CONTROL OF ROUNDUP READY® CANOLA IN ROUNDUP READY SUGARBEET AT GLYNDON, MN - 2009

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'Dekalb IS3057' Roundup Ready canola at 11 pounds per acre was seeded in 7.5 inch rows perpendicular to herbicide plots. 'SES 36711' sugarbeet was seeded 1.25 inches deep in 22 inch rows May 27. Sugarbeet seed was treated with Tachigaren at 45 grams dry product per 100,000 seeds. Counter 15G insecticide at 12 pounds product per acre was applied modified in-furrow at planting. Herbicide treatments were applied June 23, June 29, July 2, and July 8. All treatments were applied in 17 gpa water at 40 psi through 8002 nozzles with a bicycle sprayer to the center four rows of six row plots 30 feet in length. Glyphosate (0.75 lb ae/A) plus AmStik (2.5 qt/A) was applied to the weed-free check as necessary. Glyphosate (1.0 lb ae/A) plus AmStik was applied on July 21 to all treatments except for the untreated treatment to control other weeds. All evaluations are a visual estimate of percent fresh weight reduction in the treated plot compared to the adjacent untreated strip. Sugarbeet from the center two rows of each plot was counted and harvested September 29. Experiment designed as a randomized complete block having four replications.

Table. Application information.

Application Code	**1**	**2**	**3**	**4**
Date of Application	June 23	June 29	July 2	July 8
Time of Day	9:00 am	1:15 pm	9:00 am	10:00 am
Air Temperature (^{o}F)	80	66	69	73
Relative Humidity (%)	87	60	74	51
Soil Temp. (^{o}F at 6")	61	64	62	70
Wind Velocity (mph)	2	4	1	7
Cloud Cover (%)	15	95	0	0
Soil Moisture	good	wet	good	good
Sugarbeet (stage – range)	Cot.-V2	V2.0-V4.1	V2.0-V5.2	V4.2-9.4
RR Canola (stage/height - range)	Cot.-2 lf/0.5-2" tall	2-4 lf/0.75-1.5" tall	-	-
RR Canola (avg. density)	11/row foot	11/row foot	-	-
Redroot Pigweed (stage/height - range)	Cot.-1lf/ 0.125-0.5" tall	Cot.-5 lf/ 0.125-1.5" tall	-	-
Redroot Pigweed (avg. density)	2/ft^2	11.2/ft^2	-	-
C.Lambsquarters (stage/height - range)	Cot.-2lf/ 0.125-0.5" tall	Cot.-7 lf/ 0.25-1.25" tall	-	-
C.Lambsquarters (avg. density)	0.5/ft^2	1/ft^2	-	-

Summary: Herbicide treatments containing De&Ph plus Etho and applied twice caused the greatest sugarbeet injury. No appreciable injury was observed after July 23.

Glyt-PM alone did not control Roundup Ready canola as expected. Tfsu at 0.008 and 0.31 lb ai/A plus De&Ph plus Etho applied once improved control of redroot pigweed and common lambsquarters compared to other single application treatments on July 19. Treatments containing De&Ph plus Etho rarely improved Roundup Ready canola control whether applied once or twice compared to treatments with Tfsu alone. Multiple herbicide applications improved Roundup Ready canola control compared to a single application. Tfsu applied at least at a total of 0.047 lb/A plus Glyt-PM to 2-leaf canola maximized control. Treatments applied to 2-leaf canola usually improved control compared to treatments applied to 3-leaf canola. Herbicide treatments more effectively controlled canola at this Glyndon, MN location compared to the Prosper, ND location due to smaller and herbicide-injured plants.

Roundup Ready canola at 11 plants per foot of row caused a near complete loss of sugarbeet plant population, root yield, and extractable sucrose in the untreated treatment. Sugarbeet root yield and extractable sucrose were similar whether Glyt-PM was applied alone or not at all, indicating the Roundup Ready canola caused nearly all of the yield loss compared to other weeds. Weed-free checks did not differ for root yield and extractable sucrose based upon time of removal. Tfsu applied alone multiple times beginning at the 2-leaf canola stage maximized root yield and extractable sucrose compared to starting at the 3-leaf stage, except for one treatment. Root yield and extractable sucrose was higher at this location than at the Prosper, ND location.

