

TOLERANCE AND WEED CONTROL IN FLAX WITH SULFENTRAZONE

Final Report

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SaskFlax



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Executive Summary

Sulfentrazone is a Group 14 herbicide that inhibits the protoporphyrinogen oxidase (PPO) enzyme, which is important in the synthesis of chlorophyll. Sulfentrazone is a soil-applied herbicide that requires soil moisture for activation and root uptake.

The objective of this study was to determine the rates at which flax tolerates sulfentrazone in different soil and climatic conditions as well as to determine rates required to provide control of broadleaf weeds such as redroot pigweed, kochia, and wild buckwheat.

Tolerance and weed control efficacy studies were conducted in 2006 and 2007 at six locations across the Prairies: Lethbridge, AB; Scott, SK; Goodale farm, Saskatoon, SK; Kernen farm, Saskatoon, SK; Melfort, SK; Indian Head, SK; and Brandon, MB.

Tolerance of flax was evaluated at all locations by applying a range of sulfentrazone rates from 35 to 560 g ai ha⁻¹. Flax exhibited good tolerance to sulfentrazone at rates up to 280 g ai ha⁻¹ over all sites and years. There were some locations where the highest rate (560 g ai ha⁻¹) rate of sulfentrazone did not injure the crop. However, Scott, Kernen, Lethbridge, Brandon and Melfort locations had unacceptable tolerances at the high rate in at least one of the visual ratings. The only site where yields were reduced by the high rate of sulfentrazone was at Scott in both 2006 and 2007. As a 2X rate of safety is required for PMRA registration, the 1x rate will need to be lower than 280 g ai ha⁻¹.

To summarize weed control data, redroot pigweed was present in eleven site-years (five site-years with 210 g ai ha⁻¹ rate). Rates of 35, 70, 140, 210, 280, and 560 g ai ha⁻¹ provided greater than 80% control of redroot pigweed 9%, 45%, 64%, 80%, 91% and 91% of the time, respectively. Wild buckwheat was present in ten site-years (three site-years with 210 g ai ha⁻¹) and rates of 35, 70, 140, 210, 280, and 560 provided >80% control 0%, 20%, 60%, 100%, 100%, and 100% of the time, respectively. Kochia was present in 7 site-years (five site-years with 210 g ai ha⁻¹ rate) and rates of 35, 70, 140, 210, 280, and 560 g ai ha⁻¹ provided > 80% control 14%, 50%, 100%, 100%, 100%, and 100% of the time, respectively.

At sites where sulfentrazone provided efficacious weed control, flax was tolerant at the rates required for weed control. In soils such as those at Scott, Lethbridge, and the Goodale and Kernen Farms, a rate of 140 g ai ha⁻¹ should be adequate to control redroot pigweed, wild buckwheat, and kochia and provide a 2X rate margin of crop safety. Data generated from chickpea efficacy studies can be used to supplement the flax data and further refine rates. The high organic matter soils at Melfort are a concern since control of redroot pigweed was generally not satisfactory at any rate applied. Based on the Melfort results, further investigation in the Red River Valley of Manitoba is warranted to determine if sulfentrazone can provide efficacious weed control in flax on high organic matter, fine-textured soils.

Background

Sulfentrazone is a Group 14 herbicide that inhibits the protoporphyrinogen oxidase (PPO) enzyme, which is important in the synthesis of chlorophyll. It is registered in the United States on soybean, tobacco and sunflower. It also has Section 18 registrations in North Dakota for wild buckwheat control in chickpea and field pea and kochia control in flax. Sulfentrazone is a soil-applied herbicide that requires soil moisture for activation and root uptake.

The objective of this study was to:

- 1) determine the rates at which flax tolerates sulfentrazone in different soil and climatic conditions;
- 2) determine sulfentrazone rates required to provide control of broadleaf weeds such as redroot pigweed, kochia, and wild buckwheat.

Tolerance and weed control efficacy studies were conducted at six locations across the Prairies: Lethbridge, AB; Scott, SK; Goodale farm, Saskatoon, SK; Kernen farm, Saskatoon, SK; Melfort, SK; Indian Head, SK; and Brandon, MB.

Trials were conducted in 2007 and 2006 at these locations.

Herbicide treatments mentioned in this report are not registered for use and their use is not recommended by the researchers involved.

Soil characteristics at each location

Lethbridge: sandy clay loam (36% sand, 30% silt, and 34% clay), 3.6% organic matter, pH: 7.8.

Scott: loam (38% sand, 41% silt, and 21% clay), 3.5% organic matter, pH: 6.5.

Goodale: fine sandy loam (37% sand, 40% silt, and 23% clay), 1.9% organic matter, pH: 7.0.

Kernen: silty clay loam (12% sand, 28% silt, and 60% clay), 4.5% organic matter, pH: 7.2.

Melfort: silty clay loam (16% sand, 40% silt, and 44% clay), 11.3% organic matter, pH: 6.6.

Indian Head: clay (16% sand, 20% silt, and 64% clay), 4% organic matter, pH 7.5.

Brandon: Clay loam (31% sand, 35% silt 34% clay) 6.8% organic matter, pH 7.7

Flax Tolerance Trials

Tolerance of flax was evaluated at all locations by applying a range of sulfentrazone rates from 35 to 560 g ai ha⁻¹. Checks included a hand-weeded check, and Buctril-M, an industry standard. Plots were generally maintained weed-free in order to minimize confounding results from weed interference. Data collection included plant emergence counts, visual injury ratings, and crop yield. Visual injury ratings are based on a 0 to 100% scale, where 0% is no injury and 100% is complete kill. Ratings from 0-9% are considered 'acceptable'; 10-20% are considered 'just acceptable'; 21-30% are 'not acceptable'; and >30% are considered severe.

2007 Results

The tolerance data for 2007 is presented in Table 1.

Lethbridge: Unacceptable injury was recorded at the highest rate applied (560 g ai ha⁻¹). The highest rate of sulfentrazone caused a significant reduction in plant stand; however, it did not negatively impact yield.

Scott: Unacceptable injury and significant plant stand reductions were recorded at the highest rate. Flax seed yield was also significantly lower than the weed-free check and the industry standard (Buctril-M) at the highest rate.

Goodale Farm (Saskatoon silty clay loam site): The highest rate resulted in a just acceptable rating at the 2nd rating date and there was a slight reduction in plant stand at the highest rate tested. All sulfentrazone rates resulted in lower yields than the weed-free check or industry standard; however, this could have been confounded with lack of weed control of some species.

Kernen Farm (Saskatoon clay site): The 280 and 560 g ai ha⁻¹ rates resulted in just acceptable and unacceptable tolerance, respectively at the first two rating dates. The injury was transient with all rates resulting in acceptable tolerance at the third rating date. The highest rate resulted in a reduced plant stand; however, yield was not affected.

Melfort: Flax tolerated all rates of sulfentrazone and there was no reduction in plant stand or seed yield from sulfentrazone application.

Indian Head: Sulfentrazone application did not result in significant crop injury at any rate tested. Plant stands were slightly reduced at the highest rate. Some of the sulfentrazone applications were lower yielding the weed-free check; however, they were all similar to the industry standard.

Brandon: Unacceptable crop injury was recorded at the first rating date at rates 140 g ai ha⁻¹. The crop recovered and injury was acceptable at all rates when the final rating date was conducted. Sulfentrazone application did not result in a significant reduction in plant stand or yield.

Overall, flax exhibited good tolerance to sulfentrazone up to 280 g ai ha⁻¹. All sites would tolerate a rate of 140 g ai ha⁻¹, taking into consideration that a 2X rate margin of safety (280 g ai ha⁻¹) is required by PMRA.

Table 1: Tolerance of flax to sulfentrazone. Prairie Provinces. 2007.

	Rate g ai/ha	Flax Plant Counts # / m ²	Flax Injury Rating 1	Flax Injury Rating 2	Flax Injury Rating 3	Flax Yield kg/ha
Lethbridge						
1	Weed-free check	982 a	0 c	0 c	0 b	833 a
2	Buctril-M	1013 a	0 c	0 c	0 b	1088 a
3	Sulfentrazone	979 a	0 c	0 c	0 b	844 a
4	Sulfentrazone	1023 a	0 c	0 c	0 b	908 a
5	Sulfentrazone	913 a	0 c	0 c	0 b	915 a
6	Sulfentrazone	804 a	13 b	13 b	4 b	793 a
7	Sulfentrazone	550 b	38 a	54 a	31 a	786 a
	LSD _{0.05}	246	4	7	7	455
Scott						
1	Weed-free check	306 a	0 c	0 b	0 b	1420 a
2	Buctril-M	280 ab	0 c	4 b	1 b	1300 ab
3	Sulfentrazone	341 a	0 c	0 b	0 b	1310 ab
4	Sulfentrazone	300 a	0 c	2 b	0 b	1370 a
5	Sulfentrazone	270 ab	2 c	4 b	4 b	1330 ab
6	Sulfentrazone	337 a	6 b	3 b	2 b	1350 ab
7	Sulfentrazone	200 b	26 a	14 a	11 a	1140 b
	LSD _{0.05}	95	4	8	6	223
Goodale						
1	Weed-free check	174 ab	0 b	0 d	0 a	1681 ab
2	Buctril-M	193 ab	0 b	18 a	2 a	1786 a
3	Sulfentrazone	179 ab	0 b	0 d	0 a	1293 d
4	Sulfentrazone	212 a	0 b	1 cd	0 a	1382 cd
5	Sulfentrazone	200 ab	0 b	6 bc	0 a	1273 d
6	Sulfentrazone	174 ab	0 b	12 ab	1 a	1498 abc
7	Sulfentrazone	156 b	2 a	16 a	3 a	1454 bcd
	LSD _{0.05}	47	1	6	3	238
Kernen						
1	Weed-free check	288 ab	0 c	1 d	0 c	1445 a
2	Buctril-M	277 ab	0 c	25 a	3 ab	1542 a
3	Sulfentrazone	298 a	0 c	6 cd	0 c	1393 a
4	Sulfentrazone	298 a	1 c	0 d	0 c	1488 a
5	Sulfentrazone	274 ab	2 c	6 cd	0 c	1429 a
6	Sulfentrazone	260 b	13 b	12 bc	1 bc	1423 a
7	Sulfentrazone	219 c	23 a	23 ab	4 a	1422 a
	LSD _{0.05}	36	8	11	2	244
Melfort						
1	Weed-free check	280 a	0 b	0 b	0 a	1922 a
2	Buctril-M	294 a	10 a	8 a	1 a	1810 a
3	Sulfentrazone	324 a	0 b	0 b	0 a	1800 a
4	Sulfentrazone	331 a	0 b	1 b	1 a	1918 a
5	Sulfentrazone	317 a	0 b	0 b	1 a	1902 a
6	Sulfentrazone	300 a	0 b	3 b	1 a	1714 a
7	Sulfentrazone	310 a	0 b	3 b	1 a	2054 a
	LSD _{0.05}	60	0	3	3	425
Indian Head						
1	Weed-free check	648 abc	0 b	0 b	0 b	2151 a
2	Buctril-M	634 bc	9 a	10 a	3 a	2088 ab
3	Sulfentrazone	684 ab	2 b	0 b	0 b	2108 ab
4	Sulfentrazone	670 ab	0 b	0 b	0 b	2058 b
5	Sulfentrazone	658 ab	1 b	0 b	1 b	2094 ab
6	Sulfentrazone	720 a	0 b	0 b	0 b	2015 b
7	Sulfentrazone	631 bc	0 b	0 b	0 b	2163 a
8	Sulfentrazone	572 c	3 b	1 b	0 b	2103 ab
	LSD _{0.05}	81	5	1	1	93
Brandon						
1	Weed-free check	224 a	0 b	0 a	0 a	968 abc
2	Buctril-M	243 a	0 b	0 a	0 a	934 bc
3	Sulfentrazone	242 a	5 b	0 a	0 a	911 c
4	Sulfentrazone	230 a	1 b	0 a	0 a	1045 ab
5	Sulfentrazone	231 a	19 a	0 a	0 a	903 c
6	Sulfentrazone	227 a	20 a	0 a	0 a	1071 a
7	Sulfentrazone	217 a	25 a	0 a	0 a	981 abc
	LSD _{0.05}	35	7	0	0	119

