PROJECT TITLE: Evaluation of durum varieties under dryland fallow and dryland recrop conditions at six off-station sites – 2014 (4W4640)

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Personnel:

Site/County	Producers	CES/AES cooperators
Flaxville, Daniels	David Roos	Bobbie Roos, CES
Poplar, Roosevelt	Mark Swank	Ann Ronning, CES
Nashua, Valley	Bill Lauckner	Shelley Mills, CES
Wibaux, Wibaux	Rick Miske	Dave Bertelsen, CES
Turner, Blaine	Max Cederberg	Peggy Lamb, NARC
Loring, Phillips	Pete Lumsden and John Flansaas	Peggy Lamb, NARC
Chester, Liberty	Kurt Kammerzell	Peggy Lamb, NARC

OBJECTIVE: To evaluate varieties of durum under dryland conditions at various sites in Montana.

METHODS:

County	previous crop	planting date	harvest date
Valley, dryland	fallow	May 23	Sep 15
Roosevelt, dryland	fallow	May 21	Sep 12
Wibaux, dryland	spring wheat	May 22	Sep 16
Daniels, dryland	fallow	May 21	Sep 12
Blaine, dryland	fallow		hailed out
Phillips, dryland	fallow	May 13	Sep 7
Chester, dryland	fallow	May 7	Aug 19

RESULTS: Summaries of yields, test weights, protein contents, heights and sawfly damage across sites in eastern Montana are shown in Tables 1-5. The site at Turner was hailed out and was not harvested. Mountrail yielded most across sites (Table 1). Alkabo and Divide had greatest test weight across sites (Table 2). Strongfield had greatest protein content across sites (Table 3). Experimental line MT101730 was tallest and experimental line MT06584 was shortest across sites (Table 4). Experimental line MT065 had greatest percent sawfly cutting and Grenora and experimental line MT101395 had the least percent sawfly cutting across sites (Table 5).

Flaxville, Daniels County: Performances and relative values of yield, test weight, and protein of durum varieties grown at Nashua are shown in Tables 6-9. Nine lines and varieties yielded significantly lower than the check variety, Mountrail.

Poplar, Roosevelt County: Performances and relative values of yield, test weight, and protein of durum varieties grown at Poplar are shown in Tables 10-13. Two experimental lines yielded significantly less than the check variety, Mountrail.

Nashua, Valley County: Performances and relative values of yield, test weight, and protein of durum varieties grown at Nashua are shown in Tables 14-17. One variety yielded significantly more than the check variety, Mountrail, and six lines and varieties yielded significantly less.

Wibaux, Wibaux County: Performance of yield, test weight and protein of durum varieties at Wibaux are shown in Table 18. Since this is the first year for this site, there are no relative tables. Eight varieties yielded significantly less than the check variety, Mountrail.

Loring, Phillips County: Performances and relative values of yield, test weight, protein and sawfly damage due to cutting of durum varieties grown at Turner are shown in Tables 19-23. Ten experimental lines and varieties yielded significantly more than the check variety, Mountrail.

Chester, Liberty County: Performance of yield, test weight and protein of durum varieties at Chester are shown in Table 24. Since this is the first year for this site, there are no relative tables. Four lines and varieties yielded significantly less than the check variety, Mountrail.

SUMMARY: Off-station yield trials are conducted at several sites in northern and eastern Montana. All experiments reported under this project are of the replicated small plot type. These trials provide important information about performance of experimental lines and varieties from Montana, other states, and private companies. Regional durum producers make decisions on what varieties to grow based on data from these trials.

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. Summary of durum yields in bu/acre at five off-station sites in eastern Montana, 2014.