Table. Control of Roundup Ready® canola in Roundup Ready sugarbeet, Glyndon, MN, 2009. (Stachler and Luecke).

			July 19			
			Sgbt	RR-Cano	Rrpw	Colq
Treatment*	Rate	Timing	inju	cntl		
	(lb ae or ai/A)		%			
Weed-Free Check	-	1,3	0	100	100	100
Glyt-PM	0.75	1	0	3	23	23
Tfsu+Glyt-PM	0.008+0.75	1	2	50	45	25
Tfsu+Glyt-PM	0.016+0.75	1	0	63	40	32
Tfsu+Glyt-PM	0.031+0.75	1	6	76	42	35
Tfsu+De&Ph+Etho+Glyt-PM	0.008+0.22+0.11+0.75	1	6	59	56	48
Tfsu+De&Ph+Etho+Glyt-PM	0.016+0.22+0.11+0.75	1	6	66	42	38
Tfsu+De&Ph+Etho+Glyt-PM	0.031+0.22+0.11+0.75	1	8	69	54	45
Tfsu+Glyt-PM	0.008+0.75	1,3	3	77	93	83
Tfsu+Glyt-PM	0.016+0.75	1,3	2	86	97	90
Tfsu+Glyt-PM Tfsu+Glyt-PM	0.016+0.75 0.031+0.75	1 3	5	90	98	96
Tfsu+Glyt-PM Tfsu+Glyt-PM	0.031+0.75 0.016+0.75	1 3	7	94	98	96
Tfsu+Glyt-PM	0.031+0.75	1,3	8	83	97	96
Tfsu+De&Ph+Etho+Glyt-PM	0.016+0.22+0.11+0.75	1,3	15	70	93	95
Weed-Free Check	-	2,4	-	-	-	-
Glyt-PM	0.75	2	-	-	-	-
Tfsu+Glyt-PM	0.008+0.75	2	-	-	-	-
Tfsu+Glyt-PM	0.016+0.75	2	-	-	-	-
Tfsu+Glyt-PM	0.031+0.75	2	-	-	-	-
Tfsu+De&Ph+Etho+Glyt-PM	0.008+0.22+0.11+0.75	2	-	-	-	-
Tfsu+De&Ph+Etho+Glyt-PM	0.016+0.22+0.11+0.75	2	-	-	-	-
Tfsu+De&Ph+Etho+Glyt-PM	0.031+0.22+0.11+0.75	2	-	-	-	-
Tfsu+Glyt-PM	0.008+0.75	2,4	-	-	-	-
Tfsu+Glyt-PM	0.016+0.75	2,4	-	-	-	-
Tfsu+Glyt-PM Tfsu+Glyt-PM	0.016+0.75 0.031+0.75	2 4	-	-	-	-
Tfsu+Glyt-PM Tfsu+Glyt-PM	0.031+0.75 0.016+0.75	2 4	-	-	-	-
Tfsu+Glyt-PM	0.031+0.75	2,4	-	-	-	-
Tfsu+De&Ph+Etho+Glyt-PM	0.016+0.22+0.11+0.75	2,4	-	-	-	-
Untreated Check	0	-	0	0	0	0
CV (%)			82	17	21	17
LSD (0.05)			5.5	16	20	14.6

*Destiny HC (high surfactant oil [MSO] concentrate) at 1%v/v from Winfield Solutions and AmStik (AMS) at 2.5 qt/A from West Central was added to all treatments. Glyt-PM = Roundup PowerMAX from Monsanto; Tfsu = UpBeet from DuPont; De&Ph = Betamix from Bayer; Etho = Nortron from Bayer; Sgbt = sugarbeet; inju = injury; RR-Cano = RR canola; Rrpw = redroot pigweed; Colq = common lambsquarters; cntl – control; lb ae/A = pound acid equivalent per acre; lb ai/A = pound active ingredient per acre.