Means followed by the same letter do not differ significantly at P=0.05.

2006 Results

The data from each site is presented in Table 2.

Lethbridge: No visual injury was observed with any treatments and sulfentrazone application did not cause a significant yield reduction. The highest rate of sulfentrazone caused a slight reduction in plant stand; however, it did not negatively impact yield.

Scott: Hail was received at Scott which caused some reduction in flax yields. Injury was unacceptable at rates $> 280 \text{ g ai ha}^{-1}$ due to a reduction in plant stand. Yields were reduced at the highest rate.

Goodale Farm (Saskatoon silty clay loam site): All rates tested resulted in acceptable injury ratings and no significant reduction in plant stand or yield.

Kernen Farm (Saskatoon clay site): The highest rate tested (560 g ai ha $^{-1}$) resulted in just acceptable tolerance at the first rating date; however, the crop recovered and ratings were acceptable at later rating dates. Sulfentrazone did not reduce plant stand. There was some variability in yields; however, the highest rates of sulfentrazone were not significantly lower yielding than the weed-free check.

Melfort: The highest rate resulted in unacceptable crop injury and a reduction in plant stand. The injury did not result in a significant yield reduction at the highest rate.

Indian Head: Sulfentrazone application did not result in significant crop injury at any rate tested. Plant stands were not affected. The only herbicide treatment that caused a yield reduction was Buctril-M, the industry standard.

Brandon: Unacceptable crop injury was recorded at the first rating date with the 560 g ai ha $^{-1}$ rate. The crop recovered and injury was just acceptable at the final rating date. The injury at this rate did not result in a significant reduction in plant stand or yield loss.

Overall, flax exhibited good tolerance to sulfentrazone at rates up to 280 g ai ha $^{-1}$ at all sites. Scott was the only site where the 560 g ai ha $^{-1}$ rate caused a significant reduction in plant stand and flax seed yield.

Table 2: Tolerance of flax to sulfentrazone. Prairie Provinces. 2006

Lethbridge

Crop	FLAX	FLAX	FLAX	FLAX	FLAX
Rating Date	6/27/2006	9/26/2006	6/26/2006	7/25/2006	8/11/2006
Rating Data Type	Plant counts	Yield	Injury	Injury	Injury
Rating Unit	#/m2	kg/ha	%	%	%
Trt Treatment No. Name	Form Conc	Form Type	Rate Rate	Growth Unit	Stage
1 Weed-Free					
2 Buctril-M	560 EC	560 G A/H/A	3-4 L		
3 Sulfentrazone	400 SC	35 G A/H/A	3 DAS	648 ab	1942 a
4 Sulfentrazone	400 SC	70 G A/H/A	3 DAS	696 a	2011 a
5 Sulfentrazone	400 SC	140 G A/H/A	3 DAS	645 ab	2026 a
6 Sulfentrazone	400 SC	280 G A/H/A	3 DAS	658 ab	1957 a
7 Sulfentrazone	400 SC	560 G A/H/A	3 DAS	636 ab	1975 a
LSD (P=.05)				618 ab	2011 a
CV				579 b	1883 a
				116	192
				12	7

Scott

Crop	FLAX	FLAX	FLAX	FLAX	FLAX
Rating Date	8/14/2006	8/28/2006	6/14/2006	6/28/2006	7/21/2006
Rating Data Type	Plant counts	Yield	Injury	Injury	Injury
Rating Unit	#/m2	kg/ha	%	%	%
Trt Treatment No. Name	Form Conc	Form Type	Rate Rate	Growth Unit	Stage
1 Weed-Free					
2 Buctril-M	560 EC	560 G A/H/A	3-4 L	456 a	670 a
3 Sulfentrazone	400 SC	35 G A/H/A	3 DAS	439 a	750 a
4 Sulfentrazone	400 SC	70 G A/H/A	3 DAS	437 a	690 a
5 Sulfentrazone	400 SC	140 G A/H/A	3 DAS	436 a	720 a
6 Sulfentrazone	400 SC	280 G A/H/A	3 DAS	435 a	730 a
7 Sulfentrazone	400 SC	560 G A/H/A	3 DAS	411 ab	620 a
LSD (P=.05)				334 b	370 b
CV				82.9	187
				13	19

Goodale Farm - Saskatoon (silty clay loam soil)

Crop	FLAX	FLAX	FLAX	FLAX	FLAX
Rating Date	6/2/2006	10/5/2006	6/5/2006	6/19/2006	6/29/2006
Rating Data Type	Plant counts	Yield	Injury	Injury	Injury
Rating Unit	#/m2	kg/ha	%	%	%
Trt Treatment No. Name	Form Conc	Form Type	Rate Rate	Growth Unit	Stage
1 Weed-Free					
2 Buctril-M	560 EC	560 G A/H/A	3-4 L	460 a	1952 a
3 Sulfentrazone	400 SC	35 G A/H/A	3 DAS	479 a	1981 a
4 Sulfentrazone	400 SC	70 G A/H/A	3 DAS	456 a	1754 a
5 Sulfentrazone	400 SC	140 G A/H/A	3 DAS	470 a	1957 a
6 Sulfentrazone	400 SC	280 G A/H/A	3 DAS	451 a	1989 a
7 Sulfentrazone	400 SC	560 G A/H/A	3 DAS	446 a	2083 a
LSD (P=.05)				428 a	1985 a
CV				62	369
				9	13

Kernen Farm - Saskatoon (clay soil)

Crop	FLAX	FLAX	FLAX	FLAX	FLAX
Rating Date	6/6/2006	10/5/2006	6/6/2006	6/19/2006	6/29/2006
Rating Data Type	Plant counts	Yield	Injury	Injury	Injury
Rating Unit	#/m2	kg/ha	%	%	%
Trt Treatment No. Name	Form Conc	Form Type	Rate Rate	Growth Unit	Stage
1 Weed-Free					
2 Buctril-M	560 EC	560 G A/H/A	3-4 L	526 a	1232 bc
3 Sulfentrazone	400 SC	35 G A/H/A	3 DAS	456 a	1376 a
4 Sulfentrazone	400 SC	70 G A/H/A	3 DAS	460 a	1305 abc
5 Sulfentrazone	400 SC	140 G A/H/A	3 DAS	488 a	1370 ab
6 Sulfentrazone	400 SC	280 G A/H/A	3 DAS	484 a	1190 c
7 Sulfentrazone	400 SC	560 G A/H/A	3 DAS	484 a	1398 a
LSD (P=.05)				479 a	1234 bc
CV				129	141
				18	7

Means followed by same letter do not significantly differ (P=.05, LSD)

Melfort

Crop	FLAX	FLAX	FLAX	FLAX	FLAX						
Rating Date	8/25/2006	9/15/2006	6/5/2006	6/27/2006	7/18/2006						
Rating Data Type	Plant counts	Yield	Injury	Injury	Injury						
Rating Unit	#/m ²	kg/ha	%	%	%						
Trt No.	Treatment Name	Form Conc	Form Type	Rate Rate	Growth Unit Stage						
1	Weed-Free					389 ab	2563 a	0 c	0 d	0 c	
2	Buctril-M	560	EC	560	G A/HA	3-4 L	384 ab	2622 a	0 c	25 b	13 b
3	Sulfentrazone	400	SC	35	G A/HA	3 DAS	466 a	2330 b	0 c	0 d	0 c
4	Sulfentrazone	400	SC	70	G A/HA	3 DAS	429 ab	2555 a	0 c	0 d	0 c
5	Sulfentrazone	400	SC	140	G A/HA	3 DAS	407 ab	2428 ab	0 c	5 cd	0 c
6	Sulfentrazone	400	SC	280	G A/HA	3 DAS	436 ab	2513 ab	6 b	10 c	0 c
7	Sulfentrazone	400	SC	560	G A/HA	3 DAS	357 b	2604 a	38 a	48 a	33 a
LSD (P=.05)						100	218	5.8	8	8.7	
CV						16	6				

Indian Head

Crop	FLAX	FLAX	FLAX	FLAX	FLAX						
Rating Date	Plant counts #/m ²	Yield kg/ha	6/26/2006 Injury %	7/11/2006 Injury %	7/28/2006 Injury %						
Rating Data Type											
Rating Unit											
Trt No.	Treatment Name	Form Conc	Form Type	Rate Unit	Growth Stage						
1	Weed-Free					452 a	2450 ab	0 b	0 b	3 a	
2	Buctril-M	560	EC	560 G	A/HA	3-4 L	440 a	2264 b	11 a	15 a	2 a
3	Sulfentrazone	400	SC	35 G	A/HA	3 DAS	468 a	2510 a	0 b	0 b	0 a
4	Sulfentrazone	400	SC	70 G	A/HA	3 DAS	495 a	2410 ab	0 b	0 b	0 a
5	Sulfentrazone	400	SC	140 G	A/HA	3 DAS	501 a	2304 b	0 b	0 b	0 a
6	Sulfentrazone	400	SC	280 G	A/HA	3 DAS	493 a	2452 ab	0 b	0 b	0 a
7	Sulfentrazone	400	SC	560 G	A/HA	3 DAS	481 a	2402 ab	0 b	0 b	0 a
LSD (P=.05)						123	203	1.4	3.2	3	
CV						17	6				

