

Project Title: Roundup Ready Alfalfa Trial

Project Leader: Bob Stougaard

Project Personnel: Qingwu Xue

Objective: To evaluate crop tolerance and weed control with Roundup in Roundup Ready alfalfa

Results:

This study was conducted to evaluate crop tolerance and weed control efficacy of Roundup in the Roundup Ready alfalfa system. Roundup Ready alfalfa (cv. DKA41-18RR) was planted on May 9, 2006 at a seeding rate of 14.2 lb/ac, in 7-inch rows, to a depth of 1 inch. High densities of pennycress, witchgrass, redroot pigweed, and common lambsquarters were present throughout the site. Herbicides were applied using a backpack sprayer with Teejet XR11002 nozzles in 20 GPA.

Roundup Ready alfalfa demonstrated excellent crop tolerance to Roundup, regardless of the rate or application timing. In contrast, Buctril plus Select resulted in significant crop injury one week after application.

Roundup WM provided excellent control of all weeds regardless of application rate and timing. Raptor also provided good weed control. However, Buctril plus Select provided unacceptable control of most weed present.

There were no differences in alfalfa dry weights between treatments at either harvest, except for treatments with Buctril and Select. In this instance, alfalfa dry weight was significantly lower due to poor redroot pigweed control. No weeds were found in plots treated with Roundup WM in either harvest.

Summary:

Roundup WM provided excellent weed control regardless of the rate applied or growth stage.

Table 1. Effect of Roundup WM on crop injury and chlorosis in Roundup ready alfalfa during 2006 season.

Trt No.	Treatment Name	Rate lb ai/ac	Appl	Crop injury (%)					Chlorosis (%)				
				6/12/06	6/19/06	6/28/06	7/5/06	7/11/06	6/12/06	6/19/06	6/28/06	7/5/06	7/11/06
1	Untreated			0	0	0	0	0	0	0	0	0	0
2	Roundup WM	0.75	A	1.3	0	1.3	0	0	1.3	0	1.3	0	0
		Roundup WM	0.75										
3	Roundup WM	1.50	A	3.8	0	0	1.3	0	2.5	0	0	0	0
		Roundup WM	1.50										
4	Roundup WM	0.75	C		0	0	1.3	0		0	0	0	0
5	Roundup WM	1.50	C		0	0	0	0		0	0	0	0
6	Buctril	0.25	C		20	5	6	4.3		10	1.3	0	0
		Select	0.094										
7	Raptor	0.0312	C		2.5	0	1.3	1.3		2.5	0	0	0
LSD (P=.05)				3.2	1.6	2.7	2.7	1.6	3.2	1.6	2.0	0	0
CV				111.8	34.0	202.7	129.4	136.8	149.1	61.1	384.4	0	0
Treatment F				4.2	187.0	4.3	5.6	8.8	1.8	47.0	0.8	0	0
Treatment Prob(F)				0.0723	0.0001	0.0075	0.002	0.0001	0.2441	0.0001	0.5897	1	1

Roundup WM: Roundup WeatherMax; A: 1-2 trifoliolate; B: three weeks after 1-2 trifoliolate application; C: 3-4 trifoliolate.

Table 2. Effect of Roundup WM on crop stunting and penny cress control in Roundup ready alfalfa during 2006 season.

