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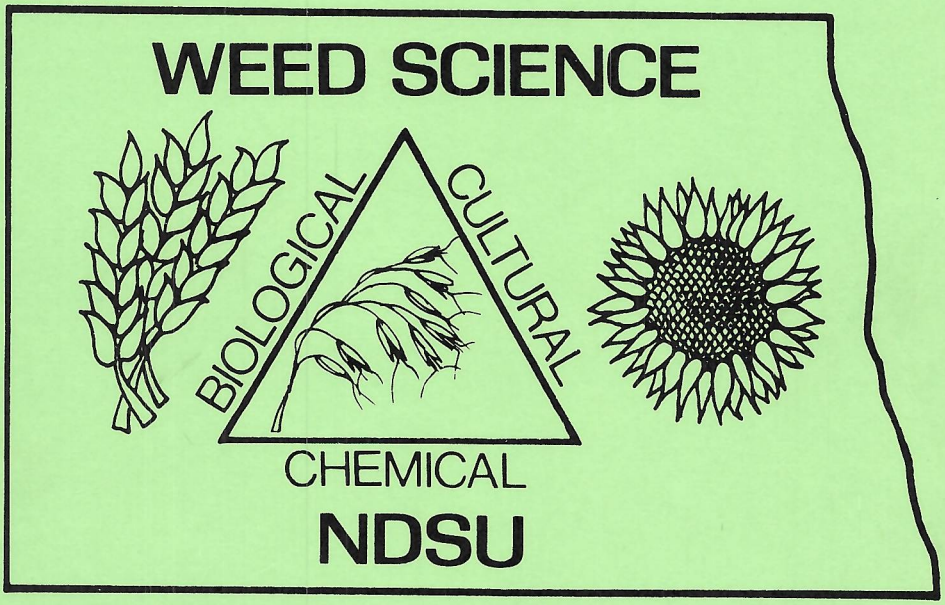
1983 NORTH DAKOTA WEED CONTROL RESEARCH



Weed Research Projects, Department of Agronomy
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SUMMARY OF 1983 WEED CONTROL TRIALS

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CLIMATIC DATA - FARGO

Date	Precipitation						Temperature											
							April		May		June		July		Aug.		Sept.	
	April	May	June	July	Aug.	Sept.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	.02		T				35	31	64	41	71	50	80	56	84	57	89	63
2	.03			1.40	.01	T	33	30	65	38	74	49	77	63	84	66	97	66
3	.04		.02	.07			41	32	70	35	74	50	72	58	91	65	82	58
4		T	T	.01		T	43	31	55	28	61	45	69	48	92	70	73	54
5						.11	47	28	71	34	65	44	69	40	96	69	73	53
6							45	30	70	43	75	42	88	60	94	61	62	48
7					.04		47	25	61	36	80	41	91	68	100	68	78	44
8			.01				50	29	69	32	76	52	90	69	83	57	88	62
9			T		.01	T	48	31	68	46	81	43	92	73	78	65	81	55
10		.34	.04			.29	55	29	62	50	89	63	95	70	80	60	67	44
11		.57				.24	56	26	52	39	84	63	78	59	81	50	50	40
12	.09	.18	.55			.07	45	30	62	37	81	66	91	55	89	60	59	37
13	.22	T	.03				30	25	50	35	69	59	98	66	85	61	63	43
14	T		.14			.01	34	29	59	39	74	56	98	72	88	55	57	37
15	T	.01	T	.17	T	.57	41	20	49	33	62	51	93	68	92	66	57	51
16	T			.10	.26		40	24	57	24	67	50	79	66	75	59	61	49
17		T		1.47			43	28	70	40	74	44	78	63	88	53	61	50
18	T			T	T		45	32	65	44	75	54	83	65	88	69	61	41
19		T	.02	.07		T	55	29	65	44	80	61	85	69	73	57	47	42
20		.33	T	.08	T	.03	59	34	63	41	84	66	85	66	81	55	45	40
21		.10	.30		.23	T	64	36	77	47	84	69	88	69	76	58	47	35
22		T	.04				63	31	67	42	79	61	86	61	76	50	50	30
23		T			T		65	28	77	40	85	55	79	58	77	61	62	28
24		.02	.24		.15		71	34	62	38	90	68	81	56	86	63	75	43
25					.09		75	45	67	30	93	70	82	61	90	60	81	37
26	.02		T		T		63	43	75	45	83	64	88	65	83	65	76	40
27	T	T		.01	T		59	33	78	55	80	55	84	69	89	65	88	57
28	T	.27		T	1.32	T	48	31	73	46	75	47	86	68	94	66	72	47
29		.18	.93		.27	.07	52	24	60	43	65	58	89	61	74	58	53	37
30		T	.02	.78		.24	61	27	64	42	77	59	82	62	82	55	66	45
31					.18				69	48			78	58	85	60		

CLIMATIC DATA - CASSELTON

Date	Precipitation						Temperature											
							April		May		June		July		Aug.		Sept.	
	April	May	June	July	Aug.	Sept.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1						.95	35	31	64	41	71	50	80	56	84	57	89	63
2				2.40	T		33	30	65	38	74	49	77	63	84	66	97	66
3				1.80			41	32	70	35	74	50	72	58	91	65	82	58
4							43	31	55	28	61	45	69	48	92	70	73	54
5							47	28	71	34	65	44	69	40	96	69	73	53
6						.21	45	30	70	43	75	42	88	60	94	61	62	48
7							47	25	61	36	80	41	91	68	100	68	78	44
8							50	29	69	32	76	52	90	69	83	57	88	62
9							48	31	68	46	81	43	92	73	78	65	81	55
10		.30				.29	55	29	62	50	89	63	95	70	80	60	67	44
11		1.05					56	26	52	39	84	63	78	59	81	50	50	40
12		.16	.62			.24	45	30	62	37	81	66	91	55	89	60	59	37
13	.22					.06	30	25	50	35	69	59	98	66	85	61	63	43
14						.63	34	29	59	39	74	56	98	72	88	55	57	37
15							41	20	49	33	62	51	93	68	92	66	57	51
16				.90	.30		40	24	57	24	67	50	79	66	75	59	61	49
17				1.55			43	28	70	40	74	44	78	63	88	53	61	50
18							45	32	65	44	75	54	83	65	88	69	61	41
19				.07			55	29	65	44	80	61	85	69	73	57	47	42
20		.33	T	.15	.05		59	34	63	41	84	66	85	66	81	55	45	40
21		.60	1.90		.30		64	36	77	47	84	69	88	69	76	58	47	35
22							63	31	67	42	79	61	86	61	76	50	50	30
23							65	28	77	40	85	55	79	58	77	61	62	28
24			.05		.50		71	34	62	38	90	68	81	56	86	63	75	43
25					.35		75	45	67	30	93	70	82	61	90	60	81	37
26				.10			63	43	75	45	83	64	88	65	83	65	76	40
27				T			59	33	78	55	80	55	84	69	89	65	88	57
28							48	31	73	46	75	47	86	68	94	66	72	47
29							52	24	60	43	65	58	89	61	74	58	53	37
30				.85		.10	61	27	64	42	77	59	82	62	82	55	66	45
31				.25					69	48			78	58	85	60		

CLIMATIC DATA - CROOKSTON

Date	Precipitation						Temperature											
							April		May		June		July		Aug.		Sept.	
	April	May	June	July	Aug.	Sept.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	.01			.01			39	33	58	31	68	49	71	55	80	55	86	64
2							34	31	63	36	72	52	76	64	86	64	91	69
3	T			.60	.06	.01	36	30	63	32	74	51	73	60	85	62	98	63
4				.35			43	32	65	24	75	49	75	57	92	68	86	53
5				.05			44	29	49	29	59	38	62	42	95	71	79	56
6						.11	46	31	66	41	64	46	68	49	96	59	73	49
7							45	26	66	32	75	40	81	65	95	68	61	45
8			.01				48	28	58	27	79	53	88	68	104	58	75	49
9							50	29	68	47	74	41	90	72	84	59	82	55
10		.13			.58	.22	51	31	68	48	80	53	92	73	72	61	78	55
11		.23				T	54	26	59	40	86	66	92	59	79	53	65	41
12		.49	.75			.17	55	36	48	38	84	63	77	57	81	58	51	43
13	T	.35	2.34				48	27	64	34	74	60	91	65	86	63	58	37
14			.02				34	20	45	27	66	56	98	73	86	52	65	36
15		.03	.04			1.27	34	20	44	29	71	48	95	73	87	64	63	39
16	T		.20	.01		.56	38	23	47	25	53	46	91	68	94	61	54	47
17						T	37	23	54	31	65	43	81	59	75	54	57	49
18	T	T					44	32	70	45	71	49	80	63	91	59	58	44
19					.39	T	41	30	70	43	77	59	88	63	88	63	60	43
20		.53	.07	T			52	37	66	37	78	61	86	63	78	52	49	40
21			T		.14		58	30	61	40	80	66	84	66	75	59	48	37
22		.35	.96				62	33	74	42	82	60	91	62	76	50	48	31
23							61	30	67	40	77	58	89	58	78	55	52	30
24		.31			.87		63	30	76	41	81	66	81	56	82	63	62	32
25					.50		71	44	58	31	86	68	83	56	84	63	75	42
26	.05				1.60		72	48	63	43	91	61	85	64	86	63	80	42
27				.14			60	37	72	53	84	58	87	69	84	65	76	44
28	.14	.12		.01		.09	55	33	77	53	77	45	87	68	87	65	84	58
29	.02				.43		45	32	72	42	77	55	90	58	89	64	65	37
30		.08	.79	.18			47	25	60	43	62	56	88	62	79	60	58	38
31				.48					63	46			82	56	84	60		

CLIMATIC DATA - MINOT

Date	Precipitation						Temperature											
	April	May	June	July	Aug.	Sept.	April		May		June		July		Aug.		Sept.	
							Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	.09			.19		.06	37	28	61	28	67	40	75	53	83	59	94	65
2			.02	.71	.06		40	21	63	32	71	46	77	54	89	61	96	67
3			.02	.35			36	23	65	32	71	41	76	55	94	65	89	55
4			T	T			43	25	57	33	70	44	70	57	99	65	81	55
5				.03		T	40	21	66	35	62	42	74	48	99	66	82	56
6							44	23	70	37	65	40	80	50	92	65	71	51
7							45	24	63	27	75	40	87	65	98	67	68	45
8			.03				50	30	64	27	81	44	93	62	98	55	85	50
9		.03		T		.33	53	32	73	49	78	46	88	63	84	54	64	50
10			.01		T	T	52	27	72	42	81	51	93	71	84	57	77	47
11						.08	55	24	71	29	91	59	84	53	85	53	62	41
12	.33	.90				.36	43	24	35	26	90	60	79	55	87	53	50	45
13	.09	.66	T			.27	27	12	36	29	69	53	90	60	91	58	49	33
14		T				T	33	12	45	26	77	49	92	62	85	52	61	33
15		T			.14	1.28	39	19	57	27	74	45	98	63	93	56	54	42
16	T			.05	.54	.16	45	20	45	25	65	38	77	52	87	60	54	42
17	.10				.06	T	37	25	56	26	74	41	78	51	77	57	62	48
18	T			.71			45	27	71	44	78	51	83	62	94	57	62	38
19		.31	.19	.33			53	29	72	44	75	59	84	63	91	51	56	35
20		.04	T	.65	.01		61	36	60	35	77	51	86	65	76	50	46	35
21		T	.02		.07		64	36	65	37	83	57	86	64	78	54	45	29
22		.09	1.57				65	30	67	37	76	54	83	58	81	57	45	25
23		T			.62		65	35	69	44	76	54	86	54	72	56	56	25
24		.04			.02		64	42	75	44	83	57	83	54	79	57	68	37
25		.03	.10		.14		69	46	61	38	94	65	82	54	81	57	78	48
26		T	.10		T		69	39	72	40	83	52	87	54	89	61	74	46
27							43	29	87	50	78	49	87	67	89	61	84	53
28	.05				T	.07	48	21	82	49	73	51	88	63	91	62	85	45
29			.20				38	23	73	39	76	55	88	55	92	58	55	38
30			.60	.05		.48	52	26	62	41	67	55	89	55	84	59	39	34
31									56	36			84	54	90	61		

CLIMATIC DATA - WILLISTON

Date	Precipitation						Temperature											
							April		May		June		July		Aug.		Sept.	
	April	May	June	July	Aug.	Sept.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	T					.22	42	25	61	32	72	39	81	52	91	61	100	61
2				.05			45	21	66	34	72	48	81	61	98	66	100	71
3			.08				44	25	65	43	68	48	80	56	102	64	82	55
4			T				43	25	70	42	62	43	79	55	102	68	83	53
5				.12	T		45	19	73	41	67	44	89	54	100	63	80	59
6							47	21	70	42	74	40	90	60	103	63	71	48
7			T				52	21	65	32	82	45	97	60	104	73	88	48
8			T			T	57	28	78	44	76	43	97	63	96	58	88	60
9		.03		.02			57	31	75	46	85	53	94	72	90	66	94	52
10		T		.65			58	28	59	27	89	54	94	67	93	61	72	44
11	.11	T				.30	56	31	43	27	90	57	80	52	95	60	63	46
12		1.67	T			.02	33	19	40	24	86	55	94	56	95	76	58	46
13		.06					40	14	44	26	75	40	94	66	86	54	63	35
14						.09	48	16	56	27	75	48	104	66	98	60	62	46
15	.01			.72	.03	T	48	29	55	29	72	42	103	52	88	60	57	47
16					.22		48	19	54	30	75	40	76	51	89	64	72	40
17		.03		.03			60	28	66	36	77	48	82	48	95	58	73	52
18		T		.22			68	30	66	43	76	55	83	59	94	61	57	34
19			.02	T			68	33	62	42	77	54	89	63	94	46	55	33
20		T		.04	.07		71	40	68	39	80	53	89	70	86	58	45	35
21		.02	.27	.04			67	37	68	61	79	50	86	58	85	58	51	25
22			.57		.45		65	36	68	36	75	49	87	57	83	59	61	23
23		T					70	33	75	42	85	54	87	54	70	54	75	32
24	T	T	T				73	40	75	46	95	70	85	57	86	57	79	43
25							72	40	78	40	95	65	95	63	92	63	81	43
26				.30	.07		66	28	88	53	81	59	95	66	91	62	90	47
27					.02		48	24	87	52	75	54	90	62	91	61	89	52
28							47	22	84	48	78	54	89	58	91	59	76	40
29			.12			.24	54	21	72	39	77	56	90	58	92	60	50	33
30		.12	.01			.16	62	27	67	42	79	52	90	57	94	62	47	34
31									64	36			87	55	100	64		

CLIMATIC DATA - LANGDON

Date	Precipitation						Temperature											
							April		May		June		July		Aug.		Sept.	
	April	May	June	July	Aug.	Sept.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	.07			.03			33	26	56	30	67	40	66	50	80	55	92	63
2				.05			27	17	60	30	69	44	68	54	85	61	95	63
3				.63			33	20	65	36	73	42	70	58	90	64	103	53
4				.50			39	25	55	21	66	44	75	54	96	66	83	51
5							38	24	53	37	52	32	59	36	100	67	82	50
6							41	24	62	32	63	39	69	46	90	59	67	44
7						.25	44	23	58	21	74	38	86	63	95	67	63	41
8							45	27	57	28	81	51	92	64	96	52	77	46
9					.06	.57	52	28	68	40	73	45	92	64	82	50	65	45
10			1.20		.03		51	25	58	47	82	48	89	68	74	53	66	46
11							42	28	66	29	90	62	92	56	79	52	60	38
12	.07	.02				T	49	22	45	26	83	61	76	55	85	60	60	37
13		.44	.08				27	15	46	27	77	49	88	61	89	59	58	37
14						T	29	12	39	23	64	47	91	62	81	47	59	35
15		.10				.92	34	14	41	19	71	41	91	69	88	63	58	41
16	T			.13		.22	35	13	43	19	54	37	91	57	89	60	52	45
17				.01	.23	T	38	25	52	32	69	42	76	53	66	49	58	45
18		.20		.26			37	31	71	38	75	41	81	60	95	59	61	41
19			.05				38	31	72	42	78	53	81	62	92	55	55	36
20			.87				55	33	54	26	76	55	82	62	75	49	47	35
21			.26				59	34	62	42	77	55	85	63	68	55	46	32
22		T	1.27				60	28	70	38	78	58	87	55	79	48	44	27
23					.04		60	36	68	43	74	53	85	53	77	54	51	27
24		.06			.18		66	36	72	34	80	53	79	51	78	47	62	32
25							70	43	57	39	82	68	78	53	83	58	74	45
26	.20				.12		67	40	67	43	80	50	85	62	92	54	75	42
27							49	30	77	46	75	47	88	63	89	59	78	45
28		.01		.11			46	29	79	50	71	49	85	64	90	61	83	50
29					.07		36	30	69	40	75	53	87	59	93	60	55	37
30			.23	.07		.21	45	17	61	38	62	55	85	59	84	54	40	35
31		T		.18					57	36			79	54	86	59		

CLIMATIC DATA - CARRINGTON

Date	Precipitation						Temperature											
							April		May		June		July		Aug.		Sept.	
	April	May	June	July	Aug.	Sept.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1			.08								70	50	79	54	89	53	99	67
2			.16	.20							72	48	80	62	95	67	99	66
3			.04	.35							71	45	68	54	99	63	83	54
4				.08							55	44	72	48	100	66	84	52
5						.12					63	34	75	42	98	64	75	53
6											74	42	86	60	98	62	67	48
7				.04							81	41	93	67	106	66	84	44
8						.08					77	52	88	64	86	52	78	55
9					.16	.04			72	30	82	48	93	73	79	61	80	46
10		.08							62	44	89	60	91	63	83	57	65	41
11						.35			44	33	83	65	78	56	84	48	49	36
12		.75				.12					79	63	90	54	95	61	52	39
13		.71							40	30	68	55	96	67	84	57	64	35
14		.08				.83			53	27	73	50	99	66	90	50	53	40
15				.28		.31			44	27	56	46	91	64	93	62	55	51
16		.04							55	23	71	36	81	59	75	56	58	49
17									72	37	75	41	83	59	97	54	64	49
18				.25	.39				71	48	74	48	87	64	91	67	56	41
19		.43	.87	.63		.08			57	40	76	59	88	65	77	57	46	34
20		.20	.55	.16					63	33	79	58	82	68	75	57	46	37
21			.75		.04				72	48	81	62	81	62	81	55	45	31
22			.51		.04				67	41	74	58	87	57	78	50	52	27
23					.12				75	48	81	54	78	55	83	60	67	31
24					.69				58	41	93	66	82	54	90	64	79	39
25					.16				71	38	84	68	86	57	87	63	81	45
26									82	50	80	54	91	64	90	59	82	42
27				.12					82	54	77	53	90	65	88	65	91	52
28				.04					73	46	75	53	88	64	96	62	76	40
29			.16						64	41	65	58	88	56	84	64	51	39
30		.04	.08	.04		.16			56	39	71	57	87	60	87	56	44	39
31									66	41			82	54	92	62		

KEY TO ABBREVIATIONS AND EVALUATIONS

Crop injury, crop stand and weed control ratings are based on a visual estimate using a scale of 0 to 100 with 0 = no effect and 100 = complete kill.

All preplant incorporated or preemergence treatments were applied in 17 gpa of water and all postemergence treatments except barban were applied in 8.5 gpa of water at 35 psi. Barban treatments were applied in 4.7 gpa water at 45 psi.

All treatments were applied with a bicycle wheel-type plot sprayer unless otherwise stated in the table. Preplant incorporation was by field cultivator + harrow or as stated in table and preemergence incorporation was by harrowing twice.

In sugarbeet experiments, weeds were counted in 40 square feet of the treated four rows and in 20 square feet of each of the two row untreated areas on the sides of the treated area. Sugarbeets were counted in 60 feet of row in th treated area.

Treatments with a + indicates tank mixtures and with an α indicates formulation mixtures.

Species

Abwo = Absinth wormwood
Barl = Barley
Bdlf = Broadleaf
Bygr = Barnyardgrass
Cath = Canada thistle
Cobu = Common cocklebur
Colq = Common lambsquarter
Copu = Common purslane
Dobr = Downy brome
Fach = False chamomile
Flwe = Flixweed
Fxtl = Foxtail species
Grft = Green foxtail
Grpw (Gfpw) = Greenflower pepperweed
Howe = Horseweed
Kocz = Kochia
Lesp = Leafy spurge
Mael = Marshelder
Mats = Marestail
Mesa = Meadow salsify
Nfcf = Nightflowering catchfly
Pest (Soth) = Perennial sowthistle
Powe = Pondweed
Prlt = Prickly lettuce
Prpw = Prostrate pigweed
Rrpw = Redroot pigweed
Ruth = Russian thistle
Soyb (Sobe) = Soybean
Sugb (Sube) = Sugarbeet
Sunf (Sufl) = Sunflower
Tamu = Tansy Mustard
Taoa = Tame oat
Tumu = Tumble mustard
Tymu = Tame yellow mustard
VSF = Volunteer sunflower
Vwht = Volunteer wheat
Wht = Wheat
Wibu = Wild buckwheat
Wimu = Wild mustard
Wioa = Wild oats
Yeft = Yellow foxtail

Methods

PPI = Preplant incorporated
PEI = Preemergence incorporated
PE = Preemergence
P, PO, POST = Postemergence

Miscellaneous

DF = Dry flowable
F = Fall
FL (F) = Flowable
S = Spring
L = Liquid
G = Granules
Inc(I) = Incorporation
%ir = Percent injury rating
%sr = Percent stand reduction
HT = Plant height
DMA = Dimethylamine
DEA = Diethylamine
SOTM = Soybean oil with 5.5% TMULZ VO
TM, LOTM = Linseed oil with 5.5% TMULZ VO
MOIS = Percent moisture
OC = Petroleum oil concentrate(17% emulsifier
Popl = Population
SPK = Spike stage
SURF, S = Surfactant
TW = Test weight
WP = Wettable powder
WK = Surfactant by Dupont
X-77 = Surfactant by Ortho
Bivt = Bivert

LIST OF HERBICIDES TESTED IN 1983

Common Name or Code Name	Abbreviation[a]	Chemical Name	Trade Name
AC-222,293	None	methyl 6-(4-isopropyl-4-methyl-5-oxo-2-imidazolin-2-yl)-m-toluate + methyl 2-(4-isopropyl-4-methyl-5-oxo-2-imidazolin-z-yl)-p-toluate	None
AC-252,214	None	3-quinoline carboxylic acid	None
Acetochlor	Acet	2-chlor-N(ethoxymethyl)-6'-ethyl-o-acetotoluidide	None
Acifluorfen	Acif	sodium 5-2-chloro-4-(trifluoromethyl)-phenoxy-2-nitrobenzoate	Blazer, Tackle
Alachlor	Alac	2-chloro-2',6'-diethyl-N-(methoxymethyl) acetanilide	Lasso
Ametryn	Amet	2-(ethylamino)-4-(isopropylamino)-6-(methylthio)-s-triazine	Evik
Amitrole	Amit	3-amino-s-triazole + ammonium thiocyanate	Amitrole
Asulam	Asul	methyl sulfanilycarbamate	Asulox
Atrazine	Atra	2-chloro-4-(ethylamino)-6-(isopropyl-amino)-s-triazine	AAtrex
Benazolin	Bena	4-chloro-2-oxo-3-benzothiazoline acetic acid	None
BAS-9052 OH	None	2-(N-ethoxybutyrimidoyl)-5-(2-ethylthio-propyl)-3-hydroxy-2-cyclohexen-1-one	Poast
Bentazon	Bent	3-isopropyl-1H-2,1,3-benzothiadiazin-(4) 3H-one 2,2-dioxide	Basagran
Bromoxynil	Brox	3,5-dibromo-4-hydroxybenzonitrile	Brominal, Buctril
Buthidazole	Buth	3-5(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl-4-hydroxy-1-methyl-2-imidazolid-inone	Ravage
Butylate	Buty	S-ethyl disobutylthiocarbamate	Sutan
Chloramben	Clam,Chlor	3-amino-2,5-dichlorobenzoic acid	Amiben
Chlorflurenol	None	methyl 2-chloro-9-hydroxyfluorene-9-carboxylate	Maintain
Chlorpropham	CIPC	isopropyl m-chlorocarbanilate	Furloe
Chlormequat chloride	CCC	(2-chloroethyl)trimethylammonium chloride	Cyclocel
Chlorsulfuron	Clsu	2-chloro-N (4-methoxy-6-methyl-1,3,5-triazine-2-yl)aminocarbonyl-benzene sulfonamide	Glean
Cyanazine	Cyan	2- 4-chloro-6-(ethylamino)-s-triazine-2-yl amino-2-methylpropionitrile	Bladex
CGA-82725	None	2-propynl 2-4(3,5-dichloro-2-pyridyloxy) phenoxy propanoate	None
Cycloate	Cycl	S-ethyl N-ethylthiocyclohexanecarbamate	Ro-Neet
Dalapon	Dala	2,2-dichloropropionic acid	Dowpon
Desmedipham	Desm	ethyl m-hydroxycarbanilate carbanilate	Betanex
Diallate	Dial	S-(2,3-dichloroally)diisoprophylthio-carbamate	Avadex
Dicamba	Dica	3,6-dichloro-o-anisic acid	Banvel
Dichlobeni	None	2,6-dichlorobenzonitrile	
Dikegulac sodium	None	2,3:4,6-bis-o-[1-methylylethylidene]-a-L-xylo-2-hexulofuranosonic acid	Assure

Common Name or Code Name	Abbreviation[a]	Chemical Name	Trade Name
Diclofop	Dicl	2- 4-(2,4-dichlorophenoxy)phenoxy propanoic acid	Hoelon
Diethatyl	Diet	N-chloroacetyl-N-(2,6-diethylphenyl)-glycine ethyl ester	Antor
Difenzoquat	Dife	1,2-dimethyl-3,5-diphenyl-1H-pyrazolium	Avenge
Dinoseb	Dino,SNBP	2-sec-butyl-4,6-dinitrophenol	Dow General, Premerge
Diuron	Diur	3-(3,4-dichlorophenyl)-1,1-dimethylurea	Karmex
DOWCO 356	None	2-(3,5-dichlorophenyl)-2-(2,2,2-trichloroethyl)oxirane	Tandem
DOWCO 453	None	methyl 2-(4-993-chloro-5-trifluoromethyl) -2 pyridinyl)oxyphenoxy) propanoate	None
DPX-F6025	None	Not released	
DPX-Y6202	None	2-[4-(6-chloro-2-quinoxalinyl)oxy] phenoxy propionic acid ethyl ester	
DPX-T6376	None	methyl 2- (4-methoxy-6-methyl-1,3,5-triazin-2-yl)amino carbonyl amino sulfonyl benzoate	None
Isouron	Isou	N- 5-(1,1-dimethyl ethyl)-3 isoxazoyl-N-N-dimethyl urea	Conserve
EL 5219	None	Oryzalin + trifluralin (1:1 mixture)	None
Endothall	Endo	7-oxabicyclo 2,2,1 heptane-2,3-dicarboxylic acid	Herbicide 273
EPTC	None	S-ethyl dipropylthiocarbamate	Eptam
Ethalfluralin	Etha	N-ethyl-N-(2-methyl-2-prophenyl)-2,6-dinitro-4-(triflurомethyl) benzenamine	Sonalan
Ethepon	Ethe	2-chloroethylphosphonic acid	Etherel
Ethofumesate	Etho	2-ethoxy-2,3-dihydro-3,3-dimethyl-5-benzofuranyl methanesulfonate	Nortron
Flamprop	Flam	N-benzoyl-N-(3-chloro-4-florophenyl)-DL-alanine	Mataven
Fluchloralin	Fluc	N-(2-chloroethyl)-2,6-dinitro-N-propyl-4-(trifluoromethyl)aniline	Basalin
Glyphosate	Glyp	N-(phosphonomethyl)glycine	Roundup
Hexazinone	Hexa	3-cyclohexyl-6-(dimethylamino)-1-methyl -s-triazine-2,4(1H,3H)-dione	Velpar
HOE 00661	None	Ammonium(3-amino-3-carboxypropyl)methyl phosphinate	None
HOE 0581	None	Not released	
KIH-3256	None	S-[(4-chlorophenyl)methyl] diethyl carbamothioate	None Lanray
Linuron	Linu	3-(3,4-dichlorophenyl)-1-methoxy-1-methylurea	Lorox
M 3785	None	2,4-D + 3,6-dichloropicolinic acid	None
M 3972	None	3,6-dichloropicolinic acid	Lontrel
M 4505	None	Picloram	None
M 4506	None	Picloram	None
MCPA	None	(4-chloro-o-tolyl)oxy acetic acid	Numerous
MCPP	None	2 (4-chloro-o-tolyl) oxy propionic acid	Numerous
Mefluidide	Mefl	N- 2,4-dimethyl-S- (trifluoromethyl) sulfonyl amino phenyl acetamide	Embark, Vistar

Common Name or Code Name	Abbreviation[a]	Chemical Name	Trade Name
Metham-sodium	Metham	sodium methyldithiocarbamate	Vapam
Metolachlor	Meto	2-chloro-N-(2-ethyl-6-methylphenyl)-N-(2-methoxy-1-methylethyl acetamide	Dual Sencor
Metribuzin	Metr	4-amino-6-tert-butyl-3-(methylthio)-as-triazine-5(4H)one	Lexone
MD 147	None	Not released	None
MSMA	None	monosodium methanearsonate	Bueno-6
Napropamide	None	2-(α-naphthoxy)-N,N-diethylpropionamide	Devrinol
Naptalam	Napt	N-1-napthylphtalamic acid	Alanap
Oryzalin	Oryz	3,5-dinitro-N^4, N^4-dipropylsulfanilamide	Surflan
Paraquat	Para	1,1'-dimethyl-4,4'-bipyridinium ion	Paraquat
Pendimethalin	Pend	N-(1-ethylpropyl)-2,6-dinitro-3,4-xylidine	Prowl
Phenmedipham	Phen	methyl m-hydroxycarbanilate m-methyl carbanilate	Batanal
Picloram	Picl	4-amino-3,5,6-trichloropicolinic acid	Tordon
PPG 124	None	p-chlorophenyl N-methylcarbamate	None
PPG 884	None	1-(carboxyethoxy)ethyl 5-[3-chloro-4-(trifluoromethyl) phenoxy]2-nitrobenzamide	Cobra
PPG 1013	None	Not released	None
PPG 1259		Not released	None
PP 009	None	butyl 2- 4-[(5-trifluoromethyl-2-pyridyl) oxy]phenoxy propanoate	Fusilade
PP-021	None	Na SaH 5-[2-chloro-4-(trifluoromethyl) phenoxy]-N-(methylsulfonyl)-2-nitrobenzamide	Flex
Pronamide	None	3,5-dichloro (N-1,1-dimethyl-2-propynyl) benzamide	Kerb
Prometryn	Prom	2,4-bis(isoprophylamino)-6-(methylthio) -s- triazine	Caparol
Propachlor	Prcl	2-chloro-N-isopropylacetanilide	Bexton, Ramrod
Propanil	Prnl	3,4-dichloropropionanilide	Stam,Stampede
Propham	Prph	isopropyl carbanilate	Chem Hoe-143
Pyrazon	Pyra	5-amino-4-chloro-2-phenyl-3(2H)-pyridazinone	Pyramin
R-25788	None	N,N-diallyl-2,2-dichloroacetamide	None
R-33865	Ext	Not released	None
R-40244	None	1-(m-trifluoromethylphenyl)-3-chlor-4-chloromethyl-2-pyrrolidine	Racer
RE 36290	None	E,E-2-1[[1-[(3-chloro-2-propanyl)oxy] imino]butyl]-5-[2-ethylthio)propyl] -3-nyoxy-2-cyclohexen-1-one	Selection
RH-8817	None	Not released	None
SC-0224	None	Trimethylsulfonium carbonymethyl aminomethyl phenyl	None
SC-1058	None	Not released	None
SD 95481	None	7-oxabicyclo(2,2,1)heptane-1-methyl-4-(1-methylethyl)-2-(2-methyl-phenylmethyl) -exo-	Cinch

Common Name or Code Name	Abbreviation[a]	Chemical Name	Trade Name
SSH 0860	None	1-amino-3-(2,2-dimethylpropyl-6-(ethylthio)1,3,5-triazine-2,4C1H, 3H-dione)	None
TCA	None	trichloroacetic acid	None
Tebuthiuron	None	N- 5-(1,1-dimethylethyl)-1,3,4-thiadiazol -2-yl -N,N'-dimethylurea	Graslan
Terbutryn	Terb	2(tert-butylamino)-4-(ethylamino)-6-(methylthio)-s-triazine	Igran
Triallate	Tria	S-(2,3,3-trichloroallyl)diisoprophylthio-carbamate	Far-go
Trifluralin	Trif	α,α,α-trifluoro-2,6-dinitro-N-N-dipropyl-p-toluidine	Treflan
2,4-D	None	(2,4-dichlorophenoxy) acetic acid	Numerous
2,4-DP		2-(2,4-dichlorophenoxy) propionic acid	
Vernolate	Vern	S-propyl dipropythiocarbamate	Vernam

[a]Abbreviations in the tables may consist of only the first one, two or three listed letters when space was limited. Abbreviations of numbered compounds varies with available space, but usually was the first letters and numbers.

SOIL TEST RESULTS AT VARIOUS WEED TRIAL LOCATIONS

	Soil Texture	Organic Matter	PH	lb/A N	P	K
Section 22 Fargo	Silty clay	6.5	7.5	Applied 70 lb/A N		
Mainstation Fargo	Silty clay	6.7	7.5	Applied 70 lb/A N		
Sugarbeet weed free	Silty clay	5.8	7.1	357	67	1200
Sugarbeet wild oat	Silty clay	4.8	7.9	268	26	650
Casselton ND	Silty clay	4.0	7.9	Applied 80 lb/A N		
Glyndon MN	Loam	4.6	7.9	26	23	295
Crookston MN	Silt Loam	4.7	8.0	57	18	205
St. Thomas ND	Silt Loam	5.4	7.8	67	26	520
Robbin MN	Silty clay loam	7.4	8.2	76	52	620
Renville MN	Clay Loam	6.3	7.2	109	73	585
Hillsboro ND	Silty clay	5.3	7.4	245	20	750
Colfax ND	Loam	5.3	8.2	81	24	450
Langdon ND	Clay Loam	4.6	7.8	Fertilized by test		
Minot ND	Loam	2.7	7.0	Fertilized by test		
Williston ND	Loam	2.3	6.8	Fertilized by test		
Carrington ND	Loam	3.6	7.2	Fertilized by test		

Fall and spring preplant incorporated herbicides, Crookston, 1982-1983. Fall herbicides were applied in 17 gpa water at 40 psi to the center four rows of six row plots October 28, 1982 when the air temp. = 47 F, six inch soil temp.=45F, wind south 8-10 mph, and excellent soil moisture. Incorporation was with a rototiller set four inches deep. The plot area had large amounts of grain stubble remaining on the soil surface when fall herbicides were applied. Spring herbicides were applied in 17 gpa water at 40 psi and rototiller incorporated May 18, 1983 when the air temp.=70F, six inch soil temp.=52F, and wind was south 10-20 mph. The rototiller was operated four inches deep for treatments containing EPTC or cycloate and two inches deep for all other spring treatments. ACH-30 sugarbeet seed was planted 1.25 inches deep in 22 inch rows on May 18. Sugarbeet injury was evaluated June 17. Redroot pigweed and green foxtail control were evaluated July 8.

Treatment	Rate (lb/A)	July 8 Rrpw cntl ratg	July 8 Grft cntl ratg	June17 Sgbt inj ratg
		(%)		
EPTC Fall	3	3	40	0
EPTC Fall	4	3	46	4
EPTC&R-33865 Fall	3	10	51	3
EPTC&R-33865 Fall	4	0	55	6
Cycloate Fall	4	13	55	0
Cycloate Fall	6	8	70	5
Cycloate&R-33865 Fall	4	0	74	4
EPTC+Cycloate Fall	2+3	4	75	6
EPTC+Diallate Fall	4+1.5	0	66	5
EPTC+Ethofumesate Fall	4+3	85	95	21
EPTC Spring	2.5	44	85	26
EPTC&R-33865 Spring	2.5	36	93	20
Cycloate Spring	4	29	95	14
EPTC+Diallate Spring	2.5+1.5	71	99	36
EPTC Fall/Diethatyl Spring	4/4	84	95	30
EPTC Fall/Ethofumesate Spring	4/3	96	98	28
EPTC Fall/TCA Spring	4/6	15	80	13
EPTC Fall/Cycloate Spring	4/2	38	91	10
Mean		30	76	13
High mean		96	99	36
Low mean		0	40	0
Coeff. of variation		50	19	40
LSD(1 Percent)		28	27	10
LSD(5 Percent)		21	20	7
No. of reps		4	4	4

Summary

Only fall EPTC plus spring ethofumesate gave over 90% control of both redroot pigweed and green foxtail. Fall EPTC + ethofumesate gave weed control superior to other fall applied treatments. Spring applied herbicides gave greater sugarbeet injury than fall applied herbicides.

Fall and spring preplant incorporated herbicides, St. Thomas, 1982-83. Fall herbicides were applied in 17 gpa water at 40 psi to the center four rows of six row plots on November 9, 1982 when the air temp.=33F, soil temp. at six inches=34F, wind was NE 0-5 mph, and top 0.5 to 1 inch of soil had frost present. Herbicides were incorporated with a rototiller set four inches deep. Spring herbicides were applied in 17 gpa water at 40 psi on May 9, 1983 when the air temp.=60F, soil temp. at six inches=51F, wind south 25-30 mph, and soil was extremely wet. Incorporation was with a rototiller set four inches deep for treatments containing EPTC or cycloate and two inches deep for others. Hilleshog Monoricca sugarbeet seed was planted 1.25 inches deep in 22 inch rows on May 9. Wild oat control was evaluated July 22. Sugarbeets were counted in 60 feet of treated row from each plot and 60 feet of untreated row adjacent to each plot to determine percent sugarbeet stand reduction.

Treatment	Rate (lb/A)	July 22 Wioa cntl ratg (%)	July 22 Sgbt stand reduc (%)
EPTC Fall	3	58	-9
EPTC Fall	4	94	-5
EPTC&R-33865 Fall	3	95	-8
EPTC&R-33865 Fall	4	100	1
Cycloate Fall	4	69	-15
Cycloate Fall	6	98	-14
Cycloate&R-33865 Fall	4	79	-9
EPTC+Cycloate Fall	2+3	89	-10
EPTC+Diallate Fall	4+1.5	86	-2
EPTC+Ethofumesate Fall	4+3	99	-1
EPTC Spring	2.5	87	-5
EPTC&R-33865 Spring	2.5	100	5
Cycloate Spring	4	60	3
EPTC+Diallate Spring	2.5+1.5	92	-1
EPTC Fall/Diethatyl Spring	4/4	98	5
EPTC Fall/Ethofumesate Spring	4/3	98	-4
EPTC Fall/TCA Spring	4/6	100	-2
EPTC Fall/Cycloate Spring	4/2	100	-5
Diethatyl+TCA Spring	6+6	98	-7
Ethofumesate+TCA Spring	3.75+6	99	-10
Mean		90	-5
High mean		100	5
Low mean		58	-15
Coeff. of variation		13	-240
LSD(1 Percent)		22	21
LSD(5 Percent)		16	16
No. of reps		4	4

Summary

Fall EPTC at 3 lb/A + extender (R-33865) gave wild oat control superior to fall EPTC at 3 lb/A alone. EPTC gave or tended to give wild oat control superior to cycloate.

Soil applied herbicides, Colfax, 1983. Preplant incorporated herbicides were applied in 17 gpa water at 40 psi to the center four rows of six row plots and rototiller incorporated April 26 when the air temp.=50F, six inch soil temp.= 47F, wind was NW 20-25 mph, and soil moisture in the top four inches of soil= 13%. The rototiller was set four inches deep for treatments containing EPTC or cycloate and two inches deep for other PPI treatments. Beta 1132 and Beta 1230 sugarbeet seed was planted 1.25 inches deep in 22 inch rows in three rows each of six row plots on April 27. Preemergence herbicides were applied to the center four rows of six row plots after planting on April 27. Green foxtail, redroot pigweed, common lambsquarters, and wild oat control and sugarbeet injury were evaluated June 27. Sugarbeets were counted June 30 in 60 feet of treated row for each plot and in 60 feet of untreated row adjacent to each plot to determine sugarbeet stand reduction.

		June 30	June 27				
Treatment	Rate (lb/A)	Sgbt stand reduc	Sgbt inj ratg	Grft cntl ratg	Rrpw cntl ratg	Colq cntl ratg	Wioa cntl ratg
		(%)					
EPTC	3	-14	0	45	10	10	64
EPTC+Cycloate	2+2	-16	11	88	60	71	78
EPTC+Cycloate	1.5+2.5	-27	0	83	73	77	71
Cycloate	4	-16	5	88	77	82	84
Diethatyl	6	-15	3	86	75	13	78
Ethofumesate	3.75	-18	9	94	97	89	88
Diethatyl+TCA	6+6	-19	4	94	78	27	81
Diethatyl+TCA (Preemergence)	6+6	-10	8	88	33	0	64
Ethofumesate+TCA	3.75+6	-5	16	97	95	92	91
Ethofumesate+TCA (Preemerge)	3.75+6	20	4	85	70	70	79
Diethatyl+EPTC	4+2	-5	5	90	87	58	93
Diethatyl+EPTC+Cycloate	4+1+1.5	-9	14	91	96	77	88
Ethofumesate+EPTC+Cycloate	3+1+1.5	-12	16	93	92	93	95
Diethatyl+Pyrazon-L	4+6	-7	3	81	92	88	58
Diethatyl+Ethofumesate	2+2	7	11	94	92	80	83
Diethatyl+Ethofumesate	2+3	-15	4	90	96	92	86
Diethatyl+Ethofumesate	4+2	-14	11	93	90	88	84
Diethatyl+Cycloate	4+3	-16	8	95	89	91	91
Ethofumesate+Cycloate	3+3	-14	16	98	97	97	95
Ethofumesate+Pyrazon-L	3+6	-17	9	95	95	94	88
Mean		-11	8	88	80	69	82
High mean		20	16	98	97	97	95
Low mean		-27	0	45	10	0	58
Coeff. of variation		-175	93	9	16	16	15
LSD(1 Percent)		36	13	15	28	24	22
LSD(5 Percent)		27	10	11	21	18	17
No. of reps		4	4	4	3	3	4

Summary

Preplant incorporated ethofumesate+TCA or diethatyl+TCA gave or tended to give weed control superior to the same treatments applied preemergence. Only ethofumesate+cycloate at 3+3 lb/A gave 95% or greater control of all weed species. Cycloate at 4 lb/A gave weed control superior to EPTC at 3 lb/A. The soil surface was still wet in spots during herbicide application so EPTC may have been lost by volatility more than the cycloate.

Soil applied herbicides, Hillsboro, 1983. Preplant incorporated herbicides were applied in 17 gpa water at 40 psi to the center four rows of six row plots and rototiller incorporated May 19 when air temp.= 60F, six inch soil temp.=50F, wind NE 10-20 mph, 11% soil moisture in top four inches of soil. The rototiller was operated four inches deep for any treatment containing EPTC or cycloate. All other treatments were incorporated two inches deep. ACH-30 sugarbeet seed was planted 1.25 inches deep in 22 inch rows May 19. Preemergence herbicides were applied to the center four rows May 19 after planting. Sugarbeet injury was evaluated June 16 and July 8 and kochia control was evaluated July 8. Sugarbeets were counted in 60 feet of treated row from each plot and 60 feet of untreated row adjacent to each plot to determine percent sugarbeet stand reduction.