Table. Control of Roundup Ready® canola in Roundup Ready sugarbeet, Glyndon, MN, 2009. (Stachler and Luecke).

			July 23		Aug. 5	Sept. 28
			Sgbt	RR-Cano		
Treatment*	Rate	Timing	inju	cntl		
	(lb ae or ai/A)		%			
Weed-Free Check	-	1,3	0	100	100	100
Glyt-PM	0.75	1	0	0	0	0
Tfsu+Glyt-PM	0.008+0.75	1	2	39	20	12
Tfsu+Glyt-PM	0.016+0.75	1	2	59	30	40
Tfsu+Glyt-PM	0.031+0.75	1	5	70	49	54
Tfsu+De&Ph+Etho+Glyt-PM	0.008+0.22+0.11+0.75	1	4	48	26	19
Tfsu+De&Ph+Etho+Glyt-PM	0.016+0.22+0.11+0.75	1	7	60	36	40
Tfsu+De&Ph+Etho+Glyt-PM	0.031+0.22+0.11+0.75	1	7	62	45	44
Tfsu+Glyt-PM	0.008+0.75	1,3	2	65	55	73
Tfsu+Glyt-PM	0.016+0.75	1,3	2	85	84	90
Tfsu+Glyt-PM Tfsu+Glyt-PM	0.016+0.75 0.031+0.75	1 3	2	88	89	96
Tfsu+Glyt-PM Tfsu+Glyt-PM	0.031+0.75 0.016+0.75	1 3	3	92	93	94
Tfsu+Glyt-PM	0.031+0.75	1,3	5	94	94	92
Tfsu+De&Ph+Etho+Glyt-PM	0.016+0.22+0.11+0.75	1,3	11	84	80	87
Weed-Free Check	-	2,4	0	100	100	100
Glyt-PM	0.75	2	0	0	0	0
Tfsu+Glyt-PM	0.008+0.75	2	1	39	22	28
Tfsu+Glyt-PM	0.016+0.75	2	7	53	33	27
Tfsu+Glyt-PM	0.031+0.75	2	1	70	46	56
Tfsu+De&Ph+Etho+Glyt-PM	0.008+0.22+0.11+0.75	2	1	35	22	34
Tfsu+De&Ph+Etho+Glyt-PM	0.016+0.22+0.11+0.75	2	5	46	34	51
Tfsu+De&Ph+Etho+Glyt-PM	0.031+0.22+0.11+0.75	2	5	50	39	53
Tfsu+Glyt-PM	0.008+0.75	2,4	3	72	54	73
Tfsu+Glyt-PM	0.016+0.75	2,4	5	79	62	74
Tfsu+Glyt-PM Tfsu+Glyt-PM	0.016+0.75 0.031+0.75	2 4	7	80	63	68
Tfsu+Glyt-PM Tfsu+Glyt-PM	0.031+0.75 0.016+0.75	2 4	5	84	71	75
Tfsu+Glyt-PM	0.031+0.75	2,4	5	84	71	71
Tfsu+De&Ph+Etho+Glyt-PM	0.016+0.22+0.11+0.75	2,4	11	77	62	78
Untreated Check	0	-	0	0	0	0
CV (%)			76	7	11	16
LSD (0.05)			4	5.8	8	12.6

*Destiny HC (high surfactant oil [MSO] concentrate) at 1%v/v from Winfield Solutions and AmStik (AMS) at 2.5 qt/A from West Central was added to all treatments. Glyt-PM = Roundup PowerMAX from Monsanto; Tfsu = UpBeet from DuPont; De&Ph = Betamix from Bayer; Etho = Nortron from Bayer; Sgbt = sugarbeet; inju = injury; RR-Cano = RR canola; cntl – control; lb ae/A = pound acid equivalent per acre; lb ai/A = pound active ingredient per acre.

