

**PROJECT TITLE:** Off-station durum variety evaluations in Montana – 2012 (4W4145)

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**Personnel:**

Site/County	Producers	CES/AES cooperators
Flaxville, Daniels	Jeff Mohn	Nicole Winkler, CES
Circle, McCone	Victor Wagner	Ken Nelson, CES
Poplar, Roosevelt	Mark Swank	Ann Ronning, CES
Nashua, Valley	Bill Lauckner	Shelley Mills, CES
Wibaux, Wibaux	David Maus	Dave Bertelsen, CES
Turner, Blaine	Max Cederberg	Peggy Lamb, NARC
Loring, Phillips	Pete Lumsden and John Flansaas	Peggy Lamb, NARC

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

**RESULTS:** The sites in Wibaux County and Daniels County were not harvested because of poor stands. Summaries of yields, test weights, protein contents, heights and sawfly damage across sites in eastern Montana are shown in Tables 1-5. Westhope yielded most across sites (Table 1). Experimental line MT5158 had greatest test weight across sites (Table 2). Strongfield had greatest protein content across sites (Table 3). Tioga was tallest and Normanno was shortest across sites (Table 4). Mountrail had greatest percent sawfly cutting and Normanno had the least percent sawfly cutting across sites (Table 5).

**Circle, McCone County:** Performances and relative values of yield, test weight, and protein of durum varieties grown at Circle are shown in Tables 6-9. Four lines and varieties yielded significantly more 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 10-13. Ten lines and varieties yielded significantly more 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 14-17. Two varieties yielded significantly more than the check variety, Mountrail.

**Turner, Blaine 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 18-22. Two lines and varieties yielded significantly more than the check variety, Mountrail, and three yielded significantly less than Mountrail.

**Loring, Phillips County:** Performance of yield, test weight, protein and sawfly damage of durum varieties grown at Loring are shown in Table 23. Two lines and varieties yielded significantly more than the check variety, Mountrail, and two yielded significantly less than 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 FY2012 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, 2012.

Variety	Circle, dryland recrop	Nashua, dryland fallow	Poplar, dryland fallow*	Loring dryland fallow	Turner dryland fallow	average
Alkabo	13.5	20.9	38.6	26.9	24.3	24.8
Pierce	15.2	22.5	<b>44.0</b>	21.3	20.3	24.7
Tioga	<b>17.2</b>	19.1	36.1	26.2	21.9	24.1
Grenora	16.4	25.8	38.7	25.7	22.4	25.8
Strongfield	13.4	20.8	32.3	24.2	24.1	22.9
Divide	14.0	22.0	38.8	24.1	20.4	23.9
Alzada	12.5	25.4	36.4	24.0	19.5	23.6
Mountrail	12.9	18.3	32.2	24.6	22.5	22.1
Normanno	12.0	25.1	38.2	26.7	24.6	25.3
Belfield	10.7	<b>26.4</b>	37.6	22.2	18.2	23.0
Westhope	14.3	24.9	42.4	25.7	24.8	<b>26.4</b>
Silver	11.8	25.7	37.6	25.8	18.7	23.9
MT06584	11.6	23.2	28.2	24.1	<b>25.7</b>	22.6
MT05158	12.0	25.9	37.7	24.1	21.6	24.3
MT05166	13.1	20.6	37.3	22.9	24.7	23.8
MT05183	14.7	25.6	33.6	<b>27.7</b>	22.6	24.8
site average	13.5	23.25	36.9	24.8	22.26	24.1
probability	0.001	0.001	0.014	<0.001	<0.001	
CV (S/Mean)	12.2	10.4	11.44	5.0	6.0	
CV(SE/Mean)	7.1	6.004	6.606	2.9	3.5	

Table 2. Summary of durum test weights in lb/bu at five sites in eastern Montana, 2012.