Treatment	Rate (lb/A)	July11 Sgbt stand reduc	June16 Sgbt inj ratg	-- July 8 -- Sgbt inj ratg	Kocz cntl ratg
		(%)			
EPTC	3	4	23	18	40
EPTC+Cycloate	2+2	-20	8	4	39
EPTC+Cycloate	1.5+2.5	-3	4	6	20
Cycloate	4	-25	0	0	4
Diethatyl	6	-10	11	0	0
Ethofumesate	3.75	-26	4	8	75
Diethatyl+TCA	6+6	14	20	3	50
Diethatyl+TCA (Preemergence)	6+6	-6	3	0	3
Ethofumesate+TCA	3.75+6	6	11	5	75
Ethofumesate+TCA (Preemerge)	3.75+6	0	4	0	35
Diethatyl+EPTC	4+2	-6	20	11	25
Diethatyl+EPTC+Cycloate	4+1+1.5	-7	10	3	13
Ethofumesate+EPTC+Cycloate	3+1+1.5	-12	11	11	84
Diethatyl+Pyrazon-L	4+6	-14	5	0	0
Diethatyl+Ethofumesate	2+2	-9	1	4	28
Diethatyl+Ethofumesate	2+3	-26	5	0	56
Diethatyl+Ethofumesate	4+2	17	5	8	26
Diethatyl+Cycloate	4+3	-7	8	3	9
Ethofumesate+Cycloate	3+3	8	9	6	86
Ethofumesate+Pyrazon-L	3+6	-1	3	0	64
Mean		-6	8	4	36
High mean		17	23	18	86
Low mean		-26	0	0	0
Coeff. of variation		-362	96	156	38
LSD(1 Percent)		41	15	13	26
LSD(5 Percent)		31	11	10	20
No. of reps		4	4	4	4

Summary

Only treatments which included ethofumesate gave 75% or greater kochia control. The best kochia control without ethofumesate was only 50%. Ethofumesate+cycloate at 3+3 lb/A and ethofumesate+EPTC+cycloate at 3+1+1.5 lb/A gave or tended to give better kochia control than all other treatments. Preplant incorporated diethatyl+TCA and ethofumesate+TCA gave better kochia control than the same treatments applied preemergence. EPTC + cycloate at 2+2 lb/A or 1.5+2.5 lb/A gave less sugarbeet injury than EPTC at 3 lb/A.

Soil applied herbicides, Renville, 1983. Preplant incorporated herbicides were applied in 17 gpa water at 40 psi to the center four rows of six row plots and rototiller incorporated April 29 when the air temp.=47F, soil temp. at six inches=51F, wind NW 0-9 mph, and soil moisture in top four inches of soil was 18%. The rototiller was operated four inches deep for treatments containing EPTC or cycloate and two inches deep for all other PPI treatments. Beta 1132 and Beta 1230 sugarbeet seed was planted 1.25 inches deep in three rows each of a six row plot with rows 22 inches apart. Preemergence herbicides were also applied in 17 gpa water at 40 psi to the center four rows of six row plots on April 29 after planting. Sugarbeet injury and yellow foxtail control were evaluated June 20.

Treatment	Rate (lb/A)	June 20 Sgbt inj ratg (%)	June 20 Yeft cntl ratg (%)
EPTC	3	0	52
EPTC+Cycloate	2+2	5	92
EPTC+Cycloate	1.5+2.5	3	92
Cycloate	4	3	85
Diethatyl	6	3	89
Ethofumesate	3.75	0	85
Diethatyl+TCA	6+6	3	99
Diethatyl+TCA (Preemergence)	6+6	5	98
Ethofumesate+TCA	3.75+6	0	100
Ethofumesate+TCA (Preemerge)	3.75+6	5	93
Diethatyl+EPTC	4+2	10	86
Diethatyl+EPTC+Cycloate	4+1+1.5	10	91
Ethofumesate+EPTC+Cycloate	3+1+1.5	10	97
Diethatyl+Pyrazon-L	4+6	3	91
Diethatyl+Ethofumesate	2+2	4	89
Diethatyl+Ethofumesate	2+3	3	96
Diethatyl+Ethofumesate	4+2	9	97
Diethatyl+Cycloate	4+3	10	93
Ethofumesate+Cycloate	3+3	0	98
Ethofumesate+Pyrazon-L	3+6	3	91
Mean		4	91
High mean		10	100
Low mean		0	52
Coeff. of variation		143	7
LSD(1 Percent)		11	12
LSD(5 Percent)		9	9
No. of reps		4	4

Summary

Cycloate gave yellow foxtail control superior to EPTC. Preemergence diethatyl+TCA and ethofumesate+TCA gave yellow foxtail control equal to the same treatments with incorporation. Diethatyl+EPTC, diethatyl+EPTC+cycloate, diethatyl+cycloate, and ethofumesate+EPTC+cycloate caused significant sugarbeet injury. No difference was observed between Beta 1132 and Beta 1230 sugarbeet seed.

Soil applied herbicides, Robbin, 1983. Preplant incorporated herbicides were applied in 17 gpa water at 40 psi to the center four rows of six row plots and rototiller incorporated May 17 when the air temp.=66F, six inch soil temp.= 52F, wind was SW 15-20 mph, and soil moisture in top four inches was 17.5%. The rototiller was operated four inches deep for treatments containing EPTC or cycloate and two inches deep for all other treatments. Hilleshog Monoricca sugarbeet seed was planted 1.25 inches deep in 22 inch rows on May 17. Preemergence herbicides were applied to the center four rows May 17 after planting. Sugarbeet injury was evaluated June 17 and July 11. Common lambsquarters and wild oats control were evaluated July 11. Sugarbeets were counted in 60 feet of treated row in each plot and 60 feet of untreated row adjacent to each plot to determine percent sugarbeet stand reduction.

Treatment	Rate (lb/A)	July12 Sgbt stand reduc	June17 Sgbt inj ratg	July 11 Sgbt inj ratg	July 11 Colq cntl ratg	July 11 Wioa cntl ratg
				(%)		
EPTC	2.5	7	25	11	78	92
EPTC+Cycloate	2+2	3	19	3	81	95
EPTC+Cycloate	1.5+2.5	6	15	3	91	95
Cycloate	4	2	5	0	79	93
Diethatyl	6	7	14	3	38	70
Ethofumesate	3.75	-1	13	0	85	88
Diethatyl+Diallate	6+1	7	19	10	81	88
Ethofumesate+Diallate	3.75+1	-4	13	3	96	98
Diethatyl+TCA	6+6	1	20	3	71	90
Diethatyl+TCA (preemergence)	6+6	3	1	0	5	7
Ethofumesate+TCA	3.75+6	-9	18	5	92	93
Ethofumesate+TCA (preemerge)	3.75+6	-11	0	0	28	30
Diallate	4	3	18	3	93	99
Diethatyl+EPTC	4+2	14	40	20	91	97
EPTC+Diallate	2.5+1	2	28	9	95	96
Diethatyl+EPTC+Cycloate	4+1+1.5	6	21	9	84	100
Ethofumesate+EPTC+Cycloate	3+1+1.5	8	33	20	96	97
Diethatyl+Ethofumesate	2+2	5	10	0	69	97
Diethatyl+Ethofumesate	2+3	-1	18	3	73	85
Diethatyl+Ethofumesate	4+2	1	15	3	79	95
Diethatyl+Cycloate	4+3	8	13	5	83	99
Ethofumesate+Cycloate	3+3	5	26	6	98	100
Mean		3	17	5	77	87
High mean		14	40	20	98	100
Low mean		-11	0	0	5	7
Coeff. of variation		333	43	127	15	13
LSD(1 Percent)		17	14	12	21	25
LSD(5 Percent)		13	10	9	16	18
No. of reps		4	4	4	4	3

Summary

Diallate at 4 lb/A gave 93% control of common lambsquarters. Preplant incorporated diethatyl+TCA and ethofumesate+TCA gave weed control superior to the same treatments applied preemergence. Diethatyl+EPTC and ethofumesate+EPTC+cycloate gave more sugarbeet injury on July 11 than all other treatments.

Soil applied and postemergence herbicides, Crookston, 1983. Soil applied herbicides were applied in 17 gpa water at 40 psi to the center four rows of six row plots on May 18 when the air temp.=70F, six inch soil temp.=52F, wind was south 10-20 mph, and soil moisture in the top 4 inches of soil=11.5%. Incorporation was by a rototiller operated four inches deep for treatments containing EPTC or cycloate and 2 inches deep for other PPI treatments. ACH-30 sugarbeet seed was planted 1.25 inches deep in 22 inch rows on May 18. Single application postemergence treatments and the first half of split applied postemergence treatments were applied in 17 gpa water at 40 psi 2:00 pm June 17 (air temp.=72F, 6 inch soil temp.=65F, rel. hum.=46%, wind south 10-15 mph, soil moisture in top 4 inches of soil=16%) when sugarbeets were in the 4 to six leaf stage, redroot pigweed was 4-8 leaf, prostrate pigweed was 1-2 inches in diameter, and green foxtail was 1-3 inches tall. The second half of split applied treatments was applied 12:15 pm June 24 when the air temp.=85F, six inch soil temp.=75F, relative humidity=63%, wind was south 10-15 mph, and soil moisture in top 4 inches of soil=15%. The late application of PP-009+OC was 10:15 am July 26 when the air temp.=77F, soil temp.=71F, and relative humidity=63%. Plots with soil applied herbicides were evaluated for sugarbeet injury and green foxtail and redroot pigweed control on June 17 before postemergence herbicides were applied. Sugarbeet injury and green foxtail, redroot pigweed, prostrate pigweed, and wild buckwheat control were evaluated July 5. Sugarbeets were counted July 28 in 60 feet of treated row from each plot and in 60 feet of untreated row adjacent to each plot. Redroot pigweed was counted August 11 in 40 square feet of treated area from each plot and in 40 square feet of untreated area adjacent to each plot.

		June 17		
Treatment	Rate (lb/A)	Sugarbeet injury rating	Green Foxtail control rating	Redroot Pigweed control rating
		(%)		
EPTC (ppi)	2	33	100	97
EPTC+Cycloate (ppi)	1.5+2.5	30	100	98
Diethatyl (ppi)	6	30	99	100
Diethatyl (preemergence)	6	20	98	99
Ethofumesate (ppi)	3.75	21	98	92
Ethofumesate (preemergence)	3.75	21	96	98
Diethatyl (preemergence)	6	28	98	99
Diethatyl (preemergence)	6	20	96	99
Ethofumesate (preemergence)	3.75	31	99	98
Diethatyl (preemergence)	6	21	99	99
Ethofumesate (preemergence)	3.75	24	100	99
Mean		25	98	98
High mean		33	100	100
Low mean		20	96	92
Coeff. of variation		27	2	4
LSD(1 Percent)		13	4	7
LSD(5 Percent)		10	3	5
No. of reps		4	4	4

Summary

All soil applied treatments gave excellent control of green foxtail and redroot pigweed on June 17. Sugarbeet stunting was evident June 17 but stand counts July 28 did not indicate significant stand loss.

Soil applied and postemergence herbicides, Crookston, 1983. (continued)

Treatment*	Rate (lb/A)	7-28 Sgbt stand reduc	July 5 Sgbt inj ratg	Grft cntl ratg	Prpw cntl ratg	Wibw cntl ratg	Rrpw cntl ratg	8-11 Rrpw stand reduc
				(%)				
EPTC (ppi)	2	3	0	96	68	40	58	14
EPTC+Cycloate (ppi)	1.5+2.5	-3	0	98	77	30	71	27
Diethatyl (ppi)	6	-7	0	96	90	0	94	60
Diethatyl (preemergence)	6	-3	0	96	87	0	93	83
Ethofumesate (ppi)	3.75	-15	0	92	71	75	94	76
Ethofumesate (preemergence)	3.75	-7	0	94	68	58	94	88
BAS-9052+OC	.2+.25G	-5	0	98	0	0	0	-30
PP-009+OC	.25+.25G	-5	0	94	0	0	0	-17
Diet (pre)/PP-009+OC June 17 & July 26	6/.5+.25G	7	0	100	83	0	96	85
Dowco-453+OC	.1+.25G	-9	0	100	0	0	0	-41
DPX-Y6202+OC	.1+.25G	-11	0	100	0	0	0	-58
Desmedipham	1	-12	0	18	97	75	92	86
Desmedipham+OC	1+.25G	-8	0	45	96	93	94	84
Desmedipham+BAS-9052+OC	1+.2+.25G	4	0	96	87	83	88	56
Desmedipham+PP-009+OC	1+.25+.25G	-5	3	74	91	65	84	27
Desmedipham+Dowco-453+OC	1+.1+.25G	-18	0	98	95	75	90	26
Desmedipham+DPX-Y6202+OC	1+.1+.25G	-10	0	90	89	70	85	40
Desmed/Desm+BAS-9052+OC	.5/.5+.2+.25G	-6	3	99	98	96	96	43
Desmed/Desm+PP-009+OC	.5/.5+.25+.25G	-4	4	86	95	90	93	52
Desmedipham+Dalapon	1+2	-12	13	99	89	88	89	23
Desmedipham+Dalapon 2X Split	.5+1	-8	9	99	98	95	95	54
Diethatyl (pre)/Desmed 2X Split	6/.5	18	0	99	100	100	100	98
Ethofume (pre)/Desmed 2X Split	3.75/.5	-3	0	100	100	100	100	97
Diet (pre)/Desm/Desm+BAS-9052+OC	6/.5/.5+.2+.25G	13	3	99	100	95	100	92
Etho (pre)/Desm/Desm+BAS-9052+OC	3.75/.5/.5+.2+.25G	-2	0	100	100	100	100	99
Etho+Desm+BAS-9052+OC 2X Split	.75+.375+.1+.+.125G	-15	11	100	100	100	100	95
Mean		-5	2	91	76	59	77	48
High mean		18	13	100	100	100	100	99
Low mean		-18	0	18	0	0	0	-58
Coeff. of variation		-256	199	5	12	19	9	34
LSD(1 Percent)		22	6	9	20	32	12	30
LSD(5 Percent)		17	5	7	15	23	9	23
No. of reps		4	4	4	3	2	4	4

*OC=oil concentrate, AT+411F

Summary

Visible sugarbeet injury was less on July 5 than on June 17. Preemergence (non-incorporated) diethatyl and ethofumesate gave weed control similar to incorporated diethtyl and ethofumesate. Rainfall totaled 1.2 inches the first week after application which explains the good performance of the preemergence herbicides. Diethatyl gave prostrate pigweed control superior to ethofumesate. Ethofumesate gave wild buckwheat control superior to diethatyl. All treatments except desmedipham, desmedipham+OC, desmedipham+PP-009+OC, and desmedipham / desmedipham+PP-009+OC gave 90% or greater control of green foxtail. Nearly total weed control was obtained from postemergence treatments over preemergence diethatyl and ethofumesate and from postemergence split applied ethofumesate + desmedipham + BAS-9052 + oil concentrate at 0.75 + 0.375 + 0.1 lb/A + 1 pint/A for each application. Green foxtail control by the postemergence grass herbicides used without desmedipham resulted in higher populations of redroot pigweed in the treated area than in the untreated checks.

Preplant incorporated, preemergence, and postemergence applied herbicides, St. Thomas, 1983. Preplant incorporated herbicides were applied May 16 to the center four rows of six row plots and rototiller incorporated four inches deep when the herbicide treatment included EPTC or cycloate. All other preplant herbicides were incorporated two inches deep with a rototiller. Hilleshog Monoricca sugarbeet seed was planted 1.25 inches deep in 22 inch rows May 16 when the air temp.=60F sunny and clear, six inch soil temp.=50F, soil moisture was very wet with damp soil surface, and wind was NW 0-3 mph. Preemergence herbicides were applied to the center four rows of six row plots on May 16 after planting. Postemergence herbicides were applied 10:00 am July 1 (air temp.=68F, six inch soil temp.=64F, soil moisture in top 4 inches of soil=15.5%, rel. hum.=76%, cloudy, wind NW 0-3 mph) when green and yellow foxtail were 1.5-15 inches tall and wild oats was 12-24 inches tall. All herbicide applications were in 17 gpa water at 40 psi pressure. Green and yellow foxtail control and wild oats control were evaluated July 22.

Treatment*	Time of Application	Rate (lb/A)	July 22 Grft Yeft cntl ratg (%)	July 22 Wioa cntl ratg (%)
EPTC	PPI	2	94	100
Cycloate	PPI	4	94	99
EPTC+Cycloate	PPI	1.5+2.5	96	100
Ethofumesate	PPI	3.75	94	99
Ethofumesate	PRE	3.75	22	13
Diethatyl	PPI	6	100	98
Diethatyl	PRE	6	86	40
Diethatyl+Diallate	PPI	6+1.5	97	100
Diethatyl+TCA	PPI	6+6	100	98

(continued on next page)

Table (continued)

Treatment*	Time of Application	Rate (lb/A)	July 22 Grft Yeft cntl ratg (%)	July 22 Wioa cntl ratg (%)
Desmedipham	POST	1	0	0
Desmedipham+OC	POST	1+.25G	3	0
BAS-9052+OC	POST	.2+.25G	99	100
PP-009+OC	POST	.25+.25G	95	94
Dowco-453+OC	POST	.1+.25G	96	99
DPX-Y6202+OC	POST	.1+.25G	95	99
Desm+BAS-9052+OC	POST	1+.2+.25G	91	98
Desm+PP-009+OC	POST	1+.25+.25G	85	99
Desm+Dowco-453+OC	POST	1+.1+.25G	90	94
Desm+DPX-Y6202+OC	POST	1+.1+.25G	90	85
Desmedipham+Dalapon	POST	1+2	93	88
Desmedipham+Endothall	POST	1+.5	58	55
Desm+Endothall+OC	POST	1+.5+.25G	35	40
Diethatyl+Diallate/Desmed	PPI/POST	6+1.5/1	97	99
Diethatyl/Desmedipham	PRE/POST	6/1	96	48
Diet/Des+BAS-9052+OC	PRE/POST	6/1+.2+.25G	99	100
Ethofumesate/Desmedipham	PRE/POST	3.75/1	85	78
Etho/Des+BAS-9052+OC	PRE/POST	3.75/1+.2+.25G	99	100
Ethofumesate+Desmedipham	POST	1.5+.75	8	42
Etho+Desm+BAS-9052+OC	POST	1.5+.75+.2+.25G	92	92
Etho+Desm+Dowco-453+OC	POST	1.5+.75+.1+.25G	89	98
Diethatyl/Trifluralin+Desm	PRE/POST	6/.75+1	93	77
Diet/Trif+Des+BAS+OC	PPI/POST	6/.75+1+.2+.25G	99	100
Mean			80	79
High mean			100	100
Low mean			0	0
Coeff. of variation			15	15
LSD(1 Percent)			22	25
LSD(5 Percent)			16	19
No. of reps			4	3

* OC = oil concentrate, AT+411F

Summary

Preemergence ethofumesate and diethatyl gave less control of wild oats and green and yellow foxtail than incorporated ethofumesate and diethatyl. BAS-9052, Dowco-453, PP-009, and DPX-Y6202 tended to give less control of green and yellow foxtail when used with desmedipham than when used alone.

Postemergence herbicides, Colfax, 1983. Beta 1132 and Beta 1230 sugarbeet seed was planted 1.25 inches deep in 22 inch rows in three rows each of six row plots on April 27. The first half of split application treatments were applied 7:30 am May 27 (air temp.=61F, six inch soil temp.=62F, relative humidity=59%, wind SE 10 mph, soil moisture in top 4 inches of soil=10.5%) when many weeds were just emerging. Sugarbeets were cotyledon to 2 leaf stage, green foxtail emerging to one inch tall, kochia emerging to 1.5 inch rosette diameter, redroot pigweed was in the cotyledon stage, wild oat 1 leaf to 4 inches tall, and common lambsquarters was cotyledon to 4 leaf. The air temperature on May 27 reached the mid-80's by mid-afternoon. The second half of split application treatments and all single application treatments were applied 5:00 pm June 1 (air temp.=73F, six inch soil temp.=64F, relative humidity=29%, wind south 5 mph, and soil moisture in the top four inches of soil=10.5%) when sugarbeets were in the 2-4 leaf stage, green foxtail emerging to 2 inches tall, kochia emerging to 1.5 inch rosette diameter, redroot pigweed cotyledon to 4 leaf, wild oat 3-6 inches tall, and common lambsquarters 2 leaf stage to 2 inches tall. All herbicides were applied in 17 gpa water at 40 psi. Sugarbeets were counted June 30 in 60 feet of treated row from each plot and in 60 feet untreated row adjacent to each plot to determine sugarbeet stand reduction. Sugarbeet injury was evaluated June 10 and June 27. Green foxtail, wild oat, redroot pigweed, common lambsquarters, and kochia control were evaluated June 27.

Treatment*	Rate (lb/A)	6-10 Sgbt inj ratg	6-27 Sgbt injratg	6-30 Sgbt standreduc	June 27 Grft cntl ratg	June 27 Wioa cntl ratg	June 27 Rrpw cntl ratg	June 27 Colq cntl ratg	June 27 Kocz cntl ratg
					(%)				
Desmedipham	1	9	1	16	31	18	87	89	65
Desmedipham+OC	1+.25G	25	16	2	35	30	90	91	75
Desmedipham+Dalapon	1+2	31	30	18	90	45	93	97	78
Desmedipham+Dalapon 2X Split	.5+1	26	20	5	89	53	91	96	90
Desmedipham+Endothall	1+.5	13	10	1	60	43	93	85	70
Desmedipham+Endothall+OC	1+.5+.25G	13	15	-7	54	53	89	89	60
Desm+Endothall+OC 2X Splt	.5+.25+.125G	44	34	24	74	73	91	97	88
Desm+BAS-9052+OC	1+.2+.25G	28	14	7	95	90	91	93	70
Desmedipham+PP-009+OC	1+.25+.25G	21	15	0	91	92	93	90	75
Desmedipham+Dowco-453+OC	1+.1+.25G	24	19	-10	99	99	90	94	80
Desmedipham+DPX-Y6202+OC	1+.1+.25G	16	11	-4	96	90	91	93	68
Desm+BAS-9052+OC 2X Split	.5+.1+.125G	41	30	16	95	98	95	97	83
Desmed+PP-009+OC 2X Splt	.5+.125+.125G	63	39	26	93	100	92	98	93
Des/Des+BAS-90+OC Split	.5/.5+.2+.25G	23	15	2	96	84	96	99	88
Des/Des+PP-009+OC Split	.5/.5+.25+.25G	14	19	4	90	95	90	94	83

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Treatment*	Rate (lb/A)	6-10 Sgbt inj ratg	6-27 Sgbt injratg	6-30 Sgbt standreduc	June 27 Grft cntl ratg	Wioa cntl ratg	Rrpw cntl ratg	Colq cntl ratg	Kocz cntl ratg
					(%)				
BAS-9052+OC	.2+.25G	0	0	0	98	98	0	0	0
PP-009+OC	.25+.25G	0	0	1	93	99	0	0	0
Dowco-453+OC	.1+.25G	0	0	-22	98	99	0	0	0
DPX-Y6202+OC	.1+.25G	0	0	-2	97	99	0	0	0
Ethofumesate+Desmedipham	1.5+.75	38	26	-6	74	59	98	99	90
Etho+Desm+BAS-9052+OC	1.5+.75+.2+.25G	35	21	2	93	97	97	99	95
Et+De+BAS90+OC 2X Sp	.75+.375+.1+.125G	61	36	19	94	98	97	98	93
Desmedipham+PP-009+OC	1+.2+.25G	15	16	8	85	85	91	89	70
Desmedipham+PP-009+OC	1+.4+.25G	13	6	-8	96	97	89	85	75
Desmedipham+BAS-9052+OC	1+.3+.25G	20	11	-2	97	99	93	91	70
Mean		23	16	4	84	79	77	78	66
High mean		63	39	26	99	100	98	99	95
Low mean		0	0	-22	31	18	0	0	0
Coeff. of variation		36	45	439	7	13	4	7	11
LSD(1 Percent)		15	13	29	11	19	6	10	21
LSD(5 Percent)		12	10	22	9	15	5	7	15
No. of reps		4	4	4	4	4	4	4	2

*OC=oil concentrate, AT+411F

Summary

The first half of the split applications were applied 5 days prior to the single, full-rate treatments and the second half of the splits. The sugarbeets were small and the temperature was high when the first half of the split applications were applied and this caused considerable sugarbeet injury. The applications made 5 days later to larger sugarbeets with a cooler temperature did not cause as much sugarbeet injury. Thus split applications generally gave more sugarbeet injury than single full-rate applications. Desmedipham+OC gave more sugarbeet injury than desmedipham. Desmedipham at 0.5 lb/A followed by desmedipham+BAS-9052+OC at 0.5+0.2+0.25G 5 days later gave less sugarbeet injury than desmedipham + BAS-9052 + OC at 0.5+0.1+0.125G applied twice, 5 days apart. Thus, the oil concentrate caused more increase in sugarbeet injury when combined with desmedipham and applied to small sugarbeets. The same was true with the PP-009 combination. There was no difference between Beta 1132 and Beta 1230 sugarbeets.

Postemergence grass herbicides, Fargo, 1983. Bush Johnson Monofort sugarbeet seed was planted 1.25 inches deep in 22 inch rows May 6. All herbicide applications were applied in 17 gpa water at 40 psi to the center four rows of six row plots. The first half of the split application treatments was applied 12:00 noon May 28 (air temp.= 73 F, soil temp. at six inches=62F, relative humidity=33%, wind was north at 20 mph, soil moisture was 13% in the top four inches of soil). Single application treatments, the second half of split treatments, and "day 1" treatments of desmedipham and BAS-9052 were applied June 1 (air temp.=69F, six inch soil temp.=56F, rel. humidity=40%, wind was north 3-5 mph, soil moisture in top four inches of soil was 13.5%) when sugarbeets were cotyledon to 2 leaf and wild oats was 1-3 leaf (2-5 inches tall). Desmedipham and BAS-9052 "day 2" and "day 3" treatments were applied 4:30 pm June 2 and 6:30 pm June 3 when the air temperature was 74F. Sugarbeet injury and wild oats control were evaluated June 9. A later evaluation of wild oats control was June 25.

		--- June 9 ---		June25
Treatment*	Rate (lb/A)	Sgbt inj ratg	Wioa cntl ratg	Wioa cntl ratg
		----------(%)----------		
PP-009+OC	.2+.25G	0	55	92
PP-009+OC	.25+.25G	0	66	97
PP-009+OC	.4+.25G	0	73	97
BAS-9052+OC	.2+.25G	0	61	90
BAS-9052+OC	.3+.25G	0	78	97
BAS-9052+OC	.4+.25G	0	81	99
Dowco-453+OC	.075+.25G	0	69	95
Dowco-453+OC	.1+.25G	0	75	97
Dowco-453+OC	.125+.25G	0	81	97
DPX-Y6202+OC	.075+.25G	0	63	96
DPX-Y6202+OC	.1+.25G	0	66	94
DPX-Y6202+OC	.125+.25G	0	73	96
Dalapon+Surfactant	3+.5%	10	45	63
Barban	1	0	45	60
Diclofop	1.5	3	55	82
Desmedipham	1	28	21	13
Desmedipham+OC	1+.25G	38	23	13
Desmedipham+Surfactant	1+.5%	34	21	14
Desmedipham+PP-009+OC	1+.2+.25G	37	82	74
Desmedipham+PP-009+OC	1+.25+.25G	40	88	87
Desmedipham+PP-009+OC	1+.4+.25G	51	88	92
Desmedipham+BAS-9052+OC	1+.2+.25G	34	88	78
Desmedipham+BAS-9052+OC	1+.3+.25G	33	88	81
Desmedipham+BAS-9052+OC	1+.4+.25G	50	88	95
Desmedipham+Dowco-453+OC	1+.075+.25G	46	89	93
Desmedipham+Dowco-453+OC	1+.1+.25G	26	83	95
Desmedipham+Dowco-453+OC	1+.125+.25G	33	86	95
Desmedipham+DPX-Y6202+OC	1+.075+.25G	36	85	74
Desmedipham+DPX-Y6202+OC	1+.1+.25G	43	86	79
Desmedipham+DPX-Y6202+OC	1+.125+.25G	33	83	83

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Treatment*	Rate (lb/A)	June 9 Sgbt inj ratg	June 9 Wioa cntl ratg	June25 Wioa cntl ratg
			(%)	
Desmedipham+PP-009+Surf.	1+.2+.25%	31	76	71
Desmedipham+PP-009+Surf.	1+.25+.25%	29	71	73
Desmedipham+BAS-9052+Surf.	1+.2+.25%	29	75	72
Desmedipham+BAS-9052+Surf.	1+.3+.25%	29	78	76
Desmedipham+Dowco-453+S	1+.075+.25%	21	68	70
Desm+Dowco-453+Surf.	1+.1+.25%	33	78	87
Desmedipham+DPX-Y6202+S	1+.075+.25%	10	55	55
Desmedipham+DPX-Y6202+Surf.	1+.1+.25%	26	74	68
Desm+PP-009+OC 2X Split	.5+.125+.125G	16	96	89
Desm+BAS-9052+OC 2X Split	.5+.1+.125G	25	97	88
Desm+Dowco-453+OC 2X Splt	.5+.05+.125G	26	99	94
Desm+DPX-Y6202+OC 2X Splt	.5+.05+.125G	20	97	88
Des/Des+PP009+OC Split	.5/.5+.25+.25G	15	90	85
Des/Des+BAS9052+OC Splt	.5/.5+.2+.25G	16	96	87
Des/Des+Dow453+OC Split	.5/.5+.1+.25G	18	95	94
Des/Des+DPX-Y+OC Split	.5/.5+.1+.25G	26	94	83
Desm(day1)/BAS9052+OC(day2)	1/.2+.25G	29	69	82
Desm(day1)/BAS9052+OC(day3)	1/.2+.25G	21	60	93
BAS9052+OC(day1)/Desm(day2)	.2+.25G/1	19	71	96
BAS9052+OC(day1)/Desm(day3)	.2+.25G/1	9	76	96
Mean		20	74	81
High mean		51	99	99
Low mean		0	21	13
Coeff. of variation		34	9	6
LSD(1 Percent)		12	12	8
LSD(5 Percent)		10	9	6
No. of reps		4	4	4

*OC=oil concentrate, AT+411F
*Surf=surfactant WK

Summary

Wild oat control was not complete by June 9 so wild oat control ratings increased from June 9 to June 25. The June 9 ratings indicated a synergism between desmedipham and the grass herbicides but the June 25 rating indicates antagonism. The leaf burn from desmedipham was present on June 9 which increased control ratings but more wild oats recovered from the combination treatments than from the grass herbicides alone. Increasing rates of the grass herbicides overcame most of the antagonism except with DPX-Y6202. Combinations with oil concentrate gave better wild oat control than those with surfactant. Desmedipham+OC gave more sugarbeet injury than desmedipham. Application of desmedipham one or two days prior to BAS-9052+OC gave less wild oat control and greater sugarbeet injury than application of BAS-9052+OC one or two days prior to desmedipham.

Postemergence herbicides, Renville, 1983. Beta 1132 and Beta 1230 sugarbeets were planted in three rows each of six row plots on April 29. Sugarbeet rows were 22 inches apart and seed was planted 1.25 inches deep. Herbicides were applied in 17 gpa water at 40 psi to the center four rows of six row plots when sugarbeets had 4 leaves, common lambsquarters was 1-2 inches tall, redroot pigweed was 0.5-1 inch tall and yellow foxtail was 1.5 inches tall. Herbicides were applied June 3 when the air temp.=70F, six inch soil temp.=62F, relative humidity=52%, and wind speed was 15 mph. Weed control and crop injury were evaluated June 20.

Treatment*	Rate (lb/A)	June 20 Sgbt inj ratg	June 20 Yeft cntl ratg	June 20 Rrpw cntl ratg	June 20 Colq cntl ratg
			(%)		
Desmedipham	1	6	23	95	95
Desmedipham+OC	1+.25G	8	45	95	94
Desmedipham+Dalapon	1+2	26	88	95	94
Desmedipham+Endothall	1+.5	8	41	91	83
Desmedipham+Endothall+OC	1+.5+.25G	25	70	94	94
Desmedipham+PP-009+OC	1+.25+.25G	14	84	93	91
Desmedipham+BAS-9052+OC	1+.2+.25G	14	100	98	95
Desmedipham+Dowco-453+OC	1+.1+.25G	11	98	98	93
PP-009+OC	.25+.25G	3	96	0	0
BAS-9052+OC	.2+.25G	0	100	0	0
Dowco-453+OC	.1+.25G	3	98	0	0
Ethofumesate+Desmedipham	1.5+.75	29	70	100	100
Etho+Desm+BAS-9052+OC	1.5+.75+.2+.25G	28	100	99	99
Etho+Desm+PP-009+OC	1.5+.75+.25+.25G	25	92	98	99
Etho+Desm+Dowco453+OC	1.5+.75+.1+.25G	31	98	100	100
Desm+DPX-Y6202+OC	1+.1+.25G	9	85	94	91
DPX-Y6202+OC	.1+.25G	0	99	0	0
Mean		14	82	73	72
High mean		31	100	100	100
Low mean		0	23	0	0
Coeff. of variation		42	17	4	8
LSD(1 Percent)		11	26	6	10
LSD(5 Percent)		8	19	4	8
No. of reps		4	4	4	4

* OC = oil concentrate, AT+411F

Summary

All treatments which included desmedipham gave good to excellent control of redroot pigweed and common lambsquarters. Desmedipham combined with dalapon, ethofumesate, or endothall+OC gave more sugarbeet injury than the other treatments. Beta 1132 and Beta 1230 sugarbeets responded similarly to the herbicides so the data on sugarbeet injury was combined over varieties.

Postemergence herbicides, Robbin, 1983. Hilleshog Monoricca sugarbeet seed was planted 1.25 inches deep in 22 inch rows May 17. Preemergence herbicides were applied in 17 gpa water at 40psi to the center four rows of six row plots May 17 after planting (air temp.=66F, six inch soil temp.=52F, wind SW 15-20 mph). Postemergence herbicides were applied in 17 gpa water at 40 psi to the center four rows of six row plots 9:30 am June 17 (air temp.=69F, six inch soil temp.=56F, relative humidity=51%, wind was south 5 mph, soil moisture in top four inches of soil = 20.5%) when sugarbeets were 2-6 leaf, common lambsquarters was 1-5 inches tall, wild oat was 2-5 leaf (3-8 inches tall). Sugarbeets were counted July 12 in 60 feet of treated row from each plot and in 60 feet of untreated row adjacent to each plot to determine sugarbeet stand reduction. Sugarbeet injury and common lambsquarters and wild oat control were evaluated July 11.

Treatment*	Rate (lb/A)	July12 Sgbt stand reduc	July 11 Sgbt inj ratg	July 11 Colq cntl ratg	July 11 Wioa cntl ratg
		(%)			
Desmedipham	1	-16	3	92	45
Desmedipham+OC	1+.25G	7	13	92	40
Desmedipham+Dalapon	1+2	9	23	96	67
Desmedipham+Endothall	1+.5	3	6	89	38
Desmedipham+Endothall+OC	1+.5+.25G	1	10	93	61
Desmedipham+PP-009+OC	1+.25+.25G	-5	6	89	97
Desmedipham+BAS-9052+OC	1+.2+.25G	3	14	94	93
Desmedipham+Dowco-453+OC	1+.1+.25G	-4	9	92	99
PP-009+OC	.25+.25G	-8	0	0	96
BAS-9052+OC	.2+.25G	-2	0	0	100
Dowco-453+OC	.1+.25G	-7	0	0	100
Ethofumesate+Desmedipham	1.5+.75	1	11	99	55
Etho+Desm+BAS-9052+OC	1.5+.75+.2+.25G	1	15	98	95
Etho+Desm+PP-009+OC	1.5+.75+.25+.25G	0	13	98	97
Etho+Desm+Dowco453+OC	1.5+.75+.1+.25G	-4	10	98	100
Diet(pre)/Desm+BAS-90+OC	6/1+.2+.25G	-5	5	93	98
Eth(pre)/Des+BAS-90+OC	3.75/1+.2+.25G	7	10	99	99
Mean		-1	9	78	81
High mean		9	23	99	100
Low mean		-16	0	0	38
Coeff. of variation		-936	69	5	9
LSD(1 Percent)		19	11	7	14
LSD(5 Percent)		15	8	6	11
No. of reps		4	4	4	4

*OC=oil concentrate, AT+411F

Summary

All treatments that included desmedipham gave good to execellent common lambsquarters control. All treatments that included PP-009, BAS-9052, or Dowco-453 gave 93% or better control of wild oat. Addition of oil concentrate or dalapon to desmedipham increased sugarbeet injury compared to desmedipham alone.

Kochia control with split applications of postemergence herbicides, Glyndon, 1983. Bush Johnson Monofort sugarbeet seed was planted 1.25 inches deep in 22 inch row spacing on May 3. The first half of each treatment was applied 1:00 pm June 2 (air temp. = 75 F, six inch soil temp.=64F, relative humidity=38%, wind south 5-10 mph, and soil moisture in top four inches of soil was 12%) when sugarbeets were at the two leaf stage and kochia was just emerging to a one inch rosette diameter. Six days later the second half of each treatment was applied 11:45 am June 8 (air temp.=75F, soil temp. at six inches=66F, relative humidity=41%, sunny and clear, no precipitation from June 2 to June 8) when sugarbeets were 2-4 leaf and kochia was 0.5 inch diameter to 2.5 inches tall. All herbicides were applied in 17 gpa water at 40 psi. Sugarbeet injury was evaluated June 21. Kochia control was evaluated June 21 and July 2.

Treatment*	Rate (lb/A)	June 21 Sgbt inj ratg	June 21 Kocz cntl ratg (%)	July2 Kocz cntl ratg
Desmedipham 2X Split	.33	0	60	50
Desmedipham 2X Split	.5	9	86	71
Desm+BAS-9052+OC 2X Spl	.33+.1+.125G	15	63	49
Desm+BAS-9052+OC 2X Splt	.5+.1+.125G	21	80	63
Desmedipham+Dalapon 2X Split	.33+1	15	61	46
Desmedipham+Dalapon 2X Split	.5+1	13	74	56
Mean		12	71	56
High mean		21	86	71
Low mean		0	60	46
Coeff. of variation		30	16	21
LSD(1 Percent)		7	24	24
LSD(5 Percent)		5	17	17
No. of reps		4	4	4

* OC = oil concentrate, AT+411F

Summary

Kochia control was evaluated as less on July 2 than on June 21 indicating that kochia recovered from early injury. Adding oil concentrate and dalapon to desmedipham did not improve kochia control compared to desmedipham alone.

Kochia and grass control, Hillsboro, 1983. Preplant incorporated herbicides were applied and rototiller incorporated May 19 when the air temp.=60F, six inch soil temp.=50F, wind was NE at 20 mph, and soil moisture in top 4 inches of soil was 11%. The rototiller was operated 4 inches deep for the EPTC treatment and 2 inches deep for the ethofumesate PPI treatment. ACH-30 sugarbeet seed was planted 1.25 inches deep in 22 inch rows on May 19. Preemergence herbicides were applied May 19 after planting. Single application postemergence herbicide treatments and the first half of split applied treatments were applied 1:00 pm June 16 (air temp.=65F, six inch soil temp.=60F, relative humidity=53%, wind was north 10 mph, soil moisture in top 4 inches of soil=18.5%) when sugarbeets were 2-6 leaf, kochia was 1 inch rosette diameter to 3 inches tall, and foxtail was 1-2 inches tall. The second half of split application treatments was applied 2:00 pm June 23 (air temp.=83F, six inch soil temp.=72F relative humidity=46%, wind was south 8-10 mph, soil moisture in top 4 inches of soil=18.5%) when sugarbeets were 4-8 leaf, kochia was just emerging to four inches tall, and foxtail was 2-4 inches tall. Treatments with three postemergence herbicide applications were sprayed a third time 2:30 pm July 1 (air temp.=79F, six inch soil temp.=70F, relative humidity=57%, wind NW 3-5 mph) when sugarbeets were 6-12 leaf, kochia was just emerging to 9 inches tall, and foxtail was emerging to six inches tall. All herbicides were applied in 17 gpa at 40 psi to the center four rows of six row plots. Sugarbeet injury and kochia control were evaluated for the soil applied treatments only on June 16 before the postemergence herbicides were applied. Sugarbeet injury and kochia and green and yellow foxtail control were evaluated in all treatments on July 8. Sugarbeets were counted July 11 in 60 feet of treated row from each plot and in 60 feet of untreated row adjacent to each plot to determine sugarbeet stand reduction.

		July11	July 8			June 16	
					Grft		
		Sgbt	Sgbt	Kocz	Yeft	Sgbt	Kocz
	Rate	stand	inj	cntl	cntl	inj	cntl
Treatment*	(lb/A)	reduc	ratg	ratg	ratg	ratg	ratg
		(%)					
Desmedipham	1	-22	6	39	43	-	-
Desmedipham+OC	1+.25G	7	15	55	53	-	-
Desmedipham&Phenmedipham	1	6	18	50	41	-	-
Desmedipham&Phenmedipham+OC	1+.25G	-2	21	64	59	-	-
Desmedipham+PP-009+OC	1+.2+.25G	-4	15	55	86	-	-
Desmedipham+PP-009+OC	1+.25+.25G	-13	15	43	88	-	-
Desmedipham+PP-009+OC	1+.4+.25G	9	20	49	90	-	-
PP-009+OC	.25+.25G	-4	0	0	100	-	-
Desmedipham+BAS-9052+OC	1+.2+.25G	-26	19	53	98	-	-
Desmedipham+BAS-9052+OC	1+.3+.25G	-8	11	51	99	-	-
BAS-9052+OC	.2+.25G	8	0	0	100	-	-
Desmedipham+Dowco-453+OC	1+.1+.25G	-16	11	54	95	-	-
Desmedipham+DPX-Y6202+OC	1+.1+.25G	4	13	54	90	-	-
Dowco-453+OC	.1+.25G	7	0	0	99	-	-
DPX-Y6202+OC	.1+.25G	10	0	0	98	-	-
Desmedipham&Phenmedipham+Dalapon	1+2	9	31	75	89	-	-
Desmedipham&Phenmedipham+Dalapon 2X	.5+1	-11	18	78	94	-	-
Desmed&Phenmed+BAS-9052+OC	1+.2+.25G	-22	11	50	96	-	-
Desmed&Phenmed+PP-009+OC	1+.25+.25G	-7	14	68	89	-	-
Des&Phen/Des&Phen+BAS-9052+OC	.5/.5+.2+.25G	2	13	73	99	-	-
Des&Phen/Des&Phen+PP-009+OC	.5/.5+.25+.25G	-7	16	73	90	-	-

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Treatment*	Rate (lb/A)	July11 --- Sgbt stand reduc	July 8 --- Sgbt inj ratg	Kocz cntl ratg	Grft Yeft cntl ratg	-June 16- Sgbt inj ratg	Kocz cntl ratg
				(%)			
Desmedipham&Phenmedipham+Endothall	1+.5	4	11	49	49	-	-
Desmed&Phenmed+Endothall+OC	1+.5+.25G	3	28	50	55	-	-
Desmed&Phenmed+Endothall 2X	.5+.25	-3	5	56	79	-	-
Des&Phen 2X/Ethofumesate+Des&Phen	.5/1.5+.75	16	24	91	96	-	-
D&P 2X/Eth+D&P+BAS9052+OC	.5/1.5+.75+.2+.25G	-12	28	90	100	-	-
D&P 2X/Eth+D&P+PP-009+OC	.5/1.5+.75+.25+.25G	-17	25	91	98	-	-
D&P 2X/Eth+D&P+Dowco453+OC	.5/1.5+.75+.1+.25G	-26	21	91	99	-	-
Ethofumesate+Desmedipham&Phenmed	1.5+.75	-20	18	89	81	-	-
Etho+Des&Phen+BAS-9052+OC	1.5+.75+.2+.25G	2	19	90	98	-	-
Eth+Des&Phen+BAS-9052+OC 2X	.75+.375+.1+.125G	2	16	76	100	-	-
Desmed&Phenmed/Etho+Des&Phen 2X	1/.75+.375	-15	24	90	95	-	-
Ethofumesate+Desmed&Phenmed 2X	.33+.33	-1	8	70	64	-	-
Eth+Des&Phen+BAS-9052+OC 2X	.33+.33+.1+.125G	-14	19	75	98	-	-
Des&Phen 2X/Etho+Desmed&Phenmed	.75/1.5+1	-2	33	94	97	-	-
Ethofumesate (PRE)/Desmed&Phenmed 2X	3.75/.5	11	15	75	83	6	39
Ethofumesate (PPI)/Desmed&Phenmed 2X	3.75/.5	12	15	90	98	19	80
EPTC (PPI)/Desmedipham&Phenmed 2X	2.5/.5	-3	13	83	99	28	71
Etho (PRE)/De&Ph 2X/Eth+De&Ph	3.75/.5/1.5+.75	-27	15	88	95	3	31
Diethatyl (PRE)/Desmed&Phenmedipham 2X	6/.5	-1	6	55	94	3	0
Mean		-4	15	62	87	12	44
High mean		16	33	94	100	28	80
Low mean		-27	0	0	41	3	0
Coeff. of variation		-406	39	16	7	49	29
LSD(1 Percent)		32	11	18	11	12	27
LSD(5 Percent)		24	8	14	9	9	20
No. of reps		4	4	4	4	4	4

*OC=oil concnetrate, AT+411F

Summary

The June 16 evaluation was prior to postemergence herbicide application. Non-incorporated ethofumesate gave 39 and 31% kochia control and incorporated ethofumesate gave 80% control. EPTC gave 71% control and non-incorporated diethatyl gave 0%. None of the treatments caused a significant stand loss on July 11. All treatments which gave 90% or greater kochia control included desmedipham+phenmedipham. Desmedipham + phenmedipham gave about 10% greater kochia control than desmedipham. Desmedipham+PP-009+OC gave less foxtail control than PP-009+OC. Addition of endothall to desmedipham+phenmedipham did not improve kochia control. None of the treatments gave complete kochia control.

