WEED CONTROL IN GLYPHOSATE RESISTANT SUGARBEET IN 2007

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Weeds have been named "worst production problem" for 18 of the past 20 years by respondents to the annual survey of sugarbeet producers in Minnesota and eastern North Dakota. In 2008, commercial production of glyphosate resistant sugarbeet will begin in North Dakota and Minnesota. The objective of this experiment was to evaluate sugarbeet injury and weed control from glyphosate used alone, glyphosate in combination with other herbicides, and registered sugarbeet-herbicide treatments.

Table 1 provides the seven locations at which this experiment was conducted, the planting dates, treatment dates, climatic conditions at treatment, and evaluation dates. 'Beta RZ02RR07' sugarbeet was seeded 1.25 inches deep in 22-inch rows. Counter 15G insecticide at 12 pounds product per acre was applied modified in-furrow at planting. Preemergence Nortron was applied to appropriate plots immediately after planting. Up to four postemergence treatments were made at 6 to 31 day intervals. Planned spray intervals were 7 days for conventional herbicide treatments and 14 days for glyphosate treatments but rain frequently caused delayed applications. All treatments were applied in 17 gpa water at 40 psi through 8002 nozzles to the center four rows of six-row by 30-foot long plots. Treatments were replicated four times. Roundup Original Max was the formulation of glyphosate in all treatments, and it was always applied at 1.0 lb ae/A or 28 fl oz product/A.

Sugarbeet injury from glyphosate alone or glyphosate plus a registered sugarbeet herbicide (Treatments 6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, and 19) was 1% or less when averaged across six locations (Table 2). Sugarbeet injury was not evaluated at Crookston due to non-uniform sugarbeet populations. Sugarbeet injury from glyphosate plus Resource (Treatment 14) was 74% averaged over locations. Resource is a herbicide from Valent that is labeled for use on field corn, soybean, and cotton. Sugarbeet injury from micro-rate, mid-rate, and conventional-rate treatments increased with herbicide rate. Sugarbeet injury from the conventional-rate treatment averaged 17%.

Kochia control at Cavalier increased with herbicide rate among the micro-rate, mid-rate, and conventional-rate treatments (Treatments 1, 2, and 3, respectively) with the micro-rate providing 62% control, the mid-rate 75% control, and the conventional-rate 90% control. The greatest kochia control from a conventional herbicide treatment (a treatment not containing glyphosate) was 95% from PRE Nortron followed by Progress applied four times (Treatment 5). Glyphosate applied two or more times either by itself or with another herbicide (Treatments 7, 12, 13, 14, 15, 16, 17, 18, and 19) gave 98% or 99% kochia control.

The greatest level of velvetleaf control at Milan was 96% (Table 2) from two applications of glyphosate plus UpBeet (Treatments 12 and 13). Velvetleaf continued to emerge throughout the spray season which resulted in lower velvetleaf control from most treatments than was expected. Glyphosate applied twice (Treatment 6) gave 92% velvetleaf control. Velvetleaf control from the conventional-rate (Treatment 3) was less than from the micro or mid-rate treatments (Treatments 1 and 2, respectively). Even though more herbicide was applied with the conventional-rate, an oil adjuvant was not included in the conventional-rate and it was not as effective at controlling velvetleaf as when an oil adjuvant was included with lower herbicide rates in the micro or mid-rate treatments. Preemergence Nortron followed by four applications of Progress (Treatment 5) provided only 47% velvetleaf control because neither Nortron nor Progress gives good velvetleaf control. UpBeet plus oil adjuvant is needed for good control of velvetleaf by treatments without glyphosate.

Pigweed spp. control was similar from PRE Nortron followed by two applications of glyphosate (Treatment 19) and two applications of glyphosate alone (Treatment 6) at all locations (Tables 3). At Milan however, rainfall during T4 began as the final two herbicide treatments were being applied and probably washed some glyphosate from the leaves of the weeds. Since PRE Nortron was applied, pigweed spp. control remained relatively high (Table 3). Nortron, however, does not provide good velvetleaf control. Therefore, rainfall probably explains why

velvetleaf control from PRE Nortron followed by two applications of glyphosate was somewhat lower, 88%, than from two applications of glyphosate alone, 92%, (Treatment 6) at Milan (Table 2).