Brandon

Crop	FLAX	FLAX	FLAX	FLAX	FLAX					
Rating Date			10 DAE**	6/20/2006	7/9/2006					
Rating Data Type	Plant counts #/m ²	Yield kg/ha	Injury %	Injury %	Injury %					
Rating Unit										
Trt No.	Treatment Name	Form Conc	Form Type	Rate Unit	Growth Stage					
1	Weed-Free					290 ab	1783 d	0 c	0 c	0 b
2	Buctril-M	560	EC	560 G	A/HA	3-4 L	322 a	2311 a	0 c	0 c
3	Sulfentrazone	400	SC	35 G	A/HA	3 DAS	302 ab	1959 bcd	0 c	0 c
4	Sulfentrazone	400	SC	70 G	A/HA	3 DAS	279 ab	2150 ab	0 c	0 c
5	Sulfentrazone	400	SC	140 G	A/HA	3 DAS	249 b	1922 cd	0 c	0 c
6	Sulfentrazone	400	SC	280 G	A/HA	3 DAS	282 ab	2149 ab	13 b	5 b
7	Sulfentrazone	400	SC	560 G	A/HA	3 DAS	281 ab	2025 bc	40 a	21 a
LSD (P=.05)						58	219	5.4	3.4	3.2
CV						14	7			

**** DAE = Days After Emergence**

Means followed by same letter do not significantly differ ($P=.05$, LSD)

Conclusions – Tolerance

Considering that a 2X rate of safety is required, the 1X rate will need to be lower than 280 g ai ha⁻¹ on soils similar to Lethbridge, Scott, and the Goodale farm. Flax was tolerant to all rates of sulfentrazone when grown on the Kernen Farm, Melfort, Brandon, and Indian Head soils.

Weed Control

2007 Results

The results are presented in tabular form following the narrative.

Lethbridge (Table 3): Sulfentrazone worked extremely well at this site. Unacceptable injury was reported at the highest rate (560 g ai ha⁻¹); however, plant stands declined at rates 280 g ai ha⁻¹. Sulfentrazone was highly effective on redroot pigweed at this site, with suppression reported at 35 g ai ha⁻¹ and greater than 80% control at 70 g ai ha⁻¹ (based on control ratings). The 35 and 70 g ai ha⁻¹ rates resulted in a 87 and 98% reduction in redroot pigweed biomass, respectively when compared to the Buctril-M standard. Kochia was a little more difficult to kill; however weed control ratings indicated that a rate of 70 g ai ha⁻¹ or higher was required to provide greater than 80% season long control. A rate of 140 g ai ha⁻¹ or higher was required to decrease kochia biomass by greater than 80%, when compared to the Buctril-M standard. Sulfentrazone rates of 140 g ai ha⁻¹ was required to provide season-long control of wild buckwheat. Round-leaf mallow was not adequately controlled with sulfentrazone, with the exception of the 560 g ai ha⁻¹ rate. Flax seed yield response to sulfentrazone was variable, likely due to the inconsistent round-leaf mallow control.

Scott (Table 4): Injury from the highest rate of sulfentrazone was rated as unacceptable. Plant density was statistically lower than the weedy check and the industrial standard at the 560 g ai ha⁻¹ rate. Season-long kochia and redroot pigweed control was achieved at rates of 140 and 210 g ai ha⁻¹, respectively based on ratings. Rates of 35, 70, and 140 g ai ha⁻¹ reduced kochia density by 76, 85, and 98%, respectively. Rates of 35, 70, 140, and 210 g ai ha⁻¹ reduced redroot pigweed density by 73, 70, 94, and 98%, respectively and total weed biomass by 27, 64, 93, and 99%, respectively. Yield of flax was maximized at 70 g ai ha⁻¹.

Elstow (Table 5): This is a clay-loam soil with 2.7% organic matter. It was chosen since it was known that there was Group 2 resistant kochia present. Some injury was noted at the first rating date; however, the injury was transient and the crop fully recovered by the third rating date. Season-long kochia control was achieved with rates of 70 to 140 g ai ha⁻¹. Shepherd's purse was not controlled by sulfentrazone in this trial. Season-long control of wild buckwheat and common lambsquarters was achieved with sulfentrazone rates of 210 and 140 g ai ha⁻¹, respectively. Flax yield was maximized at the 210 g ai ha⁻¹ of sulfentrazone.

Kernen Farm (Saskatoon clay site – Table 6): Unacceptable injury was recorded at the highest sulfentrazone rate for the first two rating dates. Just acceptable ratings were recorded at the 280 and 560 g ai ha⁻¹ rates at the last rating date. A rate of 70 g ai ha⁻¹ and 140 g ai ha⁻¹ resulted in season-long control of kochia and wild buckwheat, respectively according to visual ratings. None of the rates resulted in season-long control of wild mustard. Flax yields were maximized at 140 g ai ha⁻¹.

Melfort (Table 7): Visual injury ratings to flax were generally acceptable at all rates. Sulfentrazone application did not result in a reduction in plant stand. The highest rates of sulfentrazone resulted in season-long suppression of redroot pigweed. Similar to 2006, none of the rates were able to provide adequate visual control of redroot pigweed on this high organic matter soil. Rates of 280 g ai ha^{-1} reduced redroot pigweed fresh weight by $> 85\%$.

Indian Head (Table 8): Flax tolerated all rates of sulfentrazone according to visual ratings and plant densities. The highest rate was required to provide season-long visual control of redroot pigweed; however, biomass data indicated that rates of greater than 210 g ai ha^{-1} provided greater than 80% reduction in redroot pigweed fresh weight. Weed densities were not particularly high and sulfentrazone application had no effect on yield.

Brandon (Table 9): Some visual injury was reported at the first two rating dates; however flax fully recovered by the third rating date. Sulfentrazone application did not reduce plant stand. Visual control ratings were not conducted; however, biomass data provides some insight into level of weed control. Rates of 140 g ai ha^{-1} resulted in greater than 80% reduction in both kochia and redroot pigweed biomass. Yields were not affected by sulfentrazone application.

Table 3: Efficacy of weed control with sulfentrazone in flax. Lethbridge, 2007

	Rate g ai/ha	Flax Plant Counts # / m ²	Flax Injury Rating 1	Flax Injury Rating 2	Flax Injury Rating 3	Flax Yield kg/ha
Lethbridge						
1	Weed-free check	1052 a	0 b	0 b	0 b	1084 a
2	Buctril-M	1092 a	0 b	0 b	0 b	651 cd
3	Sulfentrazone	1086 a	0 b	0 b	0 b	602 d
4	Sulfentrazone	1139 a	0 b	0 b	0 b	527 d
5	Sulfentrazone	1015 ab	0 b	0 b	0 b	817 a-d
6	Sulfentrazone	1032 ab	0 b	0 b	0 b	704 bcd
7	Sulfentrazone	889 b	0 b	0 b	0 b	910 abc
8	Sulfentrazone	665 c	45 a	54 a	33 a	1005 ab
	LSD _{0.05}	156	3	4	3	302
		R.R. Pigweed Fresh Weight g/m ²	R.R. Pigweed Plant Counts # / m ²	R.R. Pigweed % Control 31-May-07	R.R. Pigweed % Control 12-Jun-07	R.R. Pigweed % Control 11-Jul-07
1	Weed-free check	0 b	0 c	100 a	100 a	100 a
2	Buctril-M	111 a	66 a	0 d	54 c	55 c
3	Sulfentrazone	14 b	12 b	90 c	86 b	79 b
4	Sulfentrazone	2 b	3 bc	95 b	96 a	95 a
5	Sulfentrazone	0 b	0 c	99 a	100 a	100 a
6	Sulfentrazone	0 b	0 c	100 a	100 a	100 a
7	Sulfentrazone	0 b	0 c	100 a	100 a	100 a
8	Sulfentrazone	0 b	0 c	100 a	100 a	100 a
	LSD _{0.05}	40	12	3	8	8
		Kochia Fresh Weight g/m ²	Kochia Plant Counts # / m ²	Kochia % Control 31-May-07	Kochia % Control 12-Jun-07	Kochia % Control 11-Jul-07
1	Weed-free check	0 b	0 c	100 a	100 a	100 a
2	Buctril-M	2652 a	27 a	0 d	69 d	50 c
3	Sulfentrazone	2118 a	8 b	81 c	78 c	61 c
4	Sulfentrazone	1920 a	7 b	90 b	91 b	81 b
5	Sulfentrazone	35 b	1 c	100 a	100 a	99 a
6	Sulfentrazone	0 b	0 c	100 a	100 a	99 a
7	Sulfentrazone	0 b	0 c	100 a	100 a	100 a
8	Sulfentrazone	7 b	0 c	100 a	100 a	100 a
	LSD _{0.05}	1375	4	3.9	7.3	11.3
		Wild Buckwheat Fresh Weight g/m ²	Wild Buckwheat Plant Counts # / m ²	Wild Buckwheat % Control 31-May-07	Wild Buckwheat % Control 12-Jun-07	Wild Buckwheat % Control 11-Jul-07
1	Weed-free check	0 b	0 c	100 a	100 a	100 a
2	Buctril-M	8 b	24 b	0 d	93 ab	86 ab
3	Sulfentrazone	33 a	60 a	56 c	50 c	36 c
4	Sulfentrazone	3 b	11 bc	78 b	79 b	69 b
5	Sulfentrazone	0 b	0 c	98 a	94 ab	93 a
6	Sulfentrazone	0 b	0 c	99 a	98 a	93 a
7	Sulfentrazone	0 b	0 c	100 a	100 a	98 a
8	Sulfentrazone	0 b	0 c	100 a	90 ab	100 a
	LSD _{0.05}	11	19	14	17	21
		RL Mallow Fresh Weight g/m ²	RL Mallow Plant Counts # / m ²	RL Mallow % Control 31-May-07	RL Mallow % Control 12-Jun-07	RL Mallow % Control 11-Jul-07
1	Weed-free check	0 c	0 c	100 a	100 a	100 a
2	Buctril-M	508 abc	32 a	0 d	25 d	0 e
3	Sulfentrazone	1039 a	25 abc	0 d	0 e	0 e
4	Sulfentrazone	766 ab	28 ab	0 d	0 e	0 e
5	Sulfentrazone	333 bc	5 bc	49 c	45 c	26 d
6	Sulfentrazone	437 bc	22 abc	73 b	54 c	31 d
7	Sulfentrazone	197 c	10 abc	93 a	78 b	60 c
8	Sulfentrazone	143 c	5 bc	94 a	95 a	90 b
	LSD _{0.05}	542	26	8	10	9

Table 4: Efficacy of weed control from sulfentrazone application in flax. Scott. 2007.