Variety	Circle, dryland recrop	Nashua, dryland fallow	Poplar, dryland fallow*	Loring dryland fallow	Turner dryland fallow	average
Alkabo	57.5	58.5	58.5	60.7	60.9	59.2
Pierce	58.0	59.5	58.5	61.0	60.8	59.6
Tioga	55.5	58.5	57.0	60.8	60.4	58.4
Grenora	56.0	57.5	56.5	59.5	60.1	57.9
Strongfield	56.5	58.5	56.0	60.3	60.6	58.4
Divide	58.0	59.0	57.5	60.9	61.0	59.3
Alzada	60.0	58.0	55.5	60.5	60.8	59.0
Mountrail	59.0	58.5	56.0	59.1	60.1	58.5
Normanno	54.5	58.5	55.5	59.3	59.7	57.5
Belfield	56.0	60.5	57.0	60.8	61.2	59.1
Westhope	55.5	59.5	58.5	60.5	60.8	59.0
Silver	56.0	59.0	55.0	60.4	60.7	58.2
MT06584	56.5	58.5	52.0	60.1	60.6	57.5
MT05158	59.0	61.0	58.5	62.6	62.8	<b>60.8</b>
MT05166	58.0	58.5	57.0	61.3	61.5	59.3
MT05183	57.5	59.5	56.5	61.1	61.3	59.2
site average	57.1	58.9	56.6	60.6	60.83	58.8
				<0.001	<0.001	
				0.7	0.6	
				0.4	0.3	

Table 3. Summary of durum percent protein at five sites in eastern Montana, 2012.

Variety	Circle, dryland recrop	Nashua, dryland fallow	Poplar, dryland fallow*	Loring dryland fallow	Turner dryland fallow	average
Alkabo	12.83	14.52	16.31	14.1	13.4	14.23
Pierce	13.88	14.70	16.50	14.7	14.1	14.78
Tioga	14.67	14.46	18.02	<b>15.2</b>	<b>14.3</b>	15.32
Grenora	12.63	14.16	17.18	14.6	13.3	14.37
Strongfield	14.97	<b>15.04</b>	18.93	14.7	<b>14.3</b>	<b>15.59</b>
Divide	11.96	13.97	17.39	14.9	13.8	14.40
Alzada	11.19	13.46	16.69	14.2	13.8	13.86
Mountrail	11.87	13.90	17.45	14.4	13.4	14.21
Normanno	13.70	13.06	18.04	14.9	13.6	14.65
Belfield	14.09	13.56	16.75	14.5	13.8	14.54
Westhope	<b>15.05</b>	13.66	18.22	15.1	13.3	15.07
Silver	13.78	14.15	18.12	14.5	14.0	14.91
MT06584	13.70	14.03	<b>20.48</b>	14.3	13.2	15.14
MT05158	12.24	14.41	17.91	14.1	13.5	14.42
MT05166	12.61	14.70	18.22	14.2	13.3	14.60
MT05183	13.70	14.44	18.02	14.5	13.6	14.85
site average	13.31	14.14	17.76	14.5	13.7	14.68

Table 4. Summary of durum heights in inches at five off-station sites in eastern Montana, 2012.

Variety	Circle, dryland recrop	Nashua, dryland fallow	Poplar, dryland fallow*	Loring dryland fallowp	Turner dryland fallow	average
Alkabo	20.5	26.8	33.7	22.3	23.2	25.3
Pierce	20.9	28.8	36.1	21.7	23.8	26.3
Tioga	24.3	30.7	35.4	24.1	25.0	27.9
Grenora	20.0	25.3	31.8	21.2	21.4	23.9
Strongfield	21.3	28.2	35.4	22.7	24.5	26.4
Divide	21.1	27.3	34.8	22.5	22.9	25.7
Alzada	18.8	26.1	29.2	20.6	21.6	23.3
Mountrail	19.7	26.9	33.7	21.2	22.5	24.8
Normanno	16.9	21.6	25.5	18.6	18.4	20.2
Belfield	18.2	23.2	27.4	19.7	20.7	21.8
Westhope	20.0	25.3	32.6	21.1	22.0	24.2
Silver	18.8	24.7	27.6	20.0	19.5	22.1
MT06584	18.1	23.6	26.5	19.7	21.0	21.8
MT05158	19.6	23.1	26.7	20.5	22.0	22.4
MT05166	20.2	25.1	29.0	20.3	21.0	23.1
MT05183	18.8	23.5	26.9	19.4	21.1	21.9
site average	19.8	25.64	30.8	21.0	21.92	23.8
probability	<0.001	<0.001	<0.001	<0.001	<0.001	
CV (S/Mean)	5.7	3.839	5.129	4.5	4.0	
CV(SE/Mean)	3.3	2.217	2.961	2.6	2.3	

Table 5. Summary of percent cutting by sawfly at two off-station sites in eastern Montana, 2012.

