HERBICIDES ON SUGARBEET AT SIX LOCATIONS, 2003.

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The micro-rate is a postemergence herbicide combination that generally includes Betanex or Betamix or Progress plus UpBeet plus Stinger plus a grass herbicide plus a methylated seed oil adjuvant applied three to five times at a seven-day interval at reduced rates. The micro-rate was applied 2.9 times per acre averaged over all responses to the 2003 survey of sugarbeet growers in eastern North Dakota and Minnesota. The micro-rate alone may not provide the 99 to 100% weed control that sugarbeet growers desire so the objective of this experiment was to compare the micro-rate alone to the micro-rate plus various additions for weed control and sugarbeet injury.

Dates and conditions for the various locations of the experiment are provided in Table 1. Counter 15G at 12 lb/A was applied modified-in-furrow on the planter at all locations. Herbicides were applied to the center four rows of six-row plots in 17 gpa water at 40 psi through 8002 nozzles. Herbicide treatments were replicated four times. Weed control and sugarbeet injury were evaluated visually at each location. Herbicide broadcast treatment cost in Table 2 only includes the cost of herbicides, not the application. All herbicide costs were calculated for broadcast, not band, application.

The standard micro-rate with Betamix is the first treatment listed in Table 2 (Trt 1). Dual Magnum followed by the micro-rate (Trt 3) gave 39% sugarbeet injury compared to 15% injury from the next most injurious treatment (Table 2).

PPI Dual Magnum followed by the micro-rate reduced sugarbeet populations by 18% compared to PRE Nortron followed by the micro-rate averaged over six locations (data not shown). Stand loss varied from zero to 37% over the six locations. Nortron followed by the micro-rate (Trt 2) and Dual Magnum followed by the micro-rate (Trt 3) gave better broadleaf weed control than the micro-rate alone (Trt 1)(Table 2).

All but three treatments caused more sugarbeet injury than the micro-rate alone (Table 2). The treatments with injury similar to the micro-rate were Nortron followed by the micro-rate (Trt 2); the micro-rate with extra Nortron in the first three applications (Trt 6); and the micro-rate with increased rates of UpBeet (Trt 8).

All but one treatment (Trt 8) gave greater control of one or more species than the micro-rate alone (Table 2). Seven treatments gave improved control of all three broadleaf weed species. The least expensive of these seven were the micro-rate plus extra Nortron at 4 fl oz/A (Trt 6) and the micro-rate with Betamix at 16 fl oz/A rather than 8 fl oz/A in the third and fourth application (Trt 7).

Kochia was more difficult to control than common lambsquarters or pigweed species (Table 2). Past sampling has indicated that nearly all kochia in North Dakota and Minnesota is resistant to ALS-inhibiting herbicides. Nortron followed by the micro-rate (Trt 2) gave 84% kochia control while POST conventional rate treatments (Trt 9, 10, 11) gave 89 to 96% control. All other treatments gave less than 75% kochia control. The conventional rate applied four times (Trt 11) was the most expensive treatment at $196/A but this treatment gave the best kochia control and total control of the other weed species. The most expensive treatments gave the best kochia control.

The results of this experiment suggest that the best control of ALS-resistant kochia would be from soil-applied Nortron followed by four POST applications of a conventional rate combination of herbicides. Betamix was used in this experiment but substituting Progress for Betamix at the same active ingredient rate per acre generally would give slightly greater kochia control. Increasing the rate of Nortron from the 96 fl oz/A used in this experiment to the maximum labeled rate of 120 fl oz/A often would give greater kochia control. PRE Nortron at 120 fl oz/A followed by four applications of POST Progress plus UpBeet plus Stinger + Select at 18 fl oz/A plus 0.25 oz/A + 2.6 fl oz/A + 3.0 fl oz/A all in an 11-inch band would cost $125.00/A. This would be an expensive treatment but the cost may be justified in fields with a severe problem with ALS-resistant kochia.

class=Section2>

Table 1. Herbicide application dates and conditions, 2003.

AMENIA					
Date	April 23	May 15	May 23	June 2	June 9
Time of day	12:30P	12:15P	9:00A	1:30P	10:30A
Air temperature (F)	73	63	55	68	65
Relative humidity (%)	25	50	85	40	70