Quackgrass control with postemergence herbicides, Crookston, 1983. Herbicides were applied in 17 gpa water at 40 psi to four row plots 30 feet long in a commercial sugarbeet field that was planted April 25 with Beta 1230 sugarbeet seed. Single applications and the first half of split application treatments were applied 11:45 am May 27 (air temp.=73F, six inch soil temp.=62F, relative humidity=43%, wind was east at 5 mph, soil moisture in top 4 inches of soil=16%) when sugarbeets were at the 2 leaf stage and quackgrass was 3-9 inches tall. The second half of the split application treatments was applied 3 weeks later at 12:45 pm on June 17 (air temp.=72F, six inch soil temp.=65F, relative humidity=46%, wind south 10-15 mph) when sugarbeets were 6-8 leaf and quackgrass was 12-18 inches tall in untreated plots. Quackgrass control was evaluated July 5.

Treatment*	Quackgrass size (inches)	Rate (lb/A)	July 5 Quackgrass control ----(%)---
BAS-9052+OC	(3-9 in)	.2+.25	31
BAS-9052+OC	(3-9 in)	.4+.25	64
BAS-9052+OC	(3-9 in) / (12-18 in)	.4+.25G/.2+.25G	86
PP-009+OC	(3-9 in)	.25+.25	63
PP-009+OC	(3-9 in)	.5+.25	85
PP-009+OC	(3-9 in) / (12-18 in)	.25+.25G/.25+.25G	100
Dowco-453+OC	(3-9 in)	.1+.25	78
Dowco-453+OC	(3-9 in)	.2+.25	93
Dowco-453+OC	(3-9 in) / (12-18 in)	.2+.25G/.1+.25G	100
DPX-Y6202+OC	(3-9 in)	.1+.25	86
DPX-Y6202+OC	(3-9 in)	.2+.25	88
DPX-Y6202+OC	(3-9 in) / (12-18 in)	.2+.25G/.1+.25G	100
Untreated Check			0
Mean			75
High mean			100
Low mean			0
Coeff. of variation			14
LSD(1 Percent)			20
LSD(5 Percent)			15
No. of reps			4

* OC = oil concentrate, AT+411F

Summary

Two applications of PP-009, Dowco-453, and DPX-Y6202 gave total quackgrass control on July 5. PP-009 at 0.25 lb/A gave quackgrass control similar to BAS-9052 at 0.4 lb/A. Dowco-453 at 0.2 lb/A or DPX-Y6202 at 0.2 lb/A gave quackgrass control similar to PP-009 at 0.5 lb/A. None of the treatments caused visible sugarbeet injury.

Herbicides applied preemergence, seven days after planting, Fargo, 1983. ACH-30 sugarbeet seed was planted 1.25 inches deep in 22 inch rows on May 24. Herbicides were applied in 17 gpa water at 40 psi to the center four rows of six row plots on May 31, seven days after planting, when the air temp.=53F, six inch soil temp.=52F, relative humidity=70%, wind was north 5-8 mph, and soil moisture in the top four inches of soil was 14%. Sugarbeets were counted on July 5 in 60 feet of treated row for each plot and 60 feet of untreated row adjacent to each plot to determine percent sugarbeet stand reduction.

Treatment	Rate (lb/A)	July 5 (%) Sgbt Stand Reduction
SC-0224	.25	6
SC-0224	1	2
SC-0224	4	9
Glyphosate	.25	13
Glyphosate	1	9
Glyphosate	4	28
BAS-9052	.2	-2
BAS-9052	.6	2
BAS-9052	1.2	-5
PP-009	.25	6
PP-009	.75	5
PP-009	1.5	8
Dowco-453	.1	-2
Dowco-453	.3	6
Dowco-453	.6	-10
DPX-Y6202	.1	15
DPX-Y6202	.3	20
DPX-Y6202	.6	9
2,4-D	.5	16
2,4-D	1	25
Mean		8
High mean		28
Low mean		-10
Coeff. of variation		147
LSD(1 Percent)		22
LSD(5 Percent)		16
No. of reps		4

Summary

Glyphosate at 4 lb/A, DPX-Y6202 at 0.3 lb/A, and 2,4-D at 0.5 or 1 lb/A caused significant sugarbeet stand reduction when applied seven days after sugarbeets were planted but before sugarbeet emergence. This effect should be confirmed with additional tests before making conclusions.

No hand labor sugarbeets, Glyndon, 1983. Preplant incorporated herbicides were applied to the center four rows of six row plots and incorporated with a rototiller set four inches deep May 3 when the air temp.=65F, six inch soil temp.=50F, wind was NW 25-30 mph, and soil moisture in top 4 inches of soil=14%. Bush Johnson Monofort sugarbeet seed was planted 1.25 inches deep in 22 inch rows on May 4. The first application of postemergence herbicides was applied 2:00 pm June 2 (air temp.=75F, six inch soil temp.=64F, relative humidity=38%, wind was south 5-10 mph, soil moisture in top 4 inches of soil=12%) when sugarbeets were in the 2 leaf stage and kochia were emerging to one inch rosette diameter. The second half of the split application treatments were applied six days later at 12:15 pm on June 8 (sunny and clear, air temp.=75F, six inch soil temp.=66F, wind was NW 15-20 mph, relative humidity=41%) when sugarbeets were 2-4 leaf and kochia were 0.5 inch rosette diameter to 2.5 inches tall. The third application of postemergence herbicides was applied thirteen days later at 10:30 am on June 21 (air temp.=78F, six inch soil temp.=69F, relative humidity=83%, wind was SE 5-8 mph) when sugarbeets were at the 6-10 leaf stage and kochia was 1-5 inches tall. All herbicide applications were applied in 17 gpa water at 40 psi to the center four rows of six row plots. Sugarbeet injury was evaluated July 12. Kochia control was evaluated July 12 and August 5. Sugarbeets were harvested from 60 feet of treated row in each plot on October 25.

Treatment	Rate (lb/A)	July 12 Sgbt inj ratg	July 12 Kocz cntl ratg	Aug.5 Kocz cntl ratg	Sucro (%)	Root Yield ton/A	Impur Index	Loss to Molas (%)	Extrac Sucros (lb/A)
		(%)							
EPTC+Cycloate	1.5+2.5	0	0	0	10.4	0.9	1319	1.9	147
Diethatyl+Cycloate	4+3	4	5	0	0.0	0.0	0	0.0	0
Desm/Desm/Etho+BAS-9052+OC	.5/.5/1.5+.75+.2+.25G	21	84	66	12.8	3.7	1317	2.3	739
Desm/Desm+BAS-9052+OC	.5/.5+.2+.25G	11	64	28	12.4	1.5	1333	2.2	297
Ethofumesate+Cycloate	3+3	10	58	16	14.0	3.5	1141	2.2	786
EPTC+Cycl/Des/Des+BAS-9052+OC	1.5+2.5/.5/.5+.2+.25G	16	75	40	12.9	3.1	1336	2.3	614
Dieth+Cycl/Des/Des+BAS9052+OC	4+3/.5/.5+.2+.25G	31	80	45	12.3	2.4	1499	2.5	460
Etho+Cycl/Des/Des+BAS-9052+OC	3+3/.5/.5+.2+.25G	20	93	84	13.3	7.9	1244	2.2	1709
EPT+Cyc/Des+Diet/Des+BAS-9+OC	1.5+2.5/.5+4/.5+.2+.25G	29	78	40	12.5	1.9	1413	2.4	386
EPT+Cy/Des/Des/Eth+Des+BAS+OC	1.5+2.5/.5/.5/1.5+.75+.2+.25G	33	93	74	13.3	3.5	1307	2.4	737
Desm/Desm/Etho+Desm+PP-009+OC	.5/.5/1.5+.75+.25+.25G	25	86	64	13.6	3.7	1246	2.3	808
EP+Cy/Des/Des/Eth+Des+PP-9+OC	1.5+2.5/.5/.5/1.5+.75+.25+.25G	39	93	80	13.4	6.6	1207	2.2	1478
Desm+Dieth/Desm+BAS-9052+OC	.5+4/.5+.2+.25G	19	68	28	13.1	3.5	1356	2.4	753
EP+Cy/Des+Diet/Eth+Des+BAS+OC	1.5+2.5/1+4/1.5+.75+.2+.25G	50	99	91	13.3	7.5	1279	2.3	1611
Hand Weeded Check		-	-	-	13.3	10.8	1306	2.3	2302

Table continued on next page.

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Treatment	Rate (lb/A)	-July 12- Sgbt inj ratg (%)	Kocz cntl ratg (%)	Aug.5 Kocz cntl ratg (%)	Sucro (%)	Root Yield ton/A	Impur Index	Loss to Molas (%)	Extrac Sucros (lb/A)
Mean		21	65	49	12.0	4.0	1220	2.1	855
High mean		50	99	91	14.0	10.8	1499	2.5	2302
Low mean		0	0	0	0.0	0.0	0	0.0	0
Coeff. of variation		30	13	23	6.7	37.4	13	8.2	40
LSD(1 Percent)		12	16	21	1.5	2.8	303	0.3	637
LSD(5 Percent)		9	12	16	1.1	2.1	228	0.2	479
No. of reps		4	4	4	4.0	4.0	4	4.0	4

Summary

The yield of the hand weeded check was relatively low because the kochia which escaped the initial hand weedings were not removed until August 8. Even so, the hand weeded check yielded more than all other treatments. The evaluation of kochia control was less on August 5 than on July 12 indicating that kochia recovered from herbicide injury. The herbicide treatment which resulted in the highest yield was ethofumesate+cycloate(PPI)+desmedipham(POST)+desmedipham+BAS-9052+OC(POST) at 3+3 lb/A /0.5 lb/A /0.5+0.2 lb/A+1 qt/A. Treatments which gave less than 80% kochia control on August 5 yielded less than 5 tons per acre.

Glyphosate applied four days before tillage and planting, Fargo, 1983. Plots requiring oat residue were planted to Lyon oats at 1.5 bushels per acre. Plots were 25 feet long and 7.3 feet wide. Glyphosate was applied in 17 gpa water at 40 psi 7:00 am May 31 (air temp.=53F, six inch soil temp.=52F, relative humidity=70%, wind was north at 5 mph, soil moisture in top four inches of soil was 13.5%) when oats was 2-5 inches tall. Plots requiring oat residue incorporation were incorporated with a rototiller four days after herbicide application. ACH-30 sugarbeet seed was planted 1.25 inches deep in 22 inch rows on June 4. Sugarbeet rows were planted perpendicular to the length of the plots so sugarbeets were counted in 60 square feet from the center of each plot on July 5 to determine sugarbeet stand reduction in treated plots compared to control or untreated plots.

Treatment	Rate (lb/A)	July5 Sgbt Stand Count plants/60 sq.ft.
Control (black soil)		56
Glyphosate (black soil)	1	46
Glyphosate (black soil)	4	44
Control (oat residue)		18
Glyphosate (oat residue)	1	57
Glyphosate (oat residue)	4	57
Control (oat residue incorp.)		48
Glyphosate (oat residue incorpor.)	1	59
Glyphosate (oat residue incorpor.)	4	61
Mean		49
High mean		61
Low mean		18
Coeff. of variation		18
LSD(1 Percent)		17
LSD(5 Percent)		13
No. of reps		4

Summary

Glyphosate did not cause a significant sugarbeet stand loss compared to sugarbeet stands on untreated black soil. Planting sugarbeets in standing green oat residue resulted in poor sugarbeet emergence.

Herbicides and growth regulators on weedfree sugarbeets, Fargo, 1983. ACH-30 sugarbeet seed was planted 1.25 inches deep in 22 inch rows on May 24. Plots were 25 feet long and four rows wide. Sugarbeet emergence was June 2. Sugarbeets were cultivated on June 20. Herbicides were applied in 17 gpa water at 40 psi 10:00 am June 27 (air temp.=77F, six inch soil temp.=70F, relative humidity=60%, wind was north 5-8 mph, and soil moisture in top four inches of soil was 16.5%) when sugarbeets were at the 6-8 leaf stage. Plots were hand weeded June 30 and maintained weedfree by hand weeding through the remainder of the growing season. The 60 days before harvest PP-009+OC treatment and the 60 days after emergence growth regulator treatments were applied with a backpack sprayer in 17 gpa water at 40 psi 10:00 am on August 3 when the sugarbeet canopy was closed, air temp.=85F, wind was 0-2 mph, relative humidity=66%, and six inch soil temp.=73F. The 90 days after emergence growth regulator treatments were applied with a backpack sprayer 9:00 am on September 2 when the air temp.=86F, six inch soil temp.=73F, relative humidity=60%, and wind was SE 8-10 mph. Sugarbeets were harvested in 50 feet of row (center two rows) from each plot on September 28.

Treatment*	Rate (lb/A)	(%) Sucrose	Root Yield ton/a	Impur Index	%Sugar lossto Molass	Extrac Sucro ton/a	Sgbt Stand #/50ft
Control Untreated Check		10.9	16.8	2173	3.2	2460	40
AC-243-654F 60 days>emergence	.5	11.2	17.9	2208	3.4	2683	42
AC-243-654F 60 days>emergence	1	11.3	17.7	2263	3.5	2636	43
AC-243-654F 90 days>emergence	.5	11.2	18.4	2216	3.3	2749	46
AC-243-654F 90 days>emergence	1	10.9	18.3	2291	3.4	2628	45
AC-243-654T 60 days>emergence	.5	11.0	18.6	2192	3.3	2769	45
AC-243-654T 60 days>emergence	1	11.3	16.6	2179	3.3	2547	42
AC-243-654T 90 days>emergence	.5	11.0	18.0	2193	3.3	2652	42
AC-243-654T 90 days>emergence	1	10.7	18.4	2305	3.3	2564	44
AC-239-134F 60 days>emergence	.5	11.3	16.4	2235	3.4	2473	42
AC-239-134F 60 days>emergence	1	11.2	16.9	2186	3.3	2550	42
AC-239-134F 90 days>emergence	.5	11.4	19.5	2104	3.3	3039	46
AC-239-134F 90 days>emergence	1	11.5	19.1	2077	3.2	3044	40
PP-009+OC 2X June 27 & Aug. 3	.5+.25G	11.0	17.2	2210	3.3	2538	44
Dowco-453+OC	.1+.25G	11.3	20.3	2152	3.3	3119	47
Dowco-453+OC	.2+.25G	10.9	18.6	2218	3.3	2713	42
BAS-9052+OC	.25+.25G	11.0	17.5	2244	3.3	2553	40
BAS-9052+OC	.5+.25G	11.0	18.3	2261	3.4	2643	43
PP-009+OC	.25+.25G	11.3	17.7	2192	3.4	2699	46
PP-009+OC	.5+.25G	10.9	19.1	2271	3.4	2758	43
DPX-Y6202+OC	.1+.25G	11.3	17.2	2155	3.3	2683	43
DPX-Y6202+OC	.2+.25G	11.0	19.0	2267	3.4	2757	45
Mean		11.1	18.1	2209	3.3	2693	43
High mean		11.5	20.3	2305	3.5	3119	47
Low mean		10.7	16.4	2077	3.2	2460	40
Coeff. of variation		4.7	13.3	7	5.0	15	15
LSD(1 Percent)		0.8	3.6	225	0.3	616	10
LSD(5 Percent)		0.6	2.8	170	0.2	466	7
No. of reps		6.0	6.0	6	6.0	6	6

*OC=oil concentrate, AT+411F

Summary

Plots treated with AC-239-134F at 0.5 and 1.0 lb/A 90 days after sugarbeet emergence yielded more extractable sucrose/A than the hand weeded check. Plots treated with Dowco-453+OC at 0.1 lb/A + 1 qt/A yielded more tons/A and more extractable sucrose/A than the hand weeded check.

Variety response to high rates of herbicide, Glyndon, 1983. Five herbicide treatments were applied in east-west blocks and ten sugarbeet varieties were seeded 1.25 inches deep in four 22 inch north-south rows across the 25 foot wide blocks. Treatment by variety combinations were replicated four times. Herbicides were applied in 17 gpa water at 40 psi and incorporation was with a 10 foot tandem disk set 4 inches deep plus a spike-tooth harrow. Herbicide treatments were diethatyl (Pre) at 4 lb/A, diethatyl (PPI) at 8 lb/A, EPTC (PPI) at 4 lb/A, diethatyl (Pre) at 4 lb/A + BAS-9052 + oil concentrate (Post) at 0.5 lb/A + 1 qt/A, and diethatyl (Pre) at 4 lb/A plus desmedipham (Post) at 2 lb/A. Diethatyl and EPTC were applied and sugarbeets were planted May 4 when air temp = 50 F, 6 inch soil temp = 50 F, and wind north at 10 to 14 mph. Desmedipham and BAS-9052 were applied at 10:00 A.M. June 9 when air temp = 76 F, soil temp = 66 F, relative humidity = 38 %, wind was south at 0 to 3 mph and sugarbeets had 2 to 4 leaves.

Sugarbeet populations were counted in 60 feet of row in all plots on June 3, prior to postemergence herbicide application. Sugarbeet populations were counted again June 23 in the plots treated with BAS-9052 or desmedipham.

All plots were thinned starting June 24, cultivated twice, and hand weeded throughout the growing season.

Preemergence diethatyl at 4 lb/A was applied to reduce the weed populations and the hand weeding needed in the "untreated" plots and in the plots treated with postemergence herbicides. Preemergence diethatyl is a safe treatment which would not be expected to cause any sugarbeet stunting or stand reduction. The plots treated only with preemergence diethatyl at 4 lb/A were used as an "untreated check" in making comparisons.

Table 1. Influence of herbicides on unthinned plant populations of several sugarbeet varieties in 1983.

Sugarbeet variety	Diethatyl pre, 4 lb/A +BAS-9052+OC	Diethatyl PPI 8 lb/A	EPTC PPI	Diethatyl pre, 4 lb/A + desmedipham
	(% of diethatyl 4 lb/A population)			
BJ Monofort	100	103	103	85
ACH-30	100	107	96	98
Ultramono	96	103	101	97
Beta 1132	97	96	104	102
Beta 1230	101	97	101	103
GW 107	107	96	92	96
ACH-154	104	91	97	86
BJ 19	102	95	102	99
Puressa	102	103	101	96
Monoricca	105	96	97	98
LSD (0.05)	6	18	14	8

Diethatyl, EPTC, and BAS-9052 + OC did not cause a significant stand reduction of any variety. Desmedipham reduced the population of BJ Monofort and ACH-154.

Sugarbeets were harvested October 26 from 44 feet of the center two rows of each plot. Yield parameters are presented in Tables 2 through 6.

Table 2. Influence of herbicides on harvested plant population of several sugarbeet varieties in 1983.

Sugarbeet variety	Diethatyl 4 lb/A	Diethatyl pre+ BAS-9052+OC	Diethatyl PPI 8 lb/A	EPTC PPI	Diethatyl pre+ desmedipham	Variety mean
	(plants/60 ft row)					
BJ Monofort	63	67	64	61	65	64
ACH-30	62	64	63	64	64	63
Ultramono	57	64	59	60	62	60
Beta 1132	63	64	62	64	64	63
Beta 1230	60	63	60	62	62	61
GW 107	64	72	68	68	74	69
ACH-154	60	65	60	55	63	60
BJ 19	67	70	68	69	69	68
Puressa	64	70	68	68	70	68
Monoricca	68	69	66	64	70	67
Herbicide mean	63	67	64	64	66	

Herbicide LSD (0.05) = 2
Variety LSD (0.05) = 4
Herbicide X Variety LSD (0.05) = 6

Plots treated with diethatyl plus BAS-9052 or desmedipham had slightly higher plant populations than plots treated only with diethatyl or EPTC. The plots without post-emergence herbicides required more hand weeding so the lower populations in these plots may have been from accidental thinning during hand weeding. GW 107, BJ 19, Puressa, and Monoricca had or tended to have higher harvested populations than the other sugarbeet varieties averaged over herbicides.

Table 3. Influence of herbicides on extractable sucrose from several sugarbeet varieties in 1983.

Sugarbeet variety	Diethatyl pre 4 lb/A	Diethatyl pre + BAS-9052+OC	Diethatyl PPI 8 lb/A	EPTC PPI	Diethatyl pre + desmedipham	Variety mean
	(extractable sucrose, lb/A)					
BJ Monofort	3725	4254	3853	3967	4265	4013
ACH-30	3661	4290	4171	4133	4330	4117
Ultramono	3657	3973	4009	4364	4026	4024
Beta 1132	4503	4266	4605	4036	4401	4355
Beta 1230	4082	4443	4285	4769	4600	4427
GW 107	3742	4065	3895	4596	4544	4169
ACH-154	4063	4114	4160	4264	3656	4072
BJ 19	3960	4249	4128	4305	4443	4217
Puressa	3854	4118	4016	4251	4269	4115
Monoricca	4071	4153	4164	4256	4348	4198
Herbicide mean	3926	4192	4129	4294	4297	

Herbicide LSD (0.05) = NS
Variety LSD (0.05) = 249
Herbicide X Variety interaction NS, LSD (0.05) = 499

Herbicide treatment did not influence sugarbeet yield in extractable sucrose/A averaged over varieties. Sugarbeet yield from varieties treated with diethatyl pre at 4 lb/A was lower than or similar to yield from the same variety treated with high rates of herbicides. This indicates that herbicide injury to sugarbeets was not severe enough to affect sugarbeet yield. Differences among varieties averaged over herbicide treatment will not be discussed.

Table 4. Influence of herbicides on yield of several sugarbeet varieties in 1983.

Sugarbeet variety	Diethatyl pre 4 lb/A	Diethatyl pre + BAS-9052+OC	Diethatyl PPI 8 lb/A	EPTC PPI	Diethatyl pre + desmedipham	Variety mean
	(tons/A)					
BJ Monofort	15.7	18.3	16.6	16.8	18.8	17.2
ACH-30	15.3	17.7	16.6	16.1	17.5	16.6
Ultramono	14.4	16.2	16.2	16.6	16.1	16.0
Beta 1132	17.1	17.3	18.4	16.7	18.4	17.6
Beta 1230	16.9	18.0	19.4	19.3	19.6	18.6
GW 107	16.2	17.6	17.5	18.8	19.9	18.0
ACH-154	17.5	17.6	17.3	17.3	16.7	17.3
BJ 19	16.0	17.7	17.4	17.3	18.4	17.4
Puressa	16.1	16.9	16.6	17.3	18.0	17.0
Monoricca	17.3	17.7	17.3	16.7	18.0	17.4
Herbicide mean	16.3	17.5	17.3	17.3	18.1	

Herbicide LSD (0.05) = NS
Variety LSD (0.05) = 0.9
Herbicide X Variety interaction NS, LSD (0.05) = 1.7

Table 5. Influence of herbicides on sugar content of several sugarbeet varieties in 1983.

Sugarbeet variety	Diethatyl pre 4 lb/A	Diethatyl pre + BAS-9052+OC	Diethatyl PPI 8 lb/A	EPTC PPI	Diethatyl pre + desmedipham	Variety mean
	(% sucrose)					
BJ Monofort	14.2	14.0	14.0	14.1	13.8	14.0
ACH-30	14.4	14.6	14.9	15.0	14.8	14.7
Ultramono	14.9	14.6	14.7	15.4	14.8	14.9
Beta 1132	15.1	14.6	14.8	14.4	14.4	14.7
Beta 1230	14.2	14.5	13.5	14.6	14.0	14.2
GW 107	13.9	14.0	13.4	14.5	13.9	13.9
ACH-154	13.9	14.1	14.4	14.6	13.9	14.2
BJ 19	14.5	14.4	14.1	14.7	14.5	14.5
Puressa	14.6	14.6	14.4	14.6	14.1	14.4
Monoricca	14.0	14.3	14.3	14.9	14.4	14.4
Herbicide mean	14.4	14.4	14.2	14.7	14.3	

Herbicide LSD (0.05) = NS
Variety LSD (0.05) = 0.4
Herbicide X Variety interaction NS, LSD (0.05) = 0.7

Table 6. Influence of herbicides on impurity index of several sugarbeet varieties in 1983.

Sugarbeet variety	Diethathyl pre 4 lb/A	Diethatyl pre + BAS-9052+OC	Diethatyl PPI 8 lb/A	EPTC PPI	Diethatyl pre + desmedipham	Variety mean
	(impurity index)					
BJ Monofort	1114	1110	1138	1088	1201	1130
ACH-30	1031	1109	1041	992	1068	1068
Ultramono	1004	1072	1073	957	1066	1036
Beta 1132	959	1032	1031	1059	1041	1044
Beta 1230	1061	1012	1202	997	1159	1086
GW 107	1159	1146	1137	1060	1182	1137
ACH-154	1125	1114	1078	1035	1140	1096
BJ 19	1011	1085	1084	1041	1117	1068
Puressa	1078	1058	1042	1049	1120	1069
Monoricca	1086	1169	1089	963	1092	1080
Herbicide mean	1075	1091	1091	1024	1128	

Herbicide LSD (0.05) = NS
Variety LSD (0.05) = 60
Herbicide X Variety interaction NS, LSD (0.05) = 122

Herbicide treatment did not influence tons/A, % sucrose, or impurity index averaged over varieties. Differences among varieties averaged over herbicide treatment will not be discussed.

Weed control in sugarbeet cultivation study, Glyndon, 1983. Preplant incorporated herbicides were applied and rototiller incorporated four inches deep May 4 when the air temp.=35F, six inch soil temp.=50F, and wind was north 5-10 mph. Bush Johnson Monofort sugarbeet seed was planted 1.25 inches deep in 22 inch rows on May 4. Desmedipham (0.75) was applied to the postemergence herbicide treatment 2:30 pm June 2 (air temp.=75F, six inch soil temp.=64F, wind south 5-10 mph, relative humidity=38%, soil moisture in top four inches of soil=12%)when sugarbeets were 2 leaf and kochia was emerging to 1 inch tall. Desmedipham (0.75) and (1.0) was applied 1:30 pm June 8 (air temp.=75F, six inch soil temp.=66F, relative humidity=41%, wind NW 15-20 mph) when sugarbeets were 2-4 leaf and kochia was 0.5 inch rosette diameter to 2.5 inches tall. Ethofumesate+Desmedipham (1.5+0.75) was applied 10:30 am June 21 (air temp.=78F, six inch soil temp.=69F, relative humidity=83% and wind was SE 5-8 mph) when sugarbeets were 6-10 leaf and kochia was 1-5 inches tall. All herbicide applications were in 17 gpa water, 40 psi, and applied to the center four rows of six row plots. Cultivation dates were as follows: one cultivation=June20; two cultivation=June 7, June 20; three cultivations=June 7,June 20,June 28; four cultivations= June 7,June 20,June 28,July 6 (sugarbeet canopy nearly closed). Sugarbeet injury was evaluated July 2. Kochia control was evaluated July 2 and August 5.

Treatment	Number of Cultivations	Rate (lb/A)	July 2 Sgbt inj ratg (%)	July 2 Kocz cntl ratg (%)	Aug.5 Kocz cntl ratg (%)
Hand Weeded Check	None		8	99	100
Cultivation alone	None		0	0	0
Ethofume+Cyclo (PPI)	None	3+4	14	66	33
EPTC/Desmedipham	None	3/1	16	53	18
Des 2X/Des+Eth	None	.75/.75+1.5	21	94	84
Hand Weeded Check	One		8	98	100
Cultivation alone	One		0	0	0
Ethofume+Cyclo (PPI)	One	3+4	16	75	44
EPTC/Desmedipham	One	3/1	14	68	40
Des 2X/Des+Eth	One	.75/.75+1.5	36	89	70
Hand Weeded Check	Two		8	100	100
Cultivation alone	Two		6	0	3
Ethofume+Cyclo (PPI)	Two	3+4	19	80	61
EPTC/Desmedipham	Two	3/1	25	79	50
Des 2X/Des+Eth	Two	.75/.75+1.5	21	95	87

Table continued on next page.

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Treatment	Number of Cultivations	Rate (lb/A)	July 2 Sgbt inj ratg	July 2 Kocz cntl ratg (%)	Aug.5 Kocz cntl ratg
Hand Weeded Check	Three		6	99	100
Cultivation alone	Three		6	0	0
Ethofume+Cyclo (PPI)	Three	3+4	15	81	59
EPTC/Desmedipham	Three	3/1	20	75	44
Des 2X/Des+Eth	Three	.75/.75+1.5	21	96	93
Hand Weeded Check	Four		8	99	100
Cultivation alone	Four		6	0	0
Ethofume+Cyclo (PPI)	Four	3+4	14	75	46
EPTC/Desmedipham	Four	3/1	21	83	44
Des 2X/Des+Eth	Four	.75/.75+1.5	19	97	95
Mean			14	68	55
High mean			36	100	100
Low mean			0	0	0
Coeff. of variation			25	11	28
LSD(1 Percent)			7	13	29
LSD(5 Percent)			5	10	22
No. of reps			4	4	4

Summary

Two postemergence applications of desmedipham at 0.75 lb/A followed by desmedipham plus ethofumesate at 0.75+1.5 lb/A gave kochia control superior to the other herbicide treatments and similar to the hand weeded check. Cultivation tended to improve total weed control.

Triallate and trifluralin combinations in wheat, Fargo 1982-83. Fall treatments were applied and incorporated with a field cultivator twice- 1st deep, 2nd shallow (FL6) or once shallow (FL3) on October 29. The plot area was field cultivated, spring preplant treatments applied and field cultivator incorporated twice (PPI), Era wheat seeded deep (1.5 inch) or shallow (0.75 to 1 inch) and spring preemergence treatments applied and harrow incorporated twice (PEI) on May 4. All treatments were applied with a bicycle wheel plot sprayer delivering 17 gpa at 35 psi. The experiment was a randomized complete block with 4 replications and experimental units were 10 by 12 ft..

Treatment	Rate oz/A	Deep-Shal g/48 sqft		---Deep--- %ir	%sr	---Shall-- %ir	%sr	% Cntl Fxtl	Kocz	--Wheat- 3ft /hd- Deep	shal
Triallate FL3	1	1496	1568	1	0	0	0	0	0	69	68
Triallate FL3	1.5	1478	1535	0	0	0	0	0	0	62	63
Triallate FL6	1	1470	1490	0	4	0	0	0	0	61	67
Triallate FL6	1.5	1452	1516	1	1	0	0	0	0	59	68
TriallateFL6+Triallate(SPEI)	.75+.75	1444	1536	3	1	0	0	0	0	62	63
Trifluralin FL3	0.75	1398	1496	12	16	11	14	99	98	53	68
Trifluralin FL3	1.5	891	969	28	53	20	43	100	100	42	46
Trifluralin FL6	0.75	1452	1490	14	8	14	6	100	98	63	73
Trifluralin FL6	1.5	687	929	41	56	34	40	100	100	45	52
TrifluralinFL6+triflur(SPEI)	0.5+0.5	1539	1525	10	16	10	14	100	100	69	74
Triallate+Trifluralin FL3	1+0.75	1403	1451	13	18	10	11	99	98	63	62
Triallate+Trifluralin FL3	1.5+1.5	854	871	23	55	24	57	100	100	50	54
Treallate+Trifluralin FL6	1+0.75	1338	1451	14	18	8	10	100	100	57	67
Triallate+Trifluralin FL6	1.5+1.5	869	958	33	53	31	46	100	100	49	46
Triallat+TrifFL6+Tria+TrifFL6	.75+.5	1443	1564	13	14	6	4	99	97	64	75
Triallate SPPI	1	1344	1491	4	3	3	4	0	0	61	61
Triallate SPEI	1	1538	1512	0	3	0	0	0	0	58	69
Trifluralin SPPI	0.75	1145	1201	15	43	18	35	100	99	59	60
Trifluralin SPEI	0.75	1519	1440	0	4	0	4	85	89	66	72
Triallate+Trifluralin SPPI	1+0.75	1045	933	25	44	26	41	100	100	46	49
Triallate+Trifluralin SPEI	1+0.75	1502	1657	1	6	0	3	91	93	67	74
Control	0	1511	1576	0	0	0	0	0	0	61	68
Mean		1310	1371	11	19	10	15	62	62	58	63
High mean		1539	1657	41	56	34	57	100	100	69	75
Low mean		687	871	0	0	0	0	0	0	42	46
Coeff. of variation		12	14	48	40	63	42	3	4	17	13
LSD(1 Percent)		291	344	10	14	11	12	3	4	18	15
LSD(5 Percent)		220	260	8	10	9	9	2	3	14	12
No. of reps		4	4	4	4	4	4	4	4	4	4

Summary

Trifluralin fall applied alone or in combination with triallate tended to cause less injury to shallow then deep seeded wheat. Foxtail and kochia control with trifluralin alone or in combination with triallate was excellent regardless of depth of incorporation or time of application.

Triallate and trifluralin combinations in wheat, Minot 1982-83. Fall treatments were applied and incorporated once with a rototiller to a depth of 2 inch (FL3) or 4 inch (FL6) on October 21. The plot area was field cultivated spring preplant treatments applied and rototiller incorporated (PPI) once Coteau wheat seeded deep (2 to 2.5 inch) or shallow (1 to 1.5 inch) and spring preemergence treatments applied and harrow incorporated (PEI) twice on April 29. Barban or diclofop treatments were applied on May 25 to 1 to 2-leaf wheat and wild oat. All treatments were applied with a bicycle wheel plot sprayer delivering 17 gpa for pre and 8.5 for postemergence treatments both at 35 psi. The experiment was a randomized complete block with 4 replications and experimental units were 10 by 12 ft..

		Wheat							
		--Yield--		--Deep--		Shallow		% Control	
Treatment	Rate oz/A	Deep g/48 sqft	Shal	%ir	%sr	%ir	%sr	Wioa	Grft
Triallate FL3	1	433	339	0	0	0	0	76	0
Triallate FL3	1.5	525	489	1	0	0	0	91	0
Triallate FL6	1	497	451	0	0	0	0	80	19
Triallate FL6	1.5	488	472	2	1	1	0	93	0
Barban + N	6+1G	298	364	5	3	5	3	69	0
Trifluralin FL3	0.5	443	440	0	2	0	0	65	91
Trifluralin FL3	1	476	443	0	6	0	3	82	95
Trifluralin FL6	0.5	503	417	0	4	0	1	76	91
Trifluralin FL6	1	505	539	5	21	3	11	95	97
Diclofop	12	372	272	0	0	0	0	69	33
Triallate+Trifluralin FL3	1+0.5	492	417	0	4	0	3	84	97
Triallate+Trifluralin FL3	1.5+1	535	510	0	8	0	6	95	97
Triallate+Trifluralin FL6	1+0.5	433	530	5	29	5	13	95	99
Triallate+Trifluralin FL6	1.5+1	492	577	0	20	0	9	96	100
Diclofop+Bromoxynil	12+4	396	356	0	0	0	0	66	35
Triallate SPPI	1	403	411	0	0	0	0	83	6
Triallate SPEI	1	246	238	0	0	0	0	48	0
Trifluralin SPPI	0.5	381	228	0	5	0	4	56	95
Trifluralin SPEI	0.5	220	121	0	0	0	0	5	40
Triallate+Trifluralin SPPI	1+0.5	410	352	0	10	0	4	78	96
Triallate+Trifluralin SPEI	1+0.5	246	198	0	0	0	0	41	63
Control	0	161	153	0	0	0	0	0	0
Mean		407	378	1	5	1	3	70	52
High mean		535	577	5	29	5	13	96	100
Low mean		161	121	0	0	0	0	0	0
Coeff. of variation		25	27	418	89	528	133	21	38
LSD(1 Percent)		187	190	6	8	6	6	27	37
LSD(5 Percent)		142	144	5	6	5	5	20	28
No. of reps		4	4	4	4	4	4	4	4

Summary

Foxtail control was excellent with preplant applications of trifluralin fall or spring applied and wild oat control good to excellent with preplant applications of triallate fall or spring applied or lb/A trifluralin fall applied. Wheat injury with fall trifluralin applications alone or in combination with triallate tended to be less when incorporated shallow and seeded shallow than when incorporated deep and seeded deep.

Triallate carboxin combinations in wheat, Fargo 1983. Triallate was applied and field cultivator incorporated twice (PPI), Era wheat treated or non-treated with carboxin seeded in 6 inch row spacings and triallate applied and harrow incorporated twice (PEI) April 28. Treatments were applied with a bicycle wheel plot sprayer delivering 17 gpa at 35 psi. The experiment was a randomized complete block with 4 replications and experimental units 8 by 27 ft.. Wild oat density was 10 plants/square ft. and weed control and crop injury ratings were made July 15. Crop injury was also evaluated early June 2.

			Wheat			
	Rate	Yield	Early	July 15		% Control
Treatment	oz/A	lb/A	%ir	%ir	%sr	Wioa
Triallate PPI	0	2376	0	0	1	15
Triallate PPI	8	2634	3	0	2	78
Triallate PPI	12	3198	4	0	3	82
Triallate PPI	16	2995	5	0	3	83
Triallate PPI	24	3031	19	0	10	88
Triallate&Carboxin PPI	0	2549	0	0	0	0
Triallate&Carboxin PPI	8	2676	1	0	1	77
Triallate&Carboxin PPI	12	3405	2	0	0	79
Triallate&Carboxin PPI	16	3259	6	0	3	89
Triallate&Carboxin PPI	24	3245	16	0	7	90
Triallate PEI	0	2173	0	0	0	0
Triallate PEI	8	2981	1	0	0	61
Triallate PEI	12	2893	0	0	1	55
Triallate PEI	16	2995	1	2	1	71
Triallate PEI	24	3169	1	0	2	81
Mean		2905	4	0	2	63
High mean		3405	19	2	10	90
Low mean		2173	0	0	0	0
Coeff. of variation		15	93	665	99	18
LSD(1 Percent)		816	7	1	4	21
LSD(5 Percent)		613	5	1	3	16
No. of reps		4	4	4	4	4

Summary

Wheat injury was greater with preplant than preemergence incorporated application of triallate regardless if treated or non-treated seed planted. Wild oat control with triallate was better when applied preplant than preemergence incorporated. Wild oat control with 8 oz/A triallate preplant was as good as 24 oz/A preemergence incorporated.

Wheat tolerance to PPI triallate, Fargo 1983.Triallate was applied and field cultivator incorporated 4 or 2 times April 28. Era or Alex wheat was seeded April 29 in 6 inch row spacings. Seeding depth was 1/2 to 3/4 inch (shallow) or 1 to 1 1/2 (deep). Treatments were applied with a bicycle wheel plot sprayer delivering 17 gpa at 35 psi. The experiment was a randomized complete block with 4 replications and experimental units 8 by 27 ft.. Wild oat density was 10 plants/ square ft. and control ratings were on July 15.

Treatment	Rate oz/A	wheat Yield	wheat %ir	wheat %sr	wheat Hd/3'	% Cntl Wioa
FC 4X Era deep	0	2057	0	0	47	0
FC 4X Era deep	1	2993	5	4	58	95
FC 4X Era deep	2	2843	14	18	65	100
FC 4X Era deep	4	2175	24	41	37	100
FC 4X Era shallow	0	1513	0	0	37	0
FC 4X Era shallow	1	2950	8	14	58	90
FC 4X Era shallow	2	2898	11	10	59	97
FC 4X Era shallow	4	1770	31	49	24	100
FC 2X Era deep	0	2078	0	0	49	0
FC 2X Era deep	1	2898	3	4	68	95
FC 2X Era deep	2	2790	13	23	60	99
FC 2X Era deep	4	2764	16	31	51	100
FC 2X Era shallow	0	1760	0	0	40	0
FC 2X Era shallow	1	2759	5	8	58	93
FC 2X Era shallow	2	2414	18	19	53	97
FC 2X Era shallow	4	1830	28	48	29	100
FC 2X Alex shallow	0	2048	0	0	47	0
FC 2X Alex shallow	1	2740	5	0	51	91
FC 2X Alex shallow	2	2328	15	28	44	99
FC 2X Alex shallow	4	2213	25	38	63	100
Mean		2391	11	17	50	73
High mean		2993	31	49	68	100
Low mean		1513	0	0	24	0
Coeff. of variation		11	46	48	24	3
LSD(1 Percent)		508	9	15	23	5
LSD(5 Percent)		382	7	11	17	3
No. of reps		4	4	4	4	4

Summary

Wheat injury and wild oat control with triallate increased as rate increased regardless of cultivar, number of incorporations or depth of seeding.

Triallate assessment, Fargo 1983. Era wheat was seeded and triallate applied (PEI) and harrow incorporated twice and propachlor was applied (PE) on May 27. Bromoxynil and diclofop were applied to 3-leaf wheat and wild oat and 1 to 3 inch wild mustard and kochia on May 31. Hoeing was on June 10.

			-July 15- % control			Weeds / 3 sq. ft. ---June 10---			
	Rate	Yield	Wioa	Wimu	Hoe Aug Time	Wioa	Wioa	Fxtl	Wimu
Treatment	oz/A	bu/A			h/A				
Tria+Brox no hoe PEI+P	1+.25	31.1	46	100	0.	26	1	3	17
Tria+Dicl+Brox no hoe PEI+P	1+.75+.25	44.6	95	91	0.	8	2	6	25
Prcl+Brox no hoe PE+P	3+.25	28.8	46	98	0.	25	1	11	50
Brox no hoe P	.25	17.7	3	100	0.	73	3	1	68
Control no hoe	0	13.2	0	0	0.	68	10	13	57
Tria+Brox hoe PEI+P	1+.25	37.7	65	95	108.7	20	3	6	17
Tria+Dicl+Brox hoe PEI+P	1+.75+.25	43.1	94	100	114.1	7	3	6	25
Prcl+Brox hoe PE+P	3+.25	31.4	56	100	143.8	23	1	10	53
Brox hoe P	.25	23.9	45	100	176.5	32	3	1	70
Control hoe	0	24.6	24	73	168.4	43	7	13	46
Mean		29.6	47	86	71.2	32	3	7	43
High mean		44.6	95	100	176.5	73	10	13	70
Low mean		13.2	0	0	0.	7	1	1	17
Coeff. of variation		15.7	32	6	35.8	73	57	96	62
LSD(1 Percent)		9.1	29	11	49.9	46	4	13	52
LSD(5 Percent)		6.8	22	8	37.0	34	3	9	38
No. of reps		4.0	4	4	4.0	4	4	4	4

Summary

Wheat yield generally increased with each additional herbicide or hoeing treatment that increased wild oat or wild mustard control.

Wild oat herbicide combinations with chlorsulfuron, Fargo 1983. Era wheat was seeded in 6 inch row spacings and triallate applied and harrow incorporated twice April 27. Postemergence treatments were applied May 31 to 2 to 3-leaf wheat and wild oat or June 9 to 4 to 5-leaf wheat and wild oat. Treatments were applied with a bicycle wheel plot sprayer delivering 17 gpa for pre and and 8.5 gpa for postemergence treatments both at 35 psi. The experiment was a randomized complete block with 4 replications and experimental units were 8 by 20 ft.. Wild oat stand was 10 plants/ sq. ft. and control rated July 16.