entry	Daniels	Roosevelt	Valley	Wibaux	Loring	Chester	average
Mountrail	**58.6**	41.1	36.4	**59.2**	36.5	35.1	**44.5**
Alkabo	46.0	**45.8**	28.8	49.4	40.2	**37.6**	41.3
Carpio	49.1	41.3	26.1	58.4	40.2	35.2	41.7
Tioga	38.3	43.5	27.0	45.4	38.3	34.0	37.8
Grenora	47.7	40.8	**45.2**	58.4	40.2	29.6	43.7
Divide	36.0	41.8	20.6	45.1	41.1	36.9	36.9
Joppa	53.4	41.6	34.8	57.0	40.4	34.1	43.6
Alzada	44.4	39.7	36.6	49.2	42.9	37.3	41.7
Strongfield	43.9	41.5	40.5	55.0	42.5	35.2	43.1
Silver	36.2	38.6	37.5	46.9	39.8	35.2	39.0
MT06584	42.9	44.2	43.4	48.7	44.3	33.3	42.8
MT101395	46.2	37.3	20.5	51.2	39.7	28.6	37.2
MT101427	39.5	33.2	21.8	47.4	41.4	30.0	35.6
MT101730	36.0	30.6	22.2	36.4	41.1	27.2	32.3
average	44.2	40.1	31.5	50.6	40.6	33.53	40.1
CV (S/mean)	16.9	7.3	15.8	10.2	4.9	7.5	
LSD 0.05	12.5	4.9	8.4	8.6	3.4	4.2	

Table 2. Summary of durum test weights in lb/bu at five sites in eastern Montana, 2014.

entry	Daniels	Roosevelt	Valley	Wibaux	Loring	Chester	average
Mountrail	60.5	57.5	53.5	58.5	56.7	54.5	56.9
Alkabo	60.5	59.5	54.5	58.5	56.8	55.1	57.5
Carpio	61.0	57.5	55.5	58.5	56.7	53.7	57.2
Tioga	59.0	56.5	55.0	58.5	56.0	55.0	56.7
Grenora	59.5	56.5	55.5	57.0	56.2	54.1	56.5
Divide	60.0	58.5	55.0	59.0	57.7	55.0	57.5
Joppa	60.5	58.0	55.5	58.5	56.9	53.4	57.1
Alzada	59.0	56.5	54.5	58.5	56.8	53.9	56.5
Strongfield	59.5	56.5	55.0	58.5	56.4	54.5	56.7
Silver	57.0	56.0	52.5	58.0	56.7	53.7	55.7
MT06584	58.0	56.0	54.0	58.5	56.4	52.7	55.9
MT101395	57.0	53.0	51.0	55.0	53.4	49.5	53.1
MT101427	57.5	52.5	53.0	56.0	56.6	52.1	54.6
MT101730	58.5	56.0		56.0	56.5	53.7	56.2
site average	59.1	56.5	54.2	57.8	56.4	53.64	56.3
CV (S/mean)					1.1	0.7	
LSD 0.05					1.0	0.7	

Table 3. Summary of durum percent protein at five sites in eastern Montana, 2014.

entry	Daniels	Roosevelt	Valley	Wibaux	Loring	Chester	average
Mountrail	13.19	15.61	14.80	12.69	15.20	17.73	14.87
Alkabo	12.09	14.54	15.63	12.72	14.93	18.03	14.65
Carpio	12.17	15.68	14.21	12.29	15.03	18.20	14.60
Tioga	11.46	15.85	14.34	12.42	16.63	19.00	14.95
Grenora	13.23	14.76	13.67	12.75	14.90	17.23	14.42
Divide	13.12	15.36	17.52	12.53	15.53	18.17	15.37
Joppa	13.14	15.58	16.58	12.62	15.37	18.50	15.30
Alzada	13.87	14.98	16.28	13.51	14.70	17.20	15.09
Strongfield	14.07	15.42	16.95	14.53	16.33	19.67	16.16
Silver	14.12	15.31	17.34	12.65	15.53	17.97	15.49
MT06584	12.84	15.83	14.73	11.96	15.43	18.63	14.90
MT101395	12.90	15.85	15.93	12.40	15.53	19.40	15.33
MT101427	14.06	17.29	17.13	13.22	15.60	18.33	15.94
MT101730	14.08	15.31	17.72	13.59	16.10	17.63	15.74
site average	13.17	15.53	15.92	12.85	15.49	18.26	15.20
CV (S/mean)					4.0	2.0	
LSD 0.05					1.03	0.62	

Table 4. Summary of durum heights in inches at five off-station sites in eastern Montana, 2014.