	Rate g ai/ha	Flax Plant Counts #/m2	Flax Injury Rating 1	Flax Injury Rating 2	Flax Injury Rating 3	Flax Yield kg/ha
Scott						
1	Weedy check	303 a	0 c	0 b	0 b	980 bc
2	Buctril-M	324 a	10 b	7 b	3 b	1050 bc
3	Sulfentrazone	333 a	0 c	1 b	1 b	1090 ab
4	Sulfentrazone	318 a	0 c	1 b	0 b	1250 a
5	Sulfentrazone	321 a	0 c	1 b	2 b	1160 ab
6	Sulfentrazone	327 a	0 c	1 b	1 b	1080 ab
7	Sulfentrazone	266 ab	13 b	5 b	3 b	1140 ab
8	Sulfentrazone	185 b	28 a	38 a	27 a	870 c
	LSD _{0.05}	82	4	7	10	210
		Broadleaf Weed Fresh Weight g/m2	Kochia Plant Counts #/m2	Kochia % Control 14-Jun-07	Kochia % Control 10-Jul-07	Kochia % Control 23-Jul-07
1	Weedy check	232 a	0 c	0 e	0 d	0 c
2	Buctril-M	65 c	66 a	63 d	38 c	59 b
3	Sulfentrazone	169 ab	12 b	71 c	28 c	65 b
4	Sulfentrazone	84 bc	3 bc	91 b	65 b	79 ab
5	Sulfentrazone	17 c	0 c	98 ab	93 a	98 a
6	Sulfentrazone	1 c	0 c	100 a	100 a	100 a
7	Sulfentrazone	0 c	0 c	100 a	100 a	100 a
8	Sulfentrazone	0 c	0 c	100 a	100 a	100 a
	LSD _{0.05}	96	12	7	21	24
		R.R. Pigweed Plant Counts #/m2	R.R. Pigweed % Control 14-Jun-07	R.R. Pigweed % Control 10-Jul-07	R.R. Pigweed % Control 23-Jul-07	
1	Weedy check	89 a	0 d	0 c	0 d	
2	Buctril-M	15 bc	63 c	55 b	73 ab	
3	Sulfentrazone	24 b	78 b	10 c	35 c	
4	Sulfentrazone	28 b	93 a	20 c	60 bc	
5	Sulfentrazone	5 c	98 a	70 b	79 ab	
6	Sulfentrazone	2 c	100 a	98 a	97 a	
7	Sulfentrazone	0 c	100 a	100 a	100 a	
8	Sulfentrazone	0 c	100 a	100 a	100 a	
	LSD _{0.05}	17	8	20	28	

Table 5: Efficacy of weed control in flax with sulfentrazone. Elstow. 2007.

	Rate g ai/ha	Flax Injury Rating 1	Flax Injury Rating 2	Flax Injury Rating 3	Flax Yield kg/ha
Elstow					
1	Weed-free check 0	3 bc	0 b	0 b	812 b
2	Buctril-M 560	0 c	12 a	13 a	1148 ab
3	Sulfentrazone 35	6 abc	0 b	0 b	1047 ab
4	Sulfentrazone 70	5 abc	4 ab	0 b	1110 ab
5	Sulfentrazone 140	17 a	0 b	0 b	1068 ab
6	Sulfentrazone 210	14 ab	4 ab	0 b	1246 a
7	Sulfentrazone 280	12 abc	6 ab	0 b	1222 a
8	Sulfentrazone 560	5 abc	2 ab	0 b	1125 ab
	LSD _{0.05}	13	11	2	350
		Kochia % Control 27-Jun-07	Kochia % Control 6-Jul-07	Kochia % Control 17-Jul-07	Shepherds-Purse % Control 17-Jul-07
1	Weed-free check 0	0 c	0 c	0 d	0 b
2	Buctril-M 560	0 c	55 ab	70 c	100 a
3	Sulfentrazone 35	38 b	0 c	0 d	0 b
4	Sulfentrazone 70	100 a	35 bc	83 b	33 b
5	Sulfentrazone 140	88 a	95 a	93 ab	33 b
6	Sulfentrazone 210	100 a	99 a	100 a	33 b
7	Sulfentrazone 280	100 a	100 a	100 a	40 b
8	Sulfentrazone 560	100 a	100 a	100 a	33 b
	LSD _{0.05}	27	48	11	56
		Wild Buckwheat % Control 27-Jun-07	Wild Buckwheat % Control 17-Jul-07	Lambsquarters % Control 27-Jun-07	Lambsquarters % Control 17-Jul-07
1	Weed-free check 0	0 c	0 b	0 b	0 d
2	Buctril-M 560	2 c	93 a	100 a	90 ab
3	Sulfentrazone 35	67 b	0 b	0 b	50 c
4	Sulfentrazone 70	100 a	22 b	0 b	57 bc
5	Sulfentrazone 140	98 a	73 a	50 ab	100 a
6	Sulfentrazone 210	87 ab	93 a	100 a	100 a
7	Sulfentrazone 280	100 a	100 a	100 a	100 a
8	Sulfentrazone 560	100 a	100 a	100 a	100 a
	LSD _{0.05}	29	41	67	34

Table 6: Efficacy of weed control with sulfentrazone in flax. Kernen. 2007.

	Rate g ai/ha	Flax Injury Rating 1	Flax Injury Rating 2	Flax Injury Rating 3	Flax Yield kg/ha
Kernen					
1	Weed-free check 0	0 b	3 c	0 b	1027 b
2	Buctril-M 560	0 b	21 ab	9 ab	1475 a
3	Sulfentrazone 35	0 b	9 bc	0 b	1239 ab
4	Sulfentrazone 70	0 b	6 bc	1 b	1390 a
5	Sulfentrazone 140	0 b	10 bc	5 ab	1433 a
6	Sulfentrazone 210	2 b	18 abc	7 ab	1435 a
7	Sulfentrazone 280	6 b	19 abc	18 a	1402 a
8	Sulfentrazone 560	30 a	34 a	11 ab	1371 a
	LSD _{0.05}	12.1	18.2	13.1	248
		Kochia Plant Counts # / m ²	Kochia % Control 5-Jun-07	Kochia % Control 20-Jun-07	Kochia % Control 3-Jul-07
1	Weed-free check 0	4 a	0 b	0 c	0 b
2	Buctril-M 560	3 a	0 b	85 a	86 a
3	Sulfentrazone 35	0 b	98 a	45 b	25 b
4	Sulfentrazone 70	0 b	100 a	98 a	100 b
5	Sulfentrazone 140	0 b	99 a	100 a	100 b
6	Sulfentrazone 210	0 b	100 a	95 a	100 b
7	Sulfentrazone 280	0 b	100 a	100 a	100 b
8	Sulfentrazone 560	0 b	100 a	100 a	100 b
	LSD _{0.05}	2	3	28	26
		Wild Buckwheat Plant Counts # / m ²	Wild Buckwheat % Control 5-Jun-07	Wild Buckwheat % Control 20-Jun-07	Wild Buckwheat % Control 3-Jul-07
1	Weed-free check 0	7 b	0 d	0 d	0 c
2	Buctril-M 560	15 a	0 d	81 ab	65 b
3	Sulfentrazone 35	5 b	82 c	43 bc	13 c
4	Sulfentrazone 70	1 b	83 c	23 cd	48 b
5	Sulfentrazone 140	2 b	88 bc	65 ab	98 a
6	Sulfentrazone 210	2 b	100 a	93 a	95 a
7	Sulfentrazone 280	2 b	98 ab	95 a	98 a
8	Sulfentrazone 560	2 b	100 a	99 a	100 a
	LSD _{0.05}	7	11	41	23
		Wild Mustard Plant Counts # / m ²	Wild Mustard % Control 5-Jun-07	Wild Mustard % Control 20-Jun-07	Wild Mustard % Control 3-Jul-07
1	Weed-free check 0	5 ab	0 d	0 b	0 e
2	Buctril-M 560	4 abc	0 d	86 a	98 a
3	Sulfentrazone 35	7 a	70 c	0 b	0 e
4	Sulfentrazone 70	4 abc	77 bc	15 b	18 de
5	Sulfentrazone 140	3 abc	88 ab	53 a	44 cd
6	Sulfentrazone 210	0 c	97 a	68 a	60 bc
7	Sulfentrazone 280	2 bc	97 a	58 a	45 cd
8	Sulfentrazone 560	5 abc	100 a	83 a	78 ab
	LSD _{0.05}	5	16	34	31

Table 7: Efficacy of weed control with sulfentrazone in flax. Melfort. 2007.

	Rate g ai/ha	Flax Plant Counts # / m2	Flax Injury Rating 1	Flax Injury Rating 2	Flax Injury Rating 3	Flax Yield kg/ha
Melfort						
1	Weedy check	272 a	0 b	0 b	0 a	1725 b
2	Buctril-M	288 a	10 a	8 ab	0 a	2215 a
3	Sulfentrazone	272 a	0 b	3 ab	0 a	1983 ab
4	Sulfentrazone	296 a	0 b	0 b	0 a	1954 ab
5	Sulfentrazone	312 a	0 b	0 b	0 a	2029 ab
6	Sulfentrazone	316 a	0 b	0 b	0 a	2138 ab
7	Sulfentrazone	240 a	0 b	4 ab	0 a	2105 ab
8	Sulfentrazone	228 a	0 b	13 a	0 a	1964 ab
	LSD _{0.05}	110		11	0	427
		R.R. Pigweed Plant Counts # / m2	R.R. Pigweed Fresh Weight g/m2	R.R. Pigweed % Control 27-Jun-07	R.R. Pigweed % Control 13-Jul-07	R.R. Pigweed % Control 8-Aug-07
1	Weedy check	19 a	149 ab	0 a	20 c	24 b
2	Buctril-M	12 ab	119 abc	0 a	38 bc	59 ab
3	Sulfentrazone	8 bcd	47 bcd	0 a	23 bc	40 ab
4	Sulfentrazone	9 bc	177 a	0 a	23 bc	20 b
5	Sulfentrazone	3 cd	69 bcd	0 a	35 bc	45 ab
6	Sulfentrazone	4 bcd	78 a-d	0 a	35 bc	53 ab
7	Sulfentrazone	3 cd	16 cd	0 a	63 ab	73 a
8	Sulfentrazone	0 d	9 d	0 a	80 a	79 a
	LSD _{0.05}	8	106	0	42	44

Table 8: Efficacy of sulfentrazone with flax. Indian Head. 2007.