Treatment	Rate oz/A	Yield lb/A	%ir	%sr	-% Control- Wioa	Wimu
Triallate PEI	16	1667	0	0	33	0
Triallate+Clsu PEI	16+.25	2082	0	0	44	100
Barban+S 2 lf	6+.25%	1723	0	0	66	33
Barban+Clsu+S 2 lf	6+.16+.25%	1768	0	0	49	100
Diclofop+S 2 lf	12+.25%	2312	0	0	84	0
Diclofop+Clsu+S 2 lf	12+.16+.25%	2330	0	0	82	100
Dicl +Brox +Clsu+S 2 lf	12+4+.04+.25%	1941	3	0	79	100
Dicl+Brox+Clsu+S 2 lf	12+4+.01+.25%	2636	1	0	88	100
AC222293+S 2 lf	4+.25%	2603	0	0	97	100
AC222293+S 2 lf	8+.25%	2434	1	0	100	100
AC222293+Clsu+S 2 lf	4+.16+.25%	2520	1	0	93	100
AC222293+Clsu+S 2 lf	8+.16+.25%	2737	3	0	99	100
CGA-82725+OC 4 lf	2+.125G	1933	0	0	64	0
CGA-82725+OC 4 lf	4+.125G	1863	3	0	86	0
CGA-82725+Clsu +OC 4 lf	2+.16+.125G	1938	0	0	45	100
CGA-82725+Clsu+OC 4 lf	4+.16+.125G	2296	3	0	86	100
Difenzoquat+S 4 lf	12+.25%	1701	0	0	61	33
Difenzoquat+Clsu+S 4 lf	12+.16+.25%	2064	1	0	71	100
Control	0	1534	0	0	0	0
Mean		2110	1	0	70	67
High mean		2737	3	0	100	100
Low mean		1534	0	0	0	0
Coeff. of variation		18	294	0	20	27
LSD(1 Percent)		834	4	0	26	40
LSD(5 Percent)		623	3	0	19	30
No. of reps		3	4	4	4	3

Summary

Wild mustard control was excellent with treatments containing AC-222293 or chlorsulfuron and wild oat control good with treatments containing diclofop AC-222293 or 4 oz/A CGA-82225. Little injury was observed with any treatment.

Fall vs. spring applied herbicides for wild oat control, Fargo 1982. Fall treatments were applied and incorporated twice with a field cultivator (FI) or surface applied (FS) on Oct. 26. Spring preplant treatments (SPPI) were applied, the entire plot area field cultivated twice, Era wheat seeded and spring preemergence treatments (SPEI) applied and harrow incorporated twice on May 5. The experiment was a randomized complete block with 3 replications and experimental units were 8 by 27 ft.. Wild oat density was heavy and wild mustard density variable. Weed control and crop injury ratings were on July 15.

Treatment	Rate oz/A	%ir	%sr	Percent Control Wioa	Wimu
SSH-0860 FI	1.5	0	0	67	100
SSH-0860 FI	2.0	0	0	57	98
SSH-0860 FS	1.5	0	0	53	97
SSH-0860 FS	2.0	0	0	63	95
Triallate FI	1.0	0	0	90	0
Triallate FS	1.0	0	0	57	0
AC-222293 FI	1.0	0	0	50	57
AC-222293 FS	1.0	0	0	42	55
SSH-0860+Triallate FI	1.5+1	0	3	45	97
SSH-0860+Triallate FS	1.5+1	0	0	17	57
SSH-0860 SPPI	1.5	0	0	68	97
SSH-0860 SPPI	2.0	0	0	86	100
SSH-0860 SPEI	2.0	0	0	58	90
SSH-0860 SPEI	1.5	0	0	45	60
Triallate SPPI	1.0	0	0	93	0
Triallate SPEI	1.0	0	0	63	0
AC-222293 SPPI	1.0	0	0	62	77
AC-222293 SPEI	1.0	0	0	22	37
SSH-0860+Triallate SPPI	1.5+1	0	0	97	100
SSH-0860+Triallate SPEI	1.5+1	0	0	82	95
Control	0	0	0	0	0
Mean		0	0	58	62
High mean		0	3	97	100
Low mean		0	0	0	0
Coeff. of variation		0	794	30	36
LSD(1 Percent)		0	3	39	50
LSD(5 Percent)		0	2	29	37
No. of reps		3	3	3	3

Summary

Wild oat control was good with fall or spring preplant incorporated triallate, SSH-0860 spring preplant incorporated at 2 lb/A or spring preplant incorporated applications of SSH-0860 plus triallate. Wild mustard control was good with all SSH-0860 treatments except spring preemergence incorporated. No wheat injury or stand reduction was observed with any treatment.

Effect of various herbicides on wild oat seed production, Fargo 1982-83. Triallate was applied October 30, 1982 and incorporated twice with a field cultivator. The entire experimental area was field cultivated and harrowed prior to seeding Era wheat May 2. Postemergence treatments were applied May 31 to 2 to 3-leaf wheat and wild oat or June 9 to 4 to 5-leaf wheat and wild oat. Herbicide treatments were applied with a bicycle wheel plot sprayer delivering 17 gpa for triallate treatments and 8.5 gpa for postemergence treatments. The experimental design was a randomized complete block with 4 replications and experimental units were 10 by 30 ft.. Wild oat stand was 35 plants/ square ft. and control rated July 8.

Treatment	Rate oz/A	-------Wheat------- Yield bu/A	%ir	%sr	% Cntl Wioa	Wioa Pan./ 3sqft	Wioa Seed/ Panicle
Triallate PEI	16	10	0	0	66	34	35
Barban 2	6	9	0	0	46	52	30
Diclofop 2	12	11	0	0	58	29	34
Difenzoquat 4	12	8	0	0	43	51	32
Triallate+Barban PEI+2	16+6	17	0	0	93	13	31
Triallate+Diclofop PEI+2	16+12	19	0	0	98	3	28
Triallate+Difenzoquat PEI+4	16+12	17	0	0	94	11	36
Control		3	0	0	0	106	36
Mean		12	0	0	62	37	33
High mean		19	0	0	98	106	36
Low mean		3	0	0	0	3	28
Coeff. of variation		22	0	0	13	42	19
LSD(1 Percent)		5	0	0	16	32	12
LSD(5 Percent)		4	0	0	12	23	9
No. of reps		4	4	4	4	4	4

Summary

Wild oat control was better with triallate - postemergence herbicide combinations than with the individual herbicides applied alone. Triallate - diclofop combinations reduced wild oat seed production 98% compared to the untreated control. Wheat yields ralated closely to wild oat control.

Evaluation of new herbicides for wild oat control in wheat, Fargo 1983. Era wheat was seeded in 6 inch row spacings and preemergence (PEI) treatments applied and incorporated twice with a harrow May 2. Postemergence treatments were applied May 31 to 2 to 3-leaf wheat and wild oat or June 9 to 4 to 4.5-leaf wheat and wild oat. All treatments were applied with a bicycle wheel plot sprayer delivering 17 gpa at 35 psi. The experiment was a randomized complete block with 4 replications and experimental units were 10 by 24 ft.. Wild oat density was 10 plants/ square ft. and control was rated on July 15.

Treatment	Rate oz/A	-----Wheat----- %ir	%sr	----% Control---- Wioa	Wimu
Triallate PEI	16	0	5	82	0
RE-36290 PEI	2	33	71	85	0
RE-36290 PEI	4	19	90	76	0
RE-36290 PEI	6	58	95	95	0
Diclofop 2 lf	12	0	0	95	0
HOE-00581+OC 2 lf	1+.25G	19	5	90	0
HOE-00581+OC 2 lf	2+.25G	38	64	100	0
HOE-00581+OC 2 lf	4+.25G	39	86	99	0
RE-36290+OC 2 lf	1+.25G	50	91	99	0
RE-36290+OC 2 lf	2+.25G	38	97	100	0
KIH-3356 2 lf	48	0	0	5	33
KIH-3356+Propanil 2 lf	48+8	15	0	70	65
KIH-3356+Propanil 2 lf	48+16	16	0	71	80
Difenzoquat 4 lf	12	0	0	92	0
HOE-00581+OC 4 lf	1+.25G	0	7	91	0
HOE-00581+OC 4 lf	2+.25G	16	13	97	0
HOE-00581+OC 4 lf	4+.25G	33	35	99	0
RE-36290+OC 4 lf	1+.25G	49	94	93	0
RE-36290+OC 4 lf	2+.25G	65	98	100	0
Control	0	0	0	0	0
Mean		24	43	82	9
High mean		65	98	100	80
Low mean		0	0	0	0
Coeff. of variation		81	29	17	71
LSD(1 Percent)		37	23	26	12
LSD(5 Percent)		28	17	19	9
No. of reps		4	4	4	4

Summary

Wheat tolerance to RE-36290 was poor regardless of rate or when applied and to HOE-00581 marginal at 1 oz/A. Wild oat control was 90% or greater with RE-36290 at 4 oz/A PEI or RE-36290 and HOE-00581 at 1 oz/A postemergence.

Wheat response to HOE-00581, Fargo 1983. Eleven hard red spring and two durum wheat cultivars were seeded in 6 inch row spacings May 2. HOE-00581 was applied to 4 to 5-leaf wheat on June 9 with a bicycle wheel plot sprayer delivering 8.5 gpa at 35 psi. The experiment was a randomized complete block with 3 replications. Experimental units were 10 by 12 ft and were rated for injury June 25.

	HOE-00581 + OC 4 oz + 1 qt/A			Control	
Cultivar	% IR	Ht cm	Yield bu/A	Ht cm	Yield bu/A
Marshall	47	68	41	80	43
PR-2360	44	71	42	84	41
Oslo	67	70	35	78	38
Len	42	75	38	84	36
Era	47	75	42	81	41
PR-2369	55	72	33	81	40
Erik	67	70	39	81	41
Butte	72	73	26	83	40
Alex	43	76	39	88	39
Coteau	60	77	38	88	35
Olaf	48	74	39	83	36
Ward	88	64	0	97	36
Vic	91	63	0	97	39
Mean	59	71	32	85	39
LSD (0.05)	10	6	12		

Summary

Wheat injury with HOE-00581 ranged from 41 to 97% and height reduction from 8 to 34 cm depending upon cultivar. Durum wheat were considerably more susceptible to HOE-00581 than the HRS wheats. HRS wheat yield did not relate to injury ratings. Untreated control yields were confounded by wild oat competitions.

Wheat response to RE-36290, Fargo 1983. Eleven hard red spring and two durum wheat cultivars were seeded in 6 inch row spacings May 2. RE-36290 was applied to 4 to 5-leaf wheat on June 9 with a bicycle wheat plot sprayer delivering 8.5 gpa at 35 psi. The experiment was a randomized complete block with 3 replications. Experimental units were 10 by 12 ft and were rated for injury June 25.

	RE-36290 + OC 2 oz + 1 qt/A			Control	
Cultivar	% IR	Ht cm	Yield bu/A	Ht cm	Yield bu/A
Marshall	93	-	-	80	43
PR-2360	91	-	-	84	41
Oslo	94	-	-	78	38
Len	96	-	-	84	36
Era	95	-	-	81	41
PR-2369	95	-	-	81	40
Erik	94	-	-	81	41
Butte	99	-	-	83	40
Alex	96	-	-	88	39
Coteau	95	-	-	88	35
Olaf	96	-	-	83	36
Ward	94	-	-	97	36
Vic	92	-	-	97	39
Mean	95	-	-	85	39
LSD (0.05)	10	6	12		

Summary

No wheat cultivar exhibited tolerance to postemergence applications of RE-36290 at 2 oz/A.

Wild oat control in wheat, Fargo 1983. Era wheat was seeded in 6 inch row spacings and preemergence(PEI) treatments applied and incorporated twice with a harrow May 2. Postemergence treatments were applied May 31 to 2 to 3-leaf wheat and wild oat and on June 9 to 4 to 4.5-leaf wheat and wild oat. All treatments were applied with a bicycle wheel plot sprayer delivering 17 gpa for PEI and 8.5 gpa for postemergence treatments both at 35 psi. The experiment was randomized complete block with 4 replications and experimental units were 10 by 24 ft.. Wild oat density was 15 plants/sq. ft. and control rated on July 15.

		---------Wheat---------			--% Control--	
Treatment	oz/A	Yield lb/A	%ir	%sr	Wioa	Wimu
Triallate PEI	16	2042	0	1	85	0
Triallate+Trifluralin PEI	16+12	2236	0	9	81	0
Barban 2 lf	6	2657	3	0	79	0
Barban+Nitrogen+S 4 lf	6+1G+0.5%	2505	11	0	90	0
Barban+Bromoxynil 2 lf	6+4	2749	3	0	79	85
Diclofop 2 lf	12	2396	1	0	90	0
Diclofop+Bromoxynil 2 lf	12+4	3616	3	0	96	86
Barban 4 lf	8	2230	1	1	71	0
Barban+Nitrogen +S 4 lf	8+1G+0.5%	2386	6	0	78	0
Barban+Bromoxynil 4 lf	8+4	3047	0	0	63	80
Diclofop 4 lf	12	2502	0	0	81	0
Diclofop 4 lf	16	2645	3	0	85	0
Diclofop+Bromoxynil 4 lf	16+4	3303	1	0	87	89
Difenzoquat 4 lf	12	2801	3	0	83	0
Difenzoquat 4 lf	16	2374	5	0	90	10
Dife+Brox+MCPA 4 lf	12+4+4	2859	4	0	81	92
Control	0	1558	0	0	0	0
Mean		2583	3	1	77	26
High mean		3616	11	9	96	92
Low mean		1558	0	0	0	0
Coeff. of variation		16	164	306	17	24
LSD(1 Percent)		771	8	4	24	12
LSD(5 Percent)		579	6	3	18	9
No. of reps		4	4	4	4	4

Summary

Wild oat control exceeded 75% with all treatments except the 4-leaf barban application alone or in combination with bromoxynil. Wheat stand was reduced with the triallate-trifluralin treatment and injured with the barban-nitrogen treatment at the 2-leaf stage. Wheat yields were highest with treatments which provided both wild oat and wild mustard control.

Wild oat control in wheat, Minot 1983. Coteau wheat was seeded in 6 inch row spacings April 29. Treatments were applied May 25 to 1 to 2-leaf wheat and wild oat or June 8 to 3 to 4-lf wheat and wild oat with a bicycle wheel plot sprayer delivering 8.5 gpa at 35 psi. The experiment was a randomized complete block with 4 replications and experimental units were 10 by 16 ft.. Wild oat density was 10 plants/ square ft. and control was evaluated July 14.

		---------Wheat---------			--% Control--	
Treatment	Rate oz/A	Yield lb/A	%ir	%sr	Wioa	Fxtl
Barban 2 lf	6	389	0	0	54	0
Barban+Nitrogen+S 2 lf	6+1G+.5%	447	3	0	68	0
Barban+Bromoxynil 2 lf	6+4	517	0	0	73	0
Diclofop 2 lf	12	533	0	0	76	33
Diclofop+Bromoxynil 2 lf	12+4	588	0	0	78	20
Barban 4 lf	8	356	0	0	28	0
Barban+Nitrogen+S 4 lf	8+1G+.5%	461	0	0	55	0
Barban+Bromoxynil 4 lf	8+4	503	0	0	54	0
Diclofop 4 lf	12	405	0	0	53	30
Diclofop 4 lf	16	293	0	0	44	20
Diclofop+Bromoxynil 4 lf	16+4	547	1	0	78	78
Difenzoquat 4 lf	12	528	3	0	83	0
Difenzoquat 4 lf	16	567	3	0	88	0
Diclofop+Brox& 4 lf	12+4+4	425	3	0	65	15
Control	0	377	0	0	0	0
Mean		462	1	0	60	13
High mean		588	3	0	88	78
Low mean		293	0	0	0	0
Coeff. of variation		33	332	0	28	157
LSD(1 Percent)		291	5	0	32	61
LSD(5 Percent)		219	4	0	24	44
No. of reps		4	4	4	4	2

Summary

Hard red spring wheat tolerance to all treatments was good. Wild oat control with barban at both the 2 and 4-leaf stage was enhanced by the addition of nitrogen or bromoxynil to the spray. Wild oat control with diclofop was better at the 2 than 4-leaf stage alone but similar when in comination with bromoxynil. Difenzoquat at 12 or 16 oz/A provided the highest level of wild oat control in the trial.

Wild oat control in wheat, Williston 1983. Coteau wheat was seeded May 4 in 6 inch row spacings. Herbicide treatments were applied May 26 to 1.5 to 2-leaf wheat and wild oat or June 7 to 3.5 to 4-leaf wheat and wild oat with a bicycle wheel plot sprayer delivering 8.5 gpa at 35 psi. The experimental design was a randomized complete block with 4 replications and experimental units 10 by 25 ft.. Wild oat density was 2 plants/sq.ft. and control was rated July 12.

Treatment	Rate oz/A	Wheat Yield bu/A	Wheat %ir	Wheat %sr	% control Wioa	% control Ruth	% control Grft
Barban 2 lf	6	15.9	1	0	74	0	0
Barban+Nitrogen+S 2 lf	6+1G+.5%	15.8	3	0	85	0	0
Barban+Bromoxynil 2 lf	6+4	18.3	0	0	83	85	5
Diclofop 2 lf	12	17.5	4	0	81	0	71
Diclofop+Bromoxynil 2 lf	12+4	20.4	0	0	85	86	58
AC222293+Surf 2 lf	6+.5%	20.9	0	0	94	56	0
AC222293+Surf 2 lf	8+.5%	20.2	0	0	97	77	0
AC222293+Surf 2 lf	10+.5%	22.9	0	0	98	85	0
CGA-82725+OC 2 lf	2+.125G	17.2	3	0	74	0	50
CGA-82725+OC 2 lf	4+.125G	17.8	3	0	86	0	78
CGA-82725-D 2 lf	2	15.0	0	0	32	0	23
Barban 4 lf	8	14.2	4	0	68	0	0
Barban+Nitrogen+S 4 lf	8+1G+.5%	13.9	5	0	71	0	0
Diclofop 4 lf	12	14.1	0	0	61	0	41
Diclofop 4 lf	16	13.7	1	0	61	0	43
Diclofop+Bromoxynil 4 lf	16+4	16.5	5	0	82	79	53
Difenzoquat 4 lf	12	15.2	0	0	56	0	0
Difenzoquat 4 lf	16	14.6	0	0	60	0	0
Dife+Bromoxynil&MCPA 4 lf	12+4+4	15.9	0	0	56	50	3
AC222293+Surf 4 lf	8+.5%	16.7	8	0	98	72	3
AC222293+Surf 4 lf	10+.5%	19.3	6	0	100	74	0
AC222293+Surf 4 lf	12+.5%	16.8	6	1	99	76	0
CGA-82725+OC 4 lf	2+.125G	15.5	13	0	91	0	63
CGA-82725+OC 4 lf	4+.125G	15.2	26	3	100	0	94
CGA-82725-D 4 lf	2	14.7	0	0	53	0	48
Control	0	12.1	0	0	0	0	0
Mean		16.5	3	0	75	28	24
High mean		22.9	26	3	100	86	94
Low mean		12.1	0	0	0	0	0
Coeff. of variation		10.8	96	764	11	30	74
LSD(1 Percent)		3.3	6	2	16	16	33
LSD(5 Percent)		2.4	5	2	12	12	25
No. of reps		4	4	4	4	4	4

Summary

CGA-82725 at the 4-leaf stage was the only treatment which caused significant crop injury. Wild oat control with barban was increased 11 to 36% by the addition of bromoxynil at the 4 but not the 2-leaf stage. Wild oat control with CGA-82725 was better at the 4 than the 2-leaf stage and was influenced by formulation. Wild oat control with AC-222,293 was excellent at both the 2 and-4-leaf stage regardless of rate. Russian thistle control was fair to good with bromoxynil at 4 oz/A or AC-222,293 at 8 Oz/A or higher.

Barban combinations in wheat, Fargo 1983. Era wheat was seeded May 2 in 6 inch row spacings. Treatments were applied on May 31 to 2 to 3-leaf wheat and wild oat and 1 to 2 inch wild mustard using a bicycle wheel plot sprayer delivering 8.5 gpa at 35 psi. The experiment was a randomized complete block with 4 replications and experimental units were 10 by 24 ft..Wild oat density was 10 plants per square ft. and control was evaluated on July 11.

Treatment	Rate oz/A	-----Wheat---- %ir	%sr	---% Control--- Wioa	Wimu
Barban	4	0	0	58	0
Barban	8	0	0	79	0
Barban +Nitrogen + Surf	4+1G+0.5%	9	3	86	23
Barban+Nitrogen+Surf	8+1G+0.5%	20	3	89	0
Barban+Nitrogen+Renex 36	4+1G+0.5%	9	0	87	0
Barban+MSMA	4+32	0	0	66	98
Barban+MSMA+Renex 36	4+32+0.5%	5	0	86	75
Barban+Diclofop	4+8	3	0	89	0
Barban+Difenzoquat	4+6	5	0	85	0
Barban+Difenzoquat+MCPA	4+6+4	1	0	88	70
Diclofop	8	0	0	80	0
Difenzoquat	6	0	0	63	0
MSMA	32	0	0	35	95
MSMA+Renex 36	32+0.5%	0	0	47	95
Control	0	0	0	0	0
Mean		3	0	69	30
High mean		20	3	89	98
Low mean		0	0	0	0
Coeff. of variation		161	554	19	57
LSD(1 Percent)		10	3	25	32
LSD(5 Percent)		8	3	19	24
No. of reps		4	4	4	4

Summary

Wild oat control wiht 4 oz/A barban was increased over 25% by the additon of 1 gpa of liquid nitrogen to the spray mixture. Wild oat control was generally better with barban-diclofop, difenzoquat or MSMA combinations than with the individual herbicides applied alone; however, these combination treatments were no more effective in enhancing wild oat control than liquid nitrogen. The only treatment which resulted in substantial wheat injury was 8oz/A barban in combination with liquid nitrogen.

MSMA combinations with wild oat herbicides, Fargo 1983. Era wheat was seeded on May 2 in 6 inch row spacings. Treatments were applied on May 31 to 2 to 3-leaf wheat and wild oat or June 9 to 4 to 5 leaf wheat and wild oat with a bicycle wheel sprayer delivering 8.5gpa at 35psi. The experiment was a randomized complete block with 4 replications and experimental units were 10 by 24 ft.. Wild oat density was 10 plants/ square ft. and control was evaluated on July 11.

Treatment	Rate lb/A	-----Wheat----- %ir	%sr	---% Control--- Wioa	Wimu
MSMA 2 lf	2	0	0	45	93
Barban 2 lf	.12	0	0	10	0
Barban 2 lf	.25	0	0	45	0
Diclofop 2 lf	.5	0	0	68	0
Difenzoquat 2 lf	.5	0	0	55	0
Barban+MSMA 2 lf	.12+2	0	0	71	98
Barban+MSMA 2 lf	.25+2	0	0	65	95
Diclofop+MSMA 2 lf	.5+2	0	0	86	98
Difenzoquat+MSMA 2 lf	.5+2	0	0	87	93
MSMA 4 lf	1.5	0	0	23	78
MSMA 4 lf	2	0	0	49	91
Barban 4 lf	.25	0	0	31	0
Diclofop 4 lf	.5	0	0	38	0
Difenzoquat 4 lf	.5	0	0	50	0
Barban+MSMA 4 lf	.25+1.5	0	0	58	78
Barban+MSMA 4 lf	.25+2	0	0	68	81
Diclofop+MSMA 4 lf	.5+1.5	0	0	69	73
Diclofop+MSMA 4 lf	.5+2	0	0	63	81
Difenzoquat+MSMA 4 lf	.5+1.5	0	0	58	84
Difenzoquat+MSMA 4 lf	.5+2	0	0	74	85
Control	0	0	0	0	0
Mean		0	0	53	54
High mean		0	0	87	98
Low mean		0	0	0	0
Coeff. of variation		0	0	35	14
LSD(1 Percent)		0	0	35	14
LSD(5 Percent)		0	0	26	10
No. of reps		4	4	4	4

Summary

Wild oat control was better with MSMA-wild oat herbicide combinations than with the individual herbicides applied alone at both stages of application. Wild mustard control with MSMA was generally better at the 2 then 4-leaf stage and was not influenced by wild oat herbicide mixture. Crop tolerance to all treatments was excellent.

MSMA combinations with wild oat herbicides, Minot 1983. Coteau wheat was seeded April 29 in 6 inch row spacings. Herbicide applications were made to 1.5 to 2-leaf wheat and wild oat May 25 and 3.5 to 4-leaf wheat and wild oat June 8. Treatments were applied with a bicycle wheel plot sprayer delivering 8.5 gpa at 35 psi. The experiment was a randomized complete block with 4 replicaions and experimental units were 10 by 16 ft.. Wild oat density was 10 plants / sq. ft. and weed control ratings were made July 14.

		Wheat			% Cntl
Treatment	Rate oz/A	Yield lb/A	%ir	%sr	Wioa
MSMA 2 lf	2	517	0	0	45
Barban 2 lf	.12	476	0	0	10
Barban 2 lf	.25	448	0	0	17
Diclofop 2 lf	.5	523	0	0	16
Difenzoquat 2 lf	.5	513	0	0	5
Barban+MSMA 2 lf	.12+2	483	0	0	43
Barban+MSMA 2 lf	.25+2	580	0	0	46
Diclofop+MSMA 2 lf	.5+2	595	0	0	61
Difenzoquat+MSMA 2 lf	.5+2	578	0	0	56
MSMA 4 lf	1.5	468	4	0	71
MSMA 4 lf	2	570	5	0	80
Barban 4 lf	.25	320	0	0	0
Diclofop 4 lf	.5	379	0	0	41
Difenzoquat 4 lf	.5	568	0	0	49
Barban+MSMA 4 lf	.25+1.5	443	8	0	75
Barban+MSMA 4 lf	.25+2	560	10	0	78
Diclofop+MSMA 4 lf	.5+1.5	461	6	0	67
Diclofop+MSMA 4 lf	.5+2	537	10	0	76
Difenzoquat+MSMA 4 lf	.5+1.5	673	6	0	86
Difenzoquat+MSMA 4 lf	.5+2	424	6	0	79
Control	0	381	0	0	0
Mean		500	3	0	48
High mean		673	10	0	86
Low mean		320	0	0	0
Coeff. of variation		35	146	0	28
LSD(1 Percent)		329	7	0	25
LSD(5 Percent)		247	5	0	19
No. of reps		4	4	4	4

Summary

Only slight crop injury was observed with several treatments. Wild oat control with MSMA was better at the 4 than 2-leaf stage and was similar when applied alone or in combination with other wild oat herbicides.

Difenzoquat broadleaf combinations in wheat, Fargo 1983. Era and WS1809 hard red spring wheat were seeded in 6 inch row spacings on May 3.Treatments were applied May 31 to 2 to 3-leaf wheat and wild oat or June 9 to 4 to 5-leaf wheat and wild oat using a bicycle wheel plot sprayer delivering 8.5 gpa at 35 psi. The experiment was a randomized complete block with 4 replications. Experimental units were 10 by 12 ft.. Wild oat density was 25 plant/square ft. and control was rated on July 11.

		---------Wheat--------						
		---Yield--				---% Control---		
Treatment	Rate oz/A	Era lb/A	1809 lb/A	Era %ir	1809 %sr	Era Wioa	1809 Wioa	Wimu
Difenzoquat 3 lf	12	778	311	0	0	74	67	0
Difenzoquat+2,4-D (AM) 3 lf	12+4	1017	367	0	0	46	35	99
Difenzoquat+2,4-D+Dicamba 3 lf	12+4+1	876	313	0	0	50	39	100
Difenzoquat+MCPA (AM) 3 lf	12+4	1350	354	0	0	74	54	93
Difenzoquat+MCPA+Dicamba 3 lf	12+4+1	1018	388	0	0	74	58	99
Difenzoquat 5 lf	12	753	270	0	0	41	22	0
Difenzoquat+2,4-D (AM) 5 lf	12+4	798	353	0	0	28	17	99
Difenzoquat+2,4-D+Dicamba 5 lf	12+4+1	911	372	0	0	22	16	90
Difenzoquat+MCPA (AM) 5 lf	12+4	879	423	0	0	19	10	91
Difenzoquat+MCPA+Dicamba 5 lf	12+4+1	904	349	0	0	22	14	95
Control	0	412	243	0	0	0	0	0
Mean		882	340	0	0	41	30	70
High mean		1350	423	0	0	74	67	100
Low mean		412	243	0	0	0	0	0
Coeff. of variation		22	24	0	0	37	42	5
LSD(1 Percent)		369	162	0	0	30	25	7
LSD(5 Percent)		274	120	0	0	22	18	5
No. of reps		4	4	4	4	4	4	4

Summary

Wild oat control with difenzoquat was better at the 3 than 5-lf stage and was reduced or tended to be reduced when 2,4-D or 2,4-D plus dicamba was added to the spray mixture. Wild oat control with difenzquat was 6 to 20% higher in Era than WS1809 wheat. Wild mustard control was generally good with all treatments containing broadleaf control herbicides. Wheat yield increases from weed control were greater in Era than WS1809 wheat.

Tricmec-M combinations with wild oat herbicides, Fargo 1983. Era wheat was seeded in 6 inch row spacings on May 2.Treatments were applied June 9 to 4 to 5-leaf wheat and wild oat and 1 to 3 inch wild mustard with a bicycle wheel plot sprayer delivering 8.5 gpa at 35 psi. The experiment was a randomized complete block with 4 replications and experimental units were 10 by 24 ft.. Wild oat density was 5 plants/square ft. and control was evaluated July 9.

Treatment	Rate oz/A	%ir	%sr	---% Control--- Wioa	Wimu
2,4-DSULV	4	0	0	0	100
Trimec-M	4	0	0	0	96
2,4-D (amine)	4	0	0	0	100
Difenzoquat+Trimec-M	12+4	0	0	80	72
AC222293+Trimec-M+Surf	6+4+.25%	1	0	92	100
Difenzoquat	12	0	0	76	28
AC222293+Surf	6+.25%	0	0	93	100
Control	0	0	0	0	0
Mean		0	0	43	74
High mean		1	0	93	100
Low mean		0	0	0	0
Coeff. of variation		566	0	14	10
LSD(1 Percent)		2	0	12	15
LSD(5 Percent)		1	0	9	11
No. of reps		4	4	4	4

Summary

None of the treatments injured wheat. Wild oat control with AC-222,293 or difenzoquat was not influenced by the addition of Trimec-M to the mixture. Wild mustard control was excellent with all broadleaf control treatments except when Trimec-M was combined with difenzoquat.

Wheat response to difenzoquat, Fargo 1983. Eleven hard red spring and two durum wheat cultivars were seeded in 6 inch row spacings May 2. Difenzoquat was applied to 4 to 5-leaf wheat on June 9 with a bicycle wheel plot sprayer delivering 8.5 gpa at 35 psi. The experiment was a randomized complete block with 3 replications. Experimental units were 10 by 12 ft and were rated for injury June 25.

	Difenzoquat 16 oz/A			Control	
Cultivar	% IR	Ht cm	Yield bu/A	Ht cm	Yield bu/a
Marshall	0	77	48	80	43
PR-2360	2	80	47	84	41
Oslo	3	73	37	78	38
Len	10	80	34	84	36
Era	5	80	42	81	41
PR-2369	0	77	41	81	40
Erik	10	80	42	81	41
Butte	2	84	39	83	40
Alex	8	87	34	88	39
Coteau	7	88	41	88	35
Olaf	3	83	40	83	36
Ward	11	97	45	97	36
Vic	18	97	47	97	39
Mean	6	83	41	85	39
LSD (0.05)	10	6	12		

Summary

Wheat injury with 16 oz/A difenzoquat ranged from 0 to 18% depending on cultivar. Wheat yields with difenzoquat when averaged over cultivar were higher than the untreated control. Untreated control plots had wild oat densities of 5 to 7 plants/square ft.

Wheat response to difenzoquat, Glyndon 1983. Fifteen hard red spring wheat varieties were seeded in 6 inch row spacings May 27. Difenzoquat was applied at 16 oz/A to 3 to 3.5-leaf wheat on June 17 and to 5 to 7-leaf wheat on June 30 with a bicycle wheel plot sprayer delivering 8.5 gpa at 35 psi. The experiment was a randomized complete block with 3 replications. Experimental units were 4 by 12 ft and were rated for injury July 14.

	% IR		Mat (days)			Yield (bu/A)		
Variety	3-L	7-L	Cont	3-L	7-L	Cont	3-L	7-L
PR 2360	10	10	75	77	77	30	31	24
PR 2369	2	2	76	76	77	36	35	34
X7993	45	53	80	82	82	34	22	15
Y9882	18	31	78	78	80	19	15	14
W6718A	58	72	78	81	82	19	12	6
SBW606A	7	7	76	78	77	32	32	34
SGW104D	53	76	79	83	82	26	14	5
W3702	20	17	77	77	77	14	11	14
C38	30	45	74	75	76	23	15	11
R7738	11	15	78	78	79	14	12	12
SRV005B	23	20	78	79	80	18	16	16
R8986	12	7	78	81	80	17	12	15
R9705	3	8	78	79	79	10	6	8
Len	43	42	80	81	80	27	19	13
Marshall	10	7	80	80	80	28	24	22
Mean	23	27	78	79	79	23	18	16
LSD 0.05 TRT x VAR =	11			1.4			8.5	
VAR =	5			0.5			3.3	
TRT =	7			0.3			2.8	

Summary

Wheat injury with difenzoquat ranged from 2 to 58% at the 2-leaf and 2 to 76% at the 7-leaf stage depending on variety. Len, X7993, W6718A and SGW104D were generally the most susceptible and PR-2369 the most resistant variety to difenzoquat.

AC-222293 in wheat Fargo, 1983. Era wheat was seeded in 6 inch row spacings on May 2. Treatments were applied on May 31 to 2 to 3-leaf wheat and wild oat or June 9 to 4 to 5-leaf wheat and wild oat with a bicycle wheel plot sprayer delivering 8.5 gpa at 35 psi. The experiment was a randomized complete block with 4 replications and experimental units were 10 by 24 ft.. Wild oat density was 5 plants/ square ft. and control was rated July 15.

		---------Wheat---------			--% Control--	
Treatment	Rate oz/A	Yield bu/A	%ir	%sr	Wioa	VSF
AC222293+Surf 2 lf	4+.25%	69	0	0	100	0
AC222293+Surf 2 lf	6+.25%	73	0	0	100	0
AC222293+Surf 2 lf	8+.25%	68	0	0	100	0
AC222293+Surf 2 lf	10+.25%	70	0	0	100	0
AC222293+Propanil+S 2 lf	4+18+.25%	82	3	0	86	71
AC222293+Propanil+S 2 lf	8+18+.25%	82	3	0	96	80
AC222293+Pend+S 2 lf	4+12+.25%	76	1	0	100	0
AC222293+Pend+S 2 lf	8+12+.25%	79	1	0	98	11
AC222293+Brox+S 2 lf	4+4+.25%	84	1	0	97	92
AC222293+Brox+S 2 lf	8+4+.25%	82	0	0	98	91
AC222293+Surf 4 lf	6+.25%	69	0	0	97	0
AC222293+Surf 4 lf	8+.25%	66	0	0	99	0
AC222293+Surf 4 lf	10+.25%	73	0	0	98	0
AC222293+Surf 4 lf	12+.25%	73	1	0	97	5
Control	0	63	0	0	0	0
Mean		74	1	0	91	23
High mean		84	3	0	100	92
Low mean		63	0	0	0	0
Coeff. of variation		11	259	0	2	32
LSD(1 Percent)		15	3	0	4	14
LSD(5 Percent)		11	2	0	3	11
No. of reps		4	4	4	4	4

Summary

None of the treatments reduced wheat stand and only slight injury was observed with several treatments. Wild oat control was excellent when AC-222,293 was applied alone or in combination with pendimethalin and bromoxynil. The addition of propanil to the spray reduced wild oat control with 4 oz/A AC-222,293 14%. Volunteer sunflower control was fair with treatments containing propanil good with treatments containing bromoxynil. Wheat yields were highest when both wild oat and voluteer sunflower were controlled.

AC-222293 phenoxy combinations in wheat, Fargo 1983. Era wheat was seeded in 6 inch row spacings May 2. Treatments were applied on May 31 to 2 to 3-leaf wheat and wild oat or June 9 to 4 to 5-leaf wheat and wild oat with a bicycle wheel plot sprayer delivering 8.5 gpa at 35 psi. The experiment was a randomized complete block with 4 replications and experimental units were 10 by 24 ft.. Wild oat density was 10 plants/ square ft. and control was evaluated on July 15.

		-------Wheat-------					
	Rate	Yield	%ir	%sr	-Percent Control-		
Treatment	oz/A	lb/A			Wioa	Wimu	VSF
AC222293+Surf 2 lf	4+.25%	3200	0	0	99	99	0
AC222293+Surf 2 lf	8+.25%	2864	0	0	100	100	0
AC222293+MCPA am+S 2 lf	4+3+.25%	3256	1	0	97	100	75
AC222293+MCPA am+S 2 lf	4+6+.25%	3054	0	0	91	100	88
AC222293+MCPA am+S 2 lf	8+3+.25%	3436	0	0	99	100	95
AC222293+MCPA am+S 2 lf	8+6+.25%	3258	0	0	98	100	89
AC222293+MCPA es+S 2 lf	4+3+.25%	3587	0	0	100	100	93
AC222293+MCPA es+S 2 lf	4+6+.25%	3132	3	0	99	100	98
AC222293+MCPA es+S 2 lf	8+3+.25%	3443	0	0	100	100	97
AC222293+MCPA es+S 2 lf	8+6+.25%	3409	1	0	98	100	95
AC222293+Surf 4 lf	6+.25%	2332	0	0	92	100	0
AC222293+Surf 4 lf	12+.25%	3048	0	0	98	100	0
AC222293+MCPA am+S 4 lf	6+3+.25%	3478	0	0	96	100	85
AC222293+MCPA am+S 4 lf	6+6+.25%	3533	0	0	90	100	92
AC222293+MCPA am+S 4 lf	12+3+.25%	3503	0	0	96	100	85
AC222293+MCPA am+S 4 lf	12+6+.25%	3128	0	0	97	100	86
AC222293+MCPA es+S 4 lf	6+3+.25%	3094	1	0	91	100	92
AC222293+MCPA es+S 4 lf	6+6+.25%	3246	4	0	95	100	98
AC222293+MCPA es+S 4 lf	12+3+.25%	3338	3	0	98	100	89
AC222293+MCPA es+S 4 lf	12+6+.25%	3106	8	0	98	100	100
AC222293+2,4-D am+S 4 lf	6+3+.25%	3212	0	0	96	100	78
AC222293+2,4-D am+S 4 lf	6+6+.25%	3257	2	0	90	100	90
AC222293+2,4-D am+S 4 lf	12+3+.25%	3087	4	0	98	100	85
AC222293+2,4-D am+S 4 lf	12+6+.25%	3047	1	0	98	100	95
AC222293+2,4-D es+S 4 lf	6+3+.25%	3244	1	0	93	100	100
AC222293+2,4-D es+S 4 lf	6+6+.25%	3259	1	0	91	100	95
AC222293+2,4-D es+S 4 lf	12+3+.25%	3361	1	0	97	100	98
AC222293+2,4-D es+S 4 lf	12+6+.25%	3322	1	0	97	100	95
Control	0	2109	0	0	0	0	0
Mean		3184	1	0	93	97	75
High mean		3587	8	0	100	100	100
Low mean		2109	0	0	0	0	0
Coeff. of variation		12	177	0	4	0	6
LSD(1 Percent)		702	4	0	6	1	12
LSD(5 Percent)		531	3	0	5	1	9
No. of reps		4	4	4	4	4	2

Summary

No treatment reduced wheat stand and only slight wheat injury was observed with several treatments. Wild oat control with AC-222,293 was 90% or greater regardless of rate, stage or phenoxy herbicide mixture. Wild mustard control was excellent with all treatments and volunteer sunflower control generally better with treatments containing the ester than amine formulation of MCPA or 2,4-D. Wheat yields generally reflected weed control with yield increased 700 to 1200 lb/A in treated compared to control plots.

AC-222293 in wheat, Minot 1983. Coteau wheat was seeded April 29 in 6 inch row spacings. AC-222293 applications were made to 1.5 to 2-leaf wheat and wild oat May 25 and 3.5 to 4-leaf wheat and wild oat June 8. Treatments were applied with a bicycle wheel plot sprayer delivering 8.5 gpa at 35 psi. The experiment was a randomized complete block with 4 replications and experimental units were 10 by 16 ft.. Wild oat density was 10 plants/ sq. ft. and weed control ratings were made July 14.

Treatment	Rate oz/A	Wheat Yield lb/A	Wheat %ir	Wheat %sr	% Cntl Wioa
AC222293+Surf 2 lf	4+.25%	1056	0	0	81
AC222293+Surf 2 lf	6+.25%	1133	0	0	85
AC222293+Surf 2 lf	8+.25%	1098	0	0	86
AC222293+Surf 2 lf	10+.25%	977	0	0	86
AC222293+MCPA am+S 2 lf	4+4+.25%	766	0	0	64
AC222293+MCPA am+S 2 lf	8+4+.25%	965	0	0	73
AC222293+MCPA es+OC 2 lf	4+4+.25%	1092	0	0	80
AC222293+MCPA es+OC 2 lf	8+4+.25%	995	5	0	81
AC222293+S 4 lf	6+.25%	1060	0	0	82
AC222293+S 4 lf	8+.25%	904	4	0	83
AC222293+S 4 lf	10+.25%	1217	5	0	90
AC222293+S 4 lf	12+.25%	1050	6	0	87
AC222293+MCPA am+S 4 lf	6+4+.25%	941	0	0	81
AC222293+MCPA am+S 4 lf	12+4+.25%	783	5	0	78
AC222293+MCPA es+S 4 lf	6+4+.25%	802	1	0	66
AC222293+MCPA es+S 4 lf	12+4+.25%	892	5	0	77
Control	0	431	0	0	0
Mean		951	2	0	75
High mean		1217	6	0	90
Low mean		431	0	0	0
Coeff. of variation		30	213	0	13
LSD(1 Percent)		541	7	0	19
LSD(5 Percent)		407	6	0	14
No. of reps		4	4	4	4

Summary

Only slight crop injury was observed with several treatments. Wild oat control with AC-222,293 was similar at the 2 or 4-leaf stage and increased only slight as rate increased at both stages of application. The addition of MCPA amine tended to reduce wild oat control with AC-222,293 at the 2-leaf stage and the addition of MCPA ester tended to reduced wild oat control at the 4-leaf stage.

Wheat response to AC-222,293, Fargo 1983. Eleven hard red spring and 2 durum wheat cultivars were seeded in 6 inch row spacings May 2. AC-222,293 was applied at 12 oz/A to 2 to 3-leaf wheat on May 31 and 4 to 5-leaf wheat on June 9 with a bicycle wheel plot sprayer delivering 8.5 gpa at 35 psi. The experiment was a randomized complete block with 3 replications. Experimental units were 10 by 12 ft and were rated for injury June 25.

	% IR		Ht cm			Yield bu/A		
Cultivar	2-L	4-L	CONT	2-L	4-L	CONT	2-L	4-L
Marshall	0	2	80	80	79	43	53	52
PR-2360	0	0	84	85	82	41	54	50
Oslo	6	8	78	80	77	38	50	51
Len	3	5	84	84	84	36	50	45
Era	0	1	81	83	80	41	55	47
PR-2369	0	0	81	82	80	40	56	51
Erik	3	3	81	81	82	41	53	52
Butte	0	3	83	83	85	40	49	48
Alex	3	3	88	87	89	39	46	47
Coteau	3	5	88	87	88	35	46	39
Olaf	2	2	83	83	84	36	47	42
Ward	27	17	97	91	93	36	46	42
Vic	28	19	97	91	92	39	47	46
Mean	6	5	85	84	84	39	50	47
LSD (0.05) TRT X CUL =		10		6			12	
TRT =		5		3			6	
CUL =		6		4			7	

Summary

HRS wheat tolerance to AC-222,293 was excellent; however some durum wheat injury was observed. AC-222,293 increased yields 11 bu/A at the 2- and 8 bu/A at the 4-leaf stage when averaged over cultivars compared to the untreated control. Untreated control yields were confounded by wild oat competition (density 5 to 7 plants/square ft).