entry	Daniels	Roosevelt	Valley	Wibaux	Loring	Chester	average
Mountrail	32.7	34.4	28.1	31.4	25.4	26.9	29.8
Alkabo	32.4	32.4	29.0	32.8	24.7	29.0	30.0
Carpio	32.0	34.2	28.1	33.1	25.6	29.9	30.5
Tioga	32.9	35.9	31.5	36.6	29.4	31.5	33.0
Grenora	30.1	31.3	29.8	30.2	23.9	25.4	28.4
Divide	34.5	34.8	29.7	36.5	27.5	26.5	31.6
Joppa	34.8	38.6	29.3	35.7	28.6	31.5	33.1
Alzada	27.4	27.3	26.5	25.0	24.3	24.9	25.9
Strongfield	32.8	31.0	30.2	33.4	27.2	29.3	30.6
Silver	27.6	27.5	26.8	26.5	22.6	23.4	25.7
MT06584	25.2	30.3	25.7	25.5	22.0	22.0	25.1
MT101395	31.4	32.9	28.4	30.4	25.2	26.3	29.1
MT101427	28.0	26.5	24.0	26.9	24.2	22.4	25.3
MT101730	38.1	38.2	31.2	38.6	31.7	32.5	35.0
site average	31.4	32.5	28.4	31.6	25.9	27.24	29.5
CV (S/mean)	7.7	7.4	7.0	5.4	6.2	4.3	
LSD 0.05	4.1	4.0	3.3	2.9	2.7	2.0	

Table 5. Summary of percent cutting by sawfly at one off-station site in eastern Montana, 2014.

entry	Loring	Chester	average
Mountrail	0.67	0.67	0.67
Alkabo	1.00	2.33	1.67
Carpio	0.33	1.00	0.67
Tioga	2.00	1.00	1.50
Grenora	0.33	0.33	0.33
Divide	0.67	0.67	0.67
Joppa	0.67	2.33	1.50
Alzada	1.00	0.33	0.67
Strongfield	0.33	0.00	0.17
Silver	1.00	1.00	1.00
MT06584	3.33	0.33	1.83
MT101395	0.33	0.33	0.33
MT101427	1.00	0.00	0.50
MT101730	0.33	0.67	0.50
average	0.93	0.7857	0.86
probability	0.164	0.074	
CV (S/mean)	124.4	117.1	
LSD 0.05	1.94	1.5	

Table 6. Performance of durum grown under dryland fallow conditions at Flaxville, MT.
Planted: May 21, 2014 Harvested: September 12, 2014 Cooperator: Dave Roos

variety	height, in	test wt, lb/bu	grain protein, %	yield, bu/ac	
Mountrail	32.7	60.5	13.19	58.6	
Joppa	34.8	60.5	13.14	53.4	
Carpio	32.0	61.0	12.17	49.1	
Grenora	30.1	59.5	13.23	47.7	
MT101395	31.4	57.0	12.90	46.2	
Alkabo	32.4	60.5	12.09	46.0	x
Alzada	27.4	59.0	13.87	44.4	x
Strongfield	32.8	59.5	14.07	43.9	x
MT06584	25.2	58.0	12.84	42.9	x
MT101427	28.0	57.5	14.06	39.5	x
Tioga	32.9	59.0	11.46	38.3	x
Silver	27.6	57.0	14.12	36.2	x
Divide	34.5	60.0	13.12	36.0	x
MT101730	38.1	58.5	14.08	36.0	x
site average	31.4	59.1	13.17	44.2	
probability	<0.001			0.023	
CV (S/Mean)	7.71			16.9	
LSD 0.05	4.1			12.5	

x indicates significantly lower yield than check variety, Mountrail, at p = 0.052

Table 7. Relative yields of durum varieties as compared to Mountrail when grown under dryland conditions in Roosevelt County in cooperation with CES.

Cultivar	2013	2014	Ave	as % of Mountrail
Mountrail	24.0	58.6	41.3	100.0
Joppa	--	53.4	53.4	91.1
Carpio	25.6	49.1	37.4	90.6
Grenora	22.9	47.7	35.3	85.5
Alkabo	24.0	46.0	35.0	84.7
Strongfield	25.1	43.9	34.5	83.5
Alzada	22.7	44.4	33.6	81.4
MT101395	--	46.2	46.2	78.8
MT06584	22.0	42.9	32.5	78.7
Tioga	26.1	38.3	32.2	78.0
Divide	24.3	36.0	30.2	73.1
Silver	21.8	36.2	29.0	70.2
MT101427	--	39.5	39.5	67.4
MT101730	--	36.0	36.0	61.4

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 conditions in Daniels County in cooperation with CES.