	Rate g ai/ha	Flax Plant Counts # / m2	Flax Injury Rating 1	Flax Injury Rating 2	Flax Injury Rating 3	Flax Yield kg/ha
Indian Head						
1	Weedy check	722 a	0 c	0 b	0 b	1816 a
2	Buctril-M	777 a	14 a	11 a	10 a	1735 a
3	Sulfentrazone	789 a	0 c	0 b	0 b	1852 a
4	Sulfentrazone	716 a	0 c	0 b	0 b	1773 a
5	Sulfentrazone	803 a	0 c	0 b	0 b	1801 a
6	Sulfentrazone	801 a	0 c	0 b	0 b	1857 a
7	Sulfentrazone	841 a	0 c	0 b	0 b	1804 a
8	Sulfentrazone	768 a	4 b	0 b	0 b	1726 a
	LSD _{0.05}	126	3	2	1	191
		R.R. Pigweed Plant Counts # / m2	R.R. Pigweed Fresh Weight g/m2	R.R. Pigweed % Control 28-Jun-07	R.R. Pigweed % Control 12-Jul-07	R.R. Pigweed % Control 10-Aug-07
1	Weedy check	4 ab	59 a	0 c	0 d	0 e
2	Buctril-M	2 b	3 b	95 a	91 a	89 a
3	Sulfentrazone	7 a	76 a	5 c	6 cd	0 e
4	Sulfentrazone	2 b	45 a	13 c	19 c	5 e
5	Sulfentrazone	2 b	46 a	18 c	16 c	18 d
6	Sulfentrazone	1 b	12 b	45 b	55 b	59 c
7	Sulfentrazone	1 b	3 b	74 a	68 b	76 b
8	Sulfentrazone	0 b	8 b	90 a	91 a	94 a
	LSD _{0.05}	4	33	24	15	12

Table 9: Efficacy of weed control with sulfentrazone in flax. Brandon. 2007.

	Rate g ai/ha	Flax Plant Counts #/m ²	Flax Injury Rating 1	Flax Injury Rating 2	Flax Injury Rating 3	Flax Yield kg/ha
Brandon						
1	Weedy check	184 a	0 e	0 f	539 a	1816 a
2	Buctril-M	196 a	0 e	33 a	605 a	1735 a
3	Sulfentrazone	195 a	5 de	0 f	536 a	1852 a
4	Sulfentrazone	177 a	10 de	8 e	472 a	1773 a
5	Sulfentrazone	173 a	15 cd	9 de	442 a	1801 a
6	Sulfentrazone	177 a	23 bc	14 cd	475 a	1857 a
7	Sulfentrazone	186 a	30 b	19 bc	464 a	1804 a
8	Sulfentrazone	222 a	43 a	21 b	463 a	1726 a
	LSD _{0.05}	57	10	5	176	191
		Kochia Plant Counts #/m ²	Kochia Fresh Weight g/m ²	R.R. Pigweed Plant Counts #/m ²	R.R. Pigweed Fresh Weight g/m ²	
1	Weedy check	66 a	850 a	29 a	90 ab	
2	Buctril-M	48 ab	270 bc	36 a	115 a	
3	Sulfentrazone	23 cd	310 bc	6 b	40 bc	
4	Sulfentrazone	35 bc	360 b	8 b	40 bc	
5	Sulfentrazone	5 d	20 bc	0 b	10 c	
6	Sulfentrazone	3 d	10 bc	1 b	5 c	
7	Sulfentrazone	0 d	0 c	0 b	0 c	
8	Sulfentrazone	1 d	0 c	0 b	0 c	
	LSD _{0.05}	23	351	15	60	

2006 Results

The data from each site is presented in tabular form on the next six pages.

Lethbridge (Table 10): Sulfentrazone worked extremely well at this site. Rates of 35 to 70 g ai ha⁻¹ provided greater than 80% control of kochia and redroot pigweed. Rates of 140 g ai ha⁻¹ provided greater than 80% control of wild buckwheat. No crop injury was reported. All rates of sulfentrazone resulted in a significant yield increase compared to the untreated check. There was no statistical difference in yield between sulfentrazone rates.

Scott (Table 11): Rates of 280 and 560 g ai ha⁻¹ resulted in unacceptable crop injury at this site. Rates of >70 g ai ha⁻¹ resulted in acceptable control of kochia, redroot pigweed, lambsquarters, and wild buckwheat. A rate of 140 g ai ha⁻¹ resulted in control of volunteer canola and shepherd's purse. Flax yields were lowest at the 560 g ai ha⁻¹ of sulfentrazone due to crop injury.

Goodale Farm (Saskatoon silty clay loam site Table 12): The tolerance study discussed earlier had some wild buckwheat and Russian thistle present so ratings were conducted. A rate of 280 g ai ha⁻¹ was required to provide 80% control of wild buckwheat; however, rates of 70-140 g ai ha⁻¹ provided control of Russian thistle.

In the weed control study, rates of 280 g ai ha⁻¹ were required to control wild buckwheat; while rates of 140 to 280 g ai ha⁻¹ provided control of redroot pigweed. Volunteer canola was not controlled at any rate. Green foxtail was suppressed at the 280 g ai ha⁻¹ rate. Flax exhibited excellent tolerance to sulfentrazone at this site. Seed yields were maximized with Buctril-M and sulfentrazone at the 280 g ai ha⁻¹ rate.

Kernen Farm (Saskatoon clay site) (Table 13): Wild buckwheat and redroot pigweed were controlled at rates of 140 g and 70 g ai ha⁻¹, respectively. Russian thistle was controlled at 35 g ai ha⁻¹, while wild mustard required a rate of 280 g ai ha⁻¹ for control. Plant stand declined at sulfentrazone rates 280 g ai ha⁻¹, indicating some injury. Sulfentrazone rates did not have an impact on crop yield. Rates of 280 g ai ha⁻¹ resulted in greater than a 90% reduction in wild buckwheat biomass.

Melfort (Table 14): The Melfort soil contains approximately 11% organic matter. Sulfentrazone did not provide adequate control of redroot pigweed at any rate. It is believed that the sulfentrazone became bound to the organic matter, resulting in reduced control. The highest rate of 560 g ai ha⁻¹ resulted in only a 47% reduction in redroot pigweed biomass. Injury was noted at the highest rate. Despite the lack of weed control, yields of flax were significantly higher than the untreated check at sulfentrazone rates > 70 g ai ha⁻¹.

Indian Head (Table 15): The site had relatively low densities of wild buckwheat and redroot pigweed. Rates of >70 g ai ha⁻¹ resulted in greater than 80% control of wild buckwheat and redroot pigweed. Some flax injury was noted at the highest rate; however the crop recovered and there was no significant reduction in flax yield. Sulfentrazone did not improve crop yield as weed densities were low.

Brandon (Table 16): The weed densities at this site were too low for weed rating or weed data collection. Therefore, only crop tolerance data was taken. Unacceptable crop injury was recorded at the first rating date with the 560 g ai ha⁻¹ rate. The crop recovered and injury was acceptable at the final rating date. The injury at this rate resulted in a lower plant stand than some of the other sulfentrazone treatments, but it was not lower than the untreated check. Despite the low weed densities, there was a yield response at rates >280 g ai ha⁻¹.

Table 10: Efficacy of sulfentrazone for weed control in flax. Lethbridge. 2006.

**Lethbridge
Flax Data**

Crop or Weed Rating Date Rating Data Type Rating Unit					Flax 6/27/2006 Plant counts #/m ²	Flax 9/13/2006 Yield kg/ha	Flax 6/12/2006 Injury %	Flax 6/26/2006 Injury %	Flax 7/25/2006 Injury %
Trt No. Name	Treatment	Form Conc	Form Type	Rate Unit	Growth Stage				
1 Untreated					568 b	693 c	0 a	0 a	0 a
2 Buctril-M	560 EC	560 G A/H/A	3-4 L		631 ab	1493 b	0 a	0 a	0 a
3 Sulfentrazone	400 SC	35 G A/H/A	3 DAS		558 b	1620 ab	0 a	0 a	0 a
4 Sulfentrazone	400 SC	70 G A/H/A	3 DAS		648 ab	1735 a	0 a	0 a	0 a
5 Sulfentrazone	400 SC	140 G A/H/A	3 DAS		658 a	1589 ab	0 a	0 a	0 a
6 Sulfentrazone	400 SC	280 G A/H/A	3 DAS		639 ab	1733 a	0 a	0 a	0 a
7 Sulfentrazone	400 SC	560 G A/H/A	3 DAS		611 ab	1700 ab	0 a	0 a	0 a
LSD (P=.05)					86	234	0	0	0
CV					9	10			

Weed Counts / Biomass

Crop or Weed Rating Date Rating Data Type Rating Unit					Wild buckwheat 8/24/2006 Plant counts #/m ²	Wild buckwheat 8/24/2006 Fresh Weight grams/m ²	Kochia 8/24/2006 Plant counts #/m ²	Kochia 8/24/2006 Fresh Weight grams/m ²	Redroot pigweed 8/24/2006 Plant counts #/m ²	Redroot pigweed 8/24/2006 Fresh Weight grams/m ²
Trt No. Name	Treatment	Form Conc	Form Type	Rate Unit	Growth Stage					
1 Untreated					110 ab	152 a	115 a	4911.4 a	182 a	1022 a
2 Buctril-M	560 EC	560 G A/H/A	3-4 L		82 bc	14 c	4 b	147.2 b	30 b	107 b
3 Sulfentrazone	400 SC	35 G A/H/A	3 DAS		171 a	124 ab	6 b	72.3 b	43 b	25 b
4 Sulfentrazone	400 SC	70 G A/H/A	3 DAS		110 ab	57 bc	2 b	108.1 b	36 b	2 b
5 Sulfentrazone	400 SC	140 G A/H/A	3 DAS		78 bc	14 c	0 b	0 b	38 b	8 b
6 Sulfentrazone	400 SC	280 G A/H/A	3 DAS		20 cd	2 c	0 b	0 b	11 b	1 b
7 Sulfentrazone	400 SC	560 G A/H/A	3 DAS		10 d	0 c	0 b	0 b	0 b	0 b
LSD (P=.05)					67	90	17	398	49	353
CV					54	117	63	36	68	143