Common lambsquarters and quinoa (*Chenopodium quinoa*) control was similar at all five locations among treatments of glyphosate applied two or four times alone (Treatments 6 and 7), glyphosate followed by glyphosate + another herbicide (Treatments 12, 13, 14, 15, 16, 17, 18, and 19), micro-rate (Treatment 1), mid-rate (Treatment 2), and conventional-rate (Treatment 3) treatments (Table 2). Common lambsquarters and quinoa control from these treatments was good, from 96% to 99% averaged across all five locations.

Redroot pigweed, 'Plainsman' amaranth, and common waterhemp control are combined under the heading of "pigweed spp." in Table 3. Micro-rate, mid-rate, and conventional-rate treatments (Treatments 1, 2, and 3 respectively) gave varying levels of control depending on location, but followed a trend of increased pigweed control from increased herbicide rate at each location. The micro-rate plus Nortron (Treatment 4) tended to increase pigweed control compared to the micro-rate alone (Treatment 1). Both two and four applications of glyphosate alone (Treatments 6 and 7, respectively) gave greater pigweed control than the micro-rate at five locations, greater than the mid-rate at four locations, and greater the conventional-rate at one location. Pigweed control from glyphosate treatments ranged from 96% to 99% while pigweed control from the micro-rate ranged from 57% to 97%. Glyphosate gave greater pigweed control on a more consistent basis than the micro, mid, or conventional-rate treatments.

Glyphosate was applied once at T1, T2, T3, or T4 (Treatments 8, 9, 10, and 11). Generally the greatest weed control was with the T4 timing, the second greatest at T3, then T2, and finally T1 (Tables 2 and 3). This was because weeds continued to emerge after the earlier glyphosate treatments. Glyphosate was able to control large weeds later in the season but sugarbeet vigor decreased with the T3 and T4 glyphosate application timings because the weeds became highly competitive with the sugarbeet prior to the T3 and T4 glyphosate applications. The T3 and T4 applications gave good weed control but the sugarbeet plants did not fully recover from the early season weed competition. These results indicate that an early glyphosate treatment to reduce early season weed competition plus a second, later, treatment to control later emerging weeds will generally be needed. A third treatment may be needed in some fields for weeds that emerge after the second glyphosate treatment, especially in fields with non-uniform or poor sugarbeet populations. Additional research is needed to establish the best timing of the first glyphosate treatment. However, the following timings generally will be early enough to avoid yield loss due to early season weed competition. For dense weed populations, make the first application when sugarbeet plants are in the cotyledon to 2-leaf stage. For moderate weed populations, start glyphosate applications when the sugarbeet plants have 2 leaves and for light or scattered weed infestations, make the first glyphosate application when the sugarbeet plants have 2 to 4 leaves.

Experiments at St. Thomas and Prosper were harvested and yield data has been included in Table 4. Sugarbeet at St. Thomas were treated with glyphosate broadcast at 1.6 lb ae/A or 44 fl oz/A of Roundup Original Max on July 2 to remove all weeds so that the effect of herbicide treatment could be evaluated without interference from weed competition. Sugarbeet at St. Thomas were treated with Headline at 9 fl oz/A July 31, and Eminent at 13 fl oz/A August 17 to control Cercospora leaf spot while sugarbeet at Prosper were only treated with Headline at 9 fl oz/A July 31. The center 2 rows of 6-row plots were harvested September 18 at St. Thomas and September 11 at Prosper. Conclusions should be made with the understanding that only one year of data is presented.