Cultivar	2013	2014	Ave	as % of Mountrail
Grenora	61.5	59.5	60.5	101.2
Alkabo	60.0	60.5	60.3	100.8
Carpio	59.0	61.0	60.0	100.3
Mountrail	59.0	60.5	59.8	100.0
Strongfield	60.0	59.5	59.8	100.0
Joppa	--	60.5	60.5	100.0
Tioga	59.5	59.0	59.3	99.2
Divide	58.5	60.0	59.3	99.2
Alzada	58.5	59.0	58.8	98.3
MT06584	59.0	58.0	58.5	97.8
MT101730	--	58.5	58.5	96.7
Silver	56.7	57.0	56.9	95.1
MT101427	--	57.5	57.5	95.0
MT101395	--	57.0	57.0	94.2

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 proteins of durum varieties as compared to Mountrail when grown under dryland conditions in Daniels County in cooperation with CES.

Cultivar	2013	2014	Ave	as % of Mountrail
Silver	12.2	14.1	13.2	113.8
Strongfield	11.5	14.1	12.8	110.3
MT101427	--	14.1	14.1	106.8
MT101730	--	14.1	14.1	106.8
Alzada	10.2	13.9	12.0	103.4
Grenora	10.3	13.2	11.8	101.7
MT06584	10.7	12.8	11.8	101.7
Divide	10.4	13.1	11.8	101.7
Mountrail	10.0	13.2	11.6	100.0
Joppa	--	13.1	13.1	99.2
MT101395	--	12.9	12.9	97.7
Carpio	10.3	12.2	11.2	96.6
Alkabo	10.0	12.1	11.0	94.8
Tioga	10.0	11.5	10.7	92.2

NOTE: Average proteins 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.

Table 10. Performance of durum grown under dryland fallow conditions at Poplar, MT.
Planted: May 21, 2014 Harvested: Sept 12, 2014 Cooperator: Mark Swank

Variety	height, in	test wt, lb/bu	protein percent	yield, bu/ac	
Alkabo	32.4	59.5	14.54	45.8	
MT06584	30.3	56.0	15.83	44.2	
Tioga	35.9	56.5	15.85	43.5	
Divide	34.8	58.5	15.36	41.8	
Joppa	38.6	58.0	15.58	41.6	
Strongfield	31.0	56.5	15.42	41.5	
Carpio	34.2	57.5	15.68	41.3	
Mountrail	34.4	57.5	15.61	41.1	
Grenora	31.3	56.5	14.76	40.8	
Alzada	27.3	56.5	14.98	39.7	
Silver	27.5	56.0	15.31	38.6	
MT101395	32.9	53.0	15.85	37.3	
MT101427	26.5	52.5	17.29	33.2	x
MT101730	38.2	56.0	15.31	30.6	x
Average	32.5	56.5	15.53	40.1	
probability	<0.001			<0.001	
CV (S/Mean)	7.4			7.3	
LSD 0.05	4.0			4.9	

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

Table 11. Relative yields of durum varieties as compared to Mountrail when grown under dryland conditions in Roosevelt County in cooperation with CES.

Cultivar	2010	2011	2012	2013	2014	Ave	as % of Mountrail
Joppa	--	--	--	--	41.6	41.6	101.2
Carpio	--	--	--	73.3	41.3	57.3	100.1
Mountrail	36.5	72.3	32.2	73.4	41.1	51.1	100.0
MT06584	--	--	28.2	70.7	44.2	47.7	97.5
Alkabo	35.9	57.5	38.6	70.1	45.8	49.6	97.0
Grenora	34.0	50.3	38.7	73.6	40.8	47.5	92.9
Tioga	27.7	52.8	36.1	74.3	43.5	46.9	91.7
MT101395	--	--	--	--	37.3	37.3	90.8
Silver	40.0	52.5	37.6	60.0	38.6	45.7	89.5
Divide	27.8	57.7	38.8	60.6	41.8	45.3	88.7
Strongfield	33.5	50.4	32.3	67.2	41.5	45.0	88.0
Alzada	32.8	50.4	36.4	58.9	39.7	43.6	85.4
MT101427	--	--	--	--	33.2	33.2	80.8
MT101730	--	--	--	--	30.6	30.6	74.5

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 12. Relative test weights of durum varieties as compared to Mountrail when grown under dryland conditions in Roosevelt County in cooperation with CES.