Trt No.	Treatment Name	Rate lb ai/ac	Appl Code	Stunting (%)					Penny cress control (%)				
				6/12/06	6/19/06	6/28/06	7/5/06	7/11/06	6/12/06	6/19/06	6/28/06	7/5/06	7/11/06
1	Untreated			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	Roundup WM	0.75	A	0.0	0.0	0.0	0.0	0.0	100.0	100.0	100.0	100.0	100.0
	Roundup WM	0.75	B										
3	Roundup WM	1.50	A	1.3	0.0	0.0	1.3	0.0	100.0	100.0	100.0	100.0	100.0
	Roundup WM	1.50	B										
4	Roundup WM	0.75	C		0.0	0.0	1.3	0.0		92.5	100.0	95.0	100.0
5	Roundup WM	1.50	C		0.0	0.0	0.0	0.0		93.8	100.0	100.0	100.0
6	Buctril	0.25	C		10.0	3.8	5.5	4.3		85.0	50.0	50.0	58.8
	Select	0.094	C										
7	Raptor	0.0312	C		0.0	0.0	1.3	1.3		50.0	62.5	92.5	100.0
LSD (P=.05)				2.5	0	1.4	2.61	1.6	0	3.94	11.11	13.85	19.5
CV				346.41	0	176.38	132.8	136.77	0	3.56	10.22	12.14	16.45
Treatment F				1	0	9	4.918	8.835	0	781.39	105.85	67.58	34.244
Treatment Prob(F)				0.4219	1	0.0001	0.004	0.0001	1	0.0001	0.0001	1E-04	0.0001

Roundup WM: Roundup WeatherMax; A: 1-2 trifoliolate; B: three weeks after 1-2 trifoliolate application; C: 3-4 trifoliolate.

Table 3. Effect of Roundup WM on witchgraa, redroot pigweed and lambsquarters control in Roundup ready alfalfa during 2006 season.

Trt No.	Treatment Name	Rate lb ai/ac	Appl	Witchgrass control (%)					Redroot pigweed control (%)					Lambsquarters control (%)		
				6/12/06	6/19/06	6/28/06	7/5/06	7/11/06	6/12/06	6/19/06	6/28/06	7/5/06	7/11/06	6/28/06	7/5/06	7/11/06
1	Untreated			0	0	0	0	0	0	0	0	0	0	0	0	0
2	Roundup WM	0.75	A	100	100	100	100	100	100	100	100	100	100	100	100	100
	Roundup WM	0.75	B													
3	Roundup WM	1.50	A	100	100	100	100	100	100	100	100	100	100	100	100	100
	Roundup WM	1.50	B													
4	Roundup WM	0.75	C		93.8	100	97.5	100		93.8	100	100	100	100	95	100
5	Roundup WM	1.50	C		95	100	100	100		95	100	100	100	100	100	100
6	Buctril	0.25	C		83.8	85	87.5	77.5		73.8	8.8	7.5	0	75	77.5	47.5
	Select	0.094	C													
7	Raptor	0.0312	C		42.5	86.3	95	98.8		70	72.5	100	100	82.5	95	100
LSD (P=.05)				0	7.11	8.94	5.21	11.83	0	21.46	19.78	2.81	0	19.79	14.04	23.1
CV				0	6.51	7.37	4.23	9.67	0	18.99	19.37	2.61	0	16.72	11.66	19.88
Treatment F				0	254.4	148.13	440.6	87.498	0	24.429	46.054	2476	0	30.181	60.093	26.025
Treatment Prob(F)				1	0.0001	0.0001	1E-04	0.0001	1	0.0001	0.0001	1E-04	1	0.0001	0.0001	0.0001

Roundup WM: Roundup WeatherMax; A: 1-2 trifoliolate; B: three weeks after 1-2 trifoliolate application; C: 3-4 trifoliolate.

Table 4. Effect of Roundup WM on alfalfa stands, dry weight and botanical ratio at two harvests during 2006 season.