Table 1. Herbicide applications dates and climatic conditions in 2007[1].					
	Seed / PRE	T1	T2	T3	T4
MILAN, MN					
Date of Application	27-Apr	8-May	15-May	22-May	June 1*
Time of Day	1:00 PM	11:30 AM	12:15 PM	10:30 AM	1:30 PM
Air Temperature (^{o}F)	71	67	60	74	63
Relative Humidity (%)	32	46	29	47	60
Soil Temp. (^{o}F at 6")	54	57	63	66	62
Wind Velocity (mph)	13	4	13	20	5
Cloud Cover (%)	10	10	50	100	100
Soil Moisture	Good	Good	Good	Good	Good
Sugarbeet	preemerge	Cot	Cot-V1.5	V2.1-4.1	V4.8-5.8
Velvetleaf	---	Cot	Cot-2 lf	1-3 lf	2-4lf(1-4")
Tear-thumb (Smartweed)	---	Cot	2-4 lf	3-6 lf	2-5"
Redroot Pigweed	---	Cot	Cot-2 lf	2-4 lf	2-8lf(0.5-4")
KINDRED, ND					
Date of Application	30-Apr	17-May	25-May	5-Jun	25-Jun
Time of Day	3:00 PM	11:30 AM	11:45 AM	1:00 PM	8:30 AM
Air Temperature (^{o}F)	75	67	56	69	75
Relative Humidity (%)	18	17	41	22	52
Soil Temp. (^{o}F at 6")	54	53	51	60	70
Wind Velocity (mph)	6	16	4	2	8

Cloud Cover (%)	70	100	100	5	50
Soil Moisture	Good	Good	Good	Good	Good
Sugarbeet	preemerge	Cot	V1.1-2.0	V5.5-6.2	V9.5-12.2
Common Lambsquarters	---	Cot	Cot-2lf	4-8lf(2-5")	6-12"
Redroot Pigweed	---	Cot	Cot-1lf	3-6lf	6-12"
PROSPER, ND					
Date of Application	3-May	21-May	28-May	5-Jun	21-Jun
Time of Day	10:00 AM	1:00 PM	12:30 PM	10:45 AM	12:00 PM
Air Temperature (^{o}F)	61	71	80	62	79
Relative Humidity (%)	31	64	46	20	33
Soil Temp. (^{o}F at 6")	50	55	58	61	70
Wind Velocity (mph)	18	17	18	5	9
Cloud Cover (%)	10	90	65	5	30
Soil Moisture	Good	Good	Good	Good	Good
Sugarbeet	preemerge	V1.0-1.5	V2.1-2.7	V4.2-5.9	V10.9-13.9
Redroot Pigweed	---	1-2lf	2-3lf	3-6lf	8-10"
Amaranth	---	Cot-1lf	2-3lf	3-4lf	8-12"
Quinoa	---	Cot-2lf	4-6lf(2")	(3-6")	12-20"
Canola	---	Cot-2lf	3-4lf(2-3")	5-6lf(6")	28-32"
Flax	---	Cot-2lf	(0.5-2")	(3-6")	8-14"
Millet	---	1.9-2.5lf	3-4lf(1-3")	4-5lf(3-6")	10-14"
Oats	---	1.9-2.1lf	3-4lf(4-5")	4-5lf(6-8")	28-32"
Common Lambsquarters	---	Cot-2lf	2-4lf	6-8lf(2-4")	10-14"
MOORHEAD, MN					
Date of Application	30-Apr	17-May	29-May	5-Jun	20-Jun

Time of Day	12:30 PM	10:15 AM	9:00 AM	3:15 PM	8:30 AM
Air Temperature (^{o}F)	63	62	78	67	76
Relative Humidity (%)	21	22	58	24	47
Soil Temp. (^{o}F at 6”)	50	52	60	69	62
Wind Velocity (mph)	3	10	9	3	0
Cloud Cover (%)	100	0	85	0	0
Soil Moisture	Good	Good	Good	Good	Good
Sugarbeet	preemerge	Cot-V1.2	V2.2-2.9	V4.5-5.9	V10-12
Common Lambsquarters	---	Cot-2lf	4-6lf	6-8lf(2-5")	4-6lf(10-12")
Redroot Pigweed	---	Cot	2-4lf	4-6lf	8-10"

[1]lf=leaf or leaves, cot=cotyledon, “=inches, V=number of expanded leaves with decimal indicating partial expansion of the youngest visible leaf

* = Rainfall began during application of the final two treatments

Table continued on next page.