CGA-82725 in wheat, Fargo 1983. Era wheat was seeded in 6 inch row spacings on May 2. Treatments were applied on May 31 to 2 to 3-leaf wheat and wild oat with a bicycle wheel plot sprayer delivering 8.5 gpa at 35 psi. The experiment was a randomized complete block with 4 replications and experimental units were 10 by 24 ft.. Wild oat density was 20 plants/ square ft. and control was rated on July 11.

		Wheat					
Treatment	Rate oz/A	Yield lb/A	Height (cm)	%ir	%sr	-% Control- Wioa	Wimu
CGA-82725+OC 2 lf	1+.125G	1890	81	0	3	46	0
CGA-82725+OC 2 lf	2+.125G	1942	80	1	6	98	0
CGA-82725+OC 2 lf	4+.125G	1794	81	3	5	100	0
CGA-82725-D 2 lf	2	1993	82	0	0	62	0
CGA-82725-D 2 lf	4	2215	82	0	3	94	0
CGA-82725+Dicamba+OC 2 lf	2+2+.125G	2285	78	0	0	33	96
CGA-82725+Dicamba+OC 2 lf	4+2+.125G	2225	78	0	0	29	95
CGA-82725+MCPA-AM+OC 2 lf	2+4+.125G	2410	82	0	0	52	100
CGA-82725+MCPA-AM+OC 2 lf	4+4+.125G	3258	82	3	0	95	100
CGA-82725+MCPA-ES+OC 2 lf	2+4+.125G	3306	82	0	0	91	100
CGA-82725+MCPA-ES+OC 2 lf	4+4+.125G	2789	79	4	0	97	98
CGA-82725+Brox+OC 2 lf	2+4+.125G	3158	79	0	0	97	86
CGA-82725+Brox+OC 2 lf	4+4+.125G	3516	82	1	0	100	86
CGA-82725+OC 4 lf	1+.125G	2120	82	0	5	93	0
CGA-82725+OC 4 lf	2+.125G	2196	81	1	5	100	0
CGA-82725+OC 4 lf	4+.125G	2222	80	0	8	100	0
CGA-82725-D 4 lf	2	2113	79	0	4	89	0
CGA-82725-D 4 lf	4	2373	80	0	1	99	0
CGA-82725+MCPA-AM+OC 4 lf	2+4+.125G	2704	77	3	0	93	93
CGA-82725+MCPA-AM+OC 4 lf	4+4+.125G	3012	80	1	0	100	93
CGA-82725+MCPA-ES +OC 4 lf	2+4+.125G	3103	79	3	0	98	96
CGA-82725+MCPA-ES+OC 4 lf	4+4+.125G	3066	77	5	0	100	100
CGA-82725+2,4-D-AM+OC 4 lf	2+4+.125G	2969	78	4	0	98	100
CGA-82725+2,4-D-AM+OC 4 lf	4+4+.125G	2786	77	5	0	100	100
CGA-82725+2,4-D-ES+OC 4 lf	2+4+.125G	2639	77	0	0	85	100
CGA-82725+2,4-D-ES+OC 4 lf	4+4+.125G	2604	77	6	0	99	100
Control	0	990	80	0	0	0	0
Mean		2507	80	1	1	83	57
High mean		3516	82	6	8	100	100
Low mean		990	77	0	0	0	0
Coeff. of variation		14	3	189	259	14	7
LSD(1 Percent)		651	4	5	7	21	8
LSD(5 Percent)		492	3	4	5	16	6
No. of reps		4	4	4	4	4	4

Summary

Wild oat control with CGA-82725 at 1oz/A was better at the 4 than 2-leaf stage; however, at higher rates control was similar at both stages. Wild oat control with 4 oz/A of the EC formulation of CGA-82725 was similar to control with 2 oz/A of the standard formulation. Wild oat control with CGA-82725 was reduced when dicamba was added to the spray mixture and tended to be reduced when the DMA formulation of 2,4-D or MCPA were added. Wheat yields generally reflected weed control and were higher when wild oat and wild mustard were controlled.

CGA-82725 in wheat, Minot 1983. Coteau wheat was seeded in 6 inch row spacings April 29. Treatments were applied on May 25 to 1 to 2-leaf wheat and wild oat or June 8 to 3 to 4-leaf wheat and wild oat with a bicycle wheel plot sprayer delivering 8.5 gpa at 35 psi. The experiment was a randomized complete block with 4 replications and experimental units were 10 by 16 ft.. Wild oat density was 10 plants/ square ft. and control was rated on July 13.

Treatment	Rate oz/A	Wheat Yield lb/A	Wheat %ir	Wheat %sr	7/13 Cntl Wioa
CGA-82725+OC 2 lf	1+.125G	332	0	0	9
CGA-82725+OC 2 lf	2+.125G	393	0	0	35
CGA-82725+OC 2 lf	4+.125G	786	0	0	86
CGA-82725-D 2 lf	2	379	0	0	8
CGA-82725+MCPA am+OC 2 lf	2+4+.125G	400	0	0	20
CGA-82725+MCPA am+OC 2 lf	4+4+.125G	391	0	0	31
CGA-82725+MCPA es+OC 2 lf	2+4+.125G	489	0	0	50
CGA-82725+MCPA es+OC 2 lf	4+4+.125G	951	0	0	88
CGA-82725+OC 4 lf	1+.125G	424	3	0	52
CGA-82725+OC 4 lf	2+.125G	518	6	0	81
CGA-82725+OC 4 lf	4+.125G	543	11	0	93
CGA-82725-D 4 lf	2	360	0	0	45
CGA-82725+MCPA am+OC 4 lf	2+4+.125G	272	0	0	21
CGA-82725+MCPA am+OC 4 lf	4+4+.125G	390	5	0	66
CGA-82725+MCPA es+OC 4 lf	2+4+.125G	338	5	0	58
CGA-82725+MCPA es+OC 4 lf	4+4+.125G	409	4	0	74
Control	0	284	0	0	0
Mean		450	2	0	48
High mean		951	11	0	93
Low mean		272	0	0	0
Coeff. of variation		39	159	0	32
LSD(1 Percent)		333	6	0	29
LSD(5 Percent)		250	4	0	22
No. of reps		4	4	4	4

Summary

Wild oat control with CGA-82725 was better at the 4 than 2-leaf stage of application. The EC formulation of CGA-82725 was less effective than the standard formulation for wild oat control. Wild oat control with CGA-82725 was reduced by the addition of MCPA DMA to the spray mixture at both stages or the ester formulation at the 4-leaf stage.

Wheat response to CGA-82725, Fargo 1983. Eleven hard red spring and two durum wheat cultivars were seeded in 6 inch row spacings May 2. CGA-82725 was applied to 2 to 3-leaf wheat on May 31 and 4 to 5-leaf wheat on June 9 with a bicycle wheel plot sprayer delivering 8.5 gpa at 35 psi. The experiment was a randomized complete block with 3 replications. Experimental units were 10 by 12 ft and were rated for injury June 25.

Cultivar		2-leaf			4-leaf			
		4	8	8 (EC)	4	8	8 (EC)	CONT
Marshall	% IR	7	46	7	7	34	4	--
	Ht cm	78	72	79	78	70	78	80
	Yield bu/A	50	41	43	46	44	47	42
PR-2360	% IR	3	26	2	7	22	3	--
	Ht cm	79	76	80	79	75	81	84
	Yield bu/A	49	48	52	51	46	48	41
Oslo	% IR	27	75	15	12	45	10	--
	Ht cm	70	68	73	71	70	76	78
	Yield bu/A	40	29	37	43	33	41	38
Len	% IR	42	90	36	20	45	27	--
	Ht cm	77	70	79	80	72	81	84
	Yield bu/A	40	19	35	43	34	39	36
Era	% Ir	13	38	10	14	27	10	--
	Ht cm	77	72	79	78	76	81	81
	Yield bu/A	54	44	44	56	47	51	41
PR-2369	% IR	12	51	8	11	37	14	--
	Ht cm	77	73	78	77	73	80	81
	Yield bu/A	51	40	46	45	41	47	40
Erik	% IR	10	23	12	14	23	17	--
	Ht cm	76	74	78	77	74	81	81
	Yield bu/A	48	41	43	45	43	45	41
Butte	% IR	37	66	32	35	53	40	--
	Ht cm	80	73	82	81	76	82	83
	Yield bu/A	44	33	38	38	35	40	40
Alex	% IR	28	55	8	17	42	9	--
	Ht cm	85	77	88	84	80	86	88
	Yield bu/A	42	33	39	41	36	40	39
Coteau	% IR	45	75	35	31	57	33	--
	Ht cm	83	74	87	83	76	84	88
	Yield bu/A	39	29	36	36	29	36	35
Olaf	% IR	28	66	17	20	42	20	--
	Ht cm	78	74	82	80	80	80	83
	Yield bu/A	38	33	41	46	37	39	36
Ward	% IR	13	30	20	12	15	40	--
	Ht cm	92	89	94	94	94	93	97
	Yield bu/A	47	50	50	48	46	48	36
Vic	% IR	10	28	15	10	15	15	--
	Ht cm	93	88	96	96	96	94	97
	Yield bu/A	48	51	48	52	45	46	39
Mean	% IR	21	51	17	16	35	17	--
	Ht cm	80	75	83	81	78	83	85
	Yield bu/A	45	38	42	45	40	44	39

(Continued)

		% IR	Ht cm	Yield bu/A
LSD (0.05)	TRT X CUL	10	6	12
	TRT	5	3	6
	CUL	6	4	7

Summary

Wheat injury with CGA-82725 at 4 oz/A ranged from 3 to 45% at the 2- and 7 to 35% at the 4-leaf stage depending on cultivar. Increasing the rate from 4 to 8 oz/A doubled injury when averaged over cultivar at both stages. The EC formulation of CGA-82725 at 8 oz/A injured wheat similarly to the 4 oz/A rate with the standard formulation. Wheat yields did not relate to injury ratings. Untreated control yields were confounded by wild oat competition (5 to 7 plants/square ft).

Wheat response to CGA-82725, Glyndon 1983. Fifteen hard red spring wheat varieties were seeded in 6 inch row spacings May 27. CGA-82725 was applied at 4 oz/A + 1 pt OC to 5 to 7-leaf wheat on June 30 with a bicycle wheel plot sprayer delivering 8.5 gpa at 35 psi. The experiment was a randomized complete block with 3 replications. Experimental units were 4 by 12 ft and were rated for injury July 14.

Variety	% IR	Mat.(days)		Yield (bu/A)	
		Cont	CGA	Cont	CGA
PR 2360	5	75	77	30	24
PR 2369	10	76	77	36	26
X7993	26	80	80	34	26
Y9882	27	78	80	17	29
W6718A	22	78	78	19	17
SBW 606A	27	76	79	32	31
SGW104D	38	79	81	26	20
W3702	18	77	79	14	12
C38	48	74	75	23	9
R7738	37	78	81	14	9
SRV 005B	25	78	80	18	18
R8986	16	78	81	17	15
R9705	15	78	79	10	7
Len	65	80	82	27	14
Marshall	23	80	82	28	27
Mean	27	78	79	23	19
LSD (0.05)	11	1.4		8.5	

Summary

Wheat injury with CGA-82725 ranged from 5 to 65% and yield reductions from 0 to 61% depending on variety. C38 and Len were generally the most susceptible varieties to CGA-82725.

Wild oat control in barley, Fargo 1983. Park barley was seeded in 6 inch row spacings on May 3. Herbicides applications were made to 2 to 3-leaf barley and wild oat May 31. and 4 to 5-leaf barley and wild oat June 9. Herbicides were applied with a bicycle wheel sprayer delivering 8.5 gpa at 35 psi. The experiment was a randomized complete block with 4 replications and experimental units were 10 by 24 ft.. Wild oat stand was 20 plants/ square ft. and control was rated on July 15.

		Barley			% Control	
Treatment	Rate oz/A	Yield lb/A	%ir	%sr	Wioa	Wimu
Barban 2 lf	6	2456	0	0	64	0
Barban+Nitrogen+S 2 lf	6+1G+.5%	2769	0	0	85	0
Diclofop 2 lf	12	2065	0	0	64	0
Diclofop 2 lf	16	2710	1	0	75	0
AC222293+Surf 2 lf	6+.25%	2912	1	0	98	100
AC222293+Surf 2 lf	8+.25%	3050	0	0	99	100
AC222293+Surf 2 lf	10+.25%	2548	3	0	100	100
CGA-82725+OC 2 lf	2+.125G	1559	21	24	100	0
CGA-82725+OC 2 lf	4+.125G	599	35	60	100	0
CGA-82725-D 2 lf	2	2181	5	20	69	0
HOE-00581+OC 2 lf	1+.25G	416	26	68	78	0
HOE-00581+OC 2 lf	2+.25G	255	43	78	86	0
HOE-00581+OC 2 lf	4+.25G	111	44	91	100	0
Diclofop 4 lf	16	1767	1	0	66	0
Difenzoquat 4 lf	12	2363	1	0	66	0
Difenzoquat 4 lf	16	2807	0	0	85	0
AC222293+Surf 4 lf	8+.25%	2561	4	0	78	100
AC222293+Surf 4 lf	10+.25%	2764	0	0	80	100
AC222293+Surf 4 lf	12+.25%	2289	8	0	84	100
CGA-82725+OC 4 lf	2+.125G	2922	6	0	100	0
CGA-82725+OC 4 lf	4+.125G	2165	19	4	100	0
CGA-82725-D 4 lf	2	2657	3	0	92	0
HOE-00581+OC 4 lf	1+.25G	1623	19	8	71	0
HOE-00581+OC 4 lf	2+.25G	208	45	84	96	0
HOE-00581+OC 4 lf	4+.25G	30	50	95	100	0
Control	0	1811	0	0	0	0
Mean		1907	13	20	82	23
High mean		3050	50	95	100	100
Low mean		30	0	0	0	0
Coeff. of variation		23	49	52	12	0
LSD(1 Percent)		813	12	20	18	0
LSD(5 Percent)		615	9	15	14	0
No. of reps		4	4	4	4	4

Summary

Barley tolerance to AC-222,293 was good to excellent regardless of rate or stage, to CGA-82725 marginal and influenced by rate, stage or formulation, and to HOE-00581 poor regardless of rate or stage. Wild oat control with AC-222,293 was better at the 2 than 4-leaf stage regardless of rate, CGA-82725 ED than EC formulation regardless of stage and with HOE-00581 similar at both stages. Wild mustard control with AC222,293 was excellent regardless of rate or stage.

Wild oat control in flax, Fargo 1983. Culbert flax was seeded in 6 inch row spacings on May 3. Herbicide applications were made to 1 1/2 to 2 inch flax and 2 to 3-leaf wild oat May 31. Herbicides were applied with a bicycle wheel plot sprayer delivering 8.5 gpa at 35 psi. The experiment was a randomized complete block with 4 replications and experimental units 10 by 18 ft.. Wild oat stand was 20 plants/ square ft. and control was rated on June 16.

Treatment	Rate oz/A	Yield bu/A	-----Flax----- %ir	%sr	---% Control--- Wioa	Wimu
Barban	6	3.4	11	0	71	0
Barban+Bromoxynil	6+4	7.1	6	0	81	100
Diclofop	12	10.1	0	0	78	0
Diclofop+Bromoxynil	12+4	16.8	3	0	76	96
BAS-9052+OC	4+.25G	12.0	1	0	98	0
BAS-9052+MCPA+OC	4+4+.25G	22.1	1	0	99	100
BAS-90+MCPA+Picl+OC	4+4+.25+.25G	26.6	4	0	99	100
BAS-9052+Bromoxynil+OC	4+4+.25G	26.6	2	0	99	100
HOE-00581+OC	2+.25G	14.8	0	0	97	0
HOE-00581+MCPA+OC	2+4+.25G	14.6	0	0	89	96
HOE-00581+Bromoxynil+OC	2+4+.25G	19.6	1	0	99	99
CGA-82725+OC	4+.125G	13.2	0	0	100	0
CGA-82725+MCPA+OC	4+4+.125G	18.0	1	0	92	98
CGA-82725+Bromoxynil+OC	4+4+.125G	18.8	3	0	98	99
PP-009+OC	4+.25G	11.1	0	0	98	0
PP-009+MCPA+OC	4+4+.25G	18.3	3	0	97	99
PP-009+Bromoxynil+OC	4+4+.25G	22.5	1	0	99	96
DPX-Y6202+OC	2+.25G	11.6	0	0	99	0
DPX-Y6202+MCPA+OC	2+4+.25G	18.4	1	0	93	100
DPX-Y6202+Bromoxynil+OC	2+4+.25G	20.4	1	0	96	99
Dowco-453+OC	2+.25G	12.0	0	0	100	0
Dowco-453+MCPA+OC	2+4+.25G	25.0	1	0	100	100
Dowco-453+Bromoxynil+OC	2+4+.25G	24.9	1	0	100	98
Asulam+Surf	12+.25%	8.9	3	0	78	91
Asulam+Bromoxynil+Surf	12+4+.25%	15.9	4	0	90	99
Asulam+MCPA+Surf	12+4+.25%	9.4	10	0	78	99
Control	0	2.4	0	0	0	0
Mean		15.7	2	0	89	65
High mean		26.6	11	0	100	100
Low mean		2.4	0	0	0	0
Coeff. of variation		15	138	0	5	4
LSD(1 Percent)		5.2	5	0	8	5
LSD(5 Percent)		2.6	4	0	6	4
No. of reps		4	4	4	4	4

Summary

Flax stand was not reduced by any treatment and only slight flax injury was observed with several treatments.Wild oat control exceeded 70% with all treatments and 90% with BAS-9052, HOE-00581, CGA-82725, PP-009, DPX-Y6202, and Dowco-453 alone or in combination with broadleaf control herbicides. Wild oat control with HOE-00581 and DPX-Y6202 was reduced 6 to 8% by the addition of MCPA to the spray mixture.

Wild oat control in sunflower, Fargo 1983. Preplant (PEI) treatments were applied and incorporated twice with a field cultivator plus harrow and Seed Tech 315 Hybrid sunflower seeded in 30 inch row spacings May 18. Postemergence (P) treatments were applied on June 9 to 2 to 4-leaf sunflower and 2.5 to 3-leaf wild oat. All treatments were applied with a bicycle wheel plot sprayer delivering 17 gpa for PPI and 8.5 gpa for P treatments both at 35 psi. The experiment was a randomized complete block with 4 replications and experimental units were 10 by 25 ft.. Wild oat density was 10 plant/ square ft. and control was rated on June 20.

				June 20	
	Rate	Sunflower		% Control	
Treatment	lb/A	%ir	%sr	Wioa	Wimu
Triallate PPI	1	0	0	81	0
Trifluralin PPI	1	0	0	64	0
Ethafluralin PPI	.94	0	0	87	58
Pendimethalin PPI	1.5	0	0	81	30
EPTC PPI	2	5	0	71	25
Triallate+Trifluralin PPI	1+1	0	0	88	30
Triallate+Ethafluralin PPI	1+.94	0	0	92	55
Triallate+Pendimethalin PPI	1+1.5	0	0	81	29
Triallate+EPTC PPI	1+2	0	0	93	40
Barban P	1	0	0	66	0
Diclofop P	1.25	0	0	67	0
BAS-9052 +OC P	.18+.25G	0	0	90	0
BAS-9052+OC P	.37+.25G	0	0	99	0
CGA-82725+OC P	.125+.125G	0	0	95	0
CGA-82725+OC P	.25+.125G	0	0	100	0
PP-009+OC P	.125+.25G	0	0	78	0
PP-009+OC P	.25+.25G	0	0	99	0
Dowco-453+OC P	.125+.25G	0	0	100	0
Dowco-453+OC P	.25+.25G	0	0	100	0
HOE-00581+OC P	.125+.25G	0	0	94	0
HOE-00581+OC P	.25+.25G	0	0	99	0
DPX-Y6202+OC P	.125+.25G	0	0	99	0
DPX-Y6202+OC P	.25+.25G	0	0	100	0
Control	0	0	0	13	0
Mean		0	0	85	11
High mean		5	0	100	58
Low mean		0	0	13	0
Coeff. of variation		566	0	9	108
LSD(1 Percent)		2	0	15	22
LSD(5 Percent)		2	0	11	17
No. of reps		4	4	4	4

Summary

Sunflower tolerance to all herbicide treatments was excellent. Wild oat control exceeded 80% with all treatments except trifluralin, EPTC, barban, diclfop or PP-009 at 2 oz/A. Wild oat control with ethafluralin was 23% greater than with trifluralin. No treatment adequately controlled wild mustard; however, highest levels of control were obtained with ethafluralin alone or in combination with triallate.

Broadleaf weed control in wheat, Fargo 1983. Era wheat was seeded on April 26. Herbicides were applied to 4-1f wheat, 2-1f volunteer sunflower, and 1 to 2 in. kochia on June 3 with 70F, partly cloudy sky, and a 13 mph northwest wind. Weed density was kochia 1 to 20, wild mustard less than 1, and volunteer sunflower 1/sq. ft..Weed control crop response evaluated on June 16.

Treatment	Rate oz/A	-------Wheat------- Yield bu/A	%ir	%sr	--Percent control-- Kocz	VSF	Wimu
MCPA-NA2	8	65.1	0	0	81	80	100
MCPA-(Vacate)	8	69.0	1	0	90	85	100
MCPA dma	4	63.2	0	0	76	76	100
MCPA dma	8	65.1	0	0	86	80	100
MCPA est	4	71.7	0	0	86	80	100
2,4-D est	4	63.7	3	0	89	88	100
2,4-D dma	6	68.6	3	0	87	85	100
2,4-D dacamine	4	67.9	3	0	80	66	100
Bromoxynil	4	66.5	0	0	89	93	99
Dicamba	2	69.6	3	0	79	83	97
Bentazon+OC	12+.25G	69.2	0	0	92	79	100
Bromoxynil&MCPA(1:1)	8	67.5	3	0	93	96	100
Dicamba+MCPA	1.5+4	65.2	1	0	88	88	100
Dicamba+2,4-D	1+4	66.4	4	0	91	87	100
Picloram+MCPA dma	.37+4	58.0	0	0	74	81	100
Picloram+MCPA est	.37+4	63.5	0	0	86	83	100
Picloram+2,4-D dma	.25+4	65.1	0	0	89	85	100
Picloram+2,4-D dma	.37+4	68.5	1	0	89	88	100
Picloram+2,4-D dma	.25+6	67.4	4	0	87	90	100
Picloram+2,4-D dma	.37+6	70.0	3	0	89	87	100
Picloram+2,4-D es	.37+4	65.3	4	0	92	90	100
Bentazon+2,4-D dma +OC	8+4+.25G	73.9	0	0	98	94	100
Bentazon+2,4-D es +OC	8+4+.25G	65.8	4	0	97	94	100
Bentazon+2,4-D +OC	8+16+.25G	67.9	0	0	97	90	100
Bentazon&MCPA(2:1)+OC	12	71.7	0	0	95	94	100
Bentazon&MCPA(2:1)+OC	18	70.7	3	0	98	97	100
Bentazon+Dicamba+OC	8+1+.25G	72.5	1	0	94	89	100
Bentazon+Brox+OC	8+4+.25G	69.1	4	0	98	97	100
Control	0	43.2	0	0	0	0	0
Mean		66.6	1	0	86	84	96
High mean		73.9	4	0	98	97	100
Low mean		43.2	0	0	0	0	0
Coeff. of variation		9.1	167	0	5	7	1
LSD(1 Percent)		11.2	4	0	9	11	2
LSD(5 Percent)		8.5	3	0	6	8	1
No. of reps		4.0	4	4	4	4	4

Summary

None of the herbicides caused important injury to wheat. Bentazon in combination with other herbicides gave 95% or more kochia control, except when with dicamba. Volunteer sunflower control exceeded 95% with bromoxynil + MCPA, bentazon + bromoxynil+OC, and Bentazon 8 MCPA(2:1)+OC. All herbicides caused about 50% yield increase compared to that of the untreated wheat.

Bentazon for broadleaf weed control in wheat, Casselton 1983. Era wheat was seeded on May 14. Herbicides were applied to 3-1f wheat, and 4-1f volunteer sunflower, and wild mustard on June 16 with 70F, 30% relative humidity, and a 15mph north wind. Soil was dry and plants drought stressed at treatment.

		--------Wheat--------			-% control-	
Treatment	Rate oz/A	Yield bu/A	%ir	%sr	Wimu	VSF
Bentazon+2,4-D dma +OC	8+4+.25G	32.3	0	0	100	80
Bentazon+2,4-D est +OC	8+4+.25G	30.3	1	0	100	90
Bentazon+2,4-DP +OC	8+16+.25G	32.4	1	0	99	78
Bentazon&MCPA(2:1)+OC	12+.25	32.5	0	0	100	95
Bentazon&MCPA(2:1)+OC	18+.25	29.9	1	0	100	95
Bentazon+Dicamba+OC	8+1+.25	28.7	15	0	96	76
Bentazon+Bromoxynil+Oc	8+4+.25G	31.5	0	0	100	99
MCPA	8	28.4	3	0	93	81
Bromoxynil&MCPA (1:1)	8	33.4	0	0	100	98
Bentazon+OC	12+.25G	28.6	0	0	97	79
Control	0	19.5	3	0	0	0
Mean		29.8	2	0	89	79
High mean		33.4	15	0	100	99
Low mean		19.5	0	0	0	0
Coeff. of variation		14.7	111	0	3	7
LSD(1 Percent)		8.5	5	0	5	10
LSD(5 Percent)		6.3	3	0	4	8
No. of reps		4.0	4	4	4	4

Summary

All herbicides gave 90% or more wild mustard control. Bentazon + dicamba and petroleum oil with 17% emulsafier injured wheat. Volunteer sunflower control exceeded 95% with bentazon + MCPA or bromoxynil and bromoxynil + MCPA. All herbicide treatments increased wheat yield by more than 50% of the untreated control wheat.

Sulfonylurea herbicides in wheat, Fargo 1983. ERA wheat was seeded on May 24. P treatments were applied to emerging to 1 lf wheat, May 17; P1 treatments to 4-lf wheat and 1 to 2 in. weeds, June 3; and P2 treatments to 5-lf wheat and flowering wild mustard, June 17.

		--------Wheat-------			---July 9---	
Treatment	Rate oz/A	Yield bu/A	%ir	%sr	-% Wimu	Control- Yeft
Pend+Clsu P	12+.06	68.3	0	0	88	0
Pend+Clsu P	12+.12	70.9	2	0	100	17
Clsu+X-77 P1	.01+.25%	67.3	3	0	98	0
Clsu+X-77 P1	.12+.25%	65.3	3	0	100	13
Clsu+X-77 P1	.25+.25%	66.9	3	0	100	17
Clsu+Brox+X-77 P1	.01+4+.25%	65.8	0	0	100	7
Bromoxynil P1	4	68.5	0	0	97	0
Bromoxynil&MCPA(1:1) P1	8	64.4	0	0	100	13
DPX-T6376+X-77 P1	.12+.25%	63.3	9	0	100	17
DPX-T6376+X-77 P1	.25+.25%	60.5	13	0	100	58
DPX-T6376 P1	.25	59.6	0	0	100	28
DPX-T6376+X-77 P2	.25+.25%	42.0	0	0	83	37
DPX-T6376 P2	.25	53.1	0	0	90	27
Control	0	48.9	0	0	0	0
Mean		61.8	2	0	90	17
High mean		70.9	13	0	100	58
Low mean		42.0	0	0	0	0
Coeff. of variation		11.2	131	0	6	143
LSD(1 Percent)		15.7	7	0	12	54
LSD(5 Percent)		11.6	5	0	9	40
No. of reps		3.0	3	3	3	3

Summary

All herbicide treatments controlled wild mustard and foxtail control data was variable. Wheat yields related to time of weed control and injury to wheat.

Foxtail control in wheat, Fargo 1983. PPI treatments applied and twice harrow incorporated and ERA wheat seeded on May 17 with 70F, south 10mph wind, and clear skies. PEI treatments applied and twice harrow incorporated and PE treatments applied on May 18. Soil surface was dry and high in crop residue. P treatments were applied to 3-1f wheat and 1 in. wild mustard and yellow foxtail on June 6 with 68F, 18mph northwest wind and clear sky. Foxtail varied from 1 to 20 plants/sq/ ft. and wild mustard less than 1/sq. ft..

		Wheat			June 16	
	Rate	Yield	%ir	%sr	% Control	
Treatment	oz/A	bu/A			Fxtl	Wimu
Triallate PPIS	16	28.1	1	5	5	0
Tria+Trif PPIS	16+8	25.7	3	35	98	0
Trifluralin PPIS	8	21.7	6	48	98	0
Trif+Triallate PPIS	12+16	31.2	4	30	97	0
Trifluralin PPIS	12	23.7	5	51	97	0
Ethafluralin PPIS	8	20.1	8	58	97	0
Ethafluralin PPIS	12	15.0	13	73	98	0
Trifluralin PEI	8	41.7	0	6	89	0
Trifluralin PEI	12	42.6	0	10	94	0
Trif+Tria PEI	8+16	41.4	0	5	90	0
Trif+Tria PEI	12+16	40.9	0	9	96	0
Triallate PEI	16	37.0	0	1	0	0
SD95481 PEI	8	43.0	0	4	88	0
SD95481 PEI	12	40.9	0	8	89	0
SD95481 PEI	16	44.6	0	6	94	0
Pendimethalin PEI	16	47.0	0	8	97	0
SC-1056 PEI	.8	44.3	0	1	79	5
SC-1056 PEI	1.5	46.7	0	0	83	21
KIH-3356 PEI	64	38.9	0	0	20	0
KIH-3356 PE	64	39.4	0	0	0	0
KIH-3356 PE	96	45.7	0	0	14	0
PPG-1013 PE	1.6	43.3	0	0	0	28
PPG-1013 PE	3.2	44.3	0	0	18	85
PPG-1013 PE	4.8	43.0	1	0	34	96
SC-1056 PE	.8	45.0	0	0	0	0
SC-1056 PE	1.5	46.6	0	0	48	25
SD-95481 PE	16	51.3	0	0	78	0
KIH-3356+Propanil P	48+8	38.6	10	0	89	85
KIH-3356+Propanil P	48+16	33.2	25	6	96	98
Propanil P	16	43.0	5	0	66	96
Propanil P	18	46.3	8	0	91	100
Prnl+Bromoxynil&MCPA P	18+4	43.6	8	1	94	99
Prnl+Bromoxynil&MCPA P	18+8	36.9	15	3	95	100
Prnl+MCPA est P	18+4	40.8	8	0	89	100
BAS-9052+AC222293 P	.7+8	50.8	6	0	90	99
PPG-1013 P	.16	35.2	0	1	11	96
PPG-1013 P	.32	33.7	3	0	33	100
PPG-1013 P	.64	26.9	11	0	69	100
Diclofop + Bromoxynil P	12+4	50.0	3	1	92	100
Weedy	0	35.3	0	0	0	0

Table . Continued

Treatment	Rate oz/A	Wheat Yield bu/A	Wheat %ir	Wheat %sr	June 16 --% Control-- Fxtl	June 16 --% Control-- Wimu
Mean		38.7	4	9	65	36
High mean		51.3	25	73	98	100
Low mean		15.0	0	0	0	0
Coeff. of variation		10.0	93	59	21	34
LSD(1 Percent)		7.1	6	10	25	22
LSD(5 Percent)		5.4	5	8	19	17
No. of reps		4.0	4	4	4	4

Summary

Wheat yield generally related to weed control and injury from the herbicide. Wheat stand was reduced by trifluralin or ethafluralin PP1S (preplant shallow incorporated). KIH-3356 + proponil postemergence injured wheat. Diclofop + bromoxynil, BAS-9052 + AC-222293, and proponil gave more than 90% foxtail and wild mustard control without important injury to wheat.

MK-147 evaluation in barley, Fargo 1983. Park barley was seeded, PEI treatments applied and 2x harrow incorporated and PE treatments applied on May 18 with 60F, 20mph south wind and cloudy. The soil surface was dry at treatment and 0.38 in. rain occurred on May 20 and 0.27 in. on May 27. Evaluation for crop response and weed control was on June 16. Weed densities were low.

Treatment	Rate lb/A	Wheat Yield bu/A	Wheat %ir	Wheat %sr	June 16 ----Percent control---- Fxtl	Wimu	Kocz
MK147 PE	0.3	86.5	0	0	20	43	70
MK147 PE	0.5	97.1	0	0	54	63	70
MK147 PE	0.7	93.0	0	0	61	84	95
MK147 PEI	0.3	94.1	0	0	31	68	75
MK147 PEI	0.5	93.5	0	0	48	84	90
MK147 PEI	0.7	100.7	0	0	60	93	95
Weedy X	0	89.1	0	0	0	0	0
Brox+Dicl	0.25+.75	99.1	0	0	53	94	70
Mean		94.1	0	0	41	66	71
High mean		100.7	0	0	61	94	95
Low mean		86.5	0	0	0	0	0
Coeff. of variation		5.3	0	0	42	23	0
LSD(1 Percent)		9.9	0	0	34	30	0
LSD(5 Percent)		7.3	0	0	25	22	0
No. of reps		4.0	4	4	4	4	1

Summary

Barley was not injured by MK-147 applied premergence or premergence incorporated. MK-147 at 0.7 lb/A was needed for adequate wild mustard and kochia control and control tended to be higher with MK-147 and soil incorporated(PEI) than surface applied (PE). Yield generally related to the level of weed control.

MK-147 evaluation in wheat, Fargo 1983. PPI treatments were applied and 2x harrow incorporated and Era wheat seeded on May 17 with 70F and a 10mph south wind. PEI treatments were applied and 2x harrow incorporated on May 18 with 60F, 20mph south wind and cloudy. Soil was high in straw on the surface and dry. The P (postemergence) treatment was to 2 to 3-lf wheat and 0.5 to 1 in. green & yellow foxtail on June 6 with 68F, 16mph south wind and clear skies. Weed densities were low.

		Wheat			June 16	
	Rate	Yield	%ir	%sr	Percent control	
Treatment	lb/A	bu/A			Fxtl	Wimu
MK147 PPI	.3	51.7	0	0	65	59
MK147 PEI	.3	49.8	0	0	36	55
MK147 PEI	.5	54.8	0	0	48	75
MK147 PEI	.7	54.7	0	4	79	84
MK147 PE	.3	48.2	0	0	59	73
MK147 PE	.5	53.8	0	0	69	88
MK147 PE	.7	56.9	0	0	83	94
MK147+Trif PPI	.3+.3	47.3	1	11	93	56
MK147+Trif PPI	.3+.5	40.2	8	22	99	80
MK147+Trif PEI	.3+.3	45.7	0	0	85	35
MK147+Trif PEI	.3+.5	48.3	0	4	88	18
MK147+Trif PEI	.3+.75	46.7	0	13	94	64
MK147+Trif PEI	.5+.3	46.7	0	3	85	78
MK147+Trif PEI	.5+.5	50.6	0	5	92	72
MK147+Trif PEI	.5+.75	51.7	0	10	91	80
MK147+Trif PEI	.7+.3	47.8	0	2	90	81
MK147+Trif PEI	.7+.5	53.0	0	8	91	91
MK147+Trif PEI	.7+.75	54.8	0	11	96	83
Trif PPI	.3	41.9	0	4	64	0
Trif PPI	.5	30.9	0	24	93	0
Trif PEI	.3	43.1	0	3	83	0
Trif PEI	.5	45.2	0	6	86	19
Trifluralin PEI	.75	45.3	0	6	93	0
Weedy	0	44.8	0	0	0	0
Brox+Dicl P	.25+.75	57.4	0	0	83	100
Mean		48.5	0	5	78	55
High mean		57.4	8	24	99	100
Low mean		30.9	0	0	0	0
Coeff. of variation		13.3	318	68	20	25
LSD(1 Percent)		11.9	2	7	28	26
LSD(5 Percent)		9.0	2	5	21	19
No. of reps		4.0	4	4	4	4

Summary

MK-147 applied alone did not cause important injury to wheat. Trifluralin at 0.5 lb/A applied preplant soil incorporated alone or with MK-147 reduced wheat stand and tended to reduce wheat grain yield. MK-147 tended to give higher foxtail and wild mustard control when surface applied than incorporated. MK-147 at 0.7 lb/A + trifluralin of 0.3 lb/A gave effective foxtail and wild mustard control without important injury to wheat.

Weed control in wheat, Carrington 1983. Alex wheat was seeded on June 2 and preemergence incorporated (PEI) treatments applied on June 6. Postemergence treatments were applied on June 17. The picloram combination with 2,4-D or MCPA tended to precipitate. Evaluation was on July 14.

Treatment	Rate oz/A	----Wheat--- %ir	%sr	---Percent control--- Colq	Wibu	Rrpw
Trifluralin PEI	8	3	5	35	38	98
Pendimethalin PEI	12	6	3	56	33	50
2,4-D Post	4	0	0	95	18	98
MCPA Post	4	0	0	100	31	98
2,4-D Est+Picloram Post	4+.37	3	2	100	95	100
2,4-D+Picloram Post	4+.37	1	0	100	95	98
MCPA Est+Picloram Post	4+.37	0	0	100	90	85
Bromoxynil MCPA (1:1) Post	8	3	3	100	100	100
Dicamba+MCPA Post	1.5+4	4	3	100	95	100
Dicamba+2,4-D Post	1.5+4	1	0	100	100	100
Propanil+MCPA Est Post	18+4	23	0	100	91	100
Diclofop+Brox Post	12+4	0	0	100	95	100
Bentazon MCPA(2:1)+OC Post	12+.25G	3	0	100	75	95
Control	0	0	0	0	0	0
Mean		3	1	85	68	87
High mean		23	5	100	100	100
Low mean		0	0	0	0	0
Coeff. of variation		135	283	18	26	23
LSD(1 Percent)		8	5	29	33	62
LSD(5 Percent)		6	4	21	25	44
No. of reps		4	4	4	4	2

Summary

Treatments with bromoxynil, dicamba, picloram or propanil gave 90% or more wild buckwheat control. All treatments gave good common lambsquarter and redroot pigweed control, except for common lambquater control with trifluralin and common lambsquarter and redroot pigweed with pendimethalin .

Wheat response to dicamba + MCPA, Glyndon 1983. Fifteen hard red spring wheat varieties were seeded in 6 inch row spacings May 22. Dicamba + MCPA was applied at 2+4 oz/A to 3 to 3.5-leaf wheat on June 17 and 5 to 7-leaf wheat on June 30 with a bicycle wheel plot sprayer delivering 8.5 gpa at 35 psi. The experiment was a randomized complete block with 3 replications. Experimental units were 4 by 12 ft and were rated for injury July 14.

Variety	% IR		Mat (days)			Yield (bu/A)		
	3-L	7-L	Cont	3-L	7-L	Cont	3-L	7-L
PR2360	0	12	75	77	78	30	29	21
PR2369	0	7	76	76	77	36	27	23
X7993	13	13	80	81	82	34	28	27
Y9882	8	11	78	77	79	19	17	11
W6718A	8	12	78	78	79	19	20	13
SBW606A	3	12	76	77	77	32	33	26
SGW104D	7	5	79	80	80	26	26	23
W3702	8	10	77	77	78	14	14	7
C38	0	8	74	75	75	23	21	15
R7738	10	13	78	78	79	14	15	13
SRV005B	5	13	78	78	79	18	19	14
R8986	3	17	78	79	79	17	15	9
R9705	0	18	78	79	79	10	9	5
Len	2	10	80	79	80	27	29	25
Marshall	0	15	80	80	78	28	28	22
Mean	4	12	78	78	79	23	22	17
LSD 0.05 TRT X VAR =	11			1.4			8.5	
VAR =	5			0.5			3.3	
TRT =	7			0.3			2.8	

Summary

Wheat injury with dicamba + MCPA was greater at the 7 than 3-leaf stage. Wheat yield reductions with dicamba + MCPA ranged from 0 to 25% at the 3-leaf and 3 to 50% at the 7-leaf stage depending on variety. R7738 and R9705 were the only varieties whose yield was reduced less than 10% by 7-leaf dicamba + MCPA applications.

Wheat response to propanil, Glyndon 1983. Fifteen hard red spring wheat varieties were seeded in 6 inch row spacings May 27. Propanil was applied at 1.5 lb/A to 3 to 3.5-leaf wheat on June 17 with a bicycle wheel plot sprayer delivering 8.5 gpa at 35 psi. The experiment was a randomized complete block with 3 replications. Experimental units were 4 by 12 ft and were rated for injury July 14.

Variety	% IR	Mat (Days)		Yield (bu/A)	
		Cont	PRNL	Cont	PRNL
PR2360	3	75	78	30	26
PR2369	3	76	76	36	32
X7993	18	80	81	34	27
Y9882	13	78	79	19	15
W6718A	8	78	79	19	19
SBW606A	8	76	78	32	32
SGW104D	10	79	82	26	24
W3702	5	77	78	14	13
C38	12	74	75	23	19
R7738	21	78	79	14	10
SRV005B	8	78	79	18	18
R8986	13	78	80	17	15
R9705	0	78	79	10	7
Len	5	80	81	27	30
Marshall	6	80	81	28	27
Mean	9	78	79	23	21
LSD 0.05	11	1.4		8.5	

Summary

Wheat injury and yield reductions with 1.5 lb/A propanil ranged from 0 to 21% depending on variety. X7993 and R7738 were generally the most susceptible varieties to propanil.

PE weed control in flax seeded deep and shallow, Casselton 1983. PPI treatments applied and field cultivator plus harrow incorperated twice, Culbert flax seeded, and PE treatments applied on May 16 with 55F, no wind, and clear skys. Soil was moist and mallow. Deep seeding was 1.5 in. and shallow 0.75 to 1 in. P (Postemergence) treatments applied to 2 to 3 in flax and wild mustard and 1 to 2 in kochia on June 7. Weed density was 15 kochia, 10 wild mustard and 1 yellow foxtail per sq. ft..

		Flax						
		Deep		Shallow		% Cntl June 16		
Treatment	Rate lb/A	%ir	%sr	%ir	%sr	Kocz	Wimu	Yeft
EPTC+MCPA PPI+P	2.5+.25	3	12	0	5	75	95	86
EPTC+MCPA PPI+P	5+.25	8	17	6	13	93	95	95
Trif+MCPA PPI+P	.75+.25	4	23	0	6	80	94	94
Trif+MCPA PPI+P	1.5+.25	1	32	0	11	97	94	98
Meto+MCPA PPI+P	3+.25	3	4	0	0	61	93	91
Meto+MCPA PPI+P	6+.25	0	4	0	0	51	95	93
Meto+MCPA PE+P	3+.25	0	6	0	0	61	95	75
Prcl+MCPA PE+P	4+.25	0	8	0	3	65	95	79
Prcl+MCPA PE+P	6+.25	3	8	0	3	83	95	94
BAS9052+MCPA+OCP	0.25+0.25+0.25G	1	5	0	0	89	95	100
Mean		2	12	1	4	76	95	90
High mean		8	32	6	13	97	95	100
Low mean		0	4	0	0	51	93	75
Coeff. of variation		158	73	379	131	19	2	7
LSD(1 Percent)		7	17	5	10	29	3	12
LSD(5 Percent)		5	12	3	8	21	2	9
No. of reps		4	4	4	4	4	4	4

Summary

EPTC and trifluralin reduced stand of deep seeded flax more than shallow seeded flax. Trifluralin at 1.5 lb/A PP1 plus MCPA postemergence was the only treatment to give adequate kochia control. The flax was not harvested for seeded yield because of the kochia vegetation which would have made combining impossible.

Postemergence weed control in flax, Casselton 1983. Culbert flax was seeded on May 16. Herbicides were applied to 2 to 3 in. flax, 2 to 3-lf wild mustard and 1 to 2 in. yellow foxtail and kochia on June 7 which had 75F, 60% RH, clear sky a 5 to 10 mph west wind, and with droughty soil. Kochia was at 10 plant/sq.ft. and wild mustard and yellow foxtail less than 1/sq.ft.