Trt No.	Treatment Name	Rate lb ai/ac	Appl	First cut (7/28/06)					Second cut (9/25/06)				
				Stands	Dry weight (ton/ac)		Botanical ratio		Stands	Dry weight (ton/ac)		Botanical ratio	
				No./m ²	alfalfa	weeds	alfalfa	weeds	No./m ²	alfalfa	weeds	alfalfa	weeds
1	Untreated			248.9	1.38	0.61	0.73	0.27	250.7	0.76	0.02	0.98	0.03
2	Roundup WM	0.75	A	202.8	1.45	0.00	1.00	0.00	274.7	0.87	0.00	1.00	0.00
	Roundup WM	0.75	B										
3	Roundup WM	1.50	A	232.3	1.60	0.00	1.00	0.00	252.6	0.82	0.00	1.00	0.00
	Roundup WM	1.50	B										
4	Roundup WM	0.75	C	228.6	1.51	0.00	1.00	0.00	260.0	0.87	0.01	0.99	0.01
5	Roundup WM	1.50	C	226.8	1.44	0.00	1.00	0.00	230.4	0.81	0.00	1.00	0.00
6	Buctril	0.25	C	234.1	1.10	0.52	0.71	0.29	267.3	0.67	0.02	0.96	0.04
	Select	0.094	C										
7	Raptor	0.0312	C	225.0	1.38	0.01	0.99	0.01	248.9	0.82	0.00	1.00	0.00
LSD (P=.05)				48.91	0.268	0.494	0.21	0.21	29.9	0.133	0.026	0.035	0.035
CV				14.42	12.78	15.37	170.97	162.19	7.89	11.21	246.15	2.37	226.27
Treatment F				0.7	3.013	2.779	3.811	3.811	2.022	2.458	1.359	1.633	1.63
Treatment Prob(F)				0.6535	0.0322	0.0431	0.0126	0.0126	0.1154	0.0649	0.2832	0.1954	0.1962

Roundup WM: Roundup WeatherMax; A: 1-2 trifoliolate; B: three weeks after 1-2 trifoliolate application; C: 3-4 trifoliolate.

Table 5. Effect of Roundup WM on major quality parameters in Roundup ready alfalfa at first harvest during 2006 season.

Trt No.	Treatment Name	Rate lb ai/ac	Appl code	CP	ADF	NDF	ADL	IVTD	NDFD	TDN	RFV	RFQ	ASH	Milk/T lb/ton
				----- % -----										
1	Untreated			19.9	33.4	40.6	6.8	77.4	40.8	59.0	144.3	136.5	9.9	2683.8
2	Roundup WM	0.75	A	20.8	35.2	41.5	6.7	76.3	40.2	58.5	138.0	131.5	9.6	2637.5
	Roundup WM	0.75	B											
3	Roundup WM	1.50	A	21.1	34.3	40.3	6.3	77.3	41.0	59.2	144.0	138.5	10.0	2690.3
	Roundup WM	1.50	B											
4	Roundup WM	0.75	C	20.1	35.5	41.8	6.7	76.2	40.6	58.6	136.5	131.5	9.6	2645.5
5	Roundup WM	1.50	C	20.8	35.5	41.6	6.7	76.4	40.8	58.4	137.3	132.0	9.8	2636.3
6	Buctril	0.25	C	20.4	33.3	39.2	6.2	78.5	41.9	60.2	150.0	146.3	9.9	2775.0
	Select	0.094	C											
7	Raptor	0.0312	C	20.2	35.5	41.5	6.7	76.0	39.8	58.6	137.3	131.0	9.4	2640.3
LSD (P=.05)				1.85	2.22	2.50	0.73	2.42	2.44	1.54	12.58	14.59	0.90	126.59
CV				6.08	4.31	4.11	7.43	2.12	4.02	1.76	6.00	7.26	6.21	3.19
Treatment F				0.50	1.72	1.32	0.78	1.19	0.65	1.46	1.47	1.31	0.49	1.40
Treatment Prob(F)				0.80	0.17	0.30	0.60	0.36	0.69	0.25	0.24	0.30	0.80	0.27

Roundup WM: Roundup WeatherMax; A: 1-2 trifoliolate; B: three weeks after 1-2 trifoliolate application; C: 3-4 trifoliolate.

CP: Crude Protein; ADF: Acid Detergent Fiber; NDF: Neutral Detergent Fiber; ADL: Acid Detergent Lignin; IVTD: In-vitro True Digestibility; NDFD: NDF Digestibility; TDN: Total Digestible Nutrients; RFV: Relative Feed Value; RFQ: Relative Forage Quality; ASH: Ash; Milk/T: Pounds of Milk per ton of feed.