Weed Control Rating Data

Crop or Weed Rating Date Rating Data Type Rating Unit					Wild buckwheat 6/12/2006 Visual Control %	Wild buckwheat 6/26/2006 Visual Control %	Wild buckwheat 7/25/2006 Visual Control %	Kochia 6/12/2006 Visual Control %	Kochia 6/26/2006 Visual Control %	Kochia 7/25/2006 Visual Control %
Trt No. Name	Treatment	Form Conc	Form Type	Rate Unit	Growth Stage					
1 Untreated					0 d	0 e	0 d	0 c	0 c	0 c
2 Buctril-M	560 EC	560 G A/H/A	3-4 L		NR c	95 a	76 b	NR	90 b	85 b
3 Sulfentrazone	400 SC	35 G A/H/A	3 DAS		50 b	30 d	10 d	94 b	93 b	89 b
4 Sulfentrazone	400 SC	70 G A/H/A	3 DAS		76 a	54 c	50 c	99 a	98 a	99 a
5 Sulfentrazone	400 SC	140 G A/H/A	3 DAS		91 a	86 b	81 b	100 a	99 a	99 a
6 Sulfentrazone	400 SC	280 G A/H/A	3 DAS		100 a	96 a	95 a	100 a	100 a	100 a
7 Sulfentrazone	400 SC	560 G A/H/A	3 DAS		100 a	98 a	96 a	100 a	100 a	100 a
LSD (P=.05)					9	7	14	2	4	7

Crop or Weed Rating Date Rating Data Type Rating Unit					Redroot pigweed 6/12/2006 Visual Control %	Redroot Pigweed 6/26/2006 Visual Control %	Redroot Pigweed 7/25/2006 Visual Control %	
Trt No. Name	Treatment	Form Conc	Form Type	Rate Unit	Growth Stage			
1 Untreated					0 c	0 d	0 d	
2 Buctril-M	560 EC	560 G A/H/A	3-4 L		NR b	78 c	74 c	
3 Sulfentrazone	400 SC	35 G A/H/A	3 DAS		88 a	86 b	80 bc	
4 Sulfentrazone	400 SC	70 G A/H/A	3 DAS		98 a	96 a	90 ab	
5 Sulfentrazone	400 SC	140 G A/H/A	3 DAS		100 a	99 a	95 a	
6 Sulfentrazone	400 SC	280 G A/H/A	3 DAS		100 a	100 a	99 a	
7 Sulfentrazone	400 SC	560 G A/H/A	3 DAS		100 a	100 a	100 a	
LSD (P=.05)					8	5	10	

Table 11: Efficacy of sulfentrazone for weed control in flax. Scott. 2006.

Scott

Flax Data

Crop or Weed Rating Date Rating Data Type Rating Unit					Flax 7/25/2006 Plant counts #/m ²	Flax 8/28/2006 Yield kg/ha	Flax 6/14/2006 Injury %	Flax 6/28/2006 Injury %	Flax 7/21/2006 Injury %
Trt No.	Treatment Name	Form Conc	Form Type	Rate Unit	Growth Stage				
1	Untreated					266 a	990 a	0 c	0 c
2	Buctril-M	560 EC	560 G A/H/A	3-4 L		327 a	1010 a	20 bc	12 c
3	Sulfentrazone	400 SC	35 G A/H/A	3 DAS		296 a	1060 a	0 c	0 c
4	Sulfentrazone	400 SC	70 G A/H/A	3 DAS		265 ab	1030 a	5 c	0 c
5	Sulfentrazone	400 SC	140 G A/H/A	3 DAS		198 b	1020 a	13 c	2 c
6	Sulfentrazone	400 SC	280 G A/H/A	3 DAS		76 c	1000 a	42 ab	34 b
7	Sulfentrazone	400 SC	560 G A/H/A	3 DAS		42 c	830 b	64 a	18 b
LSD (P=.05)					82	136	23	16	17
CV					26	9	76	67	105

Weed Counts / Biomass

Crop or Weed Rating Date Rating Data Type Rating Unit					Kochia 7/25/2006 Plant counts #/m ²	Shepherd's purse 7/25/2006 Plant counts #/m ²	Lambsquarters 7/25/2006 Plant counts #/m ²	Redroot pigweed 7/25/2006 Plant counts #/m ²	Broadleaf weeds 7/25/2006 Fresh Weight grams/m ²
Trt No.	Treatment Name	Form Conc	Form Type	Rate Unit	Growth Stage				
1	Untreated					318 a	10 a	60 a	87 a
2	Buctril-M	560 EC	560 G A/H/A	3-4 L		15 c	2 a	5 b	0 b
3	Sulfentrazone	400 SC	35 G A/H/A	3 DAS		104 b	16 a	3 b	0 b
4	Sulfentrazone	400 SC	70 G A/H/A	3 DAS		48 c	29 a	0 b	1 b
5	Sulfentrazone	400 SC	140 G A/H/A	3 DAS		9 c	3 a	0 b	0 b
6	Sulfentrazone	400 SC	280 G A/H/A	3 DAS		1 c	0 a	0 b	0 b
7	Sulfentrazone	400 SC	560 G A/H/A	3 DAS		0 c	0 a	0 b	0 c
LSD (P=.05)					54	32	26	22	116
CV					52	253	181	122	81

Weed Control Rating Data

Crop or Weed Rating Date Rating Data Type Rating Unit					Canola 6/14/2006 Visual Control %	Canola 6/28/2006 Visual Control %	Redroot pigweed 6/14/2006 Visual Control %	Redroot pigweed 6/28/2006 Visual Control %	Redroot pigweed 7/24/2006 Visual Control %	Lambs quarters 7/24/2006 Visual Control %	Wild buckwheat 7/24/2006 Visual Control %
Trt No.	Treatment Name	Form Conc	Form Type	Rate Unit	Growth Stage						
1	Untreated					0 b	0 d	0 c	0 c	0 c	0 c
2	Buctril-M	560 EC	560 G A/H/A	3-4 L		100 a	100 a	100 a	65 b	65 b	35 b
3	Sulfentrazone	400 SC	35 G A/H/A	3 DAS		23 b	28 c	92 b	73 b	73 b	75 a
4	Sulfentrazone	400 SC	70 G A/H/A	3 DAS		72 a	76 b	100 a	93 a	93 a	100 a
5	Sulfentrazone	400 SC	140 G A/H/A	3 DAS		94 a	95 ab	100 a	99 a	98 a	100 a
6	Sulfentrazone	400 SC	280 G A/H/A	3 DAS		100 a	100 a	100 a	100 a	100 a	100 a
7	Sulfentrazone	400 SC	560 G A/H/A	3 DAS		100 a	100 a	100 a	100 a	100 a	100 a
LSD (P=.05)					31	21	5	7	18	18	26

Crop or Weed Rating Date Rating Data Type Rating Unit					Kochia 6/14/2006 Visual Control %	Kochia 6/28/2006 Visual Control %	Kochia 7/24/2006 Visual Control %	Shepherd's purse 6/14/2006 Visual Control %	Shepherd's purse 6/28/2006 Visual Control %	Shepherd's purse 7/24/2006 Visual Control %
Trt No.	Treatment Name	Form Conc	Form Type	Rate Unit	Growth Stage					
1	Untreated					0 d	0 d	0 c	0 d	0 c
2	Buctril-M	560 EC	560 G A/H/A	3-4 L		97 a	94 a	72 bc	97 a	95 ab
3	Sulfentrazone	400 SC	35 G A/H/A	3 DAS		45 c	43 c	48 c	47 c	47 b
4	Sulfentrazone	400 SC	70 G A/H/A	3 DAS		76 b	73 b	69 c	67 b	70 bc
5	Sulfentrazone	400 SC	140 G A/H/A	3 DAS		96 a	96 a	94 ab	85 ab	85 ab
6	Sulfentrazone	400 SC	280 G A/H/A	3 DAS		99 a	100 a	100 a	98 ab	98 ab
7	Sulfentrazone	400 SC	560 G A/H/A	3 DAS		100 a	100 a	100 a	100 a	100 a
LSD (P=.05)					12	16	24	28	29	35

Means followed by same letter do not significantly differ (P=.05, LSD)

Table 12: Efficacy of sulfentrazone for weed control in flax. Goodale Farm. 2006.

Goodale Farm

Tolerance study (some weeds were present that allowed for rating)

Crop or Weed Rating Date Rating Data Type Rating Unit					Wild buckwheat 6/5/2006 Visual Control %	Wild buckwheat 6/19/2006 Visual Control %	Russian thistle 6/5/2006 Visual Control %	Russian thistle 6/19/2006 Visual Control %
Trt No. Name	Form Conc	Form Type	Rate Unit	Growth Stage				
1 Untreated					0 c	0 c	50 ab	0 b
2 Butril-M	560 EC	560 G A/H/A	3-4 L		0 c	84 a	25 b	85 a
3 Sulfentrazone	400 SC	35 G A/H/A	3 DAS		0 c	0 c	50 ab	58 a
4 Sulfentrazone	400 SC	70 G A/H/A	3 DAS		10 c	10 c	75 ab	80 a
5 Sulfentrazone	400 SC	140 G A/H/A	3 DAS		48 b	48 b	100 a	90 a
6 Sulfentrazone	400 SC	280 G A/H/A	3 DAS		79 a	83 a	100 a	100 a
7 Sulfentrazone	400 SC	560 G A/H/A	3 DAS		89 a	98 a	100 a	100 a
LSD (P=.05)					22	18	63	46

Means followed by same letter do not significantly differ (P=.05, LSD)

Weed control Study

Flax Data

Crop or Weed Rating Date Rating Data Type Rating Unit					Flax 6/2/2006 Plant counts #/m ²	Flax 10/5/2006 Yield kg/ha	Flax 6/5/2006 Injury %	Flax 6/19/2006 Injury %	Flax 6/29/2006 Injury %
Trt No. Name	Form Conc	Form Type	Rate Unit	Growth Stage					
1 Untreated					433 a	1489 b	0 a	0 b	0 b
2 Butril-M	560 EC	560 G A/H/A	3-4 L		437 a	1751 a	0 a	8 a	13 a
3 Sulfentrazone	400 SC	35 G A/H/A	3 DAS		442 a	1533 b	0 a	0 b	0 b
4 Sulfentrazone	400 SC	70 G A/H/A	3 DAS		419 a	1531 b	0 a	0 b	0 b
5 Sulfentrazone	400 SC	140 G A/H/A	3 DAS		451 a	1570 ab	0 a	0 b	0 b
6 Sulfentrazone	400 SC	280 G A/H/A	3 DAS		414 a	1769 a	0 a	0 b	0 b
7 Sulfentrazone	400 SC	560 G A/H/A	3 DAS		395 a	1570 ab	0 a	0 b	0 b
LSD (P=.05)					90	208	0	2.1	3.4
CV					14	9			