Table 1. Herbicide applications dates and climatic conditions in 2007[1]. (continued)

	Seed / PRE	T1	T2	T3	T4
CROOKSTON, MN					
Date of Application	9-May	29-May	4-Jun	20-Jun	27-Jun
Time of Day	12:45 PM	11:30 AM	9:30 AM	12:30 PM	12:00 PM
Air Temperature (^{o}F)	80	74	68	76	62
Relative Humidity (%)	23	56	32	32	33
Soil Temp. (^{o}F at 6”)	58	61	62	64	67
Wind Velocity (mph)	10	5	13	9	8
Cloud Cover (%)	0	100	25	0	95
Soil Moisture	Good	Good	Good	Good	Good
Sugarbeet	preemerge	V1.0–2.1	V1.1–4.2	V5.8-6.8	V8.5-13.9
Redroot Pigweed	---	Cot–3lf	Cot–5lf	6-8"	10-12"
Amaranth	---	1–2lf	Cot–4lf	2-5"	6-10"
Quinoa	---	4lf(2”)	4–6”	8-12"	10-18"
Canola	---	2–3lf(2”)	2–4lf(3–4”)	16-20"	28-32"
Flax	---	Cot–1.5”	1–4”	2-6"	4-10"
Millet	---	2–3lf(1–2”)	3–4lf(3-5”)	6-7lf(10-12")	14-18"
Oat	---	2–3lf(4–6”)	3–4lf(5–7”)	6-7lf(14-16")	20-24"
Yellow Foxtail	---	3-4lf(0.5–2”)	3–5lf(1–4”)	7lf(6-10")	8lf(10-14")
ST.THOMAS, ND					
Date of Application	25-Apr	11-May	18-May	31-May	12-Jun
Time of Day	7:15 PM	12:30 PM	12:15 PM	11:30 AM	12:30 PM
Air Temperature (^{o}F)	68	57	66	64	85

Relative Humidity (%)	28	28	54	50	45
Soil Temp. (^{o}F at 6")	46	51	56	58	73
Wind Velocity (mph)	7	6	9	4	13
Cloud Cover (%)	10	100	100	35	10
Soil Moisture	Good	Good	Good	Good	Good
Sugarbeet	preemerge	Cot	V1.0-2.3	V3.9-4.5	V8.5-13.1
Redroot Pigweed	---	Cot	Cot-2lf	3-6lf	2-4"
Wild Buckwheat	---	---	cot-1lf	2-6lf	4-6"tall
CAVALIER, ND					
Date of Application	25-Apr	11-May	18-May	31-May	12-Jun
Time of Day	3:00 PM	11:00 AM	2:30 PM	10:00 AM	11:00 AM
Air Temperature (^{o}F)	73	60	66	61	84
Relative Humidity (%)	21	30	45	46	48
Soil Temp. (^{o}F at 6")	48	50	55	54	68
Wind Velocity (mph)	8	1	13	7	9
Cloud Cover (%)	0	100	30	75	0
Soil Moisture	Good	Good	Good	Good	Good
Sugarbeet	preemerge	Cot	Cot-V1.5	V1.1-1.9	V6.5-8.1
Kochia	---	Cot	Cot-0.5"whorl	0.25"-1"whorl	2-6"
Common Lambsquarters	---	Cot-2lf	Cot-4lf	4-10lf(1-4")	6-10"
Redroot Pigweed	---	Cot	Cot-2lf	1-4lf	4-8lf(1-3")

[1]lf=leaf or leaves, cot=cotyledon, "=inches, V=number of expanded leaves with decimal indicating partial expansion of the youngest visible leaf

Table 2. Sugarbeet injury and weed control from herbicide treatments in 2007.