Table. Control of Roundup Ready® canola in Roundup Ready sugarbeet, Glyndon, MN, 2009. (Stachler and Luecke).

			Sept. 29			
Treatment*	Rate	Timing	Sgbt Popl.	Root Yield	Impur Index	Extr Sucr
	(lb ae or ai/A)		#/60'	ton/A	%	lb/A
Weed-Free Check	-	1,3	78	23.6	656	6413
Glyt-PM	0.75	1	31	2.6	1112	526
Tfsu+Glyt-PM	0.008+0.75	1	80	9.7	749	2418
Tfsu+Glyt-PM	0.016+0.75	1	76	17.6	741	4584
Tfsu+Glyt-PM	0.031+0.75	1	73	18.9	907	4392
Tfsu+De&Ph+Etho+Glyt-PM	0.008+0.22+0.11+0.75	1	83	12.7	654	3314
Tfsu+De&Ph+Etho+Glyt-PM	0.016+0.22+0.11+0.75	1	76	16.0	795	3911
Tfsu+De&Ph+Etho+Glyt-PM	0.031+0.22+0.11+0.75	1	72	18.2	764	4486
Tfsu+Glyt-PM	0.008+0.75	1,3	86	23.8	735	6055
Tfsu+Glyt-PM	0.016+0.75	1,3	92	23.9	678	6510
Tfsu+Glyt-PM Tfsu+Glyt-PM	0.016+0.75 0.031+0.75	1 3	87	23.8	750	6019
Tfsu+Glyt-PM Tfsu+Glyt-PM	0.031+0.75 0.016+0.75	1 3	88	25.9	730	6691
Tfsu+Glyt-PM	0.031+0.75	1,3	85	25.0	674	6654
Tfsu+De&Ph+Etho+Glyt-PM	0.016+0.22+0.11+0.75	1,3	90	22.1	601	6120
Weed-Free Check	-	2,4	85	24.0	694	6299
Glyt-PM	0.75	2	28	3.0	974	626
Tfsu+Glyt-PM	0.008+0.75	2	70	10.1	755	2527
Tfsu+Glyt-PM	0.016+0.75	2	68	11.4	678	2918
Tfsu+Glyt-PM	0.031+0.75	2	82	20.1	651	5481
Tfsu+De&Ph+Etho+Glyt-PM	0.008+0.22+0.11+0.75	2	76	10.9	796	2649
Tfsu+De&Ph+Etho+Glyt-PM	0.016+0.22+0.11+0.75	2	78	15.4	810	3709
Tfsu+De&Ph+Etho+Glyt-PM	0.031+0.22+0.11+0.75	2	86	17.4	664	4706
Tfsu+Glyt-PM	0.008+0.75	2,4	87	20.2	693	5302
Tfsu+Glyt-PM	0.016+0.75	2,4	86	21.7	791	5434
Tfsu+Glyt-PM Tfsu+Glyt-PM	0.016+0.75 0.031+0.75	2 4	85	19.7	638	5392
Tfsu+Glyt-PM Tfsu+Glyt-PM	0.031+0.75 0.016+0.75	2 4	92	23.2	648	6451
Tfsu+Glyt-PM	0.031+0.75	2,4	84	20.5	643	5678
Tfsu+De&Ph+Etho+Glyt-PM	0.016+0.22+0.11+0.75	2,4	87	22.1	604	6271
Untreated Check	0	-	26	1.3	1058	276
CV (%)			11	13	16	13
LSD (0.05)			12	3.2	166	825

*Destiny HC (high surfactant oil [MSO] concentrate) at 1%v/v from Winfield Solutions and AmStik (AMS) at 2.5 qt/A from West Central was added to all treatments. Glyt-PM = Roundup PowerMAX from Monsanto; Tfsu = UpBeet from DuPont; De&Ph = Betamix from Bayer; Etho = Nortron from Bayer; Sgbt = sugarbeet; lb ae/A = pound acid equivalent per acre; lb ai/A = pound active ingredient per acre; Popl = population; Impur index = Impurities index; Extr Sucr = extractable sucrose.