Weed Counts / Biomass

Crop or Weed Rating Date Rating Data Type Rating Unit					Wild buckwheat 6/29/2006 Plant counts #/m ²	Wild buckwheat 6/29/2006 Fresh Weight grams/m ²	Redroot pigweed 6/29/2006 Plant counts #/m ²	Redroot pigweed 6/29/2006 Fresh Weight grams/m ²	Canola 6/29/2006 Plant counts #/m ²	Canola 6/29/2006 Fresh Weight grams/m ²
Trt No. Name	Form Conc	Form Type	Rate Unit	Growth Stage						
1 Untreated					10 a	19.3 a	3 a	23.1 a	8 a	185.6 a
2 Butril-M	560 EC	560 G A/H/A	3-4 L		7 ab	6.9 c	2 ab	10.8 a	0 b	0.1 b
3 Sulfentrazone	400 SC	35 G A/H/A	3 DAS		6 b	8.2 bc	3 ab	14.6 a	12 a	193.7 a
4 Sulfentrazone	400 SC	70 G A/H/A	3 DAS		5 b	15.8 ab	2 ab	23.6 a	12 a	279.3 a
5 Sulfentrazone	400 SC	140 G A/H/A	3 DAS		4 bc	5.1 c	1 ab	13.8 a	9 a	271.6 a
6 Sulfentrazone	400 SC	280 G A/H/A	3 DAS		1 cd	0.7 c	0 b	1.6 a	10 a	245.2 a
7 Sulfentrazone	400 SC	560 G A/H/A	3 DAS		1 d	1.3 c	0 b	0.6 a	8 a	210.4 a
LSD (P=.05)					4	9	2.5	23	6	97
CV					26	30	96	125	46	23

Crop or Weed

Crop or Weed Rating Date Rating Data Type Rating Unit					Green Foxtail 6/29/2006 Plant counts #/m ²	Green Foxtail 6/29/2006 Fresh Weight grams/m ²
Trt No. Name	Form Conc	Form Type	Rate Unit	Growth Stage		
1 Untreated					7 ab	7.2 ab
2 Butril-M	560 EC	560 G A/H/A	3-4 L		10 a	9.5 a
3 Sulfentrazone	400 SC	35 G A/H/A	3 DAS		7 ab	6.8 ab
4 Sulfentrazone	400 SC	70 G A/H/A	3 DAS		10 a	12.6 a
5 Sulfentrazone	400 SC	140 G A/H/A	3 DAS		8 ab	6.5 ab
6 Sulfentrazone	400 SC	280 G A/H/A	3 DAS		8 ab	6.4 ab
7 Sulfentrazone	400 SC	560 G A/H/A	3 DAS		4 b	1.4 b
LSD (P=.05)					6	7
CV					53	64

Weed Control Rating Data

Crop or Weed Rating Date Rating Data Type Rating Unit					Wild buckwheat 6/19/2006 Visual Control %	Wild buckwheat 6/29/2006 Visual Control %	Redroot pigweed 6/7/2006 Visual Control %	Redroot pigweed 6/19/2006 Visual Control %	Redroot pigweed 6/29/2006 Visual Control %
Trt No. Name	Form Conc	Form Type	Rate Unit	Growth Stage					
1 Untreated					0 d	0 c	0 d	0 c	0 c
2 Butril-M	560 EC	560 G A/H/A	3-4 L		75 bc	86 a	0 d	85 ab	88 b
3 Sulfentrazone	400 SC	35 G A/H/A	3 DAS		10 d	0 c	0 d	5 c	0 c
4 Sulfentrazone	400 SC	70 G A/H/A	3 DAS		5 d	5 c	30 c	0 c	5 c
5 Sulfentrazone	400 SC	140 G A/H/A	3 DAS		58 c	49 b	74 b	64 b	89 b
6 Sulfentrazone	400 SC	280 G A/H/A	3 DAS		90 ab	85 a	100 a	93 a	96 ab
7 Sulfentrazone	400 SC	560 G A/H/A	3 DAS		100 a	96 a	98 ab	100 a	100 a
LSD (P=.05)					18.9	20.6	23.6	23.4	8.8

Crop or Weed Rating Date Rating Data Type Rating Unit					Canola 6/19/2006 Visual Control %	Canola 6/19/2006 Visual Control %	Canola 6/29/2006 Visual Control %	Green Foxtail 6/19/2006 Visual Control %	Green Foxtail 6/19/2006 Visual Control %	Green Foxtail 6/29/2006 Visual Control %
Trt No. Name	Form Conc	Form Type	Rate Unit	Growth Stage						
1 Untreated					0 c	0 c	0 d	0 c	0 d	0 d
2 Butril-M	560 EC	560 G A/H/A	3-4 L		0 c	83 a	100 a	0 c	20 c	0 d
3 Sulfentrazone	400 SC	35 G A/H/A	3 DAS		0 c	0 c	0 d	0 c	0 d	0 d
4 Sulfentrazone	400 SC	70 G A/H/A	3 DAS		0 c	0 c	0 d	0 c	0 d	0 d
5 Sulfentrazone	400 SC	140 G A/H/A	3 DAS		28 b	0 c	5 d	40 b	30 c	55 c
6 Sulfentrazone	400 SC	280 G A/H/A	3 DAS		69 a	5 c	28 c	74 a	48 b	70 b
7 Sulfentrazone	400 SC	560 G A/H/A	3 DAS		85 a	20 b	61 b	84 a	70 a	86 n
LSD (P=.05)					23.3	14.2	15.7	16.3	11.7	14.9

Means followed by same letter do not significantly differ (P=.05, LSD)

Table 13: Efficacy of sulfentrazone for weed control in flax. Kernen Farm. 2006.

Kernen Farm Saskatoon
Flax Data

Crop or Weed		Flax	Flax	Flax	Flax
Rating Date		6/2/2006	10/6/2006	6/6/2006	6/16/2006
Rating Data Type		Plant counts	Yield	Injury	Injury
Rating Unit		#/m2	kg/ha	%	%
Trt	Treatment	Form	Form	Rate	Growth
No.	Name	Conc	Type	Rate	Unit
1	Untreated				Stage
2	Buctril-M	560	EC	560	G A/H/A
3	Sulfentrazone	400	SC	35	G A/H/A
4	Sulfentrazone	400	SC	70	G A/H/A
5	Sulfentrazone	400	SC	140	G A/H/A
6	Sulfentrazone	400	SC	280	G A/H/A
7	Sulfentrazone	400	SC	560	G A/H/A
LSD (P=.05)				42	226
CV				12	10
					2.7
					11.7
					4.4

Weed Counts / Biomass

Crop or Weed		Wild buckwheat	Wild buckwheat	Redroot pigweed	Redroot pigweed	Wild Mustard	Wild Mustard
Rating Date		7/28/2006	Fresh Weight	7/28/2006	Fresh Weight	7/28/2006	Fresh Weight
Rating Data Type		Plant counts	grams/m2	Plant counts	grams/m2	Plant counts	grams/m2
Rating Unit		#/m2		#/m2		#/m2	
Trt	Treatment	Form	Form	Rate	Growth		
No.	Name	Conc	Type	Rate	Unit		
1	Untreated				Stage		
2	Buctril-M	560	EC	560	G A/H/A	6 a	22.7 a
3	Sulfentrazone	400	SC	35	G A/H/A	1 bc	4.1 bc
4	Sulfentrazone	400	SC	70	G A/H/A	4 ab	10.9 b
5	Sulfentrazone	400	SC	140	G A/H/A	3 bc	5 bc
6	Sulfentrazone	400	SC	280	G A/H/A	3 b	1 b
7	Sulfentrazone	400	SC	560	G A/H/A	0 c	0.4 c
LSD (P=.05)				0 c	0 c	0 b	0 b
CV				74	83	106	112
					2.7	3.77	1
						112	111
						56	203

Weed Control Rating Data

Crop or Weed		Wild buckwheat	Wild buckwheat	Wild buckwheat	Redroot pigweed	Redroot pigweed	
Rating Date		6/6/2006	6/16/2006	7/6/2006	6/16/2006	7/6/2006	
Rating Data Type		Visual Control	Visual Control	Visual Control	Visual Control	Visual Control	
Rating Unit		%	%	%	%	%	
Trt	Treatment	Form	Form	Rate	Growth		
No.	Name	Conc	Type	Rate	Unit		
1	Untreated				Stage		
2	Buctril-M	560	EC	560	G A/H/A	0 c	0 c
3	Sulfentrazone	400	SC	35	G A/H/A	0 c	0 c
4	Sulfentrazone	400	SC	70	G A/H/A	51 b	45 b
5	Sulfentrazone	400	SC	140	G A/H/A	80 a	70 ab
6	Sulfentrazone	400	SC	280	G A/H/A	100 a	94 a
7	Sulfentrazone	400	SC	560	G A/H/A	100 a	87 a
LSD (P=.05)				100 a	100 a	100 a	100 a
CV				27	32	23	13
						20	
Crop or Weed		Wild Mustard	Russian thistle				
Rating Date		7/6/2006	6/16/2006	Visual Control	Visual Control		
Rating Data Type				%	%		
Rating Unit							
Trt	Treatment	Form	Form	Rate	Growth		
No.	Name	Conc	Type	Rate	Unit		

Crop or Weed		Wild Mustard	Russian thistle				
Rating Date		7/6/2006	6/16/2006				
Rating Data Type		Visual Control	Visual Control				
Rating Unit		%	%				
Trt	Treatment	Form	Form	Rate	Growth		
No.	Name	Conc	Type	Rate	Unit		
1	Untreated				Stage		
2	Buctril-M	560	EC	560	G A/H/A	0 c	0 b
3	Sulfentrazone	400	SC	35	G A/H/A	100 a	0 b
4	Sulfentrazone	400	SC	70	G A/H/A	10 c	95 a
5	Sulfentrazone	400	SC	140	G A/H/A	5 c	100 a
6	Sulfentrazone	400	SC	280	G A/H/A	73 b	100 a
7	Sulfentrazone	400	SC	560	G A/H/A	83 ab	100 a
LSD (P=.05)				100 a	100 a	100 a	100 a
CV				19	6		

Table 14: Efficacy of sulfentrazone for weed control in flax. Melfort. 2006.