Variety	Loring dryland fallow	Turner dryland fallow	average
Alkabo	8.3	20.0	14.2
Pierce	13.3	23.3	18.3
Tioga	10.0	26.7	18.3
Grenora	8.3	21.7	15.0
Strongfield	3.7	15.0	9.3
Divide	3.7	13.3	8.5
Alzada	5.0	16.7	10.8
Mountrail	11.7	26.7	19.2
Normanno	1.0	1.0	<b>1.0</b>
Belfield	3.7	18.3	11.0
Westhope	3.7	13.3	8.5
MT03012	3.7	18.3	11.0
MT06584	1.0	10.0	5.5
MT05158	1.0	10.0	5.5
MT05166	1.0	3.7	2.3
MT05183	1.0	10.0	5.5
average	5.0	15.5	10.3
probability	<0.001	<0.001	
CV (S/Mean)	57.5	34.1	
CV(SE/Mean)	33.2	19.7	

Table 6. Performance of durum grown under dryland recrop conditions at Circle, MT. Planted: May 3, 2012 Harvested: September 6, 2012 Cooperator: Victor Wagner

Variety	height, inches	grain protein	test weight	yield, bu/acre	
Tioga	24.3	55.5	14.67	17.2	a
Grenora	20.0	56.0	12.63	16.4	a
Pierce	20.9	58.0	13.88	15.2	a
MT05183	18.8	57.5	13.70	14.7	a
Westhope	20.0	55.5	15.05	14.3	
Divide	21.1	58.0	11.96	14.0	
Alkabo	20.5	57.5	12.83	13.5	
Strongfield	21.3	56.5	14.97	13.4	
MT05166	20.2	58.0	12.61	13.1	
Mountrail	19.7	59.0	11.87	12.9	
Alzada	18.8	60.0	11.19	12.5	
MT05158	19.6	59.0	12.24	12.0	
Normanno	16.9	54.5	13.70	12.0	
Silver	18.8	56.0	13.78	11.8	
MT06584	18.1	56.5	13.70	11.6	
Belfield	18.2	56.0	14.09	10.7	
average	19.8	57.1	13.31	13.5	
probability	<0.001			0.001	
CV (S/Mean)	5.7			12.2	
CV(SE/Mean)	3.3			7.1	
LSD 0.05	1.9			2.7	

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

Table 7. Relative yielding abilities of durum varieties compared to Mountrail when grown under dryland conditions in McCone County in cooperation with CES.

Variety	2008	2009	2010	2011	2012	average	As % of Mountrail
Tioga	--	--	13.8	46.4	17.2	25.8	110.1
Westhope	--	--	--	47.4	14.3	30.9	110.0
Strongfield	11.3	29.0	13.9	46.7	13.4	22.9	109.7
Normanno	--	32.8	10.9	--	12.0	18.6	107.5
Grenora	13.3	29.5	9.7	42.4	16.4	22.3	106.8
Alkabo	12.0	26.1	15.6	43.8	13.5	22.2	106.5
MT05183	--	--	--	44.9	14.7	29.8	106.2
Pierce	10.8	27.2	14.4	41.4	15.2	21.8	104.6
MT05166	--	--	--	44.8	13.1	29.0	103.2
Divide	9.8	26.5	13.7	42.9	14.0	21.4	102.6
Mountrail	9.2	24.7	14.2	43.2	12.9	20.8	100.0
MT05158	--	--	--	--	12.0	12.0	93.0
Silver	11.9	24.7	10.9	36.3	11.8	19.1	91.7
Alzada	11.5	24.5	10.7	36.0	12.5	19.0	91.4
MT06584	--	--	--	--	11.6	11.6	89.9
Belfield	--	--	--	33.7	10.7	22.2	79.1

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

Variety	2008	2009	2010	2011	2012	average	As % of Mountrail
Pierce	61.8	60.0	61.5	62.0	58.0	60.7	100.5
Alkabo	61.0	59.2	62.0	62.5	57.5	60.4	100.2
Strongfield	61.3	60.2	62.0	62.0	56.5	60.4	100.1
Alzada	60.0	60.5	61.0	60.5	60.0	60.4	100.1
Mountrail	60.2	59.5	61.5	61.5	59.0	60.3	100.0
MT05158	--	--	--	--	59.0	59.0	100.0
Divide	61.3	59.0	61.5	61.5	58.0	60.3	99.9
MT05166	--	--	--	61.5	58.0	59.8	99.2
MT05183	--	--	--	61.0	57.5	59.3	98.3
Grenora	60.3	58.2	60.5	61.5	56.0	59.3	98.3
Silver	60.0	58.3	60.0	61.0	56.0	59.1	97.9
Tioga	--	--	61.0	61.5	55.5	59.3	97.8
Westhope	--	--	--	61.5	55.5	58.5	97.1
Belfield	--	--	--	61.0	56.0	58.5	97.1
Normanno	--	58.7	61.5	--	54.5	58.2	97.1
MT06584	--	--	--	--	56.5	56.5	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 9. Relative protein contents of durum varieties as compared to Mountrail when grown under dryland conditions in McCone County in cooperation with CES.