Cultivar	2010	2011	2012	2013	2014	Ave	as % of Mountrail
Alkabo	57.5	61.5	58.5	61.5	59.5	59.7	102.2
Joppa	--	--	--	--	58.0	58.0	100.9
Carpio	--	--	--	62.0	57.5	59.8	100.8
Divide	57.0	60.0	57.5	60.0	58.5	58.6	100.3
Mountrail	57.0	60.5	56.0	61.0	57.5	58.4	100.0
Tioga	56.5	60.5	57.0	61.5	56.5	58.4	100.0
Strongfield	56.0	61.5	56.0	61.0	56.5	58.2	99.7
Grenora	55.0	59.5	56.5	60.5	56.5	57.6	98.6
Alzada	57.0	59.0	55.5	59.5	56.5	57.5	98.5
Silver	57.5	58.5	55.0	60.0	56.0	57.4	98.3
MT101730	--	--	--	--	56.0	56.0	97.4
MT06584	--	--	52.0	59.5	56.0	55.8	96.0
MT101395	--	--	--	--	53.0	53.0	92.2
MT101427	--	--	--	--	52.5	52.5	91.3

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 13. Relative proteins of durum varieties as compared to Mountrail when grown under dryland conditions in Roosevelt County in cooperation with CES.

Cultivar	2010	2011	2012	2013	2014	Ave	as % of Mountrail
MT101427	--	--	--	--	17.3	17.3	110.9
MT06584	--	--	20.5	13.2	15.8	16.5	106.2
Strongfield	15.4	14.4	18.9	14.4	15.4	15.7	104.1
Tioga	15.1	14.1	18.0	13.8	15.8	15.4	101.9
MT101395	--	--	--	--	15.8	15.8	101.3
Divide	14.7	14.2	17.4	14.4	15.4	15.2	100.9
Mountrail	14.5	14.3	17.4	13.6	15.6	15.1	100.0
Joppa	--	--	--	--	15.6	15.6	100.0
Silver	14.1	14.9	18.1	12.7	15.3	15.0	99.6
Carpio	--	--	--	13.3	15.7	14.5	99.3
MT101730	--	--	--	--	15.3	15.3	98.1
Alzada	14.3	13.9	16.7	13.4	15.0	14.7	97.2
Alkabo	14.8	14.0	16.3	13.6	14.5	14.6	97.1
Grenora	14.6	13.5	17.2	13.1	14.8	14.6	97.1

NOTE: Average proteins 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.

Table 14. Performance of durum grown under dryland fallow conditions at Nashua, MT.
Planted: May 23, 2014 Harvested: September 15, 2014 Cooperator: Bill Lauckner

Variety	height, in	test wt, lb/bu	grain protein, %	yield, bu/ac	
Grenora	29.8	55.5	13.67	45.2	a
MT06584	25.7	54.0	14.73	43.4	
Strongfield	30.2	55.0	16.95	40.5	
Silver	26.8	52.5	17.34	37.5	
Alzada	26.5	54.5	16.28	36.6	
Mountrail	28.1	53.5	14.80	36.4	
Joppa	29.3	55.5	16.58	34.8	
Alkabo	29.0	54.5	15.63	28.8	
Tioga	31.5	55.0	14.34	27.0	x
Carpio	28.1	55.5	14.21	26.1	x
MT101730	31.2		17.72	22.2	x
MT101427	24.0	53.0	17.13	21.8	x
Divide	29.7	55.0	17.52	20.6	x
MT101395	28.4	51.0	15.93	20.5	x
average	28.5	54.2	15.92	31.5	
probability	0.004			<0.001	
CV (S/Mean)	7.0			15.8	
LSD 0.05	3.3			8.4	

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 15. Relative yielding abilities of durum varieties as compared to Mountrail when grown under dryland conditions in Valley County in cooperation with CES.

