

Timing of Weed Removal in Roundup Ready Sugarbeets at Scottsbluff, NE during the 2008 Growing Season.

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A field study was initiated near Mitchell, Nebraska to determine the effects of different timings of weed removal on sugarbeet root yield. The experimental design was a randomized complete block with four replications. Plots were 11 feet wide by 45 feet long and were located on a sandy loam soil with a pH of 8 and organic matter content of 1%. Sugarbeet, 'BTS66RR50', were planted on April 22 and irrigated on April 25 to enhance sugarbeet seed germination and early season crop vigor. Weeds were killed at different sugarbeet growth stages and additional weeds were prevented from growing by applying Roundup PowerMax. Weed removal occurred at either the cotyledon, 2, 4, 6, 8, or 10 true-leaf growth stage. Roundup PowerMax plus AMS at 17 lbs/100 g of water, were applied with a tractor-mounted sprayer calibrated to deliver 20 gallons of water per acre at 36-psi pressure with Spraying Systems 11002 VS nozzles. Environmental conditions and weed growth stages at the time of initial herbicide application are given in Table 1.

Weed populations were severe and consisted of common lambsquarters, hairy nightshade, toothed spurge, redroot pigweed, and kochia at densities of 232, 86, 24, 5, and 15 plants per 247 sq ft, respectively. At later stages of weed removal weeds became larger and were more difficult to control with Roundup PowerMax. (Table 2). Increasing the initial rate of Roundup PowerMax from 0.75 to 1.125 lb/acre increased common lambsquarters control from 81 to 94% on common lambsquarters that were 28 inches tall at the time of application. The initial rate of Roundup PowerMax was even more important for trying to control toothed spurge. Roundup PowerMax applied at 0.75 lb/acre when toothed spurge was 2 inches tall provided 14% control while increasing the rate to 1.125 lb/acre improved toothed spurge control to 85%. Roundup PowerMax effectively controlled kochia, hairy nightshade, and common sunflower at both rates and all timings except the 10 true-leaf growth stage where hairy nightshade control declined with the lower rate of Roundup PowerMax.

There was a trend for sugarbeet root yield to decline when weed control was not initiated until the 8 true-leaf growth stage (Figure 1 and

Table 2). By the time sugarbeets reached the 10 true-leaf growth stage, common lambsquarters and toothed spurge were 28 and 10 inches in height, respectively. Waiting this long before initiating the sugarbeet weed control program reduced sugarbeet root yield approximately 20%.

Table 1. Environmental Conditions at the Time of Herbicide Application,

Date	Air temperature (F)	Humidity (%)	Wind speed & direction (mph)	Time of day	Crop growth stage	Weed heights (inches)				
						Colq	Hans	Tosp	Rrpw	Kocz
May 19	72	37	7 W	9:00 am	Cotyledon	0.5	0.5	0.5	0	0.5
May 30	62	49	9 NW	9:00 am	2 TL	2	1	1	0.5	2
June 9	64	31	4 W	10:00 am	4 TL	3	3	2	2	3
June 17	76	56	2 NW	11:00 am	6 TL	8	3	2	2	5
June 23	72	62	2 NE	9:00 am	8 TL	10	4	3	4	6
July 2	74	50	3 NW	10:00 am	10 TL	28	10	10	14	24
July 8	71	50	6 NE	9:00 am	12 TL	30	14	14	15	26

Rainfall before and after herbicide application:

Date	Amount - (inches) -	Date	Amount - (inches) -	Date	Amount - (inches) -
April 30	0.61	May 22	0.27	June 15	0.08
May 1	0.10	May 23	0.33	June 16	0.17
May 7	0.29	May 24	0.08	June 19	0.01
May 9	0.05	May 26	0.15	June 20	0.46
May 10	0.03	June 1	0.06	June 26	0.02
May 12	0.08	June 4	0.52	June 28	0.02
May 14	0.10	June 5	0.13		

Herbicide treatment ¹	Rate	Time of application ²	Sugarbeet						Percent weed control 7/16 ⁴					
			Visual injury ³		Stand	Root Yield								
			6/18	7/9	7/16	10/16	Sucrose	SLM	Colq	Kocz	Tosp	Hans	Cosf	Avg
(lb/acre)			---- (%) ----	(plants/acre)	(tons/acre)	(%)	(%)	----- (%) -----						
Roundup PowerMax + AMS	1.125	4 TL	0	0	26928	35.5	15.3	1.6	97	99	85	99	99	96
Roundup PowerMax + AMS	0.75	6 TL												
Roundup PowerMax + AMS	0.75	8 TL												
Roundup PowerMax + AMS	1.125	6 TL	0	0	21450	29.5	15.7	1.5	98	98	61	96	99	91
Roundup PowerMax + AMS	0.75	8 TL												
Roundup PowerMax + AMS	0.75	10 TL												
Roundup PowerMax + AMS	0.75	8 TL	0	0	21912	29.3	15.7	1.6	99	99	86	99	99	96
Roundup PowerMax + AMS	0.75	10 TL												
Roundup PowerMax + AMS	0.75	12 TL												
Roundup PowerMax + AMS	1.125	8 TL	0	0	19536	27.1	16.0	1.5	99	99	91	99	99	97
Roundup PowerMax + AMS	0.75	10 TL												
Roundup PowerMax + AMS	0.75	12 TL												
Roundup PowerMax + AMS	0.75	10 TL	0	0	18414	24.3	14.8	1.7	81	99	45	55	99	76
Roundup PowerMax + AMS	0.75	12 TL												
Roundup PowerMax + AMS	1.125	10 TL	0	0	16764	24.3	14.9	1.7	94	99	71	99	99	92
Roundup PowerMax + AMS	0.75	12 TL												
LSD (P=.05)	—	—	0	0	N/S	5.9	1	0	12	5	33	20	0	11

¹ Spray additives were combined with the spray solution at the following rate: ammonium sulfate (AMS) at 17lbs/100 gal.

² Time of application: cotyledon (Cot), 2 true-leaves (2 TL), 4 true-leaves (4 TL), 6 true-leaves (6 TL), 8 true-leaves (8 TL), 10 true-leaves (10 TL), and 12 true-leaves (12 TL).

³ Visual crop injury evaluated on a scale from 0 to 100 with 0 equal to no injury and 100 equal to death of the plant.

⁴ Percent weed control calculated from weed counts taken on July 16. Weed abbreviations: common lambsquarters (Colq), kochia (Kocz), toothed spurge (Tosp), hairy nightshade (Hans), and common sunflower (Cosf).

Figure 1. Effect of Different Timings of Weed Removal on Sugarbeet Root Yield at Mitchell, NE during the 2008 Growing Season.