Variety	2008	2009	2010	2011	2012	average	As % of Mountrail
MT06584	--	--	--	--	13.7	13.7	115.1
Westhope	--	--	--	12.7	15.0	13.9	109.9
Belfield	--	--	--	13.1	14.1	13.6	107.9
Normanno	--	12.3	12.7	--	13.7	12.9	107.5
MT05183	--	--	--	13.3	13.7	13.5	107.1
Tioga	--	--	12.6	12.6	14.7	13.3	106.7
Silver	13.6	12.5	14.2	13.1	13.8	13.4	106.7
Pierce	13.5	12.8	13.2	13.1	13.9	13.3	105.6
Strongfield	13.8	11.0	12.6	13.0	15.0	13.1	103.8
MT05158	--	--	--	--	12.2	12.2	102.5
Grenora	13.3	12.2	13.0	12.9	12.6	12.8	101.6
MT05166	--	--	--	12.9	12.6	12.8	101.2
Alkabo	13.2	12.4	13.0	12.2	12.8	12.7	101.0
Mountrail	13.7	11.9	12.2	13.3	11.9	12.6	100.0
Divide	13.0	12.0	11.7	12.6	12.0	12.3	97.3
Alzada	12.3	11.4	12.8	13.3	11.2	12.2	96.8

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 10. Performance of durum grown under dryland fallow conditions at Nashua, MT.  
 Planted: May 3, 2012 Harvested: September 7, 2012 Cooperator: Bill Lauckner

Variety	height, inches	grain protein, %	Test wt, lb/bu	Yield, bu/acre	
Belfield	23.2	60.5	13.56	26.4	a
MT05158	23.1	61.0	14.41	25.9	a
Grenora	25.3	57.5	14.16	25.8	a
Silver	24.7	59.0	14.15	25.7	a
MT05183	23.5	59.5	14.44	25.6	a
Alzada	26.1	58.0	13.46	25.4	a
Normanno	21.6	58.5	13.06	25.1	a
Westhope	25.3	59.5	13.66	24.9	a
MT06584	23.6	58.5	14.03	23.2	a
Pierce	28.8	59.5	14.70	22.5	a
Divide	27.3	59.0	13.97	22.0	
Alkabo	26.8	58.5	14.52	20.9	
Strongfield	28.2	58.5	15.04	20.8	
MT05166	25.1	58.5	14.70	20.6	
Tioga	30.7	58.5	14.46	19.1	
Mountrail	26.9	58.5	13.90	18.3	
average	25.6	58.9	14.14	23.2	
probability	<0.001			0.001	
CV (S/Mean)	3.839			10.4	
CV(SE/Mean)	2.217			6.004	
LSD 0.05	1.642			4.031	

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

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

Cultivar	2008	2009	2010	2011	2012	Ave	As % of Mountrail
MT05158	--	--	--	--	25.9	25.9	141.5
MT06584	--	--	--	--	23.2	23.2	126.8
MT05183	--	--	--	44.2	25.6	34.9	109.7
Normanno	--	29.9	16.8	--	25.1	23.9	109.3
Alzada	20.0	31.0	19.6	36.6	25.4	26.5	103.4
Alkabo	16.2	26.4	24.1	43.1	20.9	26.1	102.0
Belfield	--	--	--	38.3	26.4	32.4	101.7
Silver	19.1	25.0	21.8	38.5	25.7	26.0	101.5
Grenora	15.4	26.7	20.4	40.9	25.8	25.8	100.8
Strongfield	14.9	30.3	19.7	42.9	20.8	25.7	100.3
Mountrail	17.2	26.0	21.4	45.3	18.3	25.6	100.0
Westhope	--	--	--	38.4	24.9	31.7	99.5
MT05166	--	--	--	42.1	20.6	31.4	98.6
Pierce	16.3	28.6	17.4	41.4	22.5	25.2	98.4
Divide	16.3	26.1	15.6	42.3	22.0	24.5	95.4
Tioga	--	--	21.1	36.1	19.1	25.4	89.8

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.