Cultivar	2010	2011	2012	2013	2014	Ave	As % of Mountrail
MT06584	--	--	23.2	52.5	43.4	39.7	114.7
Silver	21.8	38.5	25.7	51.6	37.5	35.0	102.7
Grenora	20.4	40.9	25.8	40.0	45.2	34.5	101.1
Mountrail	21.4	45.3	18.3	49.1	36.4	34.1	100.0
Strongfield	19.7	42.9	20.8	43.1	40.5	33.4	97.9
Alkabo	24.1	43.1	20.9	48.7	28.8	33.1	97.1
Alzada	19.6	36.6	25.4	45.3	36.6	32.7	95.9
Joppa	--	--	--	--	34.8	34.8	95.6
Tioga	21.1	36.1	19.1	48.0	27.0	30.3	88.7
Carpio	--	--	--	49.2	26.1	37.7	88.1
Divide	15.6	42.3	22.0	42.8	20.6	28.7	84.0
MT101730	--	--	--	--	22.2	22.2	61.0
MT101427	--	--	--	--	21.8	21.8	59.9
MT10139	--	--	--	--	20.5	20.5	56.3

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 16. Relative test weights of durum varieties as compared to Mountrail when grown under dryland conditions in Valley County in cooperation with CES.

Cultivar	2010	2011	2012	2013	2014	Ave	As % of Mountrail
Joppa	--	--	--	--	55.5	55.5	103.7
Alkabo	57.0	62.0	58.5	62.0	54.5	58.8	101.9
Carpio	--	--	--	60.5	55.5	58.0	100.9
Strongfield	55.5	59.5	58.5	62.5	55.0	58.2	100.9
Tioga	56.0	60.0	58.5	61.0	55.0	58.1	100.7
Divide	56.0	60.0	59.0	60.5	55.0	58.1	100.7
Mountrail	56.0	59.0	58.5	61.5	53.5	57.7	100.0
Silver	54.5	60.0	59.0	62.0	52.5	57.6	99.8
Grenora	55.0	59.0	57.5	61.0	55.5	57.6	99.8
MT06584	--	--	58.5	59.5	54.0	57.3	99.1
MT101427	--	--	--	--	53.0	53.0	99.1
Alzada	54.0	58.5	58.0	60.5	54.5	57.1	99.0
MT10139	--	--	--	--	51.0	51.0	95.3

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 17. Relative protein contents of durum varieties as compared to Mountrail when grown under dryland conditions in Valley County in cooperation with CES.

Cultivar	2010	2011	2012	2013	2014	Ave	As % of Mountrail
MT101730	--	--	--	--	17.7	17.7	119.6
MT101427	--	--	--	--	17.1	17.1	115.5
Joppa	--	--	--	--	16.6	16.6	112.2
MT10139	--	--	--	--	15.9	15.9	107.4
Strongfield	14.7	15.4	15.0	14.7	17.0	15.4	107.0
Silver	14.8	14.7	14.2	14.2	17.3	15.0	104.7
Divide	14.1	14.4	14.0	13.5	17.5	14.7	102.4
Mountrail	14.3	14.7	13.9	14.1	14.8	14.4	100.0
Alkabo	14.6	13.3	14.5	13.7	15.6	14.3	99.9
Alzada	14.2	14.6	13.5	13.0	16.3	14.3	99.7
Tioga	14.9	14.9	14.5	12.6	14.3	14.2	99.2
MT06584	--	--	14.0	13.3	14.7	14.0	98.1
Grenora	15.0	15.2	14.2	11.9	13.7	14.0	97.5
Carpio	--	--	--	13.2	14.2	13.7	94.8

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.

Table 18. Performance of durum grown under dryland conditions at Wibaux, MT.
Planted: May 22, 2014 Harvested: September 16, 2014 Cooperator: Rick Miske

Variety	Height, inches	Grain protein, %	Test weight	Yield, bu/acre	
Mountrail	31.4	12.69	58.5	59.2	
Carpio	33.1	12.29	58.5	58.4	
Grenora	30.2	12.75	57.0	58.4	
Joppa	35.7	12.62	58.5	57.0	
Strongfield	33.4	14.53	58.5	55.0	
MT101395	30.4	12.40	55.0	51.2	
Alkabo	32.8	12.72	58.5	49.4	x
Alzada	25.0	13.51	58.5	49.2	x
MT06584	25.5	11.96	58.5	48.7	x
MT101427	26.9	13.22	56.0	47.4	x
Silver	26.5	12.65	58.0	46.9	x
Tioga	36.6	12.42	58.5	45.4	x
Divide	36.5	12.53	59.0	45.1	x
MT101730	38.6	13.59	56.0	36.4	x
average	31.6	12.85	57.8	50.6	
probability	<0.001			<0.001	
CV (S/Mean)	5.4			10.2	
LSD 0.05	2.9			8.6	