Treatment	Rate oz/A	----Flax--- %ir	%sr	------June 16------ --Percent control-- Kocz	Fxtl	Wimu
Bromoxynil	4	4	0	83	0	98
Bromoxynil&MCPA	8	0	0	88	8	98
MCPA dma	4	3	0	35	0	94
MCPA est	4	3	0	75	4	93
MCPA dma +Picloram	4+.37	3	0	38	0	71
MCPA est +Picloram	4+.37	8	0	75	0	96
Dalapon+MCPA	12+4+.25	4	0	55	36	94
Dala+MCPA+Picl	12+4+.37	0	0	56	51	95
BAS-9052+OC	1.5+.25G	0	0	0	93	0
BAS-9052+OC	3+.25G	0	0	0	99	0
BAS-9052+MCPA dma +OC	3+4+.25G	5	0	83	100	95
BAS-9052+MCPA est +OC	3+4+.25G	3	0	83	100	99
BAS-9052+MCPA+Picl+OC	1.5+4+.25+.25G	8	0	76	95	94
BAS-9052+MCPA+Picl+OC	1.5+4+.37+.25G	24	0	78	96	98
BAS-9052+MCPA+Picl+OC	3+4+.37+.25G	25	0	82	98	98
BAS-9052+Brox+OC	3+4+.25G	0	0	84	99	100
BAS-9052+Bromoxynil&MCPA+OC	3+8+.25G	0	0	89	100	100
PP-009+OC	4+.25G	0	0	0	67	0
PP-009+MCPA dma +OC	4+4+.25G	5	0	78	52	98
PP-009+Brox+OC	4+4+.25G	0	0	88	62	98
PP-009+MCPA+Picl+OC	4+4+.37+.25G	5	0	79	55	94
Diclofop+Brox+OC	16+4+.25G	10	0	79	63	93
SC-1084+OC(R1G0)	4+.25G	0	0	0	93	0
SC-1084+OC(R1G0)	8+.25G	0	0	0	91	0
SC-1084+OC(R1G0)	12+.25G	0	0	0	86	0
Asulam+Surf(x-100)	12+.2%	0	0	21	81	89
Asulam+Surf	16+.2%	1	0	16	82	90
Asulam+Surf	32+.2%	15	0	49	96	94
Asulam+Ethaphon+Surf	32+.4%+.2%	16	0	38	92	91
Asulam+MCPA+Surf	12+4+.2%	4	0	65	65	93
Asulam+Bromoxynil&MCPA+Surf	12+8+.2%	8	0	81	83	98
Control	0	0	0	0	0	0
Mean		5	0	52	64	74
High mean		25	0	89	100	100
Low mean		0	0	0	0	0
Coeff. of variation		121	0	17	18	13
LSD(1 Percent)		11	0	16	21	17
LSD(5 Percent)		8	0	12	16	13
No. of reps		4	4	4	4	4

Summary

Picloram at 0.37 oz/A when with BAS-9053 and OC injured flax, but not when applied with MCPA or at 0.25oz/A. Kochia control was lower with MCPA dma than MCPA est applied alone or with picloram, but was similar with MCPA dma or est when applied with BAS-9052+OC. Kochia control with bromoxynil alone or with other herbicides tended to be higher than with MCPA est. Kochia control was not adequate with any treatment as the uncontrolled kochia plants grew large and would have caused difficulty with harvest. All broadleaf control herbicides adequately controlled wild mustard. BAS-9052+OC alone or with other herbicides gave 95% or more yellow foxtail control.

MCPA for kochia control in flax, Casselton 1983. Culbert flax was seeded on May 16. Treatments were applied to 3 inch flax and 1 to 3 inch kochia on June 9.

Treatment	Rate oz/A	Flax %ir	Flax %sr	June 16 % Cntl Kocz
MCPA DMA	3	0	0	46
MCPA DMA	4	0	0	49
MCPA Est	3	0	0	61
MCPA DMA+X77	3+0.1%	0	0	74
MCPA DMA+X77	4+0.1%	0	0	65
MCPA Est+X77	3+0.1%	0	0	64
MCPA DMA+X100	3+0.1%	0	0	71
Mean		0	0	61
High mean		0	0	74
Low mean		0	0	46
Coeff. of variation		0	0	16
LSD(1 Percent)		0	0	20
LSD(5 Percent)		0	0	14
No. of reps		4	4	4

Summary

Kochia control was not adequate with any of the MCPA treatments as the surviving kochia grew large and would have made harvest impossible. Surfactants enhanced kochia control with MCPA DMA, but not with MCPA Est. However, MCPA Est was more effective then MCPA DMA for kochia control, when applied alone.

Weed control in flax, Williston 1983. 'Flor' flax was seeded to dry soil on May 3 and preemergence treatments applied on May 5. The experiment was on soil which was fallow in 1982, with 7.4 pH, 2% organic matter, and fertilized with N at 50 lb/A. Postemergence treatments were to 2 to 3 inch flax, 3-leaf wild oats, and other weeds less than 2 inches tall on June 1 with 60F, 60% R.H. and an east wind at 8 mph. The infestation of wild oat, green foxtail, and Russian thistle were dense. Plots were 10 by 24 ft and harvest was on August 15.

		----Flax---		----Percent Weed Control-----					
Treatment	Rate oz/A	Yield bu/A	TWT lb/bu	Grft	Wioa	Ruth	Wimu	Rrpw	Colq
Sethoxydim+MCPA Est+OC	3+4+.25gal	8.02	51.4	95	96	28	100	0	85
Sethoxydim+MCPA+OC	3+4+.25gal	7.53	50.6	96	95	6	100	0	60
Seth+MCPA+Picl+OC	3+4+.25+.25g	8.90	52.7	96	95	33	100	75	100
Seth+Bromoxynil+OC	3+4+.25gal	11.20	51.5	97	96	86	99	90	100
Sethoxydim	3+.25gal	4.29	45.9	99	99	0	0	0	0
Fluazifop	4+.25gal	4.12	44.9	98	96	0	0	0	0
Prcl+MCPA (PE+P)	64+4	3.22	46.1	15	0	10	100	90	98
MCPA	4	2.28	44.5	0	0	0	99	90	48
MCPA Est	4	2.67	47.7	0	0	21	100	100	100
Bromoxynil	4	3.05	49.0	4	0	86	99	100	100
Bromoxynil&MCPA6E(1:1)	8	3.47	48.8	0	0	90	100	100	100
Asulam	16	2.85	47.6	51	85	0	99	0	25
Asulam+Bromoxynil&MCPA	12+8	6.05	50.6	54	79	88	100	100	100
Asulam+MCPA DMA	12+4	2.98	48.2	25	28	0	100	90	98
Control		2.32	45.2	0	0	0	0	0	0
High Mean		11.20	52.7	99	99	90	100	100	100
Low Mean		2.28	44.5	0	0	0	0	0	0
Exp Mean		4.86	48.3	49	51	30	80	56	68
Coeff. of Variation		17.66		28	14	39	2		31
LSD (5%)		1.23		19	10	17	2		45
LSD (1%)		1.64		26	14	22	2		63
No. of Reps		4	1	4	4	4	4	1	2

Summary

Sethoxydim in combination with bromoxynil gave the highest control of all weed species resulting in the highest flax yield. The ester of MCPA generally gave higher control of broadleaf weed, especially Russian thistle, then MCPA amine, applied alone or with sethoxydim and 1 qt/A of petroleum oil with 17% surfactant. Effective weed control increased flax seed yield by nearly 9 bu/A.

Weed control in flax, Minot 1983. Culbert 79 flax was seeded and the PE propachlor applied on May 27. Postemergence treatments were applied to 4 inch tall flax, 1 to 3 inch green foxtail, and 3-leaf wild oats on June 23. Evaluation was on July 15 and harvest on September 21.

		--------Sunflower--------				-% control-	
Treatment	Rate oz/A	Yield bu/A	Test wt.	%ir	%sr	Fxtl	Wioa
BAS-9052+MCPA est+OC	3+4+.25G	16.5	48.0	1	0	91	100
BAS-9052+MCPA+OC	3+4+.25G	17.6	48.0	0	0	94	99
BAS-9052+MCPA+Picl+OC	3+4+.25+.25G	14.3	49.0	8	0	85	87
BAS-9052+Brox+OC	3+4+.25G	19.1	49.0	0	0	94	99
BAS-9052+OC	3+.25G	18.8	48.0	0	0	97	100
PP-009+OC	4+.25G	13.9	48.0	0	0	91	100
Propachlor+MCPA PE+P	64+4	15.0	47.0	0	0	31	0
MCPA	4	12.4	46.5	3	0	0	0
MCPA est	4	16.3	47.5	0	0	0	0
Bromoxynil	4	10.7	46.0	1	0	0	0
Bromoxynil&MCPA 6E(1:1)	8	14.3	47.5	0	0	0	0
Asulam	16	16.5	47.0	0	0	49	100
Asulam+Bromoxynil&MCPA	12+8	11.2	46.0	3	0	21	98
Asulam+MCPA dma	12+4	13.4	47.5	10	0	28	79
Control	0	14.3	46.0	0	0	0	0
Mean		15.0	47.4	2	0	45	57
High mean		19.1	49.0	10	0	97	100
Low mean		10.7	46.0	0	0	0	0
Coeff. of variation		23.4	0.	141	0	31	11
LSD(1 Percent)		6.6	0.	4	0	27	12
LSD(5 Percent)		5.0	0.	3	0	20	9
No. of reps		4.0	1.0	4	4	4	4

Summary

Weed density was very low so yield only small yield increases occurred with affective herbicides.

Fall herbicides for sunflower, Fargo 1982. Fall treatments were applied and incorporated twice with a field cultivator plus harrow on October 27, 1982. Spray treatments were applied without previous tillage and incorporated twice with a field cultivator plus harrow and SeedTech 315 sunflower seeded on May 23.

Treatment	Rate lb/A	---Sunflower-- %ir	%sr	----June 16---- Percent control Wioa	Wimu
EPTC fall	3	0	0	7	0
EPTC fall	4	0	0	32	0
EPTC+Trifluralin fall	3+1	0	0	88	0
Trifluralin fall	1	0	0	91	0
EPTC+R-40244 fall	3+.5	3	0	35	97
Trifluralin+R-40244 fall	1+.5	0	0	37	98
Trifluralin+Prometryn fall	1+1.5	0	0	92	20
Pendimethalin fall	1.5	0	0	90	0
Pendimethalin fall	2	0	0	95	0
Fluchloralin fall	1	0	0	88	0
EPTC spring	3	0	0	77	32
Trifluralin spring	.1	0	0	82	0
Pendimethalin spring	1.5	0	0	88	0
EPTC+R-40244 spring	3+.5	0	0	95	98
Trifluralin+R-40244 spring	1+.5	0	0	88	80
Trifluralin+Prometryn spring	1+1.5	0	0	87	17
Fluchloralin spring	1	0	0	70	0
Trifluralin+Chloramben spring	1+2	7	0	94	98
Control weedy		0	0	0	0
Control weedfree		0	0	98	99
Mean		0	0	72	32
High mean		7	0	98	99
Low mean		0	0	0	0
Coeff. of variation		585	0	15	42
LSD(1 Percent)		6	0	24	29
LSD(5 Percent)		5	0	18	22
No. of reps		3	3	3	3

Summary

All treatments with R-40244 or chloramben gave more than 95% wild mustard control without injury to sunflower. Trifluralin, pendimethalin, and fluchlorali fall applied and these herbicides and EPCT spring applied gave more than 70% wild oat control.

Sunflower tolerance to early cyanazine, Fargo 1983. The first four treatments(E) were applied and the cyanazine + trifluralin roto tiller incorporated on May 5. Seed Tech 315 sunflower was seeded and the glyphosate and pendimethalin + chloramben applied on May 23. Wild oat density was more than 50 and wild mustard less than 1 plant/ sq. ft.. Evaluation was on June 16.

Treatment	Rate lb/A	--Sunflower--- %ir	%sr	Percent control Wioa	Wimu
Cyan-DF+Glyp EPPS+PE	4+.5	13	24	83	95
Cyan-DF+Trif EPPI	3+.75	41	53	92	100
Cyan-DF/Glyp+Pend EPPS+PE	4+.5+1.25	20	35	89	96
Cyan-DF+Glyp EPPS+PE	3+.5	19	41	89	97
Pend+Clam-W+Glyp PE	1.25+2+.5	0	5	75	74
Weed Free	0	0	0	67	67
Weedy	0	0	0	0	0
Mean		13	23	71	76
High mean		41	53	92	100
Low mean		0	0	0	0
Coeff. of variation		34	60	28	26
LSD(1 Percent)		9	27	40	40
LSD(5 Percent)		7	20	29	29
No. of reps		4	4	4	4

Summary

Cyanazine caused injury and stand reduction of sunflower. The 18 day delay in sunflower seeding after cyanazine application did not provide for sunflower tolerance to cyanaznine. One inch of rain occured on May 10-12 which was 5 days after cyanazine application. Thus, possibly reducing the period for cyanazine breakdown to after the rains. All treatments of cyanazine gave 95% or more wild mustard control.

Weed control in sunflower, Williston 1983. Preplant treatments (PPI) applied and incorporated twice with a Triple K and Multiweeder, Sigco 448 sunflower seeded at 18000 seeds/A, and preemergence treatments applied on May 27. Soil surface was dry and the air was 78 F with 45% RH and moving from the northeast at 12 mph. The experiment was on soil which was fallow in 1982 and with 7.4 pH, 2% organic matter and fertilized with N at 50 lb/A. Postemergence treatments were applied to 4-leaf sunflower, 2-to 3-leaf wild oat and green foxtail and other weeds less than 2 inches tall on June 16 with 52 F, 75% RH, 7 mph southeast wind, and dry soil conditions. Harvest was on September 26.

		-----Sunflower----			--Percent Weed Control--				
Treatment	Rate oz/A	Yield lb/A	%inj	TWT lb/bu	Grft	Wioa	Ruth	Wimu	Rrpw
R-40244 PPI	16	406.5	0	36.0	0	0	0	95	25
Eptc PPI	40	501.0	0	35.2	99	95	30	40	89
Ethalfluralin PPI	11	606.6	0	34.7	98	91	90	6	96
Trifluralin PPI	12	507.4	0	34.7	96	88	78	0	98
Pendimethalin PPI	16	470.6	0	34.2	92	80	66	0	95
Trifluralin+CLAM-W PPI	12+22	641.8	0	34.6	92	69	75	84	76
Trifluralin+CLAM-W PPI	12+29	452.9	0	34.5	89	68	88	95	88
Trifluralin+PROM PPI	12+32	611.4	0	34.4	95	82	71	38	78
Ept+CLAM-W PPI	40+22	739.4	0	34.7	97	96	89	95	98
Trifluralin+R-40244 PPI	12+4	683.4	0	34.9	91	65	65	64	92
Trifluralin+R-40244 PPI	12+8	494.6	1.25	34.4	96	88	76	91	97
Sethoxydim+OC POST	3+.25gal	278.5	0	35.6	97	94	0	0	0
Fluazifop+OC POST	4+.25gal	361.7	0	34.8	88	93	0	0	0
Sethoxydim+Desm+OC POST	3+6+.25g	460.9	18.75	33.5	94	83	34	85	54
Sethoxydim+R-40244 POST	3+1	400.1	0	34.7	95	78	14	96	6
Sethoxydim+R-40244+OC P	3+1+.25g	353.7	0	34.4	93	91	8	81	0
Sethoxydim+Acif POST	3+2	408.1	1.25	34.4	93	49	45	98	28
Trifluralin+Desm PPI+P	12+6	486.6	7.5	35.0	97	85	88	90	96
Trifluralin+R-40244 PPI+P	12+1	568.2	1.25	35.7	93	83	80	94	98
Trifluralin+Acif PPI+P	12+2	571.4	0	34.2	91	75	66	69	88
Alachlor PE	32	328.1	0	33.4	0	0	0	0	0
Weed Free Check		817.9	0	34.3	100	100	100	100	100
Weedy Check		393.7	0	34.2	0	0	0	0	0
High Mean		817.9	18.75	36.0	100	100	100	100	100
Low Mean		278.5	0	33.4	0	0	0	0	0
Exp Mean		501.9	1.3	34.6	82	72	50	57	61
Coeff. of Variation		23.9	91.24		5	13	31	27	27
LSD (5%)		248.9	1.68		5	13	22	22	23
LSD (1%)		NS	2.23		7	18	29	29	31
No. of Reps		2	4	1	4	4	4	4	4

Summary

Only two replications were harvested because of bird damage in other replications. Wild oat, green foxtail, and Russian thistle infestations were high; and redroot pigweed moderate. None of the treatments caused any sunflower stand reduction. Desmedipham when applied with sethoxydim and oil caused 18% injury to sunflower without adequate Russian thistle or redroot pigweed control. EPTC applied with chloramben gave 88% or more control of all weed species and sunflower yield equal to that of the weed free sunflowers. Postemergence desmedipham and R-40244 gave 90% or more wild mustard control and acifluorfen 69%. Promitryne only gave 37% wild mustard control. Weed free sunflower yielded more than twice the weed sunflower, all without and cultivation.

Weed control in sunflower, Langdon 1983. Preplant treatments applied and rototiller incorporated, Sigco 444A sunflower seeded, and PE treatments applied on June 3. Postemergence treatments were to cotyledon to 4-leaf sunflower and and 1 to 3 inch tall weeds on June 23. Evaluations were on July 28.

		---------Sunflower---------				-Percent control-		
Treatment	Rate oz/A	Yield lb/A	Test wt.	%ir	%sr	Grft	Wibu	Colq
R40244 PPI	16	1405	28.5	0	0	11	68	90
EPTC PPI	40	1736	27.5	0	0	94	88	95
Ethaeflurolin PPI	11	1477	28.3	1	3	95	92	100
Trifluralin PPI	12	1492	28.5	0	0	94	87	95
Pendimethalin PPI	16	1678	28.1	0	0	92	73	95
Trif+Clam-W PPI	12+22	1514	28.0	0	0	94	95	100
Trif+Clam-W PPI	12+29	1560	27.8	0	0	93	100	100
Trif+Prometryn PPI	12+32	1475	28.0	1	0	90	92	100
EPTC+Clam-W PPI	40+22	1615	27.9	1	0	91	98	100
Trif+R40244 PPI	12+4	1359	28.8	0	0	85	96	100
Trif+R40244 PPI	12+8	1368	28.0	0	5	94	97	100
BAS-9052+OC P	3+.25G	1404	28.6	0	0	95	15	0
PP-009+OC P	4+.25G	1455	27.9	0	0	78	0	0
BAS-9052+Desm+OC P	3+6+.25G	1215	28.1	22	0	84	67	90
BAS-9052+R40244 P	3+1	1482	28.9	3	0	89	87	100
BAS-9052+R40244+OC P	3+1+.25G	1230	28.4	6	0	88	73	95
BAS-9052+Acif P	3+2	1032	27.8	35	0	88	67	100
Trif+Desm PPI+P	12+6	1231	27.9	14	0	96	93	100
Trif+R40244 PPI+P	12+1	1390	27.8	4	0	94	83	100
Trif+Acif PPI+P	12+2	1357	28.3	13	0	95	93	100
Alachlor PE	32	1219	28.3	0	0	63	63	90
Weed Free	0	1495	28.1	0	0	83	100	100
Weedy check	0	1371	28.5	0	0	0	0	0
Mean		1416	28.2	4	0	82	75	85
High mean		1736	28.9	35	5	96	100	100
Low mean		1032	27.5	0	0	0	0	0
Coeff. of variation		14	2.6	75	405	12	20	0
LSD(1 Percent)		354	1.4	6	2	18	32	0
LSD(5 Percent)		268	1.0	5	2	13	24	0
No. of reps		4	4.0	4	4	4	3	1

Summary

Sunflower seed yield generally refected the level of weed control or injury to the sunflower from the herbicides. Acifluorfen applied with BAS-9052 caused important injury to sunflower which resulted in a yield reduction. The injury symptoms in addition to plant stunting was an initiation of branching. Aciluorfen applied as a postemergence treatment after PPI Trifluralin did not cause the injury as when applied with BAS-9052. Desmedipham applied with BAS-9052 and oil caused important injury to sunflower.

Weed control in sunflower, Carrington 1983. PPI treatment applied and rototiller incorporated on June 6. 894 sunflower was seeded on June 9, and preemergence treatments applied on June 10. Postemergence treatments were applied to 6 to 8-leaf sunflower on July 6. The trifluralin-prometryn precipitated and weed control ratings were low in replication 3 and 4. Sunflower injury and weed control were evaluated on July 14. Redroot pigweed and green foxtail were dense and wild mustard sparce.

Treatment	Rate oz/A	--Sunflower- %ir	%sr	---Percent control--- Fxtl	Rrpw	Wimu
R40244 PPI	16	0	15	0	93	98
Ethalfluralin PPI	11	0	0	90	95	34
Trifluralin PPI	12	13	0	73	85	0
Pendimethalin PPI	16	0	0	64	69	5
Trifluralin+Clam-W PPI	12+22	0	0	63	60	48
Trifluralin+Prom PPI	12+32	1	13	51	63	40
Trifluralin+R40244 PPI	12+4	3	1	94	93	75
Trifluralin+R40244 PPI	12+8	0	0	81	95	95
BAS-9052+OC P	3+.25G	1	0	88	0	0
PP-009+OC P	4+.25G	0	0	58	0	0
BAS-9052+Desm+OC P	3+6.25G	19	0	91	19	76
BAS-9052+R40244 P	3+1	13	0	80	20	76
BAS-9052+R40244+OC P	3+1+.25G	18	0	86	3	91
BAS-9052+Acif P	3+2	13	0	76	13	76
Trifluralin PPI+P	12+6	21	0	85	96	68
Trifluralin+R40244 PPI+P	12+1	19	0	82	91	81
Trifluralin+Acif PPI+P	12+2	19	0	88	91	61
Alachlor PE	32	0	0	95	92	20
Mean		8	2	75	60	52
High mean		21	15	95	96	98
Low mean		0	0	0	0	0
Coeff. of variation		111	328	18	24	40
LSD(1 Percent)		16	10	26	27	40
LSD(5 Percent)		12	7	19	21	30
No. of reps		4	4	4	4	4

Summary

R-40244 at 16 oz/A alone or at 8 oz/A with trifluralin control of redroot pigweed and wild mustard. The average control, for replication one and two, both trifluralin + prometryn was 87% for foxtail, 90% for redroot pigweed, and 80% for wild mustard. Postemergence treatments for wild mustard control gave between 60 and 90% control and 13 to 19% injury to sunflower.

Herbicide incorporation in sunflower, Fargo 1983. Herbicides were applied and incorported once or twice with a field cultivator plus a harrow and Seed Tech 315 sunflower seeded on May 23, the soil surface was dry but subsoil moisture was adequate for seed germintion.

Treatment	Rate oz/A	-----Sunflower----- %ir	%sr	------June 17------ --Percent control-- Fxtl	Kocz
Pend 1 incorp	16	0	1	80	70
Pend 1 incorp	24	0	1	84	78
Trif 1 incorp	12	0	0	81	81
Trif 1 incorp	18	0	0	87	78
Fluc 1 incorp	12	0	0	75	54
Fluc 1 incorp	18	0	0	82	63
Etha 1 incorp	12	0	0	85	80
Etha 1 incorp	18	0	1	91	79
Pend 2 incorp	16	0	0	91	83
Pend 2 incorp	24	0	0	94	84
Trif 2 incorp	12	0	0	85	83
Trif 2 incorp	18	0	0	96	92
Fluc 2 incorp	12	0	0	89	79
Fluc 2 incorp	18	0	0	87	79
Etha 2 incorp	12	0	0	98	94
Etha 2 incorp	18	0	1	98	100
Mean		0	0	88	80
High mean		0	1	98	100
Low mean		0	0	75	54
Coeff. of variation		0	404	11	15
LSD(1 Percent)		0	2	18	23
LSD(5 Percent)		0	2	13	17
No. of reps		4	4	4	4

Summary

All herbicides were more effective in controlling kochia and foxtail when incorporated twice than once. Ethafulralin tended to give higher kochia and foxtail control than the other herbicides.

Preplant and preemergence weed control in sunflower PPI, Casselton 1983. Preplan soil incorporated (PPI) treatments applied and twice field cultivator plus harro incorporated, Seed Tch 315 sunflower seeded and PE treatments applied on May 23 Wild mustard at evaluation was either flowering (Wimu1) or less than 3 inches (Wimu2) tall because of early drought which limited early germination.

Treatment	Rate oz/A	Sunflower %ir	Sunflower %sr	July 6 Percent Control Fxtl	Wimu1	Wimu2	Kocz	Colq
SC-1056 PPI	1.5	0	0	36	0	34	23	25
R40244 PPI	16	5	3	21	96	99	90	83
EPTC PPI	48	1	4	83	16	40	53	82
Trifluralin PPI	16	0	0	92	0	15	78	80
Ethafluralin PPI	15	3	0	96	0	18	85	100
Ethafluralin PPI	30	0	0	96	23	51	92	99
Fluchloralin PPI	16	0	0	90	0	13	63	78
Fluchloralin PPI	32	0	0	94	0	30	58	90
Pendimethalin PPI	24	0	0	86	0	15	67	82
Pendimethalin PPI	48	0	0	73	28	38	65	100
Dinitramine PPI	12	1	0	94	0	40	82	97
Prodiamine PPI	12	0	3	83	22	34	87	97
EPTC+R40244 PPI	48+8	0	0	83	84	98	82	98
EPTC+R40244 PPI+PE	48+8	1	0	92	96	94	89	98
Trif+R40244 PPI	16+8	0	0	89	60	84	67	85
Trif+R40244 PPI+PE	16+8	1	0	96	99	86	96	98
Trif+Metr-W PPI	16+2	0	0	92	0	86	81	98
Trif+Metr-W PPI	16+4	6	5	78	8	75	80	90
Trif+Metr-W PPI+PE	16+2	5	0	91	28	65	73	95
Trif+Metr-W PPI+PE	16+4	5	11	93	30	76	84	95
Trif+Clam-W PPI	16+23	1	4	93	49	86	91	97
Trif+Clam-W PPI	16+29	1	0	94	11	85	97	98
EPTC+Clam-W PPI	48+23	0	0	80	24	66	82	93
EPTC+Clam-W PPI	48+29	3	0	78	11	91	73	88
Pend+Clam-W PPI	24+29	0	0	89	30	96	90	95
Fluc+Clam-W PPI	16+23	0	0	88	28	91	78	90
Dini+Clam-W PPI	12+23	1	0	95	55	94	93	100
Etha+Clam-W PPI	15+23	0	8	71	13	58	72	97
Trif+Prometryn PPI	16+	0	0	94	20	66	75	92
Trif+Prom PPI	16+48	0	0	94	33	84	87	98
Trif+Prom PPI+PE	16+24	0	0	94	16	35	82	95
Trif+Prom PPI+PE	16+48	0	3	97	64	70	85	100
R40244 PE	8	0	0	19	96	99	78	93
R40244 PE	16	0	0	49	99	100	92	88
SC-1056 PE	0.75	0	0	14	8	34	28	37
SC-1056 PE	1.5	0	0	13	0	8	23	17
SC-1056 PE	3	0	1	35	0	39	70	80
SD-95481 PPIS	8	0	0	69	0	11	55	25
SD-95481 PPIS	12	0	0	76	12	48	20	28
SD-95481 PE	12	0	0	45	0	8	0	0
SD-95481 PE	16	0	0	69	0	0	0	0
Alachlor PE	40	0	0	73	0	0	7	55
Alachlor+R40244 PE	40+8	0	0.	79	98	97	93	82
Weed Free	0	0	0	0	0	0	0	0
Weedy	0	0	0	0	0	0	0	0

Table . Continued

Treatment	Rate oz/A	Sunflower %ir	Sunflower %sr	July 6 Percent Control Fxtl	Wimu1	Wimu2	Kocz	Colq
Mean		1	1	72	28	55	66	76
High mean		6	11	97	99	100	97	100
Low mean		0	0	0	0	0	0	0
Coeff. of variation		383	404	23	79	39	25	20
LSD(1 Percent)		5	7	31	40	39	35	33
LSD(5 Percent)		4	5	23	30	30	27	25
No. of reps		4	4	4	4	4	3	3

Summary

Chloramben controlled the wild mustard that emerged late after the rains more than the early emerged wild mustard. R-40244 tended to give higher wild mustard control when applied PE than PPI especially of the early emerged wild mustard. Premetryne was not physically compatable with as a tank mixture with trifluralin (Each was applied separately). R-40244 in combination with EPTC or alachlor enhanced kochia control.

AC-222293 and PPG-1013 in sunflower, Casselton 1983. Seed Tech 315 sunflower were seeded on May 25. Treatments were applied to 4 to 6-lf sunflwer, cotyledon to 6-leaf wild mustard, 2 to 4-lf yellow foxtail, and 1 to 4 inch common lambsquarters on June 21 with 75F, 65% RH, and a 12 mph NE wind.

Treatment	Rate oz/A	--Sunflower-- %ir	%sr	----Percent Control---- Wimu	Yeft	Colq
AC222293+S	4	0	0	100	0	0
AC222293+S	8	0	0	100	0	0
AC22293+OC	4	0	0	100	0	0
AC222293+BAS-9053+OC	4+3+0.25G	0	0	98	100	0
BAS-9052+OC	3	0	0	0	100	0
Control	0	0	0	0	0	0
Mean		0	0	66	33	0
High mean		0	0	100	100	0
Low mean		0	0	0	0	0
Coeff. of variation		0	0	2	0	0
LSD(1 Percent)		0	0	3	0	0
LSD(5 Percent)		0	0	2	0	0
No. of reps		3	3	3	3	3

Summary

AC-22293 gave 98% or more wild mustard control without any visual injury to sunflower. AC-222293 in combination with BAS-9052 controlled both wild mustard and foxtail. Common lambsquarters was not controlled by either herbicide. PPG-1013 was applied to sunflower in an adjacent area free of grass weeds. PPG-1013 at 0.101b/A gave 40% sunfower injury, 100% wild mustard and 75% common lambsquarter control; and at 0.2 lb/A gave 45% sunflower injury, 100% wild mustard, and 90% common lambsquarters control on July 2. Later observations indicated that sunflowers as well as common lambsquarters recovered from the injury.

Postemergence wild mustard control in sunflower, Casselton 1983. Seed Tech 315 sunflower was seeded on May 25. S1 treatments were applied 4-leaf sunflower and colytedon to 4-leaf wild mustard on June 21. S2 treatments were applied to 6 to 10-leaf sunflower and wild mustard (some colytedonary), and 4 to 6 inch kochia on June 27.

		July 1				Aug 22	
		Sunflower		% Control		Sufl	% Cntl
Treatment	Rate oz/a	%ir	%sr	Wimu	Kocz	%ir	Kocz
PP-021+Surf S1	4+.2%	34	0	100	75	18	23
Acif-RP S1	2	10	0	85	0	0	0
Acif-RH S1	1	3	0	69	0	0	0
Acif-RH S1	2	9	0	96	35	0	0
Desm S1	4	7	0	49	20	0	0
Desm S1	6	15	0	83	33	0	0
Desm S1	8	16	0	94	68	0	0
Benazolin+OC S1	4+.25G	5	0	41	95	0	90
Bena+OC S1	6+.25G	5	0	50	93	0	95
Bena+OC S1	8+.25G	14	0	54	90	0	98
Bena S1	8	4	0	40	93	0	90
R40244 S1	1	19	0	98	55	5	45
R40244 S1	2	28	0	95	58	10	35
R40244+OC S1	1+.25G	21	0	95	35	3	43
MCPA S1	1	35	0	86	0	0	0
MCPA S1	2	45	0	96	45	0	0
Acif-RP S2	2	21	0	80	33	0	0
Acif-RH S2	1	4	0	50	0	0	0
Acif-RH S2	2	33	0	88	13	0	0
Bena+OC S2	4+.25G	10	0	68	85	0	93
Bena+OC S2	6+.25G	5	0	71	95	5	95
Bena+OC S2	8+.25G	5	0	63	90	10	95
Bena S2	8	0	0	45	88	0	93
Bena+Acif-RH S2	4+1	6	0	65	58	0	85
Bena+Desm S2	4+4	21	0	78	75	8	83
PP-021+Surf S2	4+.2%	74	0	98	63	0	0
Desm S2	6	7	0	44	8	0	0
Desm S2	8	14	0	60	40	0	0
Weed Free	0	0	0	100	100	0	0
Weedy	0	0	0	0	0	0	0
Mean		16	0	71	51	2	35
High mean		74	0	100	100	18	98
Low mean		0	0	0	0	0	0
Coeff. of variation		61	0	23	51	164	34
LSD(1 Percent)		17	0	30	73	9	33
LSD(5 Percent)		13	0	23	54	6	24
No. of reps		4	4	4	2	2	2

Summary

The sunflowrs were not harvested because of the uncontrolled kochia in many plots. Acifluorfen at 2 oz/A applied early or late, desmedipham at 8 oz/A and R-40244 early all gave more than 80% wild mustard control with less than 20% sunflower injury. Benazolin at all rates gave more than 90% kochia control in August. Benazolin with desmedipham appeared promising for postemergence control of both wild mustard and kochia.

Postemergene wild mustard control in sunflower, Fargo 1983. Seed Tech 315 sunflower was seeded on May 23. Plots all treated with BAS-9052 at 8 oz/A for grass weed control on June 17. S1 treatments applied to 4-leaf sunflower and cotyleden to 4-lf wild mustard on June 21 with 80F, 75% RH, and partly cloudy sky. S2 treatments were to 8 to 10-lf sunflower and 6 to 10-leaf wild mustard on June 27 with 75F, 30% RH, clear sky, and 8 mph NE wind.

		July 1				Aug 20	
		Sunflower			% Cntl	Sufl	% Cntl
Treatment	Rate oz/A	Yield lb/A	%ir	%sr	Wimu	%ir	Wimu
PP-021+SURF S1	4+.2%	2425	23	0	96	3	95
ACIF-RP S1	2	1996	4	0	43	0	45
ACIF-RH S1	1	1778	5	0	41	0	45
ACIF-RH S1	2	2196	15	0	75	0	65
DESM S1	4	1737	10	0	41	0	58
DESM S1	6	1362	19	0	75	0	73
DESM S1	8	1949	23	0	73	0	74
Benazolin+OC S1	4+.25G	2132	1	0	34	0	36
Bena+OC S1	6+.25G	1769	29	0	79	4	64
Bena+OC S1	8+.25G	1473	40	0	84	9	74
Bena S1	8	1785	13	0	77	4	66
R40244 S1	1	1639	16	0	69	1	73
R40244 S1	2	1940	31	0	84	0	88
R40244+OC S1	1+.25G	1325	24	0	75	0	71
MCPA S1	1	821	46	0	86	9	89
MCPA S1	2	905	78	0	95	54	93
Acif-RP S2	2	1522	9	0	61	1	83
Acif-RH S2	1	1450	3	0	41	1	48
Acif-RH S2	2	1021	11	0	69	1	73
Bena+OC S2	4+.25G	1338	16	0	63	5	65
Bena+OC S2	6+.25G	1231	3	0	65	8	54
Bena+OC S2	8+.25G	850	9	0	58	24	58
Bena S2	8	2694	0	0	24	0	33
Bena+Acif-RH S2	4+1	2344	1	0	49	0	68
Bena+Desm S2	4+4	2126	8	0	73	0	78
PP-021+Surf S2	4+.2%	932	48	0	99	11	96
Desm S2	6	1419	8	0	35	0	38
Desm S2	8	1241	20	0	76	0	51
Weed Free	0	2256	1	0	0	0	0
Weedy	0	1330	0	0	0	0	0
Mean		1633	17	0	61	4	62
High mean		2694	78	0	99	54	96
Low mean		821	0	0	0	0	0
Coeff. of variation		37	46	0	28	111	32
LSD(1 Percent)		1105	15	0	32	9	37
LSD(5 Percent)		836	11	0	24	7	28
No. of reps		4	4	4	4	4	4

Summary

Herbicides generally injured sunflower at the early stage more than at the later stage of treatment. Sunflower recovery from herbicide injury was usually good as the August 20 evaluation indicated that only MCPA at 2 oz/A and benazolin at 8 oz/A still caused more than 20% injury. Wild mustard was quite large and drought stressed early in the season.

Postemergence grass and broadleaf control in sunflower, Casselton 1983. Seed Tech 315 sunflower was seeded on May 25. Treatments were applied to 4-leaf sunflower, and emerging to 6 inch wild mustard and kochia on June 21 with 75F, 80%RH, cloudy sky, and 10 mph northeast wind. Sunflower response and weed control were evaluated on July 1.

Treatment	Rate oz/A	-Sunflower- %ir	%sr	---Percent control--- Wimu	Kocz	Fxtl
BAS-9052+OC	3+.25G	0	0	0	0	100
BAS-9052+OC	5+.25G	0	0	0	0	100
PP-009+OC	4+.25G	0	0	0	0	96
BAS-9052+R40244+OC	3+.5+.25G	9	0	88	15	98
BAS-9052+R40244+OC	3+1+.25G	28	0	96	48	98
BAS-9052+R40244+OC	3+2+.25G	28	0	97	68	100
BAS-9052+Benazolin+OC	3+6+.25G	5	0	56	88	95
BAS-9052+Desm+OC	3+6+.25G	31	0	93	45	98
BAS-9052+Acif+OC	3+.5+.25G	5	0	90	60	98
BAS-9052+Acif+OC	3+1+.25G	23	0	96	93	99
BAS-9052+Acif+OC	3+2+.25G	34	0	99	90	98
BAS-9052+Acif	3+2	10	0	93	45	91
PP-009+R40244+OC	4+1+.25G	21	0	95	38	95
PP-009+Desm+OC	4+6+.25G	20	0	85	5	84
PP-009+Acif+OC	4+.5+.25G	3	0	89	35	93
PP-009+Acif+OC	4+1+.25G	21	0	96	78	98
PP-009+Bena+OC	4+6+.25G	10	0	46	90	94
Mean		14	0	72	47	96
High mean		34	0	99	93	100
Low mean		0	0	0	0	84
Coeff. of variation		39	0	12	33	5
LSD(1 Percent)		11	0	16	45	8
LSD(5 Percent)		8	0	12	33	6
No. of reps		4	4	4	2	4

Summary

Foxtail control exceeded 90% with all treatments except for PP-009 + desmedipham. Injury to sunflower from acifluorfen with Bas-9052 plus petroleam oil with seventeen percent emulsifier (OC) was greater then the treatment without OC. R-40244 and desmedipham applied with OC also injured sunflower. Wild mustard control exceeded 90% with all treatments with R-40244, acifluorfen, and desmedipham, except for R-40244 at 0.5 oz/A. Benozolin at 6 oz/A gave less than 60% wild mustard control, but appeared effective for Kochia control. Kochia density was variable and only occured in two replications. Sunflower was not harvested because of the variable kochia infestation.

PPI and PE weed control in soybeans, 1983. Preplant treatments applied and field cultivator plus harrow twice incorporated, Evans soybean and Fleetwood navybean seeded, and premergence treatments applied on May 16 with 55F, no wind, and clear sky. Soil moisture adequate for seed germination at seeding. The DPE chloramben was applied on May 19. Postemergence (P) treatments were applied to 1 to 2 trifuliolate beans, and 2 to 6-leaf weeds on June 17 with 73F, 45% RH, clear sky, and 10 to 15 mph SE wind. Evaluation for crop injury and weed control was on July 2.

						June 2			
	Rate	Soybeans		Navybeans		--Percent control--			
Treatment	lb/A	%ir	%sr	%ir	%sr	Wimu	Kocz	Fxtl	Colq
Trif PPI	1	0	0	0	0	0	90	85	95
Pend PPI	1	0	0	0	0	3	78	85	85
Pend PPI	1.5	0	0	20	0	10	70	85	90
EPTC+Clam-W PPI	3+1.9	15	0	3	0	91	10	95	100
Trif+Clam-W PPI	1+1.9	0	0	0	0	95	95	97	100
Pend+Clam-W PPI	1.25+1.9	0	0	3	0	86	100	100	100
Trif+EPTC+Clam-W PPI	.5+2+1.9	15	0	0	0	78	95	97	95
Trif+Clam-W+Clam-W PPI+PE	1+1.4+.9	0	0	4	0	89	100	99	100
Alac+Clam-W PPI	2.5+1.9	0	0	5	0	99	100	97	100
Meto+Clam-W PPI	2.5+1.9	0	0	0	0	79	95	95	95
Trif+Metr-W PPI	1+.12	0	0	0	0	35	95	90	95
Trif+Metr-W PPI	1+.19	0	0	5	0	70	95	90	100
Trif+Metr-W PPI	1+.25	0	0	8	0	74	95	90	0
EPTC PPI	3	11	0	0	0	19	45	75	68
EPTC-Ext PPI	3	9	0	4	0	23	60	80	90
SD-95481 PPI	.5	0	0	0	0	24	40	75	50
SD-95481 PPI	.75	0	0	0	0	5	63	95	0
SD-95481+Metr-W PPI	.5+.25	0	0	4	0	78	95	65	95
Etha PPI	.94	0	0	0	0	25	85	95	95
Etha PPI	1.31	0	0	0	0	15	90	90	100
Dini PPI	.66	0	0	4	0	13	70	80	85
SD-95481 PE	.75	0	0	0	0	11	0	50	0
SD-95481 PE	1	0	0	0	0	8	0	85	0
SD-95481+Metr-W PE	.75+.25	0	0	0	0	35	0	0	0
Alac+Metr-W PE	2.5+.25	0	0	0	0	34	65	40	0
Trif+PPG844 PPI+P	1+.15	10	0	26	0	99	95	85	100
Alac+PPG844 PE+P	2.5+.15	15	0	28	0	78	0	90	80
Trif+Bent+PPG844 PPI+P	1+.5+.15	15	0	30	0	100	100	90	100
Alac+Bent+PPG844 PE+P	2.5+.5+.15	16	0	38	0	81	65	80	80
Trif+PPG1013 PPI+PE	1+.2	0	0	0	0	43	95	90	85
Trif+PPG1013 PPI+P	1+.2	40	0	81	0	100	100	95	100
Clam-W DPE	1.8	0	0	0	0	93	92	97	95
Clam-W PE	1.8	0	0	0	0	76	95	95	95
Mean		4	0	8	0	53	72	84	75
High mean		40	0	81	0	100	100	100	100
Low mean		0	0	0	0	0	0	0	0
Coeff. of variation		137	0	119	0	29	0	0	0
LSD(1 Percent)		11	0	17	0	29	0	0	0
LSD(5 Percent)		9	0	13	0	22	0	0	0
No. of reps		4	4	4	4	4	1	1	1

Summary

Soybean and navybean were injured by PPG-844 and PPG-1013 applied postemergence. Wild mustard density was extremely high which prevented emergence of other weeds. The kochia, foxtail and common lambsquarter control ratings represent only one evaluation which occured in various replications where the weeds were evident in the plot boarder area.

Postermergence weed control in beans, Cassellton 1983. Fleetwood navybean and Evans soybean were seeded and preemergence BAS-9052 applied on May 16 dry with surface and hot moist subsoil. Bentazon at 12oz/A was applied to plots to recieve grass control postemergence herbicides alone (without mixture with broadleaf control herbicides) on June 15. The objective of June 15 treatment was to control the excessive wild mustard infestation. All postemergence treatments except 1 to 9 and P2, were applied to 1 to 2-trifoliolate beans, 4 to 6-leaf wild mustard and volunteer sunflower, and 2 to 4-leaf yellow foxtail on June 17. P2 treatments were applied on June 22. The first nine postemergence treatments were to 2 to 6-leaf foxtail and flowering wild mustard on June 28.