Treatment Rate	6 Locations Sgbt	Cavalier Kochia	Milan Velvetleaf	5 locations Com. Lambsquarters & Quinoa
fl oz/A or oz/A	% Inj	% control		
1. Progress+UpBeet+Stinger+Select Max+MSO[1] 5.7 + 0.125 + 1.3 + 3.0 + 1.5% (T1, T2, T3, T4)[2]	6	62	91	96
2. Progress+UpBeet+Stinger+Select Max+MSO 8.5 (T1,T2)/11.4(T3)/15.6(T4) +0.125+1.3+3.0+1.5%	11	75	91	98
3. Progress+UpBeet+Stinger+Select Max 17.8 (T1)/23.5(T2,T3)/35.6(T4) +0.25+2.6+3.0	17	90	84	99
4. Progress+UpBeet+Stinger+Select Max+Nortron+MSO 5.7 + 0.125 + 1.3 + 3.0 + 3.0 + 1.5% (T1, T2, T3, T4)	7	64	92	97
5. Nortron (PRE) 120 Progress 17.8(T1)/23.5(T2,T3)/35.6(T4)	9	95	47	99
6. RU Original Max+P90[3]+AMS[4] 28.4+0.25%+10lb/100gal (T2, T4)	0	NA[6]	92	99[6]
7. RU Original Max+P90+AMS 28.4 + 0.25% + 10lb/100gal (T1,T2,T3,T4)	0	99	95	99
8. RU Original Max+P90+AMS 28.4 + 0.25% + 10lb/100gal (T1)	0	50	3	41
9. RU Original Max+P90+AMS 28.4 + 0.25% + 10lb/100gal (T2)	0	58	64	74
10. RU Original Max+P90+AMS 28.4 + 0.25% + 10lb/100gal (T3)	0	97	91	96
11. RU Original Max+P90+AMS 28.4 + 0.25% + 10lb/100gal (T4)	1	98	72	94
12. RU Original Max+P90+AMS+UpBeet 28.4 + 0.25% + 10lb/100gal + 0.25 (T2,T4)	1	99	96	99
13. RU Original Max+P90+AMS+UpBeet 28.4 + 0.25% + 10lb/100gal + 1.0 (T2,T4)	1	99	96	99
14. RU Original Max+P90+AMS+Resource 28.4 + 0.25% + 10lb/100gal + 2.2 (T2,T4)	74	98	93	99
15. RU Original Max+P90+AMS+Stinger 28.4 + 0.25% + 10lb/100gal + 1.3 (T2) fb[5] RU Original Max+P90+AMS 28.4 + 0.25% + 10lb/100gal (T4)	0	99	93	99
16. RU Original Max+P90+AMS+Stinger 28.4 + 0.25% + 10lb/100gal + 2.6 (T2) fb RU Original Max+P90+AMS 28.4 + 0.25% + 10lb/100gal (T4)	1	99	94	99
17. RU Original Max+P90+AMS+Select Max 28.4 + 0.25% + 10lb/100gal + 12.0 (T2) fb RU Original Max+P90+AMS 28.4 + 0.25% + 10lb/100gal (T4)	0	99	89	99
18. RU Original Max+P90+AMS+Nortron 28.4 + 0.25% + 10lb/100gal + 120 (T1) fb RU Original Max+P90+AMS 28.4 + 0.25% + 10lb/100gal (T4)	0	99	83	99
19. Nortron (PRE) 120 RU Original Max+P90+AMS 28.4 + 0.25% + 10lb/100gal (T2,T4)	1	99	88	99
LSD (0.05)	2	11	6	6

[1]MSO=methylated seed oil from Loveland
[2]T1=1st POST application, T2=2nd POST application, etc
[3]P90=Premier 90 non-ionic surfactant from West Central
[4]AMS=Am-Stick liquid ammonium sulfate from West Central
[5]fb=followed by
[6]NA=treatment was not applied at Cavalier or St. Thomas

Table 3. Pigweed species control from herbicide treatments at seven locations in 2007.