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

Table 19. Performance of durum grown under dryland fallow conditions at Loring, MT.
Planted: May 13, 2014 Harvested: Sep 7, 2014 Cooperators: Pete Lumsden and John Flansaas

	stand percent	height, cm	height, in	test wt, lb/bu	protein percent	sawfly cutting	yield, bu/ac	
MT06584	98.1	55.8	22.0	56.4	15.43	3.33	44.3	a
Alzada	95.8	61.6	24.3	56.8	14.70	1.00	42.9	a
Strongfield	95.2	69.0	27.2	56.4	16.33	0.33	42.5	a
MT101427	95.5	61.4	24.2	56.6	15.60	1.00	41.4	a
Divide	96.8	69.8	27.5	57.7	15.53	0.67	41.1	a
MT101730	95.2	80.4	31.7	56.5	16.10	0.33	41.1	a
Joppa	97.5	72.7	28.6	56.9	15.37	0.67	40.4	a
Carpio	96.8	65.1	25.6	56.7	15.03	0.33	40.2	a
Alkabo	97.5	62.7	24.7	56.8	14.93	1.00	40.2	a
Grenora	97.1	60.5	23.9	56.2	14.90	0.33	40.2	a
Silver	97.1	57.5	22.6	56.7	15.53	1.00	39.8	
MT101395	99.0	63.8	25.2	53.4	15.53	0.33	39.7	
Tioga	98.4	74.8	29.4	56.0	16.63	2.00	38.3	
Mountrail	95.5	64.6	25.4	56.7	15.20	0.67	36.5	
average	96.8	65.7	25.9	56.4	15.49	0.93	40.6	
CV (S/mean)	2.1	6.3	6.2	1.1	4.0	124.4	4.9	
LSD 0.05	3.5	6.9	2.7	1.0	1.03	1.94	3.4	

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

Table 20. Relative yielding abilities of durum varieties as compared to Mountrail when grown under dryland conditions at Loring, MT.

Cultivar	2011	2012	2013	2014	Ave	as % of Mountrail
MT101427	--	--	--	41.4	41.4	113.4
MT101730	--	--	--	41.1	41.1	112.6
Joppa	--	--	--	40.4	40.4	110.7
MT06584	--	24.1	48.3	44.3	38.9	110.2
Alzada	28.5	24.0	52.7	42.9	37.0	110.1
Alkabo	29.7	26.9	50.0	40.2	36.7	109.2
MT101395	--	--	--	39.7	39.7	108.8
Carpio	--	--	47.8	40.2	44.0	108.1
Silver	31.0	25.8	45.2	39.8	35.5	105.7
Strongfield	30.6	24.2	44.4	42.5	35.4	105.4
Tioga	29.9	26.2	46.2	38.3	35.2	104.8
Grenora	27.6	25.7	43.4	40.2	34.2	101.8
Divide	27.9	24.1	42.5	41.1	33.9	100.9
Mountrail	28.4	24.6	44.9	36.5	33.6	100.0

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.

Table 21. Relative test weights of durum varieties as compared to Mountrail when grown under dryland conditions Loring MT.

Cultivar	2011	2012	2013	2014	Ave	as % of Mountrail
Alkabo	62.5	60.7	62.4	56.7	60.6	101.8
Carpio	--	--	62.1	57.7	59.9	101.5
Divide	61.7	60.9	62.0	56.4	60.3	101.3
Tioga	62.0	60.8	61.9	56.0	60.2	101.2
Strongfield	61.5	60.3	62.0	56.2	60.0	100.8
Silver	61.1	60.4	61.6	56.4	59.9	100.7
Alzada	61.4	60.5	60.7	56.8	59.9	100.7
Joppa	--	--	--	56.9	56.9	100.3
Mountrail	60.9	59.1	61.2	56.7	59.5	100.0
Grenora	61.3	59.5	60.5	56.7	59.5	100.0
MT101427	--	--	--	56.6	56.6	99.8
MT06584	--	60.1	59.4	56.8	58.8	99.7
MT101730	--	--	--	56.5	56.5	99.6
MT101395	--	--	--	53.4	53.4	94.2

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 22. Relative protein contents of durum varieties as compared to Mountrail when grown under dryland conditions Loring, MT.