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

Cultivar	2008	2009	2010	2011	2012	Ave	As % of Mountrail
MT05158	--	--	--	--	61.0	61.0	104.3
Westhope	--	--	--	61.0	59.5	60.3	102.6
Alkabo	58.8	60.0	57.0	62.0	58.5	59.3	102.3
Pierce	58.5	60.2	56.5	61.5	59.5	59.2	102.2
Belfield	--	--	--	59.5	60.5	60.0	102.1
Divide	58.0	59.8	56.0	60.0	59.0	58.6	101.1
MT05183	--	--	--	59.0	59.5	59.3	100.9
Tioga	--	--	56.0	60.0	58.5	58.2	100.6
Strongfield	57.0	60.5	55.5	59.5	58.5	58.2	100.4
MT05166	--	--	--	59.5	58.5	59.0	100.4
Mountrail	56.5	59.7	56.0	59.0	58.5	57.9	100.0
MT06584	--	--	--	--	58.5	58.5	100.0
Silver	56.3	59.8	54.5	60.0	59.0	57.9	100.0
Normanno	--	59.7	55.5	--	58.5	57.9	99.7
Grenora	56.8	59.0	55.0	59.0	57.5	57.5	99.2
Alzada	56.5	60.0	54.0	58.5	58.0	57.4	99.1

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

Cultivar	2008	2009	2010	2011	2012	Ave	As % of Mountrail
MT05158	--	--	--	--	14.4	14.4	103.6
Tioga	--	--	14.9	14.9	14.5	14.8	103.3
MT05166	--	--	--	14.8	14.7	14.8	103.1
Strongfield	16.8	14.1	14.7	15.4	15.0	15.2	103.1
Grenora	15.9	14.8	15.0	15.2	14.2	15.0	101.9
MT05183	--	--	--	14.7	14.4	14.6	101.7
Westhope	--	--	--	15.3	13.7	14.5	101.4
MT06584	--	--	--	--	14.0	14.0	100.7
Mountrail	16.4	14.4	14.3	14.7	13.9	14.7	100.0
Silver	15.7	14.0	14.8	14.7	14.2	14.7	99.6
Pierce	16.2	14.4	14.5	13.5	14.7	14.7	99.5
Belfield	--	--	--	14.7	13.6	14.2	99.0
Divide	15.6	14.6	14.1	14.4	14.0	14.5	98.6
Alkabo	15.8	14.1	14.6	13.3	14.5	14.5	98.1
Alzada	15.3	13.7	14.2	14.6	13.5	14.3	96.7
Normanno	--	13.8	14.2	--	13.1	13.7	96.5

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

Table 14. Performance of durum grown under dryland fallow conditions at Poplar, MT.  
 Planted: May 2, 2012 Harvested: Sept 10, 2012 Cooperator: Mark Swank

Variety	height, inches	grain protein, %	test wt, lb/bu	yield, bu/ac	
Pierce	36.1	58.5	16.50	44.0	a
Westhope	32.6	58.5	18.22	42.4	a
Divide	34.8	57.5	17.39	38.8	
Grenora	31.8	56.5	17.18	38.7	
Alkabo	33.7	58.5	16.31	38.6	
Normanno	25.5	55.5	18.04	38.2	
MT05158	26.7	58.5	17.91	37.7	
Belfield	27.4	57.0	16.75	37.6	
Silver	27.6	55.0	18.12	37.6	
MT05166	29.0	57.0	18.22	37.3	
Alzada	29.2	55.5	16.69	36.4	
Tioga	35.4	57.0	18.02	36.1	
MT05183	26.9	56.5	18.02	33.6	
Strongfield	35.4	56.0	18.93	32.3	
Mountrail	33.7	56.0	17.45	32.2	
MT06584	26.5	52.0	20.48	28.2	
Average	30.8	56.6	17.76	36.9	
probability	<0.001			0.014	
CV (S/Mean)	5.129			11.44	
CV(SE/Mean)	2.961			6.606	
LSD 0.05	2.632			7.033	

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

Table 15. Relative yields of durum varieties as compared to Mountrail when grown under dryland conditions in Roosevelt County in cooperation with CES.