Treatment	Rate oz/A	Navybean %ir	Navybean %sr	Soybean %ir	Soybean %sr	--% control-- --6-27---- 7-15 Wimu	VSF	Fxtl
AC-214 PE+P	20+2	3	0	0	0	83	65	29
AC-214 PE+P	20+4	8	0	0	0	85	35	78
AC-252214 P	2	6	0	4	0	86	43	54
AC-252214 P	4	3	0	0	0	88	33	28
Bent+Clam-W P	12+29	0	0	0	0	46	15	11
Bent (BAs9052 PE)	12	3	0	0	0	64	23	68
Acif (BAS9052 PE)	3	3	0	0	0	60	13	34
Acif (BAS9052 PE)	6	0	0	0	0	68	15	52
Acif+OC (BAS9052 PE)	1.5+.25G	8	0	0	0	54	10	53
PP-021+X-77	4+.25%	6	0	0	0	97	10	19
PP-021+X-77	5+.25%	6	0	0	0	99	13	62
PP-021+X-77	6+.25%	1	0	0	0	98	48	51
BAS-9052+OC (bdl 1day+)	1.5+.25G	0	0	0	0	99	48	56
BAS-9052+SO (bdl 1day+)	1.5+.25G	0	0	0	0	97	48	56
BAS-9052+OC (bdl 1day+)	3+.25G	5	0	0	0	95	77	88
BAS-9052+OC (bdl 1day+)	5+.25G	0	0	0	0	97	49	94
BAS-9052+OC P2	3+.25G	0	0	0	0	93	84	98
BAS-9052+OC P2	5+.25G	3	0	0	0	97	98	98
BAS-9052+Bent+Acif+OC	3+12+2+.25G	5	0	5	0	99	91	59
BAS-9052+Bent+OC	3.0+12+.25G	0	0	0	0	91	43	61
BAS-9052+Bent+OC	3.0+12+.5G	0	0	0	0	91	82	53
BAS-9052+Napt&2,4-DB+OC	1.5+20.7+.25G	30	0	6	0	88	38	29
Dowco453+Bent+OC	1+12+.25G	0	0	0	0	88	88	40
Dowco453+Acif	1+6	8	0	1	0	83	60	46
Dowco453+Bent+Acif	1+12+6	9	0	0	0	98	46	55
Dowco453+OC	1+.25G	1	0	0	0	95	88	51
HOE33171+OC	2.5+.25G	0	0	1	0	93	84	69
HOE33171+OC/Bent+Acif(4d)	2.5+1q+12+6	21	0	5	0	99	80	45
HOE33171+Bent+OC	2.5+12+.25G	0	0	0	0	78	53	50
HOE3317+Acif+OC	2.5+6+.25G	16	0	8	0	96	94	67
HOE33171+Acif+Bent+OC	2.5+12+6+.25G	54	0	11	0	100	97	64
PP-009+OC	3+.25G	0	0	0	0	92	65	53
PP-009+OC	4+.25G	9	0	4	0	96	78	21
PP-009+OC	6+.25G	0	0	0	0	68	23	59
PP-009+Surf	3+.25%	1	0	0	0	95	83	33
PP-009+Surf	4+.25%	0	0	0	0	95	80	30
PP-009+Acif+Surf	4+.37+.25%	0	0	0	0	46	18	33
PP-009+Acif+Surf	6+.37+.25%	0	0	0	0	44	28	75
PP-009+Bent+OC	4+12+.25G	3	0	0	0	84	73	8
PP-009+Bent+OC	6+12+.25G	0	0	0	0	74	40	58
CGA82725D+OC	4+.12G	1	0	0	0	96	92	35
CGA82725D+Bent+OC	4+12+.12G	0	0	0	0	89	35	76
CGA82725D+Bent+Acif	4+8+4	13	0	1	0	98	83	20

Table . Continued

Treatment	Rate oz/A	Navybean %ir	Navybean %sr	Soybean %ir	Soybean %sr	--% control-- --6-27 Wimu	7-15 VSF	7-15 Fxtl
CGA82725D+Bent+Acif+OC	4+8+4+.12G	23	0	10	0	100	35	53
CGA82725D+2,4-DB +OC	4+3+.12G	4	0	0	0	30	18	81
CGA82725D+2,4-DB +Acif	4+3+4	14	0	4	0	87	83	29
Weedy control	0	0	0	0	0	0	0	0
Weed Free control	0	0	0	0	0	0	0	0
Mean		5	0	1	0	81	52	50
High mean		54	0	11	0	100	98	98
Low mean		0	0	0	0	0	0	0
Coeff. of variation		132	0	230	0	13	61	47
LSD(1 Percent)		13	0	5	0	20	84	42
LSD(5 Percent)		10	0	4	0	15	63	32
No. of reps		4	4	4	4	4	2	4

Summary

The wild mustard infeatation was excessive preventing other weed from devloping normally. Volunteer sunflower occured only in two replications and yellow foxtail density was low. The data was quite variable because of the variation in the large area required for the experiment.

Sulfonylurea herbicides in soybeans, Fargo 1983. Evans soybeans were seeded on May 19 and herbicides were applied to trifoliolate soybeans, 2 to 8-1f wild mustard and 2 to 4-1f yellow foxtail. Foxtail density at treatment was low as an early season drought and cold temperatures prevented foxtail emergence. However, more than 0.5 inch rain occured 5 days before and after treatment which caused a dense late season foxtail population.

Treatment	Rate oz/A	----Soybean---- %ir	%sr	-----July 9----- Percent Fxtl	Control Wimu
DPX-F6025+X-77	.12+.25%	0	0	19	100
DPX-F6025+X-77	.25+.25%	3	0	25	100
DPX-F6+DPX-Y6+X-77	.25+.5+.25%	0	0	19	100
DPX-Y6202+X-77	.5+.25%	0	0	48	0
Control	0	0	0	0	0
Mean		1	0	22	60
High mean		3	0	48	100
Low mean		0	0	0	0
Coeff. of variation		258	0	48	0
LSD(1 Percent)		3	0	23	0
LSD(5 Percent)		2	0	16	0
No. of reps		4	4	4	4

Summary

DPX-F6025 controlled wild mustard completely without injury to soybean. DPX-Y6202 did not adequately control the yellow foxtail, possibily because of emergence after treatment.

Weed control in soybeans, Carrington 1983. PPI treatments were applied and roto-tiller incorporated on June 8. McCall soybean seeded on June 9 and PE treatment applied on June 10. A 0.71 inch rain occurred on June 13. The post-emergence treatment of BAS-9052 was on July 6 and the other postemergence treatmemts on July 12 when the soybeans were 6 to 8 inches tall and in the V3 stage.

Treatment	Rate oz/A	--Beans-- %ir	%std	------Percent control------ FXtl	Wibu	Colq	Wimu	Rrpw
Trifluralin PPI	12	1	100	81	66	74	8	86
Trifluralin+Metribrzin PPI	12+2.5	1	100	89	93	91	98	98
Trifluralin+Metribrzin PPI	12+4	1	100	91	68	95	99	98
Pendimethalin PPI	20	4	96	93	76	60	18	64
Pendimethalin+Metribryin PPI	20+4	3	100	88	80	93	98	94
Alachlor+Metribryin PE	32+4	1	100	99	65	100	100	100
Diclofop+Bentazon P	16+16	13	100	61	93	100	100	89
BAS-9052+Bentazon P	5+16	8	100	97	86	68	91	71
BAS-9052+Acifluorfen P	5+6	8	100	100	30	43	59	79
Ethalfluralin PPI	11	3	95	95	64	68	43	86
Control	0	0	0	0	0	0	0	0
Mean		4	90	81	65	72	65	79
High mean		13	100	100	93	100	100	100
Low mean		0	0	0	0	0	0	0
Coeff. of variation		68	4	11	26	26	21	21
LSD(1 Percent)		5	6	17	33	36	26	33
LSD(5 Percent)		4	5	13	25	27	19	24
No. of reps		4	4	4	4	4	4	4

Summary

Treatments with metribryin or bentazon gave 90% or more wild mustard control. All treatments except diclofop gave 80% or more foxtail control.

Weed control in corn, Casselton 1983. Preplant soil incorporated treatments were applied field cultivator plus harrow incorporated twice, Pioneer 3392 corn seeded, and preemergence treatments applied on May 16. Soil surface was dry with adequate subsoil moisture. Postemergence treatments were 2 to 2.5-leaf corn, 2 to 4-leaf wild mustard and less than 2-leaf yellow foxtail and volunteer sunflower. Weed control and crop injury were determined visually on June 23. Weeds were all at a high density the Cyon-W + LOTM P treatment was at a lower than indicated rate because of mechanical problems with the sprayer.

				June 23		
	Rate	Corn		Percent control		
Treatment	oz/A	%ir	%sr	VSF	Wimu	Fxtl
EPTC&R+PPG1013 PPI+PE	3+.2	0	0	0	99	91
EPTC&R+PPG1259 PPI+P	3+.1	0	0	0	45	92
EPTC&R PPI	4	0	0	0	13	92
EPTC&R&Ext PPI	4	0	0	0	11	95
EPTC&R&Ext+Cyan-W PPI	4+1.5	0	0	3	45	95
EPTC&R&Ext+Dica PPI+P	4+.25	8	0	99	99	96
EPTC&R&Ext+Cyan+Lotm PPI+P	4+1.5+.25G	1	0	100	100	99
Alachlor+Cyan-W PPI	2.5+2	0	0	3	61	54
Metolachlor+Cyan-W PPI	2.5+2	0	0	0	49	72
Metolachlor+Dicamba PPI+PE	2.5+.25	1	0	90	92	81
Pendimethalin+Cyan-W PE	2+2	0	0	0	34	50
Pend+Cyan-W+Lotm P	1.5+1.5+.25G	9	0	99	100	88
Clam-W+Cyan-W P	2+2	3	0	100	100	98
Alachlor+Dicamba PRE+P	2+.25	30	5	100	98	56
Alachlor+Brox PRE+P	2+.25	0	0	93	94	56
Alachlor+Brox PRE+P	2+.5	0	0	97	98	85
Alac+Brox+Dica PRE+P	2+.25+.25	1	0	96	98	51
Alac+Brox+2,4-D PRE+P	2+.25+.25	6	0	97	98	73
Atrazine-L+Brox P	1+.25	0	0	100	99	68
Cyan-W+Brox P	1.2+.25	15	5	100	99	71
Dowco356+Atra-L+OC P	.5+1.5+.25G	3	0	100	100	98
Do356+Atra+Cyan+Lot P	.5+.75+.75+.25G	10	0	100	100	99
Dowco356+Cyan-W+Lotm P	.5+1.5+.25G	9	0	100	99	77
Dowco356+Brox P	.5+.25	4	0	94	95	0
Dowco356+PPG1259 P	.5+.1	0	0	5	56	62
Cyan-W+Lotm P	1.5+.25G	10	0	100	99	91
Cyan-W+Atra-L+Lotm P	.75+.75+.25G	5	0	100	100	97
Mean		4	0	66	81	77
High mean		30	5	100	100	99
Low mean		0	0	0	11	0
Coeff. of variation		215	740	6	12	17
LSD(1 Percent)		17	5	7	17	24
LSD(5 Percent)		13	4	5	13	18
No. of reps		4	4	4	4	4

Summary

PPG-1013 preemergence controlled wild mustard, but not volunteer sunflower. Six treatments gave 95% control of all weeds (see table).

Weed control in corn, Carrington 1983. PPI treatments applied and roto-tiller incorporated and Jacques JX10 corn seed on June 9 and preemergence treatments applied on June 10. A 0.71 inch rain fall occurred on June 13.

Treatment	Rate lb/A	---Corn-- %ir	%std	------Percent control------ Fxtl	Wibu	Colq	Rrpw	Prpw
EPTC+R25788 PPI	4	1	100	99	84	65	76	3
EPTC+R+R33865 PPI	4	15	100	99	85	81	84	69
Cyanazine+Alachlor PPI	1.5+2	1	100	83	98	96	74	38
Alachlor PPI	1+2	0	100	91	100	96	99	85
Cyanazine+Alachlor PE	1.5+2	0	100	95	89	98	100	86
Atrazine+Alachlor PE	1+2	0	100	100	100	100	100	100
Butylate+Atrazine PPI	3.2+0.8	0	100	99	100	100	100	99
Cyanzine P	1.5	0	0	0	0	0	0	0
Control	0	0	0	0	0	0	0	0
Mean		2	78	74	73	71	70	53
High mean		15	100	100	100	100	100	100
Low mean		0	0	0	0	0	0	0
Coeff. of variation		235	0	5	14	13	11	15
LSD(1 Percent)		9	0	7	20	18	15	15
LSD(5 Percent)		7	0	5	15	13	11	11
No. of reps		4	4	4	4	4	4	4

Summary

Atrazine plus alachlor or butylate provide nearly complete control of all Weeds without injury to corn. EPTC + R25788 + R33865 (Eradicane Extra) tended to give higher weed control than EPTC + R25788 (Ecadicane).

Weed control in safflower, Williston 1983. 'S 541' safflower was seeded at 10 lb/A preplant (PPI) treatments applied and incorporated twice with a Triple K and multiweeder, and preemergence (PE) treatments applied on May 23 with 75 F, 32% RH, 5 mph south wind, and a dry soil surface. The experiment was on an area fallow in 1982, N fertilized at 50 lb/A, and with 7.4 pH and 2% organic matter. Postemergence treatments were to 2-to 4-leaf safflower and less than 2 inch tall weeds consisting of dense populations of wild oat, green foxtail, and Russian thistle, on June 10 with 70 F, 69% RH, and a 6 mph southwest wind. Plots were 10 by 24 ft. Harvest was on September 20.

		------Safflower-----		-Percent Weed Control---						
Treatment	Rate oz/A	Yield lb/A	TWT lb/bu	%sr	%inj	Grft	Wioa	Ruth	Rrpw	Wimu
Trifluralin PPI	12	592.7	39.3	0	0	98	88	75	98	0
Pendimethalin PPI	16	419.2	34.9	0	0	94	51	55	98	0
Eptam PPI	48	334.5	35.3	0	0	98	97	16	96	30
Trifluralin+Triallate PPI	12+16	572.4	38.5	0	0	99	96	78	98	0
Ethalfluralin PPI	16	764.8	39.9	0	0	99	90	91	99	52
Ethalfluralin PPI	32	875.2	41.3	0	0	99	97	96	100	97
Trifluralin+R-40244 PPI	12+8	615.2	40.1	0	1.25	99	85	79	97	98
Pendimethalin+chlor PE	16+.125	169.3	0	1.25	0	13	0	5	33	33
R-40244+Sethoxydim PE+P	4+3	250.2	38.1	0	0	95	88	23	58	95
Chlorsulfuron+seth PE+P	.125+3	245.0	38.9	0	1.25	97	90	11	24	33
Ethalfluralin PE	16	297.9	0	0	0	13	0	0	6	0
Ethalfluralin PE	24	162.8	0	0	0	14	0	0	0	10
Seth+chlorsulfuron POST	3+.0625	698.6	40.5	0	5.5	96	89	96	100	100
Seth+chlorsulfuron POST	3+.125	716.1	41.0	1.25	10	96	90	97	100	100
Seth+chlorsulfuron POST	3+.25	489.6	40.5	6.25	26.25	94	88	97	100	100
Seth+chlorsulfuron POST	3+.5	439.5	39.0	47.5	77.5	96	89	100	100	100
Sethoxydim POST	3	286.2	38.7	0	0	97	93	4	0	0
Sethoxydim POST	6	346.2	37.0	0	0	99	96	0	0	0
Sethoxydim+R-40244 POST	3+1	266.2	34.8	0	2.5	96	90	21	28	88
Diclofop+R-40244 POST	16+1	381.3	37.8	0	.25	93	89	6	47	87
Sethoxydim+2,4-DB POST	3+8	262.5	38.4	0	11.25	97	86	71	64	97
Fluazifop POST	4	230.5	36.0	0	0	75	95	0	0	0
Fluazifop+Chlor POST	4+.125	334.5	38.6	3.75	7.5	30	86	95	100	100
Fluazifop POST	8	262.2	35.2	0	0	96	99	0	0	0
Control		81.9	0	0	0	0	0	0	0	0
High Mean		875.2	41.3	47.5	77.5	99	99	100	100	100
Low Mean		81.9	0	0	0	0	0	0	0	0
Exp Mean		403.8	32.2	2.4	5.73	79	75	45	58	49
Coeff. of Variation		26.5		124.6	47.0	11	10	27	34	35
LSD (5%)		150.5		4.21	3.79	13	11	17	28	28
LSD (1%)		199.6		5.58	5.02	17	14	22	37	37
No. of Reps		4	1	4	4	4	4	4	4	3

Summary

Sethoxydim and fluazifop were always applied with 1 qt/A petroleum oil with 17% surfactant. Ethalfluralin at 32 oz/A gave 95% or more control of all weeds and safflower treated with ethalfluralin had the highest yields. R-40244 PE controlled wild mustard, but did not adequately control Russian thistle or redroot pigweed. Chlorsulfuron postemergence injured safflower.

Weed control in tame buckwheat, Langdon 1983. Preplant incorporated treatments (PPI) were applied and field cultivator incorporated twice and tame buckwheat seeded June 4. Postemergence treatments were applied to 2 to 3 inch buckwheat and 1 to 3 inch weeds June 24. The experiment was a randomized complete block with 4 replications and experimental units were 10 by 20 ft.. Weed densities were moderate to light and were evaluated for control on July 27.

Treatment	oz/A	%ir	%sr	oats	Fxtl	Must
Metolachlor PPI	2	0	0	0	92	0
Metolachlor PPI	4	0	0	0	93	0
Alachlor PPI	2	1	0	0	92	0
Triallate PPI	1	0	0	97	0	0
Glyphosate P	.18	75	96	83	73	86
BAS-9052+OC P	.2+.25G	9	0	60	84	0
PP-009+OC P	.2+.25G	0	0	96	88	0
Dalapon P	.75	6	0	0	30	0
Diclofop P	1	3	0	95	95	0
BAS-9052+2,4-D+OC P	.2+.06+.25G	24	0	100	100	81
BAS-9052+2,4-D+OC P	.2+.12+.25G	33	0	100	100	87
BAS-9052+MCPA+OC P	.2+.06+.25G	24	0	100	100	71
BAS-9052+MCPA+OC P	.2+.12+.25G	39	3	99	97	69
BAS-9052+R-40244+OC P	.2+.12+.25G	26	0	100	100	75
BAS-9052+Benazolin+OC P	.2+.62+.25G	89	92	96	93	8
Control	0	0	0	0	0	0
Mean		20	12	64	77	30
High mean		89	96	100	100	87
Low mean		0	0	0	0	0
Coeff. of variation		38	17	21	15	31
LSD(1 Percent)		15	4	25	21	17
LSD(5 Percent)		11	3	19	16	13
No. of reps		4	4	4	4	4

Summary

Glyphosate, 2,4-D, MCPA and benazolin treatments injured buckwheat; however only glyphosate or benozlin reduced stand. Tame oat control was excellent with triallate, PP-009 or BAS-9052 combinations with 2,4-D, MCPA and benozlin, foxtail control excellent with all treatments except triallate and mustard control fair with glyphosate, 2,4-D or MCPA.

Tame buckwheat, IR-4 Fargo 1983. Manor buckwheat was seeded at 20 lb/A to a Fargo silty clay soil with 7.9 pH and 5% organic matter on May 30. All the treatment except the harvest interval treatment were applied to 2- to 3-leaf buckwheat and 3-leaf green foxtail on June 20. A 0.3 inch rain occurred on June 21. The preharvest interval treatment was applied to flowering buckwheat on July 22. The treatments were applied in 8.5 gpa at 35 psi. The experiment was a randomized complete block with treatments replicated three times. Experimental units were 8 by 40 ft and harvest was a 4 ft width the length of the plot in two replications. Harvest was delayed until September 29 because of rains. The yield values were not calculated because the lodging made harvest difficult and was only from two replications for residue. The lodging did not relate to treatments, it also occurred in the untreated plots. Weed infestations were low with less than four foxtail plants per square foot.

Treatment[a]		Buckwheat injury, %	Green foxtail control, %
BAS-9052 + OC	3 oz/A	0	100
BAS-9052 + OC	8 oz/A	0	100
(BAS-9052 + OC) + (BAS-9052 + OC PH)	8 oz/A 8 oz/A	0	100
Control untreated, weedy		0	0

[a] OC = petroleum oil with 17% emulsifier and PH = preharvest interval treatment.

BAS-9052 gave complete control of the foxtail without causing any injury to buckwheat.

Grass herbicide combinations, Fargo 1983. Lyon oats and Era wheat were seeded in 6 ft. wide adjacent strips on April 29. Herbicides were applied to 4-leaf wheat and oats on June 2.

Treatment	Rate oz/A	---% control------June 17--- Wht	Oat
BAS-9052+OC	1.5+.25G	69	78
BAS-9052+OC	3+.25G	96	99
PP-009+OC	2+.25G	100	100
PP-009+OC	4+.25G	100	100
BAS-9052+PP-009+OC	.75+1+.25G	79	84
BAS-9052+PP-009+OC	1.5+2+.25G	100	100
BAS-9052+PP-009+OC	.75+2+.25G	99	99
BAS-9052+PP-009+OC	1.5+1+.25G	99	100
Control	0	0	0
Mean		82	84
High mean		100	100
Low mean		0	0
Coeff. of variation		9	6
LSD(1 Percent)		14	11
LSD(5 Percent)		11	8
No. of reps		4	4

Summary

The objective was to determine grass species control with combinations of BAS-9052 and PP-009. The intent was that the spectrum of species controlled might increase with less total herbicide usage for certain mixtures. The lowest rate of PP-009 alone gave complete control of the two species. Thus, comparisions to control with combinations could not be made.

Grass herbicide combinations, NW22 1983. Lyon oats and Era wheat were seeded in 6 ft. strips as bioassay species on May 25 for Experiment 1 and May 26 for Experiment 2. A strip of natural yellow foxtail was left in Exp. 1 and Siberian millet was seeded in Exp. 2. Treatments were applied to r-leaf wheat, oats, and yellow foxtail on June 21 for Exp. 1, and to jointing to flag leaf stage of grasses on July 7 for Exp. 2. The herbicide rates were one half the rates given in the table for Experiment 2.

		Percent control								
		Experiment 1						Experiment 2		
	Rate	July 7			July 15			July 22		
Treatment	oz/A	Wht	Oat	Fxtl	Wht	Oat	Fxtl	Oat	Milt	Wht
BAS-9052+OC	1.5+.25G	90	97	95	91	98	96	35	85	40
BAS-9052+OC	3+.25G	97	100	98	100	100	99	69	89	70
PP-009+OC	2+.25G	96	99	83	100	100	83	38	20	68
PP-009+OC	4+.25G	98	100	93	100	100	95	64	30	71
BAS-9052+PP-009+OC	.75+1+.25G	94	98	88	98	98	91	57	85	71
BAS-9052+PP-009+OC	1.5+2+.25G	98	100	93	100	100	96	82	88	75
BAS-9052+PP-009+OC	.75+2+.25G	97	99	92	100	99	90	73	90	73
BAS-9052+PP-009+OC	1.5+1+.25G	97	99	96	100	100	98	86	95	80
Mean		96	99	92	99	99	93	63	73	68
High mean		98	100	98	100	100	99	86	95	80
Low mean		90	97	83	91	98	83	35	20	40
Coeff. of variation		2	1	6	3	1	5	18	10	6
LSD(1 Percent)		4	2	11	6	2	8	23	15	8
LSD(5 Percent)		3	1	8	4	1	6	17	11	6
No. of reps		4	4	4	4	4	4	4	4	4

Summary

The level of gross species control in Experiment 1 was too high to determine any enforcement of species control from the herbicide combinations. The data from Experiment 2 indicated that the combination of BAS-9052 with PP-009 could give control of more species than either herbicide alone, without more total herbicide. Herbicide rates in Experiment 2 were at one half the rate listed in the Table.

MCPA antagonism of PP-009, NW22 1983. Lyon oats, Era wheat, and Siberian millet were seeded in adjacent strips to serve as bioassay species, May 26. Treatments were applied to 7-leaf millet and flag leaf stage wheat and oats from July 8 (3DB, 3 day before PP-009) to July 14 (3DA, 3 day after PP-009). TM = tank mix and ST = each herbicide applied separately within several minutes of each other.

Treatment	Rate oz/A	----Percent control-----July 22---- Oat	Millet	Wheat
PP-009+OC	2+.25G	70	30	79
PP-009+OC	4+.25G	84	54	87
MCPA (3DB)+PP-009+OC	4+2+.25G	69	29	78
MCPA (3DB)+PP-009+OC	4+4+.25G	86	51	88
MCPA (3DB)+PP-009+OC	8+2+.25G	67	24	76
MCPA (3DB)+PP-009+OC	8+4+.25G	82	26	84
MCPA (1DB)+PP-009+OC	4+2+.25G	76	25	81
MCPA (1DB)+PP-009+OC	4+4+.25G	88	35	87
MCPA (1DB)+PP-009+OC	8+2+.25G	69	23	79
MCPA (1DB)+PP-009+OC	8+4+.25G	87	26	85
MCPA+PP-009+OC (TM)	4+2+.25G	67	19	76
MCPA+PP-009+OC (TM)	4+4+.25G	84	45	87
MCPA+PP-009+OC (TM)	8+2+.25G	58	19	71
MCPA+PP-009+OC (TM)	8+4+.25G	83	22	82
MCPA+PP-009+OC (ST)	4+2+.25G	63	24	77
MCPA+PP-009+OC (ST)	4+4+.25G	88	54	87
MCPA+PP-009+OC (ST)	8+2+.25G	71	20	75
MCPA+PP-009+OC (ST)	8+4+.25G	79	41	84
MCPA (1DA)+PP-009+OC	4+2+.25G	75	50	83
MCPA (1DA)+PP-009+OC	4+4+.25G	87	66	91
MCPA (1DA)+PP-009+OC	8+2+.25G	74	51	83
MCPA (1DA)+PP-009+OC	8+4+.25G	88	65	90
MCPA (3DA)+PP-009+OC	4+2+.25G	70	48	82
MCPA (3DA)+PP-009+OC	4+4+.25G	89	73	87
MCPA (3DA)+PP-009+OC	8+2+.25G	70	49	81
MCPA (3DA)+PP-009+OC	8+4+.25G	89	72	88
MCPA+OC	4+.25G	3	3	0
MCPA+OC	8+.25G	6	6	0
Control	0	0	0	0
Mean		70	36	74
High mean		89	73	91
Low mean		0	0	0
Coeff. of variation		11	26	5
LSD(1 Percent)		14	17	6
LSD(5 Percent)		10	13	5
No. of reps		4	4	4

Summary

PP-009 grass control only tended to be antagonized by MCPA. Grass control was generally lower when PP-009 was tank mixed with MCPA than when applied as separate treatments. Millet control was generally higher when MCPA was applied after PP-009.

BAS-9052 and PP-009 antagonism by desmedipham. Lyon oats and Era wheat were seeded in 6 ft. adjacent strips to serve as bioassay species to evaluate postemergence herbicides, May 26. A 9 foot strip was left unseeded for the natural yellow foxtail infestation. Treatments were applied to 4-leaf yellow foxtail, wheat and oats on from June 20 for the 3 day before (3db) to June 26 for the 3 day after (3da) Bas-9052 or PP-009 treatment. Species control was evaluated on June 7 and 15. (Tm) = tank mixture and (ST) = each herbicide applied separately.

Treatment	Rate oz/A	July 7 Wht	July 7 Oat	July 7 Yeft	July 15 Wht	July 15 Oat	July 15 Yeft
BAS-9052+OC	1.5+.25G	68	61	93	53	63	93
Desm (3db)+BAS-9052+OC	8+1.5+.25G	82	89	94	80	90	89
Desm (1db)+BAS-9052+OC	8+1.5+.25G	70	83	92	58	77	76
Desm+BAS-9052+OC (tm)	8+1.5+.25G	73	71	89	58	58	63
Desm+BAS-9052+OC (st)	8+1.5+.25G	59	54	81	46	50	50
Desm (1da)+BAS-9052+OC	8+1.5+.25G	91	91	96	100	99	99
Desm (3da)+BAS-9052+OC	8+1.5+.25G	93	93	91	100	100	99
PP-009+OC	2+.25G	96	96	81	100	97	81
Desm (3db)+PP-009+OC	8+2+.25G	99	97	82	100	99	74
Desm (1db)+PP-009+OC	8+2+.25G	95	94	81	100	97	73
Desm+PP-009+OC (tm)	8+2+.25G	92	90	73	100	95	48
Desm+PP-009+OC (st)	8+2+.25G	89	68	74	89	69	60
Desm (1da)+PP-009+OC	8+2+.25G	93	93	93	100	98	86
Desm (3da)+PP-009+OC	8+2+.25G	96	94	75	100	98	76
Control	0	0	0	0	0	0	0
Desm (3db)	8	5	3	3	1	0	0
Desm (1db)	8	8	4	8	3	1	5
Desm (0d)	8	1	0	0	1	0	0
Desm (1da)	8	8	4	5	4	0	0
Desm (3da)	8	1	0	3	0	0	0
Mean		61	59	61	59	60	53
High mean		99	97	96	100	100	99
Low mean		0	0	0	0	0	0
Coeff. of variation		14	17	11	15	18	17
LSD(1 Percent)		16	19	13	16	20	17
LSD(5 Percent)		12	14	10	12	15	13
No. of reps		4	4	4	4	4	4

Summary

The BAS-9052+OC treatment may have been miss-applied as control levels were lower than in an adjacent experiment treated at the same time. The July 7 rating for BAS-9052 in the other experiment were 88% for wheat, 96% for oat and 98% for Yeft. In general, antagonism of grass control was highest when the grass control herbicide and desmedipham were applied the same day.

BAS-9052 and PP-009 with various oils, Fargo 1983. Lyon oats and Era wheat were seeded in 6 foot wide adjacent strips on April 29. Treatments were applied to 4 to 5-leaf wheat and oats on June 2. All oil additives were at 1 qt/A, unless indicated in the table, applied in a total of 8.5 gpa oil in water emulsion. BAS-9052 was at 1.5 oz/A and PP-009 at 2 oz/A. POSS = petroleum oil with 17% AL411F, SO = soybean and LO = linseed oil, BE = emulsifier from BASF in soybean oil from am. Soybean association ASA.

Treatment	----Percent control---- Wheat	Oats
BAS-9052 (alone)	15	37
BAS-9052+POSS	75	88
BAS-9052+SO(once refined)-5.5%TM	65	78
BAS-9052+SO-5.5%TM + 11.5% POSS	75	87
BAS-9052+SO(refined)-15% BE (ASA	82	88
BAS-9052+SO(once refined)-3% TRI ON X-207	73	85
BAS-9052+LO(Raw)-5.5% TM	53	70
BAS-9052+LO(Raw)-5.5% TM+11.5% P SS	63	78
BAS-9052+LO(Raw)-3% TRITON X-207	58	78
BAS-9052+X-77 at 0.2% v/v	42	53
BAS-9052+POSS at 0.17 qt/A	63	75
PP-009 (alone)	70	82
PP-009+POSS	100	100
PP-009+SO(once refined)-5.5% TM	92	95
PP-009+SO-5.5% TM + 11.5% POSS	97	98
PP-009+SO(refined)-15% BE(ASA)	93	97
PP-009+SO(once refined)-3% TRITO X-207	73	85
PP-009+LO(Raw)-5.5% TM	80	90
PP-009+LO(Raw)-5.5% TM+11.5% POS	95	98
PP-009+LO(Raw)-3% TRITON X-207	63	77
PP-009+X-77 at 0.2% v/v	97	100
PP-009+POSS at 0.17 qt/A	100	100
Mean	74	84
High mean	100	100
Low mean	15	37
Coeff. of variation	13	7
LSD(1 Percent)	20	14
LSD(5 Percent)	15	10
No. of reps	3	3

Summary

Surfactant, X-77, was less effective than the oil additive in enhancing grass species control with BAS-9052. The enhancement was generally greater with the high than low emulsifier concentration. Linseed oil tended to give less enhancement than petroleum or soybean oil as additives to BAS-9052. Grass species control tended to be higher with PP-009 incombination with X-77 and petroleum oil than the other additives.

Triton X-207 emulsifer with various oils additives with BAS-9052 and PP-009, Fargo 1983. Lyon oats and Era wheat were seeded in 6 ft. wide adjacent strips on April 29. Treatments were applied to 5 to 6-leaf wheat and oats on June 9. All treatments applied in a total of 8.5gpa oil in water emulsion. BAS-9052 was at 1.5 oz/A and PP-009 at 2 oz/A. All oil were with 3% Triton X-207, PO = petroleum oil, SO = soybean oil, LO = linseed oil, and SF = sunflower oil.

Treatment	Oil, qt/A	Percent control	
		Wheat	Oat
BAS-9052 alone	0	53	45
BAS-9052+P07N	0.5	88	87
BAS-9052+SO degumed	0.5	80	70
BAS-9052+SO refined	0.5	87	72
BAS-9052+LO raw	0.5	75	70
BAS-9052+LO alkali refined	0.5	80	68
BAS-9052+SF	0.5	87	87
BAS-9052+Triton X-207	0.015	70	50
BAS-9052+P07N	1.0	87	83
BAS-9052+SO degumed	1.0	88	87
BAS-9052+SO refined	1.0	93	88
BAS-9052+LO raw	1.0	85	78
BAS-9052+LO alkali refined	1.0	88	87
BAS-9052+SF	1.0	90	87
BAS-9052+Triton X-207	0.03	72	52
PP-009 alone	0	82	80
PP-009+P07N	0.5	92	87
PP-009+SO degumed	0.5	88	83
PP-009+SO refined	0.5	82	72
PP-009+LO raw	0.5	82	72
PP-009+LO alkali refined	0.5	80	75
PP-009+SF	0.5	87	83
PP-009+Triron X-207	0.015	90	85
PP-009+P07N	1.0	100	100
PP-009+SO degumed	1.0	87	85
PP-009+SO refined	1.0	88	80
PP-009+LO raw	1.0	83	78
PP-009+LO alkali refined	1.0	82	80
PP-009+SF	1.0	83	78
PP-009+Triton X-207	0.03	93	88
Mean		84	78
High mean		100	100
Low mean		53	45
Coeff. of variation		8	9
LSD(1 Percent)		15	15
LSD(5 Percent)		11	11
No. of reps		3	3

Summary

Raw linseed oil in general tended to be less effective as an additive to BAS-9052 or PP-009 than the other oils all with 3% Triton X-207. Grass control with both BAS-9052 and PP-009 generally was higher when with 1 than with 0.5 qt/A of oil additive. Petroleum oil 7N was more effective than the crop origin oil with PP-009, but some crop origin oil were equal to petroleum oil in enhancing grass control with BAS-9052.

BAS-9052 and PP-009 applied by various methods. Scoresby, R. J. and J. D. Nalewaja. Two experiments were conducted to determine the phytotoxicity of BAS-9052 and PP-009 applied in soybean and petroleum oil alone and in a petroleum oil in water emulsion at Fargo, ND 1983. Treatments were applied to late boot stage wild oat on July 5 for Experiment 1 and to 5-to 6-leaf 'Era' wheat and 'Lyon' oats on September 9. Both experiments were on silty clay soil with 6% organic matter, 7 to 7.5 pH, and adequate moisture for good plant growth. Five day post-treatment environment was about 90 F each day and no rain for Experiment 1 and 80 F on the day of treatment and less than 67 F for 5 days after and 1 inch rainfall over the 5 days for Experiment 2. The herbicide carrier volumes obtained were with the controlled droplet applicator unit at 2000 rpm and 473 ml/min., applying only one half the droplets by shielding and collecting the other one half; and a travel at 11 kph (7.5 mph). The objective was to apply 200 µm diameter droplets at a low volume with the available equipment. The flat fan application was at 77 L/ha (8.5 gpa), 276 KPa (40 psi), 5.6 kph (3.5 mph), and four 8001 nozzles. Only one CDA unit was used and the droplet pattern varied from 1.5 to 2 m, probably because of the travel speed; but rates were calculated for a 2 m pattern. A CDA application with water as the carrier applied with the unit as above, but unshielded and at 5.6 kph (3.5 mph). The experiments were randomized complete blocks with treatments replicated three times.

Herbicide[a]	Rate (kg/ha)	Carrier Type[b]	Carrier L/h	Method applied	Exp. 1 Wioa	Experiment 2 Wheat	Experiment 2 Oats
					--(Percent Control)--		
BAS-9052	0.07	Soy	6.3	CDA	23	7	23
BAS-9052	0.07	11-N	6.3	CDA	47	33	73
BAS-9052 + OC	0.07 + 5%	H_2O	77	Flat fan	33	53	75
BAS-9052 + OC	0.07 + 5%	H_2O	50	CDA	--	78	85
BAS-9052	0.14	Soy	6.3	CDA	30	67	77
BAS-9052	0.14	11-N	6.3	CDA	60	22	40
BAS-9052 + OC	0.14 + 5%	H_2O	77	Flat fan	33	65	75
BAS-9052 + OC	0.14 + 5%	H_2O	50	CDA	--	70	80
PP-009	0.07	Soy	6.3	CDA	20	33	55
PP-009	0.07	11-N	6.3	CDA	50	17	13
PP-009 + OC	0.07	H_2O	77	Flat fan	17	47	62
PP-009 + OC	0.07	H_2O	50	CDA	--	60	78
PP-009	0.14	Soy	6.3	CDA	40	60	65
PP-009	0.14	11-N	6.3	CDA	57	37	60
PP-009 + OC	0.14	H_2O	77	Flat fan	30	57	68
Coeff. of Variation					30	25	22
LDS (5 percent)					19	20	23

[a] OC=phytoblend petroleum oil with 17% emulsifier and was at 1 qt/A.

[b] Soy=once refined soybean oil, 11-N=110 second viscosity phytoblend petroleum oil.

The results of the second experiment did not agree with those of the first experiment. The data in the second experiment indicated possible errors in application as responses to rate were not logical. Data from experiment 1 indicated that low volume of oil carriers are as effective as conventional volumes of oil water emulsions and that petroleum oil was more effective than soybean oil as a carrier for the herbicides. In experiment 2 the response would follow logic if the values for soy and 11-N were interchanged for BAS-9052 at 0.14 kg/ha and PP-009 at 0.07 and 0.14 kg/ha. Possibly an error occurred during filling of the bottles for spraying.

Grass control herbicide mixtures, Fargo, 1983. 'Lyon' oat and 'Era' wheat were seeded in adjacent strips each 6 ft wide and a 6 ft area was left for the natural green foxtail, May 25. The herbicides were applied across the grass species which were in the stages as follows: oats and wheat 5-leaf and yellow foxtail 2 to 6-leaf on June 22 with 78 F, 57% RH, clear sky, NW wind at 15 mph, and good soil moisture for plant growth. The experiment was a split plot with grass herbicides as the main plots and contained 3 replications. Herbicides were all applied in 8.5 gpa with 1 qt/A phytobland petroleum oil with 17% surfactant 300 F. Evaluations were on July 7 and 15 and data averaged over the two evaluations. Each experiment was a randomized block with 3 replications.

Broadleaf Herbicide	Rate oz/A	Percent Control								
		Yellow foxtail			Oats			Wheat		
		Sethoxydim (BAS-9052), oz/A								
		1.5	3	X	1.5	3	X	1.5	3	X
Acifluorfen	16	84	97	91	97	100	98	71	94	86
Bentazon	12	82	88	85	61	94	77	57	79	68
Bromoxynil	4	90	98	94	93	100	96	86	97	92
Desmedipham	12	87	91	89	68	84	76	63	78	71
MCPA amine	4	95	99	97	94	100	96	87	98	93
None		96	99	98	96	100	98	87	98	93
		Fluazifop (PP-009), oz/A								
		2	4	X	2	4	X	2	4	X
Acifluorfen	16	65	76	70	95	100	97	93	100	97
Bentazon	12	62	69	65	96	99	98	99	99	99
Bromoxynil	4	64	87	76	97	99	98	97	99	98
Desmedipham	12	68	86	77	81	97	90	93	96	95
MCPA amine	4	69	87	78	95	98	96	97	98	98
None		75	93	84	98	100	99	97	99	98
		CGA-82725, oz/A								
		1.5	3	X	1.5	3	X	1.5	3	X
Acifluorfen	16	61	68	65	98	99	99	48	71	60
Bentazon	12	71	72	71	99	100	100	29	5	17
Bromoxynil	4	68	78	73	100	100	100	4	6	5
Desmedipham	12	45	66	55	96	97	96	12	15	13
MCPA amine	4	23	73	48	96	99	97	4	5	5
None		85	94	89	100	100	100	4	9	7
		DPX-Y6202, oz/A								
		0.75	1.5	X	0.75	1.5	X	0.75	1.5	X
Acifluorfen	16	53	65	59	95	100	97	100	100	100
Bentazon	12	43	83	63	96	99	98	100	100	100
Bromoxynil	4	47	72	59	92	99	95	100	100	100
Desmedipham	12	55	64	60	57	83	70	100	100	100
MCPA amine	4	50	84	67	42	80	61	100	100	100
None		91	98	95	98	99	99	100	100	100

Broadleaf Herbicide	Rate oz/A	Percent Control								
		Yellow Foxtail			Oats			Wheat		
		Haloxyfop (Dowco 453), oz/A								
		0.75	1.5	X	0.75	1.5	X	0.75	1.5	X
Acifluorfen	16	49	66	58	98	100	99	96	100	98
Bentazon	12	50	83	66	99	100	100	100	100	100
Bromoxynil	4	56	81	68	100	100	100	100	100	100
Desmedipham	12	68	80	74	99	100	100	97	99	98
MCPA amine	4	68	94	81	100	100	100	100	100	100
None		80	98	89	99	100	100	98	100	99
		HOE-33171 (00581), oz/A								
		1.5	3	X	1.5	3	X	1.5	3	X
Acifluorfen	16	65	83	74	76	92	84	75	82	78
Bentazon	12	68	90	79	87	97	92	5	4	5
Bromoxynil	4	59	91	75	84	98	91	28	44	36
Desmedipham	12	63	84	73	42	81	62	22	29	25
MCPA amine	4	93	97	95	70	97	83	3	3	3
None		97	98	98	95	99	97	40	67	53
		Cloproxydim (RE-36290), oz/A								
		0.75	1.5	X	0.75	1.5	X	0.75	1.5	X
Acifluorfen	16	85	86	85	98	100	99	83	94	84
Bentazon	12	75	80	78	98	99	99	88	87	87
Bromoxynil	4	87	92	89	99	100	99	93	96	94
Desmedipham	12	82	82	82	88	95	92	83	80	81
MCPA amine	4	96	97	97	99	100	100	98	98	98
None		93	98	95	100	100	100	97	98	97
LSD 5%		10.8[a]		7.6[b]	5.8[a]		4.1[b]	8.2[a]		5.8[b]

[a]LSD for the grass herbicide x broadleaf herbicide x rate interaction

[b]LSD for the grass herbicide x broadleaf herbicide interaction

Summary

All the grass control herbicides were antagonized by the broadleaf control herbicides, except sethoxydim and cloproxydim which were not antagonized by MCPA and only tended to be antagonized by bromoxynil. The influence of doubling the rate of the grass control herbicide on overcoming antagonism by a given rate of broadleaf herbicide was influenced by grass control herbicide, broadleaf control herbicide, and the grass species.

Grass control herbicides with various additives, Fargo NW22 1983. 'Lyon' oat, 'Era' wheat, and 'Siberian' millet were seeded in 6 ft wide adjacent strips as bioassy grasses to evaluate grass control herbicides with additives, May 27. BAS-9052 (sethoxydim) and PP-009 (fluazifop) were applied to 6- to 7-leaf oats, 5- to 6-leaf wheat, and 4- to 8-leaf millet on July 2. A 1 inch rain shortly of treatment prevent application of the other two herbicides on July 2. Dowco 453 (haloxyfop) and CGA-82725 were applied to late tiller stage wheat and oats and to 5- to 8-leaf millet on July 7. A second experiment was seeded on July 29 and treatment applied to jointing stage oat, 6-leaf wheat and heading millet on September 7. The millet was killed by a frost before evaluation. The oil additives are described in the tables and the surfactant WK was 90% trimethylnonylpolyethoxyethanol. The data in the tables were averaged over experiments and variables when interactions were nonsignificant or had no influence on the interpretations. The interactions which occurred were usually because of a reduced influence from a factor when control levels were high or low.

Grass control with herbicides as influenced by oil additive and herbicide rate, averaged over experiments and oil volume.