Treatment	Pigweed spp.						
Rate	Moorhead	St. Thomas	Kindred	Cavalier	Prosper	Milan	Crookston
fl oz/A or oz/A	----------% control----------						
1. Progress+UpBeet+Stinger+Select Max+MSO[1] 5.7 + 0.125 + 1.3 + 3.0 + 1.5% (T1, T2, T3, T4)[2]	94	97	89	84	73	73	57
2. Progress+UpBeet+Stinger+Select Max+MSO 8.5 (T1,T2)/11.4(T3)/15.6(T4) +0.125+1.3+3.0+1.5%	96	98	91	86	93	83	68
3. Progress+UpBeet+Stinger+Select Max 17.8 (T1)/23.5(T2,T3)/35.6(T4) +0.25+2.6+3.0	99	99	98	93	99	99	89
4. Progress+UpBeet+Stinger+Select Max+Nortron+MSO 5.7 + 0.125 + 1.3 + 3.0 + 3.0 + 1.5% (T1, T2, T3, T4)	95	97	93	88	93	80	75
5. Nortron (PRE) 120 Progress 17.8(T1)/23.5(T2,T3)/35.6(T4)	99	99	99	95	99	99	97
6. RU Original Max+P90[3]+AMS[4] 28.4+0.25%+10lb/100gal (T2, T4)	99	NA[6]	99	NA[6]	99	96	99
7. RU Original Max+P90+AMS 28.4 + 0.25% + 10lb/100gal (T1,T2,T3,T4)	99	98	99	96	99	96	99
8. RU Original Max+P90+AMS 28.4 + 0.25% + 10lb/100gal (T1)	32	64	46	6	59	0	18
9. RU Original Max+P90+AMS 28.4 + 0.25% + 10lb/100gal (T2)	75	79	50	29	84	90	82
10. RU Original Max+P90+AMS 28.4 + 0.25% + 10lb/100gal (T3)	95	84	99	66	97	93	96
11. RU Original Max+P90+AMS 28.4 + 0.25% + 10lb/100gal (T4)	98	99	99	95	97	92	89
12. RU Original Max+P90+AMS+UpBeet 28.4 + 0.25% + 10lb/100gal + 0.25 (T2,T4)	99	99	99	98	99	98	99
13. RU Original Max+P90+AMS+UpBeet 28.4 + 0.25% + 10lb/100gal + 1.0 (T2,T4)	99	99	99	99	99	99	98
14. RU Original Max+P90+AMS+Resource 28.4 + 0.25% + 10lb/100gal + 2.2 (T2,T4)	99	96	99	94	99	95	97
15. RU Original Max+P90+AMS+Stinger 28.4 + 0.25% + 10lb/100gal + 1.3 (T2) fb[5] RU Original Max+P90+AMS 28.4 + 0.25% + 10lb/100gal (T4)	99	98	99	97	99	95	99
16. RU Original Max+P90+AMS+Stinger 28.4 + 0.25% + 10lb/100gal + 2.6 (T2) fb RU Original Max+P90+AMS 28.4 + 0.25% + 10lb/100gal (T4)	99	99	99	96	99	96	99
17. RU Original Max+P90+AMS+Select Max 28.4 + 0.25% + 10lb/100gal + 12.0 (T2) fb RU Original Max+P90+AMS 28.4 + 0.25% + 10lb/100gal (T4)	99	99	99	95	99	94	98
18. RU Original Max+P90+AMS+Nortron 28.4 + 0.25% + 10lb/100gal + 120 (T1) fb RU Original Max+P90+AMS 28.4 + 0.25% + 10lb/100gal (T4)	99	99	99	99	99	63	99
19. Nortron (PRE) 120 RU Original Max+P90+AMS 28.4 + 0.25% + 10lb/100gal (T2,T4)	99	99	99	97	99	99	99
LSD (0.05)	8	7	5	6	7	9	8

[1]MSO=methylated seed oil from Loveland
[2]T1=1st POST application, T2=2nd POST application, etc
[3]P90=Premier 90 non-ionic surfactant from West Central
[4]AMS=Am-Stick liquid ammonium sulfate from West Central
[5]fb=followed by
[6]NA=treatment was not applied at Cavalier or St. Thomas

Table 4. Sugarbeet root yield, percent sucrose, and extractable sucrose per acre for experiments harvested at St. Thomas, ND and Prosper, ND in 2007.