Cultivar	2006	2009	2010	2011	2012	Ave	as % of Mountrail
MT05158	--	--	--	--	37.7	37.7	117.1
Normanno	--	50.7	37.5	--	38.2	42.1	104.2
Mountrail	21.7	52.6	36.5	72.3	32.2	43.1	100.0
Grenora	21.1	62.3	34.0	50.3	38.7	41.3	95.9
Alkabo	22.5	51.4	35.9	57.5	38.6	41.2	95.6
Divide	21.4	57.4	27.8	57.7	38.8	40.6	94.3
Silver	21.8	51.2	40.0	52.5	37.6	40.6	94.3
Pierce	20.8	54.2	26.0	55.3	44.0	40.1	93.0
Westhope	--	--	--	54.2	42.4	48.3	92.4
MT05166	--	--	--	59.1	37.3	48.2	92.2
Strongfield	21.1	60.9	33.5	50.4	32.3	39.6	92.1
Alzada	25.4	49.0	32.8	50.4	36.4	38.8	90.1
MT05183	--	--	--	60.2	33.6	46.9	89.8
Belfield	--	--	--	54.2	37.6	45.9	87.8
MT06584	--	--	--	--	28.2	28.2	87.6
Tioga	--	--	27.7	52.8	36.1	38.9	82.7

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

Cultivar	2006	2009	2010	2011	2012	Ave	as % of Mountrail
MT05158	--	--	--	--	58.5	58.5	104.5
Westhope	--	--	--	61.0	58.5	59.8	102.6
Alkabo	53.0	62.5	57.5	61.5	58.5	58.6	102.3
Pierce	52.5	63.2	57.0	61.5	58.5	58.5	102.2
Divide	53.3	62.7	57.0	60.0	57.5	58.1	101.4
MT05166	--	--	--	61.0	57.0	59.0	101.3
Tioga	--	--	56.5	60.5	57.0	58.0	100.3
Alzada	53.2	62.2	57.0	59.0	55.5	57.4	100.1
Mountrail	51.2	61.8	57.0	60.5	56.0	57.3	100.0
Strongfield	50.7	62.2	56.0	61.5	56.0	57.3	100.0
Silver	53.3	61.7	57.5	58.5	55.0	57.2	99.8
Belfield	--	--	--	59.0	57.0	58.0	99.6
Grenora	51.0	61.3	55.0	59.5	56.5	56.7	98.9
Normanno	--	60.7	56.0	--	55.5	57.4	98.5
MT05183	--	--	--	58.0	56.5	57.3	98.3
MT06584	--	--	--	--	52.0	52.0	92.9

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

Table 17. Relative proteins of durum varieties as compared to Mountrail when grown under dryland conditions in Roosevelt County in cooperation with CES.

Cultivar	2006	2009	2010	2011	2012	Ave	as % of Mountrail
MT06584	--	--	--	--	20.5	20.5	117.8
MT05183	--	--	--	15.3	18.0	16.7	105.0
Westhope	--	--	--	15.0	18.2	16.6	104.7
Strongfield	19.6	10.8	15.4	14.4	18.9	15.8	104.5
MT05166	--	--	--	14.9	18.2	16.6	104.4
MT05158	--	--	--	--	17.9	17.9	102.9
Tioga	--	--	15.1	14.1	18.0	15.7	102.2
Normanno	--	10.6	14.4	--	18.0	14.3	101.4
Silver	17.7	11.2	14.1	14.9	18.1	15.2	100.4
Belfield	--	--	--	14.9	16.8	15.9	100.0
Mountrail	19.0	10.5	14.5	14.3	17.4	15.1	100.0
Alkabo	19.4	11.0	14.8	14.0	16.3	15.1	99.7
Pierce	18.7	11.0	14.5	13.9	16.5	14.9	98.5
Divide	17.9	10.3	14.7	14.2	17.4	14.9	98.4
Grenora	18.0	11.1	14.6	13.5	17.2	14.9	98.3
Alzada	17.0	11.1	14.3	13.9	16.7	14.6	96.4

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 18. Performance of durum grown under dryland conditions at Turner, MT.  
 Planted: May 4, 2012      Harvested: August 27, 2012    Cooperator: Max Cederberg  
 Hail damage in early June and August

