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

PRINCIPAL INVESTIGATOR:
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 durum 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:
Fourteen lines and varieties of durum were planted under dryland recrop conditions. Agronomic data are shown in Table 1. Two lines and varieties yielded significantly more than the check variety, Mountrail, and one 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 durum yield trial conducted under dryland recrop conditions at the Eastern Agricultural Research Center, Sidney, Montana.

entry	heading*	height, inches	grain protein, %	test wt, lb/ac	yield, bu/ac	
Alkabo	63.7	24.0	10.93	60.5	35.8	a
MT06584	61.7	22.8	11.43	60.5	35.5	a
Divide	63.3	26.2	10.73	60.0	34.3	
MT101427	63.3	20.3	11.13	59.0	34.2	
Tioga	63.7	24.1	12.17	59.5	32.7	
Grenora	63.3	24.8	11.01	59.5	32.0	
Joppa	62.7	26.9	11.53	60.5	31.6	
Alzada	61.0	24.3	11.99	60.5	31.5	
Carpio	63.7	26.4	11.87	60.0	30.4	
Strongfield	63.0	24.9	11.62	60.0	30.1	
Mountrail	64.7	23.2	10.94	59.5	29.6	
MT101395	64.3	24.4	11.99	57.0	29.0	
MT101730	64.3	26.5	11.33	61.0	25.7	
Silver	60.3	20.3	12.94	59.0	21.3	x
average	63.1	24.2	11.54	59.8	31.0	
probability	<0.001	<0.001			0.002	
CV (S/mean)	0.9	6.3			11.2	
LSD 0.05	1.0	2.6			5.8	

*days from planting
a indicates significantly greater yield than check variety, Mountrail, at p = 0.05
x indicates significantly lower yield than check variety, Mountrail, at p = 0.05

Table 2. Relative yields of durum varieties in bu/ac as compared to Mountrail when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	2009	2010	2011	2012	2014	Ave	as % of Mountrail
MT101427	--	--	--	--	34.2	34.2	115.5
MT06584	--	--	--	6.6	35.5	21.1	115.0
Joppa	--	--	--	--	31.6	31.6	106.8
Divide	37.9	48.6	39.8	3.8	34.3	32.9	106.1
Carpio	--	--	--	--	30.4	30.4	102.7
Alkabo	31.5	44.3	38.0	8.7	35.8	31.7	102.1
Tioga	--	46.0	35.5	4.1	32.7	29.6	101.3
Mountrail	38.2	43.7	36.5	7.0	29.6	31.0	100.0
Strongfield	36.5	42.7	36.9	4.9	30.1	30.2	97.5
Silver	38.8	44.4	34.3	8.5	21.3	29.5	95.0
Grenora	24.9	46.2	37.0	4.2	32.0	28.9	93.1
Alzada	29.6	41.7	31.6	6.7	31.5	28.2	91.0
MT101395	--	--	--	--	25.7	25.7	86.8
MT101730	--	--	--	--	25.7	25.7	86.8

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. Hailed out in 2013.

Table 3. 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	2009	2010	2011	2012	2014	Ave	as % of Mountrail
MT101730	--	--	--	--	61.0	61.0	102.5
Joppa	--	--	--	--	60.5	60.5	101.7
Alkabo	61.0	60.5	62.5	56.5	60.5	60.2	101.4
Carpio	--	--	--	--	60.0	60.0	100.8
Tioga	--	60.0	62.5	55.0	59.5	59.3	100.4
Divide	61.5	59.5	62.0	55.0	60.0	59.6	100.4
Mountrail	60.8	60.5	62.5	53.5	59.5	59.4	100.0
Strongfield	60.7	59.0	62.0	54.0	60.0	59.1	99.6
Grenora	60.5	60.0	62.0	53.5	59.5	59.1	99.6
MT06584	--	--	--	52.0	60.5	56.3	99.6
Alzada	60.3	60.5	61.0	53.0	60.5	59.1	99.5
Silver	61.2	59.5	62.0	53.0	59.0	58.9	99.3
MT101427	--	--	--	--	59.0	59.0	99.2
MT101395	--	--	--	--	57.0	57.0	95.8

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

Cultivar	2009	2010	2011	2012	2014	Ave	as % of Mountrail
Joppa	--	--	--	--	27	27.0	117.4
Tioga	--	32	27	21	24	26.0	113.0
Carpio	--	--	--	--	26	26.0	113.0
MT101730	--	--	--	--	26	26.0	113.0
Divide	21	29	25	19	26	24.0	108.1
Strongfield	19	28	25	20	25	23.4	105.4
MT101395	--	--	--	--	24	24.0	104.3
Alkabo	19	28	24	20	24	23.0	103.6
MT06584	--	--	--	21	23	22.0	102.3
Grenora	18	27	23	19	25	22.4	100.9
Mountrail	19	26	23	20	23	22.2	100.0
Alzada	18	25	22	21	24	22.0	99.1
Silver	18	23	23	18	20	20.4	91.9
MT101427	--	--	--	--	20	20.0	87.0

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. Hailed out in 2013.

Table 5. Relative protein contents of durum varieties in percent as compared to Mountrail when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	2009	2010	2011	2012	2014	Ave	as % of Mountrail
MT101395	--	--	--	--	12.0	12.0	110.1
Carpio	--	--	--	--	11.9	11.9	109.2
Strongfield	15.7	12.7	14.3	18.2	11.6	14.5	107.6
Joppa	--	--	--	--	11.5	11.5	105.5
Silver	13.6	12.0	14.0	18.2	12.9	14.1	104.9
Tioga	--	12.2	13.0	17.4	12.3	13.7	104.6
MT06584	--	--	--	18.0	11.4	14.7	104.3
MT101730	--	--	--	--	11.3	11.3	103.7
MT101427	--	--	--	--	11.1	11.1	101.8
Alzada	15.3	11.3	13.9	15.1	12.0	13.5	100.3
Mountrail	14.9	10.9	13.4	17.3	10.9	13.5	100.0
Grenora	15.4	11.4	13.4	16.1	11.0	13.5	99.9
Alkabo	14.8	12.4	13.7	15.0	10.9	13.4	99.1
Divide	14.5	11.6	13.1	15.5	10.7	13.1	97.0

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. Hailed out in 2013.