

PROJECT TITLE: Evaluation of barley varieties under minimum-till, continuous cropping conditions – 2014 (4W4640)

PRINCIPAL INVESTIGATOR:

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

Methods:

Planted: April 23 Harvested: August 14

Soil type: Williams clay loam

Previous crops: 2013- peas, 2012- spring wheat, 2011 – spring wheat

Residual soil N to 3 ft: 49 lb/bu

Residual soil P to 6 in: 41 ppm

Applied fertilizer: 25 lb N/ac as granular 34-0-0

Herbicides: Full Deck 16 oz/ac and Axial 16 oz/ac, applied Jun 10

Precipitation April – August, 2014: 10.57 in

Ave (65 yr) precipitation April – August: 9.67 in

Precipitation September 2013 – August 2014: 13.59 in

Ave (65 yr) precipitation September – August: 14.11 in

Comments:

Conditions were wet at planting. May and August had much above average rainfall.

RESULTS:

Sixteen lines and varieties of barley were planted under dryland recrop conditions. Agronomic data are shown in Table 1. Six lines and varieties yielded significantly more than the check variety, Haxby, and two yielded significantly less. Five-year summaries of yield, test weight, height, and grain protein are shown in Tables 2-5.

SUMMARY: All experiments reported under this project are of the replicated small plot type. These trials provide important information about performance of malt barley lines and varieties.

FUNDING SUMMARY: Expenditure information to be provided by OSP. No other grants support this project.

MWBC FY2015 GRANT SUBMISSION PLANS: It is planned to submit this project for funding consideration in the next fiscal year.

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

entry	heading*	height, inches	grain protein, %	test wt, lb/bu	percent plump	percent regular	yield, bu/ac	
Champion	62.3	25.9	11.46	49.5	93.6	5.8	47.9	a
Tradition	60.0	27.4	12.62	48.5	93.5	5.9	44.5	a
Harrington	62.3	27.4	12.36	47.5	93.8	5.7	44.5	a
Conrad	63.3	24.4	12.25	48.5	96.4	3.4	42.8	a
MT090190	63.3	26.1	13.22	49.5	96.1	3.8	42.2	a
Hockett	62.0	26.5	11.24	50.5	98.1	1.7	42.1	a
Metcalfe	61.3	28.6	12.47	49.5	92.3	6.9	36.8	
Gallatin	62.0	27.0	12.40	49.5	94.4	5.2	36.0	
Eslick	64.0	22.0	11.65	47.5	79.3	18.2	35.1	
Geraldine	61.7	27.4	12.07	49.5	92.5	6.6	35.1	
MT090180	63.3	26.0	10.84	50.0	98.0	1.7	33.1	
Haxby	60.7	24.4	10.57	52.0	96.2	3.4	32.4	
Cowboy	63.7	33.2	12.64	50.5	97.0	2.6	31.6	
MT100126	65.0	26.5	10.69	51.0	97.6	2.1	29.0	
Craft	63.0	29.8	12.40	49.5	96.3	3.3	22.5	x
MT100120	63.0	24.4	11.13	49.5	97.9	1.8	19.1	x
average	62.56	26.7	11.88	49.5	94.6	4.9	35.9	
probability	<0.001	<0.001					<0.001	
CV (S/mean)	1.027	5.112					10.2	
LSD 0.05	1.071	2.3					6.1	

*days from planting

a indicates significantly greater yield than check variety, Haxby, at $p = 0.05$

x indicates significantly lower yield than check variety, Haxby, at $p = 0.05$

Table 2. Relative yields of barley varieties in bu/ac compared to Haxby when grown under dryland recrop conditions at the EARC, Sidney, Montana.

Cultivar	2008	2010	2011	2012	2014	Ave	as % of Haxby
MT090190	--	--	--	--	42.2	42.2	130.2
Champion	--	--	--	21.2	47.9	34.6	128.2
Hockett	10.7	60.9	33.5	16.9	42.1	32.8	107.0
Conrad	8.9	55.4	36.5	14.9	42.8	31.7	103.4
MT090180	--	--	--	--	33.1	33.1	102.2
Harrington	7.4	54.0	30.3	18.8	44.5	31.0	101.1
Haxby	8.1	51.0	40.3	21.5	32.4	30.7	100.0
Gallatin	--	54.6	34.0	19.0	36.0	35.9	98.9
Metcalfe	6.4	53.1	36.5	15.5	36.8	29.7	96.7
Eslick	--	--	--	16.7	35.1	25.9	96.1
Tradition	8.3	--	25.2	19.9	44.5	24.5	95.7
Geraldine	7.6	54.9	31.5	14.5	35.1	28.7	93.7
MT100126	--	--	--	--	29.0	29.0	89.5
Cowboy	--	--	--	14.0	31.6	22.8	84.6
Craft	--	--	--	--	22.5	22.5	69.4
MT100120	--	--	--	--	19.1	19.1	59.0

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. No trial in 2009. Hailed out in 2013.

