Timing of Weed Removal in Roundup-Ready Sugarbeets at Mitchell, Nebraska during the 2009 Growing Season.

Robert Wilson

A field study was initiated near Mitchell, Nebraska to determine the effect 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 25 feet long and were located on a silt loam soil with a pH of 7.8 and organic matter content of 1.1%. Sugarbeet 'BST66RR70' was planted on May 5. The plot area was irrigated on May 8 for seed germination. Weeds were killed at different sugarbeet growth stages and additional weeds were prevented from growing by applying a second application of Roundup Power Max. Weed removal occurred at either the two true-leaf (1 inch weeds), four true-leaf (2 inch weeds), six true-leaf (4 inch weeds) or eight true-leaf (6 inch weeds) growth stage. Roundup Power Max plus AMS at 2% w/w was applied with a tractor-mounted sprayer calibrated to deliver 20 gallons of water per acre at 32-psi pressure with Spraying Systems 11002 VS nozzles. Environmental conditions and weed growth stages at the time of herbicide application are given in Table 1.

Weed populations were moderate and consisted of common lambsquarters, redroot pigweed, hairy nightshade, kochia, and toothed spurge at densities of 75, 8, 81, 6, and 1 plant per 137 sq ft, respectively. Weed control was excellent when Roundup Power Max was applied at the four, six, and eight true-leaf growth stages (Table 2). Redroot pigweed and toothed spurge control was reduced when sugarbeets were treated at the two true-leaf stage. This was probably due to the emergence of weeds following the second application of Roundup Power Max which occurred on June 23. Sugarbeets suffered hail damage on June 10 which caused approximately 75% leaf damage. This interrupted herbicide applications until sugarbeets and weeds had recovered.

There was a trend for sugarbeet root yield to decline when weed control was not initiated until the eight true-leaf growth stage (Table 1 and Figure 1). At the eight true-leaf growth stage of sugarbeets the average weed height was 6 inches. Sugarbeet root yield was not influenced by the rate of Roundup Power Max applied since both the 0.75 and 1.12 lb/acre rates provided similar weed control.

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

Date	Air temperature	Humidity	Wind speed & direction	Time of day	Sugarbeet growth stage	Weed heights				
						Colq	Rrpw	Hans	Kochia	Tosp
	(F)	(%)	(mph)			(inches)				
May 27	64	50	1 SW	10:30 AM	2 TL	1.5	0.5	1.75	1	1
June 3	62	60	6 SE	1:30 PM	4 TL	3	1	2.5	2	2
June 23	70	65	1 SW	9:00 AM	6 TL	5	4	6	4	3
July 2	80	51	Calm	11:00 AM	8 TL	7	5	8	6	5
July 6	61	87	4 SE	10:00 AM	10 TL	20	20	11	20	7
July 14	68	59	6 W	9:00 AM	12 TL	25	26	18	23	14

Table 2. Effect of Time of Weed Removal with Roundup Power Max on the Root Yield of Roundup-Ready Sugarbeets at Mitchell, Nebraska during the 2009 Growing Season.

				Sugarbeet				
Herbicide treatment[1]	Rate		Time of application	Visual injury[2] 7/8	Stand	Root yield less tare	Sucrose	SLM
	(lb/acre)			(%)	(plants/acre)	(tons/acre)	(%)	
Nontreated	--		--	0	31010	16.2	14.4	1.61
Roundup Power Max	0.75	2 TL	1" weeds					
Roundup Power Max	0.75		2 wk later	0	36230	33.4	16.1	1.39
Roundup Power Max	0.75	4 TL	2" weeds					
Roundup Power Max	0.75		2 wk later	7	34700	36.2	16.6	1.32
Roundup Power Max	0.75	6 TL	4" weeds					
Roundup Power Max	0.75		2 wk later	0	35880	36.0	15.6	1.35
Roundup Power Max	0.75	8 TL	6" weeds					
Roundup Power Max	0.75		2 wk later	0	38730	32.7	15.8	1.47
Roundup Power Max	1.125	2 TL	1" weeds					
Roundup Power Max	1.125		2 wk later	4	32910	29.9	16.0	1.40
Roundup Power Max	1.125	4 TL	2" weeds					
Roundup Power Max	1.125		2 wk later	6	36120	35.0	15.4	1.35
Roundup Power Max	1.125	6 TL	4" weeds					
Roundup Power Max	1.125		2 wk later	5	32910	36.7	15.4	1.44
Roundup Power Max	1.125	8 TL	6" weeds					
Roundup Power Max	1.125		2 wk later	0	34930	32.1	15.7	1.48
LSD at 0.05	–		--	6	NS	7.8	NS	NS

[1]All Roundup Power Max treatments were combined with ammonium sulfate (AMS) at 2% w/w.

[2]Sugarbeet injury evaluated on a scale from 0 to 100 with 0 equal to no injury and 100 equal to death of the plant.