6-inch soil temp (F)	46	51	48	60	53
Soil moisture	good	good	good	fair	good
Sugarbeet (Crystal 955)	seeded	cotyl	2 lf	4-6 lf	6-8 lf
Redroot pigweed	-	cotyl	cot-2 lf	2-4 lf	4-6 lf
Kochia	-	cotyl	0.7" diam	1.5" diam	2" diam
Common Lambsquarters	-	cot-2 leaf	2-4 lf	6-8 lf	4-8" tall
Yellow Foxtail	-	emerging	0.7" tall	3-5 lf	4-5 lf
CROOKSTON					
Date	April 29	May 21	May 28	June 5	June 13
Time of day	5:30 P	1:00 P	12:15 P	1:10P	11:00 A
Air temperature (F)	60	59	78	75	73
Relative humidity (5)	17	43	21	55	60
6-inch soil temp (F)	46	45	55	54	58
Soil moisture	good	good	good	good	good
Sugarbeet (Beta 6225)	seeded	cot-2 lf	2-4 lf	4-6 lf	8-10 lf
Redroot pigweed	-	cotyl	2 lf	4-6 lf	6-7 lf
Wild oat	-	4-5" tall	1 tiller	4-5 lf	5 lf
Common lambsquarters	-	cot-2 lf	2-6 lf	6-10 lf	4-8" tall
Yellow foxtail	-	0.75" tall	1" tall	4-5 lf	5-6 lf
GLASSTON					
Date	May 1	May 22	May 29	June 6	June 16
Time of day	noon	1:00 P	2:00P	noon	10:45A
Air temperature (F)	54	68	82	73	78
Relative humidity (%)	14	32	29	50	72
6-inch soil temp (F)	40	48	54	56	60
Soil moisture	good	good	good	fair	good
Sugarbeet (Crystal 955)	seeded	cotyl	2-4 lf	4-6 lf	8-10 lf
Redroot pigweed	-	cotyl	2 lf	4 lf	6-8 lf
Kochia	-	0.25" diam	0.5" diam	1-2" diam	6-10" tall
Common lambsquarters	-	cot - 2 lf	4-6 lf	8-10 lf	10-12" tall
Volunteer wheat	-	4-5" tall	3 lf	5 lf	5-6 lf
MORRIS					
Date	April 28	May 12	May 20	May 27	June 4
Time of day	11:00A	4:30P	11:00A	noon	11:00A
Air temperature (F)	50	63	53	79	69
Relative humidity (%)	31	20	38	26	37
6-inch soil temp (F)	45	56	49	58	55
Soil moisture	good	good	good	good	fair
Sugarbeet (Crystal 955)	seeded	cotyl	cot-2 lf	2-4 lf	4-6 lf
Pigweed species	-	cotyl	cot-2 lf	4 lf	6-10 lf
Common lambsquarters	-	cotyl	2-4 lf	6-8 lf	6-10 lf
TINTAH					
Date	April 28	May 12	May 20	May 27	June 4
Time of day	3:15P	2:00P	1:30P	3:30P	1:30P
Air temperature (F)	56	61	56	79	69
Relative humidity (%)	26	26	30	32	45
6-inch soil temp (F)	50	51	54	59	56
Soil moisture	good	good	good	good	good
Sugarbeet (Crystal 955)	seeded	cotyl	cot-2 lf	2-4 lf	4-6 lf
Pigweed species	-	cotyl	cot-2 lf	2-4 lf	4-6 lf
Kochia	-	cotyl	0.25" diam	1.5" diam	2.5" diam
Green foxtail	-	emerging	1 lf	4 lf	4-6 lf
WAHPETON					
Date	April 25	May 16	May 23	June 2	June 13
Time of day	10:00A	2:30P	11:30A	11:00A	2:30P
Air temperature (F)	58	72	58	65	78
Relative humidity (%)	26	31	70	55	28
6-inch soil temp (F)	43	57	49	56	68
Soil moisture	good	good	good	good	good
Sugarbeet (Crystal 955)	seeded	cotyl	2 lf	4-6 lf	6-8 lf
Pigweed species	-	cotyl	cot-2 lf	4 lf	8-10 lf
Common lambsquarters	-	cot-2 lf	2-4 lf	8-10 lf	6-8" tall

class=Section3>

Table 2. Herbicide treatments at six locations, 2003.

Treatment	Rate	6 loc Sugb inj	6 loc Piwe[4] cntl	5 loc Colq cntl	3 loc Kocz cntl	4 loc Grass spp cntl	Broadcast treatment cost
	fl oz or oz/A	%	%	%	%	%	$/A
1. Betamix + UpBeet + Stinger + Poast +MSO[1] (T1-T4[2]) 8 + 0.125 + 1.3 + 5.1 + 1.5%		7	93	94	58	100	90
2. Nortron (PRE) fb[3] Betamix + UpBeet + Stinger + Poast + MSO (T1-T4) 8 + 0.125 + 1.3 + 5.1 + 1.5%	96	9	100	98	84	100	165
3. Dual Magnum (PPI) fb Betamix + UpBeet + Stinger + Poast + MSO (T1-T4) 8 + 0.125 + 1.3 + 5.1 + 1.5%	32	39	99	98	74	100	115
4. Betamix + UpBeet + Stinger + Poast + MSO (T1-T4) 8 + 0.125 + 1.3 + 5.1 + 1.5%		14	95	97	68	100	112

+ Outlook at 21 fl oz (T3)						
5. Betamix + UpBeet + Stinger + Poast + MSO (T1-T4) 8 + 0.125 + 1.3 + 5.1 + 1.5% + Outlook at 21 fl oz (T4)	14	96	94	65	100	112
6. Betamix + UpBeet + Stinger + Poast + MSO (T1-T4) 8 + 0.125 + 1.3 + 5.1 + 1.5% + Nortron at 4 fl oz (T1-T3)	11	97	98	70	100	100
7. Betamix + UpBeet + Stinger + Poast + MSO (T1-T4) 8 (T1-T2)/16 (T3-T4)+0.125+1.3+5.1+1.5%	14	97	99	69	100	103
8. Betamix + UpBeet + Stinger + Poast + MSO (T1-T4) 8+0.16 (T1)/0.25(T2-T4)+1.3+5.1+1.5%	11	95	95	65	100	103
9. Betamix + UpBeet + Stinger + Select (T1-T3) 24(T1)/32(T2)/48(T3)+0.25+2.6+3.0	14	97	99	91	99	158
10. Betamix + UpBeet + Stinger + Select (T1-T3) 24(T1)/32(T2)/48(T3)+0.5+2.6+3.0	15	98	99	89	100	170
11. Betamix + UpBeet + Stinger + Select (T1-T4) 24(T1)/32(T2-T4)+ 0.25 + 2.6 + 3.0	13	100	100	96	100	196
LSD (0.05)	6	3	3	8	NS	

[1]MSO=methylated seed oil from Loveland

[2]T1=first POST application, T2=second POST application, etc.

[3]fb=followed by

[4]Piwe=pigweed species.