Variety	Height, inches	sawfly rating	grain protein, %	Test weight	Yield, bu/acre	
MT06584	21.0	10.0	13.2	60.6	25.7	a
Westhope	22.0	13.3	13.3	60.8	24.8	a
MT05166	21.0	3.7	13.3	61.5	24.7	
Normanno	18.4	1.0	13.6	59.7	24.6	
Alkabo	23.2	20.0	13.4	60.9	24.3	
Strongfield	24.5	15.0	14.3	60.6	24.1	
MT05183	21.1	10.0	13.6	61.3	22.6	
Mountrail	22.5	26.7	13.4	60.1	22.5	
Grenora	21.4	21.7	13.3	60.1	22.4	
Tioga	25.0	26.7	14.3	60.4	21.9	
MT05158	22.0	10.0	13.5	62.8	21.6	
Divide	22.9	13.3	13.8	61.0	20.4	
Pierce	23.8	23.3	14.1	60.8	20.3	
Alzada	21.6	16.7	13.8	60.8	19.5	x
Silver	19.5	18.3	14.0	60.7	18.7	x
Belfield	20.7	18.3	13.8	61.2	18.2	x
average	21.9	15.5	13.2	60.8	22.3	
probability	<0.001	<0.001		<0.001	<0.001	
CV (S/Mean)	4.0	34.1		0.6	6.0	
CV(SE/Mean)	2.3	19.7		0.3	3.5	
LSD 0.05	1.5	8.8		0.6	2.2	

Table 19. Relative yielding abilities of durum varieties as compared to Mountrail when grown under dryland conditions at Turner, MT.

Cultivar	2008	2009	2010	2011	2012	Ave	as % of Mountrail
Normanno	--	40.9	33.1	--	24.6	32.9	134.5
Strongfield	19.4	36.5	27.0	25.5	24.1	26.5	114.8
MT06584	--	--	--	--	25.7	25.7	114.2
Grenora	15.4	35.4	24.9	26.6	22.4	24.9	108.1
Silver	16.5	33.0	26.2	24.8	18.7	23.8	103.3
MT05166	--	--	--	26.0	24.7	25.4	102.8
Westhope	--	--	--	25.9	24.8	25.4	102.8
Alzada	17.1	29.1	28.1	24.4	19.5	23.6	102.4
MT05183	--	--	--	27.8	22.6	25.2	102.2
Mountrail	15.3	35.4	15.4	26.8	22.5	23.1	100.0
Alkabo	14.8	31.9	17.3	23.9	24.3	22.4	97.2
MT05158	--	--	--	--	21.6	21.6	96.0
Pierce	14.8	32.9	15.5	26.1	20.3	21.9	95.0
Divide	17.2	29.9	14.6	25.2	20.4	21.5	93.0
Belfield	--	--	--	26.2	18.2	22.2	90.1
Tioga	--	--	9.4	26.7	21.9	19.3	89.6

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 20. Relative test weights of durum varieties as compared to Mountrail when grown under dryland conditions at Turner, MT.

Cultivar	2008	2009	2010	2011	2012	Ave	as % of Mountrail
MT05158	--	--	--	--	62.8	62.8	104.5
MT05183	--	--	--	62.2	61.3	61.8	101.8
MT05166	--	--	--	61.5	61.5	61.5	101.4
Alkabo	57.4	60.8	57.0	62.7	60.9	59.8	101.3
Belfield	--	--	--	61.4	61.2	61.3	101.1
MT06584	--	--	--	--	60.6	60.6	100.8
Pierce	57.0	60.9	56.7	62.1	60.8	59.5	100.8
Westhope	--	--	--	61.3	60.8	61.1	100.7
Alzada	57.4	60.6	56.2	61.3	60.8	59.3	100.4
Mountrail	57.6	60.2	56.0	61.2	60.1	59.0	100.0
Divide	57.3	60.0	55.2	61.6	61.0	59.0	100.0
Strongfield	57.5	59.9	56.0	60.9	60.6	59.0	99.9
Grenora	56.5	60.6	55.6	61.3	60.1	58.8	99.7
Silver	56.9	60.1	55.4	61.0	60.7	58.8	99.7
Normanno	--	59.8	55.8	--	59.7	58.4	99.4
Tioga	--	--	52.9	62.2	60.4	58.5	99.0

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 21. Relative protein contents of durum varieties as compared to Mountrail when grown under dryland conditions at Turner, MT.

