8	10.8	11.9	106.6
Metcalfe	--	--	--	12.4	11.2	11.8	106.3
Harrington	9.8	13.8	12.5	12.8	10.2	11.8	106.1
Hays	--	--	12.6	11.0	12.8	12.1	105.8
Merit	--	--	--	--	11.4	11.4	105.6
Copeland	--	--	--	11.3	11.8	11.6	104.1
Hockett	--	--	--	11.3	11.4	11.4	102.3
Drummond	--	--	--	--	10.9	10.9	100.9
Haxby	8.8	12.5	12.2	11.4	10.8	11.1	100.0
Kendall	--	--	--	--	10.6	10.6	98.1
Legacy	--	--	--	--	10.0	10.0	92.6
Conrad	--	--	--	--	9.9	9.9	91.7

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.