Cultivar	2011	2012	2013	2014	Ave	as % of Mountrail
MT101730	--	--	--	16.1	16.1	105.9
Tioga	12.1	15.2	16.5	16.6	15.1	104.9
Strongfield	12.6	14.7	16.4	16.3	15.0	104.2
Silver	12.9	14.5	16.6	15.5	14.9	103.5
MT101427	--	--	--	15.6	15.6	102.6
Divide	11.6	14.9	16.7	15.5	14.7	102.1
MT101395	--	--	--	15.5	15.5	102.0
MT06584	--	14.3	16.6	15.4	15.4	101.3
Joppa	--	--	--	15.4	15.4	101.3
Grenora	11.9	14.6	16.6	14.9	14.5	100.7
Mountrail	11.7	14.4	16.1	15.2	14.4	100.0
Carpio	--	--	15.9	15.0	15.4	98.7
Alzada	11.8	14.2	16.1	14.7	14.2	98.6
Alkabo	11.4	14.1	15.5	14.9	14.0	97.2

NOTE: Average proteins 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.

Table 23. Relative percent sawfly cutting of durum varieties as compared to Mountrail when grown under dryland conditions Loring, MT.

Cultivar	2011	2012	2013	2014	Ave	as % of Mountrail
MT101427	--	--	--	1.0	1.0	185.7
Tioga	25.0	10.0	8.3	2.0	11.3	114.1
Alkabo	23.3	8.3	8.3	1.0	10.2	103.0
Mountrail	20.0	11.7	7.0	0.7	9.9	100.0
Joppa	--	--	--	0.7	0.7	100.0
Grenora	20.0	8.3	6.7	0.3	8.8	88.9
Silver	15.0	3.7	3.7	1.0	5.9	59.6
Divide	13.3	3.7	5.0	0.7	5.7	57.6
Alzada	10.0	5.0	1.0	1.0	4.3	43.4
MT101730	--	--	--	0.3	0.3	42.9
MT101395	--	--	--	0.3	0.3	42.9
Carpio	--	--	2.3	0.3	1.3	34.2
Strongfield	8.3	3.7	0.7	0.3	3.3	33.3
MT06584	--	1.0	0.7	3.3	1.7	26.2

NOTE: Average sawfly damage 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 24. Performance of durum grown under dryland fallow conditions at Chester, MT.
Planted: May 7, 2014 Harvested: Aug 19, 2014 Cooperator: Kurt Kammerzell

entry	stand percent	height, cm	height, in	test wt, lb/bu	protein percent	sawfly cutting	yield, bu/ac	
Alkabo	98.4	73.7	29.0	55.1	18.03	2.33	37.6	
Alzada	95.9	63.3	24.9	53.9	17.20	0.33	37.3	
Divide	93.7	67.2	26.5	55.0	18.17	0.67	36.9	
Carpio	96.5	75.9	29.9	53.7	18.20	1.00	35.2	
Strongfield	94.6	74.3	29.3	54.5	19.67	0.00	35.2	
Silver	95.9	59.4	23.4	53.7	17.97	1.00	35.2	
Mountrail	90.5	68.3	26.9	54.5	17.73	0.67	35.1	
Joppa	98.1	79.9	31.5	53.4	18.50	2.33	34.1	
Tioga	97.1	80.0	31.5	55.0	19.00	1.00	34.0	
MT06584	97.1	55.9	22.0	52.7	18.63	0.33	33.3	
MT101427	95.9	56.9	22.4	52.1	18.33	0.00	30.0	x
Grenora	92.4	64.5	25.4	54.1	17.23	0.33	29.6	x
MT101395	92.4	67.0	26.3	49.5	19.40	0.33	28.6	x
MT101730	97.8	82.5	32.5	53.7	17.63	0.67	27.2	x
average	95.45	69.19	27.24	53.64	18.26	0.7857	33.53	
probability	0.306	<0.001	<0.001	<0.001	<0.001	0.074	<0.001	
CV (S/mean)	3.9	4.3	4.3	0.7	2.0	117.1	7.5	
LSD 0.05	6.3	5.0	2.0	0.7	0.62	1.5	4.2	