Cultivar	2008	2009	2010	2011	2012	Ave	as % of Mountrail
Belfield	--	--	--	13.2	13.8	13.5	107.6
Strongfield	16.2	15.7	15.7	13.1	14.3	15.0	105.8
Westhope	--	--	--	12.9	13.3	13.1	104.4
Divide	15.6	15.7	15.9	13.0	13.8	14.8	104.4
Pierce	16.1	15.4	15.7	12.1	14.1	14.7	103.5
Silver	15.5	15.5	14.8	13.4	14.0	14.6	103.2
MT05166	--	--	--	12.5	13.3	12.9	102.8
Tioga	--	--	16.2	11.0	14.3	13.8	102.5
Alzada	15.3	15.9	14.0	13.0	13.8	14.4	101.6
MT05183	--	--	--	11.8	13.6	12.7	101.2
MT05158	--	--	--	--	13.5	13.5	100.7
Mountrail	15.6	14.8	15.4	11.7	13.4	14.2	100.0
Grenora	15.4	14.7	14.8	12.5	13.3	14.1	99.7
MT06584	--	--	--	--	13.2	13.2	98.5
Alkabo	15.0	15.2	14.5	11.4	13.4	13.9	98.0
Normanno	--	14.5	14.3	--	13.6	14.1	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 22. Relative sawfly damage as percent cutting of durum varieties as compared to Mountrail when grown under dryland conditions at Turner, MT.

Cultivar	2008	2009	2010	2011	2012	Ave	as % of Mountrail
Grenora	21.7	15.0	25.0	38.3	21.7	24.3	119.7
Pierce	26.7	11.7	23.3	33.3	23.3	23.7	116.3
Alkabo	18.3	8.7	21.7	46.7	20.0	23.1	113.5
Mountrail	13.3	8.3	21.7	31.7	26.7	20.3	100.0
Tioga	--	--	21.7	23.3	26.7	23.9	89.5
Belfield	--	--	--	25.0	18.3	21.7	74.1
Silver	11.7	5.7	18.3	18.3	18.3	14.5	71.1
Divide	8.3	5.0	18.3	16.7	13.3	12.3	60.6
Strongfield	10.0	10.0	13.3	10.0	15.0	11.7	57.3
Alzada	10.0	8.3	8.3	15.0	16.7	11.7	57.3
Westhope	--	--	--	13.3	13.3	13.3	45.5
MT06584	--	--	--	--	10.0	10.0	37.5
MT05158	--	--	--	--	10.0	10.0	37.5
MT05183	--	--	--	10.0	10.0	10.0	34.2
MT05166	--	--	--	5.0	3.7	4.4	14.9
Normanno	--	0.7	2.3	--	1.0	1.3	7.1

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 23. Performance of durum grown under dryland conditions at Loring, MT.

Planted: May 4, 2012      Harvested: August 27, 2012

Cooperators: Pete Lumsden and John Flansaas

Variety	Height, in	sawfly rating	grain protein, %	Test weight	Yield, bu/acre	
MT05183	19.4	1.0	14.5	61.1	27.7	a
Alkabo	22.3	8.3	14.1	60.7	26.9	a
Normanno	18.6	1.0	14.9	59.3	26.7	
Tioga	24.1	10.0	15.2	60.8	26.2	
Silver	20.0	3.7	14.5	60.4	25.8	
Grenora	21.2	8.3	14.6	59.5	25.7	
Westhope	21.1	3.7	15.1	60.5	25.7	
Mountrail	21.2	11.7	14.4	59.1	24.6	
Strongfield	22.7	3.7	14.7	60.3	24.2	
Divide	22.5	3.7	14.9	60.9	24.1	
MT06584	19.7	1.0	14.3	60.1	24.1	
MT05158	20.5	1.0	14.1	62.6	24.1	
Alzada	20.6	5.0	14.2	60.5	24.0	
MT05166	20.3	1.0	14.2	61.3	22.9	
Belfield	19.7	3.7	14.5	60.8	22.2	x
Pierce	21.7	13.3	14.7	61.0	21.3	x
average	21.0	5.0	14.5	60.6	24.8	
probability	<0.001	<0.001		<0.001	<0.001	
CV (S/Mean)	4.5	57.5		0.7	5.0	
CV(SE/Mean)	2.6	33.2		0.4	2.9	
LSD 0.05	1.6	4.8		0.7	2.1	