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

Cultivar	2008	2010	2011	2012	2014	Ave	as % of Haxby
Haxby	50.5	54.0	47.0	48.0	52.0	50.3	100.0
MT100126	--	--	--	--	51.0	51.0	98.1
MT090180	--	--	--	--	50.0	50.0	96.2
MT090190	--	--	--	--	49.5	49.5	95.2
Craft	--	--	--	--	49.5	49.5	95.2
MT100120	--	--	--	--	49.5	49.5	95.2
Conrad	47.5	50.5	46.0	45.5	48.5	47.6	94.6
Cowboy	--	--	--	44.0	50.5	47.3	94.5
Gallatin	--	51.0	47.0	42.0	49.5	47.4	94.3
Geraldine	47.0	50.0	47.0	43.5	49.5	47.4	94.2
Hockett	46.0	50.5	46.0	44.0	50.5	47.4	94.2
Tradition	44.5	--	47.0	46.0	48.5	46.5	94.2
Metcalfe	45.0	49.5	46.0	43.0	49.5	46.6	92.6
Harrington	43.5	49.5	47.0	42.5	47.5	46.0	91.5
Champion	--	--	--	41.5	49.5	45.5	91.0
Eslick	--	--	--	42.5	47.5	45.0	90.0

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. No trial in 2009. Hailed out in 2013.

Table 4. Relative heights of barley varieties in inches compared to Haxby when grown under dryland recrop conditions at the EARC, Sidney, Montana.

Cultivar	2008	2010	2011	2012	2014	Ave	as % of Haxby
Cowboy	--	--	--	24	33	28.5	135.7
Craft	--	--	--	--	30	30.0	125.0
Metcalfe	18	24	24	18	29	22.6	109.7
Gallatin	--	26	22	19	27	23.5	109.3
Tradition	20	--	22	19	27	22.0	108.6
MT090190	--	--	--	--	26	26.0	108.3
MT090180	--	--	--	--	26	26.0	108.3
MT100126	--	--	--	--	26	26.0	108.3
Champion	--	--	--	18	26	22.0	104.8
Hockett	17	25	21	17	26	21.2	102.9
Harrington	16	21	21	19	27	20.8	101.0
Haxby	17	22	22	18	24	20.6	100.0
MT100120	--	--	--	--	24	24.0	100.0
Conrad	16	22	22	18	24	20.4	99.0
Geraldine	15	21	19	17	27	19.8	96.1
Eslick	--	--	--	16	22	19.0	90.5

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. No trial in 2009. Hailed out in 2013.

Table 5. Relative protein contents as percent of barley varieties compared to Haxby when grown under dryland recrop conditions at the EARC, Sidney, Montana.

Cultivar	2007	2008	2010	2011	2014	Ave	as % of Haxby
MT090190	--	--	--	--	13.2	13.2	124.5
Cowboy	--	--	--	--	12.6	12.6	118.9
Craft	--	--	--	--	12.4	12.4	117.0
Eslick	--	--	--	--	11.6	11.6	109.4
Champion	--	--	--	--	11.5	11.5	108.5
MT100120	--	--	--	--	11.1	11.1	104.7
Conrad	10.9	10.9	10.7	14.3	12.2	11.8	102.8
Geraldine	10.4	13	9.7	13.5	12.1	11.7	102.3
MT090180	--	--	--	--	10.8	10.8	101.9
Gallatin	--	--	8.8	12.4	12.4	11.2	101.8
Metcalfe	8.9	12.7	9.5	14.6	12.5	11.6	101.4
MT100126	--	--	--	--	10.7	10.7	100.9
Haxby	10.9	13.5	8.3	14.1	10.6	11.5	100.0
Harrington	9.9	12.3	9.0	12.2	12.4	11.2	97.2
Hockett	9.3	12.3	9.4	13.4	11.2	11.1	96.9
Tradition	10.2	10.2	--	11.6	12.6	11.2	90.8

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. No trial in 2009. Hailed out in 2013.