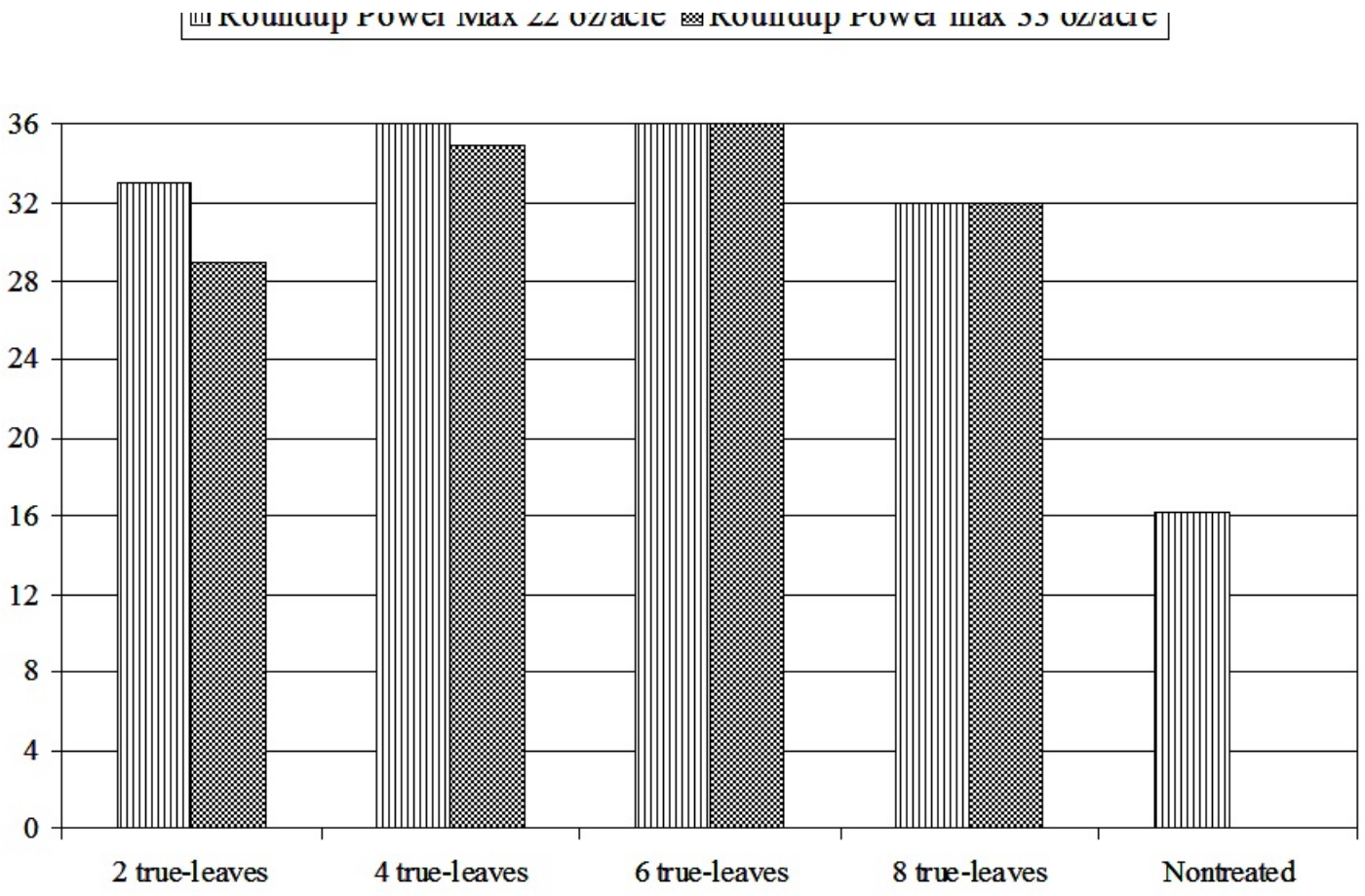
Table 2. Effect of Time of Weed Removal with Roundup Power Max on the Root Yield of Roundup-Ready Sugarbeets at Mitchell, Nebraska during the 2009 Growing Season – Continued.

Herbicide treatment[1]	Rate		Time of application	Percent weed control 7/21[3] Common lambsquarters	Redroot pigweed	Hairy nightshade	Kochia	Toothed spurge	Average
	(lb/acre)								
Nontreated	--		--	0	0	0	0	0	0
Roundup Power Max	0.75	2 TL	1" weeds						
Roundup Power Max	0.75		2 wk later	96	71	98	99	74	87
Roundup Power Max	0.75	4 TL	2" weeds						
Roundup Power Max	0.75		2 wk later	99	99	99	99	99	99
Roundup Power Max	0.75	6 TL	4" weeds						
Roundup Power Max	0.75		2 wk later	99	99	99	99	99	99
Roundup Power Max	0.75	8 TL	6" weeds						
Roundup Power Max	0.75		2 wk later	99	99	99	99	99	99
Roundup Power Max	1.125	2 TL	1" weeds						
Roundup Power Max	1.125		2 wk later	92	47	99	95	50	76
Roundup Power Max	1.125	4 TL	2" weeds						
Roundup Power Max	1.125		2 wk later	99	99	99	99	99	99
Roundup Power Max	1.125	6 TL	4" weeds						
Roundup Power Max	1.125		2 wk later	99	99	99	99	99	99
Roundup Power Max	1.125	8 TL	6" weeds						
Roundup Power Max	1.125		2 wk later	99	99	99	99	99	99
LSD at 0.05	–		--	3	29	1	4	38	14

[1]All Roundup Power Max treatments were combined with ammonium sulfate (AMS) at 2% w/w..

[3]Percent weed control calculated from weed counts taken on July 21.

Figure 1. Effect of Different Timings of Weed Removal on Sugarbeet Root Yield at Mitchell, NE during the 2009 Growing Season.



Sugarbeet growth stage at the time of Roundup Power Max application.