Melfort
Flax Data

Crop or Weed Rating Date Rating Data Type Rating Unit					Flax 9/13/2006 Yield kg/ha	Flax 6/5/2006 Injury %	Flax 6/27/2006 Injury %	Flax 7/18/2006 Injury %
Trt No.	Treatment Name	Form Conc	Form Type	Rate Unit	Growth Stage			
1	Untreated				2147 c	0 c	0 d	0 c
2	Buctril-M	560	EC	560 G A/HA	3-4 L	2434 a	0 c	20 b
3	Sulfentrazone	400	SC	35 G A/HA	3 DAS	2140 c	0 c	3 cd
4	Sulfentrazone	400	SC	70 G A/HA	3 DAS	2292 b	0 c	3 cd
5	Sulfentrazone	400	SC	140 G A/HA	3 DAS	2366 ab	5 c	3 cd
6	Sulfentrazone	400	SC	280 G A/HA	3 DAS	2357 ab	20 b	11 bc
7	Sulfentrazone	400	SC	560 G A/HA	3 DAS	2358 ab	45 a	43 a
LSD (P=.05)					130	13	9	6
CV					4			

Weed Counts / Biomass

Crop or Weed Rating Date Rating Data Type Rating Unit					Wild buckwheat 8/25/2006 Plant counts #/m2	Wild buckwheat 8/25/2006 Fresh Weight grams/m2	Redroot pigweed 8/25/2006 Plant counts #/m2	Redroot pigweed 8/25/2006 Fresh Weight grams/m2
Trt No.	Treatment Name	Form Conc	Form Type	Rate Unit	Growth Stage			
1	Untreated				11 a	21 a	218 a	175 ab
2	Buctril-M	560	EC	560 G A/HA	3-4 L	0 c	0 a	10 b
3	Sulfentrazone	400	SC	35 G A/HA	3 DAS	10 ab	20 a	221 a
4	Sulfentrazone	400	SC	70 G A/HA	3 DAS	8 abc	9 a	96 ab
5	Sulfentrazone	400	SC	140 G A/HA	3 DAS	5 abc	7 a	99 ab
6	Sulfentrazone	400	SC	280 G A/HA	3 DAS	1 bc	1 a	81 ab
7	Sulfentrazone	400	SC	560 G A/HA	3 DAS	1 abc	1 a	32 b
LSD (P=.05)					9	23	149	215
CV					134	185	93	89

Weed Control Rating Data

Crop or Weed Rating Date Rating Data Type Rating Unit					Redroot pigweed 6/5/2006 Visual Control %	Redroot Pigweed 6/27/2006 Visual Control %	Redroot Pigweed 7/18/2006 Visual Control %	
Trt No.	Treatment Name	Form Conc	Form Type	Rate Unit	Growth Stage			
1	Untreated				0 d	0 d	0 d	
2	Buctril-M	560	EC	560 G A/HA	3-4 L	0 d	98 a	90 a
3	Sulfentrazone	400	SC	35 G A/HA	3 DAS	43 bcd	0 d	13 cd
4	Sulfentrazone	400	SC	70 G A/HA	3 DAS	13 cd	33 c	45 bc
5	Sulfentrazone	400	SC	140 G A/HA	3 DAS	48 abc	25 cd	33 cd
6	Sulfentrazone	400	SC	280 G A/HA	3 DAS	90 a	25 cd	30 cd
7	Sulfentrazone	400	SC	560 G A/HA	3 DAS	80 ab	65 b	68 ab
LSD (P=.05)					46	25	35	

Table 15: Efficacy of sulfentrazone for weed control in flax. Indian Head. 2006.

**Indian Head
Flax Data**

Crop or Weed Rating Date Rating Data Type Rating Unit					Flax Yield kg/ha	Flax 6/14/2006 Injury %	Flax 7/7/2006 Injury %	Flax 7/27/2006 Injury %
Trt No.	Treatment Name	Form Conc	Form Type	Rate Unit	Growth Stage			
1	Untreated				1078 a	0 b	0 c	0 b
2	Buctril-M	560 EC	560 G A/H/A	3-4 L	1087 a	0 b	11 b	14 a
3	Sulfentrazone	400 SC	35 G A/H/A	3 DAS	1116 a	0 b	0 c	0 b
4	Sulfentrazone	400 SC	70 G A/H/A	3 DAS	1026 a	0 b	0 c	0 b
5	Sulfentrazone	400 SC	140 G A/H/A	3 DAS	1083 a	0 b	0 c	0 b
6	Sulfentrazone	400 SC	280 G A/H/A	3 DAS	1142 a	0 b	5 bc	0 b
7	Sulfentrazone	400 SC	560 G A/H/A	3 DAS	1139 a	3 a	25 a	0 b
LSD (P=.05)					199	2	8	3
CV					12			

Weed Counts / Biomass

Crop or Weed Rating Date Rating Data Type Rating Unit					Wild buckwheat 8/25/2006 Plant counts #/m2	Redroot pigweed 8/25/2006 Plant counts #/m2	Broadleaf weeds 8/24/2006 Dry Weight grams/m2	
Trt No.	Treatment Name	Form Conc	Form Type	Rate Unit	Growth Stage			
1	Untreated				1.8 a	11.5 a	17 a	
2	Buctril-M	560 EC	560 G A/H/A	3-4 L	0.5 ab	0.1 c	2 b	
3	Sulfentrazone	400 SC	35 G A/H/A	3 DAS	1.1 ab	3.4 b	8 ab	
4	Sulfentrazone	400 SC	70 G A/H/A	3 DAS	0.1 b	0 c	0 b	
5	Sulfentrazone	400 SC	140 G A/H/A	3 DAS	0 b	0 c	0 b	
6	Sulfentrazone	400 SC	280 G A/H/A	3 DAS	0 b	0 c	0 b	
7	Sulfentrazone	400 SC	560 G A/H/A	3 DAS	0 b	0 c	0 b	
LSD (P=.05)					1	2	9	
CV					179	66	162	

Weed Control Rating Data

Crop or Weed Rating Date Rating Data Type Rating Unit					Wild buckwheat 6/26/2006 Visual Control %	Wild buckwheat 7/7/2006 Visual Control %	Wild buckwheat 7/27/2006 Visual Control %	Redroot Pigweed 6/26/2006 Visual Control %	Redroot Pigweed 7/7/2006 Visual Control %	Redroot Pigweed 7/27/2006 Visual Control %	
Trt No.	Treatment Name	Form Conc	Form Type	Rate Unit	Growth Stage						
1	Untreated				0 c	0 d	0 c	0 b	0 b	0 b	0 b
2	Buctril-M	560 EC	560 G A/H/A	3-4 L	81 b	74 c	64 b	85 a	98 a	99 a	
3	Sulfentrazone	400 SC	35 G A/H/A	3 DAS	1 c	1 d	1 c	13 b	5 b	10 b	
4	Sulfentrazone	400 SC	70 G A/H/A	3 DAS	88 ab	85 bc	89 a	87 a	88 a	93 a	
5	Sulfentrazone	400 SC	140 G A/H/A	3 DAS	100 a	99 ab	100 a	100 a	100 a	100 a	
6	Sulfentrazone	400 SC	280 G A/H/A	3 DAS	100 a	100 a	100 a	100 a	100 a	100 a	
7	Sulfentrazone	400 SC	560 G A/H/A	3 DAS	100 a	100 a	100 a	100 a	100 a	100 a	
LSD (P=.05)					16	14	12	19	15	14	
CV											

Table 16: Efficacy of sulfentrazone for weed control in flax. Brandon. 2006.

**Brandon
Flax Data**

Crop or Weed Rating Date Rating Data Type Rating Unit					Flax 6/27/2006 Plant counts #/m2	Flax 9/13/2006 Yield kg/ha	Flax 10 DAE Injury %	Flax 6/20/2006 Injury %	Flax 7/09/2006 Injury %
Trt No.	Treatment Name	Form Conc	Form Type	Rate Unit	Growth Stage				
1	Untreated				294 abc	732 b	0 b	0 a	0 a
2	Buctril-M	560 EC	560 G A/H/A	3-4 L	338 a	852 b	0 b	0 a	0 a
3	Sulfentrazone	400 SC	35 G A/H/A	3 DAS	324 ab	788 b	0 b	0 a	0 a
4	Sulfentrazone	400 SC	70 G A/H/A	3 DAS	271 c	833 b	2.6 b	0 a	0 a
5	Sulfentrazone	400 SC	140 G A/H/A	3 DAS	341 a	746 b	0 b	0 a	0 a
6	Sulfentrazone	400 SC	280 G A/H/A	3 DAS	337 a	950 ab	10 b	5 a	0 a
7	Sulfentrazone	400 SC	560 G A/H/A	3 DAS	277 bc	1175 a	37.5 a	24 a	8 a
LSD (P=.05)					50	262	11	9	8
CV					11	20			

Conclusions – Weed Control

To summarize weed control data, redroot pigweed was present in eleven site-years (five site-years with 210 g ai ha⁻¹ rate). Rates of 35, 70, 140, 210, 280, and 560 g ai ha⁻¹ provided greater than 80% control of redroot pigweed 9%, 45%, 64%, 80%, 91% and 91% of the time, respectively. Wild buckwheat was present in ten site-years (three site-years with 210 g ai ha⁻¹) and rates of 35, 70, 140, 210, 280, and 560 provided >80% control 0%, 20%, 60%, 100%, 100%, and 100% of the time, respectively. Kochia was present in 7 site-years (five site-years with 210 g ai ha⁻¹ rate) and rates of 35, 70, 140, 210, 280, and 560 g ai ha⁻¹ provided > 80% control 14%, 50%, 100%, 100%, 100%, and 100% of the time, respectively.

Conclusions

A very good dataset was generated from this study. In all cases where sulfentrazone provided efficacious weed control, flax was tolerant at the rates required for weed control. In soils such as those at Scott, Lethbridge, and the Goodale and Kernen Farms, a rate of 140 g ai ha⁻¹ should be adequate to control redroot pigweed, wild buckwheat, and kochia and provide a 2X rate margin of crop safety. Data generated from chickpea efficacy studies can be used to supplement the flax data and further refine rates. The high organic matter soils at Melfort are a concern since control of redroot pigweed was generally not satisfactory at any rate. Based on the Melfort results, further investigation in the Red River Valley of Manitoba is warranted to determine if sulfentrazone can provide efficacious weed control in flax on high organic matter, fine-textured soils.