Treatment Rate	St. Thomas			Prosper		
	Yield	Sucrose	Extractable Sucrose	Yield	Sucrose	Extractable Sucrose
fl oz/A or oz/A	tons/A	%	lb/A	tons/A	%	lbs/A
1. Progress+UpBeet+Stinger+Select Max+MSO[1] 5.7 + 0.125 + 1.3 + 3.0 + 1.5% (T1, T2, T3, T4)[2]	26.2	14.5	7371	25.6	15.8	7300
2. Progress+UpBeet+Stinger+Select Max+MSO 8.5 (T1,T2)/11.4(T3)/15.6(T4) +0.125+1.3+3.0+1.5%	25.3	14.3	6932	26.3	15.5	7264
3. Progress+UpBeet+Stinger+Select Max 17.8 (T1)/23.5(T2,T3)/35.6(T4) +0.25+2.6+3.0	25.6	14.2	7041	22.8	15.7	6444
4. Progress+UpBeet+Stinger+Select Max+Nortron+MSO 5.7 + 0.125 + 1.3 + 3.0 + 3.0 + 1.5% (T1, T2, T3, T4)	28.5	13.7	7472	28.8	15.1	7709
5. Nortron (PRE) 120 Progress 17.8(T1)/23.5(T2,T3)/35.6(T4)	25.7	13.4	6630	25.1	16.0	7172
6. RU Original Max+P90[3]+AMS[4] 28.4+0.25%+10lb/100gal (T2, T4)	NA[6]	NA[6]	NA[6]	27.7	16.5	8294
7. RU Original Max+P90+AMS 28.4 + 0.25% + 10lb/100gal (T1,T2,T3,T4)	26.0	14.0	6977	27.4	16.3	8095
8. RU Original Max+P90+AMS 28.4 + 0.25% + 10lb/100gal (T1)	25.1	13.9	6654	24.3	16.7	7446
9. RU Original Max+P90+AMS 28.4 + 0.25% + 10lb/100gal (T2)	27.1	14.1	7318	27.2	15.7	7718
10. RU Original Max+P90+AMS 28.4 + 0.25% + 10lb/100gal (T3)	26.7	14.0	7208	24.4	15.9	7015
11. RU Original Max+P90+AMS 28.4 + 0.25% + 10lb/100gal (T4)	25.6	14.1	6926	28.2	15.4	7887
12. RU Original Max+P90+AMS+UpBeet 28.4 + 0.25% + 10lb/100gal + 0.25 (T2,T4)	27.4	13.8	7216	28.9	16.1	8419
13. RU Original Max+P90+AMS+UpBeet 28.4 + 0.25% + 10lb/100gal + 1.0 (T2,T4)	28.5	14.1	7746	28.2	16.4	8422
14. RU Original Max+P90+AMS+Resource 28.4 + 0.25% + 10lb/100gal + 2.2 (T2,T4)	16.0	13.4	4160	25.7	16.1	7494
15. RU Original Max+P90+AMS+Stinger 28.4 + 0.25% + 10lb/100gal + 1.3 (T2) fb[5] RU Original Max+P90+AMS 28.4 + 0.25% + 10lb/100gal (T4)	25.8	13.9	6901	28.0	15.9	8108
16. RU Original Max+P90+AMS+Stinger 28.4 + 0.25% + 10lb/100gal + 2.6 (T2) fb RU Original Max+P90+AMS 28.4 + 0.25% + 10lb/100gal (T4)	26.2	13.8	6927	28.9	15.7	8176
17. RU Original Max+P90+AMS+Select Max 28.4 + 0.25% + 10lb/100gal + 12.0 (T2) fb RU Original Max+P90+AMS 28.4 + 0.25% + 10lb/100gal (T4)	27.0	13.9	7118	25.2	15.0	6693
18. RU Original Max+P90+AMS+Nortron 28.4 + 0.25% + 10lb/100gal + 120 (T1) fb RU Original Max+P90+AMS 28.4 + 0.25% + 10lb/100gal (T4)	29.9	13.5	7798	25.1	15.5	7070
19. Nortron (PRE) 120 RU Original Max+P90+AMS 28.4 + 0.25% + 10lb/100gal (T2,T4)	29.2	13.5	7481	25.5	15.6	7109
LSD (0.05)	3.6	NS	1017	3.5	0.9	1021

[1]MSO=methylated seed oil from Loveland
[2]T1=1st POST application, T2=2nd POST application, etc
[3]P90=Premier 90 non-ionic surfactant from West Central
[4]AMS=Am-Stick liquid ammonium sulfate from West Central
[5]fb=followed by
[6]NA=treatment was not applied at Cavalier or St. Thomas