Herbicide	Rate, oz/A Exp 1	Rate, oz/A Exp 2	additive[1]	Percent control oat	Percent control wheat	Percent control millet[2]
Sethoxydim	1.5	1	POSS	87	65	90
Sethoxydim	1.5	1	SOSA	80	54	96
Sethoxydim	1.5	1	SOTM	66	58	94
Sethoxydim	3	2	POSS	98	92	100
Sethoxydim	3	2	SOSA	95	77	97
Sethoxydim	3	2	SOTM	92	74	96
Fluazifop	1.5	1	POSS	89	88	45
Fluazifop	1.5	1	SOSA	58	65	23
Fluazifop	1.5	1	SOTM	55	59	22
Fluazifop	3	2	POSS	97	96	79
Fluazifop	3	2	SOSA	90	88	59
Fluazifop	3	2	SOTM	85	82	48
Haloxyfop	0.7	0.5	POSS	99	94	91
Haloxyfop	0.7	0.5	SOSA	98	88	87
Haloxyfop	0.7	0.5	SOTM	96	86	83
Haloxyfop	1.5	1.0	POSS	100	99	97
Haloxyfop	1.5	1.0	SOSA	100	95	95
Haloxyfop	1.5	1.0	SOTM	100	95	98
CGA-82725	1.5	1	POSS	100	8	66
CGA-82725	1.5	1	SOSA	97	2	41
CGA-82725	1.5	1	SOTM	93	1	34
CGA-82725	3	2	POSS	100	16	97
CGA-82725	3	2	SOSA	98	5	73
CGA-82725	3	2	SOTM	98	6	82

(continued on next page)

LSD (5%)	5.1	5.7	8.2

[1] POSS = petroleum oil with 17% AT 300 F emulsifier, SOSA = soybean oil fully refined with 15% emulsifier from BASF (oil from Am. Soybean Assoc.) and SOTM = once refined soybean oil with 5.5% TMULZ VO emulsifier.

[2] Millet data only from experiment 1 while other data was averaged over the two experiments.

The influence of oil additive volume and herbicide rate on grass control averaged over experiments, herbicides, and oil types.

Grass control herbicide ---(Rate)---	Oil additive -(PT/A)-	Oats ---------(%)----------	Wheat
Low	1	83	55
Low	2	86	60
High	1	96	68
High	2	96	70
LSD (5%)		1	5

Percentage control of various grass species with several herbicides as influenced by additives.

Herbicide	Additive[1]		Percent control Oats	Wheat	Millet[2]
Sethoxydim			67	54	83
Sethoxydim	POSS	1 pt/A	92	76	91
Sethoxydim	SOSA	1 pt/A	86	63	96
Sethoxydim	SOTM	1 pt/A	78	64	94
Sethoxydim	POSS	2 pt/A	93	81	99
Sethoxydim	SOSA	2 pt/A	88	68	97
Sethoxydim	SOTM	2 pt/A	80	69	96
Sethoxydim	WK	0.3% v/v	83	67	97
Fluazifop			59	67	21
Fluazifop	POSS	1 pt/A	91	91	61
Fluazifop	SOSA	1 pt/A	72	72	38
Fluazifop	SOTM	1 pt/A	69	72	39
Fluazifop	POSS	2 pt/A	95	93	63
Fluazifop	SOSA	2 pt/A	75	81	44
Fluazifop	SOTM	2 pt/A	70	70	31
Fluazifop	WK	0.3% v/v	92	88	44

(continued on next page)

Haloxyfop			87	79	74
Haloxyfop	POSS	1 pt/A	99	95	94
Haloxyfop	SOSA	1 pt/A	99	91	92
Haloxyfop	SOTM	1 pt/A	96	88	93
Haloxyfop	POSS	2 pt/A	100	98	94
Haloxyfop	SOSA	2 pt/A	99	93	90
Haloxyfop	SOTM	2 pt/A	99	92	89
Haloxyfop	WK	0.3% v/v	99	92	84
CGA-82725			64	1	17
CGA-82725	POSS	1 pt/A	99	9	78
CGA-82725	SOSA	1 pt/A	97	2	57
CGA-82725	SOTM	1 pt/A	95	2	54
CGA-82725	POSS	2 pt/A	100	15	82
CGA-82725	SOSA	2 pt/A	97	5	57
CGA-82725	SOTM	2 pt/A	96	5	61
CGA-82725	WK	0.3% v/v	99	9	55
LSD (5%)			7.5	6.8	6.9

[1] POSS = petroleum oil with 17% AT 300 F emulsifier, SOSA = soybean oil fully refined with 15% emulsifier from BASF (oil from Am. Soybean Assoc.) and SOTM = once refined soybean oil with 5.5% TMULZ VO emulsifier.

[2] Oats and wheat data averaged over the two experiments and millet data only from the first experiment. All data averaged over herbicide rates. The rate x herbicide x additive interaction was significant because the influence of the additive was generally less at the high rate when control levels were high, but statistical differences were similar for the low rate and average data.

Summary

The rain immediately after sethoxydim and fluazifop application in experiment 1 did not influence the grass control compared to the control with the various treatment in experiment 2. The data of the two experiments were combined as no meaningful experiment interactions occurred. The control of at least one of the grass species was higher or tended higher when the grass control herbicides were applied with the petroleum than the soybean oil additives. The enhancement of grass control with petroleum oil compared to soybean was higher with fluazifop and CGA-82725 than with sethoxydim or haloxyfop. However, control levels may have been too high with haloxyfop for expression of differences. All herbicides were enhanced similarly by volume of oil additive, regardless of oil type. The 2 pt/A oil volume was only more effective in enhancing grass control than 1 pt/A when the herbicides were at the low rate. Oil additives enhanced grass control compared to when the herbicides were applied alone. The surfactant WK was generally less effective in enhancing control of at least one of the species compared to the petroleum oil additive.

Various oil additives with sethoxydim and fluazifop, Fargo NW22 1983. 'Lyon' oat, 'Era' wheat, and 'Siberian' millet were seeded in 6 ft wide adjacent strips on May 27 for Experiment 1 and on July 29 for Experiment 2. Treatments were applied across the fully tillered to jointing grass species on July 7 for Experiment 1 and to 6-leaf wheat and oats and headed millet on Sept. 8 for Experiment 2. The millet in Experiment 2 was killed by a frost before evaluation. Evaluations were 2 and 3 weeks after treatment and data was averaged over the two evaluations. Both herbicides were at 1.5 oz/A in both experiments.

Additives[a] at 1 qt/A	Sethoxydim[b]				Fluazifop[b]			
	Oat	Wht	X̄	Millet	Oat	Wht	X̄	Millet
	(% control)							
None	36	28	32	50	36	37	37	6
PO w 17% 300F (POSS)	71	46	58	79	84	55	70	20
SOIR w 5% BE	67	44	56	81	52	46	49	10
SOIR w 15% BE	76	51	63	86	59	47	53	19
SOFR w 15% BE	74	46	60	83	60	49	55	11
SOIR w 5.5% TM	74	41	57	74	47	45	46	8
SOIR w 5.5% TM + 11.5% POSS	76	49	62	76	50	44	47	9
SOIR w 5.5% BE + 11.5% POSS	69	46	57	86	58	46	52	18
LORA w 5% BE	40	31	35	65	38	38	38	9
LORA w 15% BE	65	43	54	80	47	44	45	10
SF w 5% BE	69	46	57	80	45	39	42	6
SF w 15% BE	80	56	68	83	59	47	53	10
BE at 0.15 qt/A	76	50	63	80	59	48	54	19
POSS at 0.15 qt/A	74	47	58	83	69	52	61	21
TM at 0.15 qt/A	70	46	58	79	71	49	60	10
LSD (5%)	--10.6--		8	10	--10.6--		8	10

[a]POSS = AT PLUS-411F, SOIR=once refined and SOFR=fully refined soybean oil, LORA=ray linseed oil, SF=sunflower oil degumed, BE=emulsifier from BASF and TM=TMULZ VO emulsifier and SOFR was from Am Soybean Assoc.

[b]Data for oat and wheat are an average of the two experiments and millet only Experiment 1.

Summary

Petroleum oil and various soybean and sunflower oil formulations, linseed oil with 15% BE, and emulsifiers alone all similarly enhanced grass control with sethoxydim. Oat control with fluazifop was higher and millet control tended to be higher with petroleum than soybean or emulsifier additives. The herbicide by additive by species interaction was significant, but the averages over species are presented in the table as the interaction may have been because of the similar oat and wheat control with fluazifop applied alone.

Chlorsulfuron soil residual from 1979, Fargo NW-22 1982. The plot area received chlorsulfuron at 1 to 4 oz/A applied at 10 weekly intervals from June 4 to August 6, 1979. Soybeans were seeded to the area on May and sugarbeet on May 1982 and evaluated for stand reduction in July. The area was moldboard plowed in the fall of each year since the 1979 treatments. The 1979 experiment was a split plot wich chlorsulfuron rate as main-plots and week of application the sub-plots. Evaluations were over the main plots and the range represents the highest and lowest stand reduction for the sub plots in the main plot.

Chlorsulfuron (oz/A)	July 1980 % Stand reduction		August 1981 % Stand reduction		July 1982 % Stand reduction	
	Soybean	Sugarbeet	Soybean	Sugarbeet	Soybean	Sugarbeet
1	40-63	75-98	50-60	98-100	40-50	98-100
2	82-87	92-96	75-80	98-100	65-75	98-100
4	95-100	97-100	92-95	98-100	90-95	98-100

SUMMARY

Chlorsulfuron residual from 1 to 4 oz/A application in 1979 reduced sugarbeet stands 98 to 100 in 1982 regardless of the rate applied. Soybean stands were reduced similarily in 1982 as in 1980 and 81, except for a trend for less soybean stand reduction in 1982 from chlorsulfuron at 2 oz/A. Sub plots were only 6 feet wide, but interplot contamination was low as the untreated plots were easily distinguishable. The soil in the area has a pH of 8.2.

Chlorsulfuron soil residual from 1979, Fargo NW-22 1983.

Chlorsulfuron oz/A	July 1983 % Stand reduction		% injury
	Soybean	Sugarbeet	Soybean
1	0	0	0
2	0	100	50 to 60
4	0	100	70 to 80

The range in injury within the main plots was not too evident probably because the area had been moldboard plowed each year causing soil mixing among the various sub plots.

Leafy spurge control in wooded areas of North Dakota with various herbicides. Lym, Rodney G. and Calvin G. Messersmith. Leafy spurge is a major problem in wooded areas, shelterbelts, and around homes. The purpose of these experiments was to evaluate the controlled droplet applicator (CDA) and compressed air (Hudson single nozzle hand pumped model) sprayers for application of picloram, dicamba and glyphosate to leafy spurge growing under trees. Also dichlobenil 10%G was applied at one site as a preemergence treatment, for leafy spurge control.

The experiments were established at Mandan, ND in a tree grove, at Walcott, ND in a wind break, and in a wooded area of the Sheyenne National Grasslands near McLeod, ND. The trees were Populus spp. (cottonwood and aspen) and ranged from 6 to 16 inches in diameter with some saplings intermixed. The demonstration at Mandan was established on 26 August 1981 under a partly cloudy sky, 70 F and 96% relative humidity. The plot size was 25 by 50 ft and unreplicated. The demonstration at Walcott was established on 17 September 1981 under a partly cloudy sky, 70 F and 35% relative humidity, except the dichlobenil treatments were applied on 24 November 1981 under a cloudy sky, 32 F and 87% relative humidity. The plots were 20 by 50 ft and unreplicated. All glyphosate treated plots received two 2,4-D dimethylamine retreatments in the summer of 1982 using the CDA with a solution concentration of 1:4 (2,4-D:water v:v). The experiment at the Sheyenne National Grasslands was established on 21 September 1982 under a clear sky, 69 F, and 42% relative humidity and the soil was moist. The plots were 25 by 50 ft and replicated four times in a randomized complete block design. The treatments using the CDA and compressed air sprayers were applied with single coverage at walking speed, except some overlap occurred as the applicator tried to prevent skipped areas while walking around trees.

Leafy spurge control with glyphosate ranged from 80 to 99% at Mandan two years after application using either applicator (Table 1). However, control had declined to 15 to 70% at Walcott by August 1983. The Walcott site had some standing water until late July 1983 due to heavy precipitation in the area, which may have enhanced leafy spurge reestablishment. Picloram at 1:3 and 1:7 (v:v) at Mandan and at 1:7 (v:v) at Walcott gave 80% leafy spurge control two years after application. Saplings which showed herbicide injury in 1982 at Mandan had recovered by 1983. Picloram at 1:3 (v:v) applied at Walcott gave 95% leafy spurge control and was the only satisfactory treatment applied with the compressed air sprayer after 24 months. Picloram plus 2,4-D applied with the CDA at 1:1:10 (v:v:v) gave 84% leafy spurge control in 1983 but ranged from 0 to 30% control when applied with the compressed air sprayer at 1:2:65 to 1:4:63 (v:v:v). Dichlobenil did not provide satisfactory leafy spurge control.

Leafy spurge control at Mandan and Walcott generally was better than at the Sheyenne National Grasslands. All treatments at the Grasslands provided 92% or better leafy spurge control when evaluated in June but control declined rapidly by August 1983 (Table 2). Picloram at 1:3 (v:v), dicamba at 1:2 (v:v) and glyphosate at 1:1 (v:v) applied with the CDA, provided 77, 75 and 76% leafy spurge control, respectively, 11 months after application. The addition of 2,4-D to picloram did not improve leafy spurge control compared to picloram applied alone.

Glyphosate provided good leafy spurge control when applied using the CDA or compressed air sprayer. Picloram gave good leafy spurge control at Mandan and Walcott when applied at 1:7 (v:v) using the CDA but at the Sheyenne National Grasslands picloram at 1:2 (v:v) was required to give similar control. The addition of 2,4-D to picloram did not increase control over picloram alone. Dicamba provided good initial leafy spurge control at all sites but control declined rapidly. No tree damage resulted from any treatment. (Cooperative investigation Dep. of Agron. and ARS, U. S. Dep. of Agric. Published with the approval of the Agric. Exp. Stn., North Dakota State Univ., Fargo.)

Table 1. Leafy spurge control by various herbicides applied with the controlled droplet and compressed air applicators under trees - Walcott and Mandan, ND. (Lym and Messersmith)

Application	Herbicide	Herbicide concentration (herbicide:water)	Control						
			Mandan				Walcott		
			6-82	9-82	6-83	9-83	6-82	9-82	8-83
CDA	Glyphosate	1:1	100	90	83	80	95	78	70
	Glyphosate	1:3/1:2	95	100	95	90	85	50	20
	Picloram	1:3	100	85[a]	80	80	98	65	30
	Picloram	1:7	90	70	82	80	92	90	80
	Dicamba	1:3	90	70	82	80	98	0	0
	Picloram + 2,4-D	1:1:10	90	70	82	80	99	100	84
Compressed air	Glyphosate	1:7	100	100	93	90	92	95	15
	Glyphosate	1:14	99	90	98	99	85	60	30
	Picloram	1:67	70	40	58	20	75	0	0
	Picloram	1:33	98	100	80	30	100	100	95
	Dicamba	1:33	98	100	80	30	97	95	60
	Picloram + 2,4-D	1:2:65	80	40	10	0	90	90	15
	Picloram + 2,4-D	1:4:63	80	20	30	30	90	90	15
Granular	Dichlobenil	4 lb/A	80	20	30	30	20	0	0
	Dichlobenil	8 lb/A	80	20	30	30	60	30	0

[a]Damage to saplings.

Table 2. Leafy spurge control by various herbicides applied using the CDA at a wooded site in the Sheyenne National Grasslands near McLeod, ND. (Lym and Messersmith)

Herbicide	Herbicide concentration (Herbicide:water)	Control	
		8 June 1983	15 August 1983
		- - - - - - - - (%) - - - - - - - -	
Picloram	1:7	92	60
Picloram	1:3	97	69
Picloram	1:2	100	77
Picloram + 2,4-D	1:1:7	92	48
Dicamba	1:2	92	75
Glyphosate	1:1	93	76
LSD (0.05)		9	35

Leafy spurge control from spring, summer or fall herbicide application. Lym, Rodney G. and Calvin G. Messersmith. Two experiments were conducted to evaluate the effectiveness of various herbicide application dates and methods of application for leafy spurge control. Leafy spurge control was compared using conventional broadcast application of picloram, dicamba and picloram + 2,4-D, and using picloram applied with a wick or a carpet applicator. The wick applicator is similar to the rope-wick applicator but uses a poly-foam backed canvas instead of the rope and delivers more volume of solution per acre for improved coverage (wick design described in 1981 NCWCC Research Report 38:36-37). The carpet applicator was designed by Magnolia Spray Equipment Corp., Jackson, MS, and consists of a 1 by 8 foot carpet attached to a rectangular spray box. The herbicide solution is sprayed onto the backside of the carpet through nozzles inside the spray box. Excess solution is returned to the spray tank. The carpet applicator was modified to fit a three-point free floating hitch and mounted on wheels to allow even application in rough terrain.

The treatments were in a randomized complete block design with four replications. The plot size was 15 by 50 ft in the first experiment and 10 by 50 ft in the second. The broadcast treatments were applied at 35 psi and 8 gpa. The picloram concentration applied with the wick and carpet applicator varied from 1:3 to 1:7 picloram (Tordon 22K):water (v:v). Evaluations were based on reduction of plant density as compared to the control.

The first experiment was established in a pasture near Jamestown, ND with treatments applied on 29 June (spring), 21 July (summer) and 26 August (fall) 1982. The leafy spurge was in full bloom and beginning seed set on 29 June and the weather was 73 F, 47% relative humidity and the soil was wet and 94 F at 1 inch. On 21 July the leafy spurge had developed mature seed and was beginning mid-summer senescence. The weather was 84 F, 47% relative humidity and the soil was dry and 96 F at 1 inch. Leafy spurge was beginning fall regrowth by 26 August and had three to four new branches per stem. The weather was 63 F, 47% relative humidity and the soil was moist and 70 F at 1 inch.

Picloram broadcast at 2 lb/A provided 92 and 95% control the year following treatment when spring or summer applied, respectively, but tended to decrease when fall applied (Table 1). Previous research has shown that leafy spurge control with picloram applied at 1.5 to 2.0 lb/A generally is not affected by application date. Dicamba broadcast at 8 lb/A provided similar leafy spurge control to picloram at 2 lb/A when evaluated in June 1983, but by August 1983 control fell to 46% or less. Dicamba tended to provide better leafy spurge control as a fall treatment than as a spring or mid-summer treatment. Picloram wick applied provided similar leafy spurge control to picloram broadcast applied at 2 lb/A when evaluated in June 1983 but control fell to 47% or less by August 1983. Picloram carpet applied provided less leafy spurge control than when wick applied on all application dates. Leafy spurge control with picloram applied using the wick or carpet applicator was better as a summer or fall treatment compared to a spring treatment. The picloram + 2,4-D combination treatment provided 94 to 98% leafy spurge control in the spring following the season of application but control fell to 0 to 23% by fall regardless of application date. Previous research has shown that annual applications of 2,4-D + picloram at 0.25 + 1.0 lb/A will maintain satisfactory leafy spurge control.

The second experiment was established in a pasture near Leonard, ND and was similar to the first experiment except the solution concentration on the wick and carpet applicator varied between 1:3 and 1:7 picloram (Tordon 22K):water (v:v) and the spring treatment was replaced by a late fall treatment. The first treatment was made on 8 July 1982 (summer), when the leafy spurge had mature seed with most leaves senesçenced under dry conditions and the weather was 81 F, 77% relative humidity and the soil 95 F at 1 inch. The second treatment was applied on 22 August 1982 (early fall) when leafy spurge was beginning fall regrowth and the weather was 55 F, 60% relative humidity with moist soil and 66 F at 1 inch. The third treatment was applied on 20 September 1982 (late fall) when the leafy spurge had four to six branches of regrowth. The air temperature was 57 F with 72% relative humidity. One inch of rain fell six days prior to treatment.

Picloram applied with the wick applicator at 1:7 and 1:3 (v:v) in early fall gave leafy spurge control similar to picloram broadcast at 2.0 lb/A (Table 2). Picloram applied with the wick applicator in the summer or the carpet applicator at any application date did not provide satisfactory leafy spurge control.

In summary, leafy spurge control with picloram broadcast at 2.0 lb/A was similar regardless of application date; however, control with picloram at 1:3 to 1:7 (v:v) wick applied was better as a late summer or fall treatment compared to spring application. The carpet applicator did not give satisfactory long term control regardless of application date or solution concentration.
(Cooperative investigation of Agron. Dep. and ARS, U. S. Dep. of Agric. Published with the approval of the Agric. Exp. Stn., North Dakota State University, Fargo.)

Table 1. Leafy spurge control with various herbicides and applicator techniques applied at three different times during the growing season near Jamestown, ND. (Lym and Messersmith)

Date, herbicide and type of application	Rate (lb/A)	Solution a/ concentration	Control 2 June 1983 (%)	Control 22 August 1983 (%)
29 June 1982				
Picloram broadcast	2.0	1:7.5	100	92
Dicamba broadcast	8.0	1:3	97	20
Picloram carpet	...	1:7	62	8
Picloram wick	...	1:3	94	3
Picloram + 2,4-D	0.375+1.0	1:1.4:43	98	13
21 July 1982				
Picloram broadcast	2.0	1:7.5	100	95
Dicamba broadcast	8.0	1:3	86	27
Picloram carpet	...	1:7	77	27
Picloram wick	...	1:3	100	47
Picloram + 2,4-D	0.375+1.0	1:1.4:43	98	0
26 August 1982				
Picloram broadcast	2.0	1:7.5	100	70
Dicamba broadcast	8.0	1:3	97	46
Picloram carpet	...	1:7	81	8
Picloram wick	...	1:3	99	46
Picloram + 2,4-D	0.375+1.0	1:1.4:43	94	23
LSD (0.05)			17	35

a/Herbicide:water

Table 2. Leafy spurge control with variable picloram concentrations using carpet and wick applicators near Leonard, ND. (Lym and Messersmith).

Date and type of application	Rate (lb/A)	Solution[a] concentration	Control 15 June 1983 (%)	Control 22 September 1983 (%)
8 July 1982				
Carpet	...	1:7	13	0
Carpet	...	1:3	21	18
Wick	...	1:7	11	0
Wick	...	1:3	24	14
27 August 1982				
Carpet	...	1:7	29	9
Carpet	...	1:3	15	10
Wick	...	1:7	85	59
Wick	...	1:3	88	80
Broadcast	2.0	1:7.5	89	70
20 September 1982				
Carpet	...	1:7	13	1
Carpet	...	1:3	13	0
LSD (0.05)			17	20

[a] Herbicide:water (v:v)

Leafy spurge control with picloram using several wick applicators. Messersmith, Calvin G. and Rodney G. Lym. Leafy spurge control with picloram was evaluated using three designs of a pipe-wick applicator. The pipe-wick consisted of 0.75 inch PVC pipe with 0.12 inch holes drilled every 2 inches and covered by 0.5 inch poly-foam overlayed with canvas. The wicking material was wrapped around 75% of the pipe circumference and attached to the PVC pipe with contact cement. Liquid in the storage tank flowed into the wick with flow rate dependent on weed density. The design consisted of 1) two 6-foot bars, one foot apart rectangular shaped (2-bar applicator); 2) three 6-foot bars one foot apart rectangular shaped (3-bar applicator); and 3) two 6-foot bars one foot apart with three interconnecting diagonal bars so each leafy spurge stem was treated by the front, diagonal and rear bar (diagonal applicator). Picloram at 1:3 picloram (Tordon 22K):water (v:v) was applied using the wicks either with one pass or two passes; the second pass was in the opposite direction to the first pass. The experiment was established on 10 August 1981 in a pasture near Sheldon, ND when the leafy spurge was 16 to 32 inches tall and most seed was mature. The weather was 82 F, 70% relative humidity and the soil was dry and 89 F at 1 inch. The plots were 10 by 30 ft in a randomized complete block design and evaluations were based on percent stand reduction as compared to the control.

Application	No. passes	Picloram[a] concentration	1982		1983	
			June	August	June	August
			---------(% control)---------			
2-Bar	1	1:3	77	36	48	17
2-Bar	2	1:3	88	77	76	55
3-Bar	1	1:3	75	15	30	11
3-Bar	2	1:3	92	80	86	57
Diagonal	1	1:3	71	56	52	45
Diagonal	2	1:3	100	99	97	84
LSD (0.05)			21	25	25	30

[a] Picloram (Tordon 22K):water (v:v).

Picloram applied using two passes resulted in better leafy spurge control than a single pass regardless of applicator type. Picloram application with the diagonal wick resulted in better leafy spurge control than with either the 2-bar or 3-bar rectangular design, while the 2-bar and 3-bar designs provided similar leafy spurge control. Picloram applied with two passes of the diagonal wick provided 84% leafy spurge control after 2 years which is similar to picloram broadcast at 2.0 lb/A but wick application required only 20 to 40% as much herbicide as the broadcast treatment (Volume per acre of picloram wick applied discussed in 1980 NCWCC Research Report 37:56). Wick application of picloram is an inexpensive alternative to obtain leafy spurge control comparable to picloram at 2 lb/A broadcast applied even when two passes with the wick are required to maintain long term control. (Cooperative investigation Dep. of Agronomy and ARS, U. S. Dep. of Agric. Published with the approval of the Agric. Exp. Stn., North Dakota State Univ., Fargo.)

Dikegulac sodium activity on leafy spurge alone and in combination with 2,4-D and picloram. Lym, Rodney G. and Calvin G. Messersmith. Dikegulac sodium is manufactured as Atrinal (Tradename) by Maag Agrochemicals, Vero Beach, Florida. It is applied as a foliar spray and is translocated throughout the plant to meristematic zones. At appropriate concentrations dikegulac sodium causes temporary inhibition of plant growth, reduces or eliminates apical dominance, promotes growth of axillary buds and inhibits flowering and fruit set of certain plant species. The purpose of these experiments was to determine the effects of dikegulac sodium on leafy spurge grown in the greenhouse.

In the first experiment dikegulac sodium was applied to leafy spurge at solution concentrations ranging from 0.10 to 0.62% a.i. dikegulac sodium in water (v:v) with a hand held mist sprayer to the point of run-off. The leafy spurge plants had approximately equal root mass and were 3 to 4 inches tall with one stem/pot. The numbers of branches on shoots, shoots from roots and root buds were counted 8 weeks after treatments. Then the roots were replanted to observe the number of new shoots from roots for 5 weeks after replanting. The emerged shoots were counted and then removed to stimulate more stem development from root buds.

Four weeks after treatment all treated plants showed profuse branching from the main stem regardless of application rate. Eight weeks after treatment the plants were still 3 to 4 inches tall, with numerous branches and resembled pompons in appearance.

Dikegulac sodium at concentrations of 0.31, 0.46 and 0.62% increased the number of branches on leafy spurge stems by 8 to 11 times (Table 1). All dikegulac sodium concentrations inhibited shoot development from roots, but there were no significant differences between treated and untreated leafy spurge plants for number of root buds. Dikegulac sodium at 0.46 and 0.62% (v:v) decreased the number of leafy spurge shoots arising from the roots when counted two weeks after the topgrowth was removed. All the treatments except the 0.10% treatment caused at least some of the new shoots to be multi-branched, which may indicate that dikegulac sodium was translocated at least partially in the leafy spurge root system. The multi-branching was not seen in new shoots arising from the roots at 3 weeks or later.

In the second and third experiments dikegulac sodium was applied to leafy spurge in the pre-flowering and flowering stages of growth. A range of dikegulac sodium rates from 0.05 to 0.78% a.i. (v:v) were used. The remainder of the experiment was conducted as in experiment one, except the plants were allowed to grow for six weeks after treatment before the number of branches on shoots was counted. Then the topgrowth was removed to soil level for 8 to 10 more weeks. The number of emerged shoots were counted and then removed to stimulate stem development from root buds.

In general dikegulac sodium was less active on more mature leafy spurge. Dikegulac sodium increased branching on leafy spurge stems in the bud stage, but only at the 0.78% concentration (Table 2). There was no effect on new shoots arising from the roots. Treatment of dikegulac sodium did not affect the number of branches on shoots or shoots from the roots on flowering leafy spurge (Table 3). However, some new shoots from the roots at all concentrations except 0.05% showed increased branching on the stem, thus demonstrating translocation of dikegulac sodium.

In the next experiments dikegulac sodium was applied to leafy spurge as a 24 hr pretreatment to and as a tank mix with the herbicides picloram and 2,4-D; each herbicide was a separate experiment. The leafy spurge had been grown in 6 inch diameter pots for 9 months and then cut back to soil level 4 weeks before treatment. The leafy spurge was 10 to 14 inches tall and in a vegetative growth stage at treatment. The treatments were applied with a moving nozzle pot sprayer delivering 17.5 gpa at 35 psi. The experiments were a randomized complete block with four replications. Plants were evaluated for injury 3, 4 and 28 days after treatment on a scale from 0 to 100 with 0 indicating no injury and 100 indicating complete burn down.

A tank-mix of dikegulac sodium plus picloram caused a rapid burning of the treated leaves and much faster injury than either a pretreatment of dikegulac sodium followed by picloram, or picloram used alone (Table 4). After 28 days the tank-mix and pretreatment applications showed similar leafy spurge injury and both were more injurious to leafy spurge than picloram alone. Tank-mixing dikegulac sodium with 2,4-D resulted in greater injury to leafy spurge than either a pretreatment of dikegulac sodium or 2,4-D alone. Injury was highest at the 2 and 4 oz/A rate of dikegulac sodium tank mixed with 2,4-D but decreased at the 8 oz/A rate.

Dikegulac sodium applied to young leafy spurge caused the plant to stop growing in height and to develop a large number of branches from the main stem. Dikegulac sodium had a slight effect on leafy spurge in the bud stage of growth but did not affect the morphology of flowering leafy spurge. The plant growth regulator was translocated in the leafy spurge root system. Herbicide injury to leafy spurge was increased when dikegulac sodium was tank-mixed with 2,4-D and picloram.

Table 1. Effect of dikegulac sodium on young leafy spurge plants. (Lym and Messersmith).

Dikegulac sodium concentration (%)	Branches on shoots (No./plant)	Shoots from roots (No./plant)	Root buds (No.)	New shoots from roots (weeks)			
				2	3	4	5
0.10	2	2	10	7	1	4	3
0.33	8	2	2	6	1	2	2
0.31	20	2	7	6	2	1	2
0.46	16	2	1	1	0	0	0
0.62	23	1	6	2	2	2	1
0	2	5	8	8	1	2	2
LSD(0.05)	8	2	8	4	2	4	3

[a] Dikegulac sodium (Atrinal) in water (v:v).

Table 2. Effect of dikegulac sodium on leafy spurge in the bud stage. (Lym and Messersmith).

Dikegulac sodium concentration (%)	Branches on shoots (No./plant)	Shoots from roots (No./plant)	New shoots from roots (weeks)					
			2	3	4	6	8	10
0.05	3	4	7	10	19	11	13	2
0.23	8	3	2	7	8	11	7	2
0.46	10	3	3	7	12	14	5	0
0.62	13	4	3	6	9	12	4	2
0.78	29	3	2	8	13	9	8	5
0	5	3	1	7	4	9	5	5
LSD(0.05)	16	3	6	5	9	7	9	4

[a] Dikegulac sodium (Atrinal) in water (v:v).

Table 3. Effect of dikegulac sodium on flowering leafy spurge. (Lym and Messersmith).

Dikegulac sodium concentration (%)	Branches on shoots (No./plant)	Shoots from roots (No./plant)	New shoots from roots (weeks)				
			2	3	4	6	8
0.05	4	7	2	9	9	4	11
0.23	5	6	3	7	7	6	16
0.46	6	3	2	7	10	4	15
0.62	7	4	3	8	8	6	15
0.78	6	2	2	4	6	4	18
0	5	5	2	4	6	4	13
LSD(0.05)	4	6	3	5	7	5	7

[a] Dikegulac sodium (Atrinal) in water (v:v).

Table 4. Effect of dikegulac sodium in combination with picloram and 2,4-D as split or tank mix treatments on leafy spurge. (Lym and Messersmith).

Treatment	Rate (oz/A)	Injury		
		3 days	14 days	28 days
Dikegulac sodium+picloram (split)	2+2	3	20	45
Dikegulac sodium+picloram (split)	4+2	8	20	35
Dikegulac sodium+picloram (split)	8+2	22	28	43
Dikegulac sodium+picloram (tank mix)	2+2	18	25	40
Dikegulac sodium+picloram (tank mix)	4+2	30	30	43
Dikegulac sodium+picloram (tank mix)	8+2	48	50	60
Picloram	2	13	18	30
LSD (0.05)	---	12	10	11
Dikegulac sodium+2,4-D (split)	2+8	38	25	38
Dikegulac sodium+2,4-D (split)	4+8	30	25	33
Dikegulac sodium+2,4-D (split)	8+8	48	33	30
Dikegulac sodium+2,4-D (tank mix)	2+8	75	73	78
Dikegulac sodium+2,4-D (tank mix)	4+8	78	75	88
Dikegulac sodium+2,4-D (tank mix)	8+8	48	40	50
2,4-D	8	15	20	20
LSD (0.05)	---	16	22	21

[a] Dikegulac sodium was applied 24 hours before herbicides with split treatments.

Dikegulac sodium in combination with 2,4-D and picloram for leafy spurge control in rangeland. Lym, Rodney G. and Calvin G. Messersmith. Previous studies have shown dikegulac sodium (trade name Atrinal by Maag Agrochemicals, Vera Beach, Florida) to be synergistic with 2,4-D and picloram on leafy spurge. Dikegulac sodium causes temporary inhibition of plant growth, reduction or elimination of flowering and promotion of axillary plant growth. Dikegulac sodium activity on leafy spurge decreases as the plant matures. The purpose of these experiments was to evaluate the synergism of dikegulac sodium with picloram or 2,4-D in the field both as a tank mix and split application.

The experiments were established at Lisbon, ND in an unused quarry with a heavy infestation of leafy spurge. The first two experiments were established on 26 May 1982 when the leafy spurge was in the yellow bract growth stage and before true flower initiation. The weather was partly cloudy, 76 F and 67% relative humidity with a soil temperature of 76 and 65 F at 1 and 4 inches, respectively. The plots were 10 by 30 feet, and treatments were replicated four times in a randomized complete block design. The treatments were applied in 8.5 gpa at 35 psi. Evaluations were based on percent stand reduction as compared to the control.

In the first experiment dikegulac sodium at 0.5, 1.0 and 2.0 lb/A was applied alone and a tank mixed with picloram at 1.0 or 2.0 lb/A and 2,4-D at 2.0 lb/A. One month after application leafy spurge plants treated with dikegulac sodium alone were stunted, with many axillary branches and most flowers had been aborted. In general, the number of axillary branches increased as the dikegulac sodium rate increased. By the end of the growing season plants treated with dikegulac sodium at 2 lb/A still had many axillary branches but plants treated at the lower rates had resumed normal growth. Leafy spurge control was increased when picloram at 1.0 lb/A was applied with dikegulac sodium (Table 1). Leafy spurge control was 19% 15 months following application of picloram at 1.0 lb/A alone but was 70, 60 and 68% when tank mixed with 0.5, 1.0 and 2.0 lb/A, respectively, of dikegulac sodium. Dikegulac sodium tank-mixed with picloram at 2.0 lb/A or 2,4-D did not increase leafy spurge control compared to the herbicides applied alone.

In the second experiment dikegulac sodium was applied as a tank mix or split treatment with picloram and 2,4-D. Dikegulac sodium alone at 0.5 and 1.0 lb/A was applied on 26 May 1983. Picloram or 2,4-D at 1.0 lb/A were applied on 30 June 1983, as a split treatment alone or as a tank mix treatment with dikegulac sodium. The weather was clear with 76 F, 69% relative humidity and a soil temperature of 80 and 76 F at 1 and 4 inches, respectively. The leafy spurge was in the true flower growth stage and beginning seed set. Dikegulac sodium had no observable effect on leafy spurge growth when applied later in the growing season. However, leafy spurge control with picloram at 1.0 lb/A increased slightly when dikegulac sodium was used as a pretreatment or a tank mix compared to picloram applied alone (Table 2). Leafy spurge control with 2,4-D was not affected by dikegulac sodium.

The third experiment was similar to the second experiment with dikegulac sodium alone applied on 7 September 1982 and 2,4-D or picloram applied on 4 October 1982 either alone for the split treatments or tank mixed with dikegulac sodium. On 7 September the sky was partly cloudy with 78 F and 80% relative humidity, the soil was dry and leafy spurge was under moisture stress. On 4 October the temperature was 57 F with 45% relative humidity and the leafy spurge was red and yellow with slight frost damage. Dikegulac sodium alone did not affect leafy spurge growth or control with picloram and 2,4-D when applied as a fall treatment to mature plants (Table 3).

Dikegulac sodium was very active on leafy spurge early in the growing season before flower initiation, as indicated by increased axillary branching, flower abortion and stem shortening, but it shows little effect on more mature plants. Leafy spurge control increased when dikegulac sodium at 0.5 to 2.0 lb/A was applied with picloram at 1.0 lb/A compared to picloram alone. (Cooperative investigation Dep. of Agron. and ARS., U. S. Dept. of Agric. Published with the approval of the Agric. Exp. Stn., North Dakota State University, Fargo)

Table 1. Leafy spurge control with 2,4-D or picloram applied alone or with dikegulac sodium on 26 May 1982 near Lisbon, ND. (Lym and Messersmith)

Treatment	Rate (lb/A)	Control 1 June 1983 (%)	Control 22 August 1983 (%)
Dikegulac sodium + picloram	0.5 + 1.0	92	70
Dikegulac sodium + picloram	0.5 + 2.0	100	90
Dikegulac sodium + picloram	1.0 + 1.0	91	60
Dikegulac sodium + picloram	1.0 + 2.0	100	83
Dikegulac sodium + picloram	2.0 + 1.0	96	68
Dikegulac sodium + picloram	2.0 + 2.0	99	94
Dikegulac sodium + 2,4-D	0.5 + 2.0	15	3
Dikegulac sodium + 2,4-D	1.0 + 2.0	15	3
Dikegulac sodium + 2,4-D	2.0 + 2.0	2	0
Dikegulac sodium	0.5	1	0
Dikegulac sodium	1.0	0	0
Dikegulac sodium	2.0	2	0
Picloram	1.0	90	19
Picloram	2.0	96	98
2,4-D	2.0	12	0
LSD (0.05)		13	15

Table 2. Leafy spurge control with 2,4-D or picloram applied with dikegulac sodium as a pretreatment or tank mix on 26 May and 30 June 1982, respectively, in Lisbon, ND. (Lym and Messersmith)

Treatment	Rate	Control	
		1 June 1983	22 August 1982
	(lb/A)	(%)	
Dikegulac sodium	0.5	0	0
Dikegulac sodium	1.0	7	0
Picloram	1.0	90	9
2,4-D	1.0	14	0
Dikegulac sodium + picloram (split)	0.5 + 1.0	94	19
Dikegulac sodium + picloram (split)	1.0 + 1.0	92	16
Dikegulac sodium + picloram (tank mix)	0.5 + 1.0	95	18
Dikegulac sodium + picloram (tank mix)	1.0 + 1.0	82	9
Dikegulac sodium + 2,4-D (split)	0.5 + 1.0	4	0
Dikegulac sodium + 2,4-D (split)	1.0 + 1.0	4	0
Dikegulac sodium + 2,4-D (tank mix)	0.5 + 1.0	1	0
Dikegulac sodium + 2,4-D (tank mix)	1.0 + 1.0	9	0
LSD (0.05)		14	10

Table 3. Leafy spurge control with 2,4-D or picloram applied with dikegulac sodium as a pretreatment or tank mix on 7 September and 4 October 1982, respectively, in Lisbon, ND. (Lym and Messersmith)

Treatment	Rate	Control	
		1 June 1983	22 August 1983
	(lb/A)	(%)	
Dikegulac sodium + picloram (tank mix)	0.5 + 1.0	72	1
Dikegulac sodium + picloram (tank mix)	1.0 + 1.0	52	4
Dikegulac sodium + picloram (split)	0.5 + 1.0	47	0
Dikegulac sodium + picloram (split)	1.0 + 1.0	64	8
Dikegulac sodium + 2,4-D (tank mix)	0.5 + 2.0	2	0
Dikegulac sodium + 2,4-D (tank mix)	1.0 + 2.0	2	0
2,4-D	2.0	4	0
Picloram	1.0	57	8
LSD (0.05)		20	3

Picloram and 2,4-D combination treatments for leafy spurge control

Rodney G. Lym and Calvin G. Messersmith

Picloram (4-amino-3,5,6-trichloropicolinic acid) is an effective herbicide for leafy spurge (Euphorbia esula L.) control especially when applied at rates from 1 to 2 lb/A. However, the high cost of picloram at 2 lb/A makes it uneconomical to treat large acreages in pasture and rangeland weed control programs. Research by North Dakota State University has suggested that picloram at 0.25 to 0.5 lb/A applied annually will give satisfactory leafy spurge control after 3 to 5 years. The purpose of this experiment is to establish the number of annual applications of picloram needed to provide 90 to 100% control of leafy spurge at three locations in the state, to investigate possible synergism between picloram and 2,4-D [(2,4-dichlorophenoxy)acetic acid] and to evaluate picloram residue in three soil types.

The experiment was established on 25 August 1981 at Dickinson, 1 September 1981 at Sheldon and on 11 June 1982 at Valley City. All treatments were applied annually except 2,4-D alone which was applied biannually (both spring and fall). Picloram treatments were applied in late August 1981 and in June of 1982 and 1983. Thus the Dickinson and Sheldon sites have received three picloram and picloram plus 2,4-D treatments and five 2,4-D treatments, while the Valley City site has received two and four treatments, respectively. The plots were 10 by 30 ft and each treatment was replicated four times in a randomized complete block design at all sites. Evaluations were based on percent stand reduction as compared to the control.

A soil bioassay was conducted to determine the herbicide residue from annual broadcast applications of picloram at 0.25, 0.375 and 0.5 lb/A. Three soil samples per plot to a 4 inch depth were taken to form a composite sample in June and August of each year. Sunflower height, fresh weight and dry weight in a greenhouse bioassay were used to determine picloram residues. The soil at Dickinson was a loamy fine sand with pH 7.2 and 0.6% organic matter, at Sheldon was a silty clay loam with pH 5.8 and 3.4% organic matter, and at Valley City was loam with pH 6.0 and 3.3% organic matter.

Picloram at 0.25, 0.375 and 0.5 lb/A provided 42, 61 and 75% leafy spurge control, respectively, after three treatments when averaged across the Dickinson and Sheldon locations (Table 1). Control in August 1983 was not increased when compared to the August 1982 evaluations. 2,4-D alone provided between 19 and 30% control of leafy spurge after biannual applications for three years.

Leafy spurge control was increased when 2,4-D was applied with picloram at 0.25 lb/A and when 2,4-D at 1.5 lb/A was applied with picloram at 0.375 lb/A at Dickinson and Sheldon (Table 1). Leafy spurge control increased 29 and 20% when 2,4-D at 1.5 lb/A was applied with picloram at 0.25 or 0.375 lb/A, respectively. Picloram at 0.5 lb/A plus 2,4-D provided 78 to 85% leafy spurge control and was similar to picloram at 0.5 lb/A alone at 75%. The greatest synergism of 2,4-D and picloram seems to be with 2,4-D rates of 1.5 lb/A or less and picloram at 0.375 or less. In general, leafy spurge control was lower at Valley City than at Dickinson or Sheldon after two years. Also at Valley City, the addition of 2,4-D to picloram tended to increase leafy spurge control compared to picloram alone and control in August 1983 was similar to or slightly higher than control in August 1982.

Picloram soil residue did not accumulate from annual applications regardless of location (Table 2). Picloram residue ranged from 0 to 0.18 ppm in August following June application but generally was undetectable the following spring. Thus the general increase in leafy spurge control was due to a gradual stand reduction and not to an increased picloram level that would prevent reestablishment.

Three years after the experiment was begun picloram at 0.5 lb/A provided the best leafy spurge control and with the addition of 2,4-D is approaching the 90% control range. Picloram at 0.25 and 0.375 lb/A plus 2,4-D at 1.5 lb/A or less is synergistic for leafy spurge control and picloram residues have not accumulated after three annual applications.

(Cooperative investigation Dep. of Agron. and ARS, U.S. Dep. of Agric. Published with the approval of the Agric. Exp. Stn., North Dakota State Univ., Fargo).

Table 1. Leafy spurge control from annual picloram or picloram plus 2,4-D treatments and biannual 2,4-D treatments at three locations in North Dakota.

		Site/Evaluation date												
		Sheldon				Dickinson				Valley City			Mean	
		1982		1983		1982		1983		1982	1983		1982[a]	1983
Herbicide	Rate	June	Aug	June	Aug	June	Aug	June	Aug	Aug	June	Aug	Aug	Aug
	(lb/A)	(% Control)												
icloram	0.25	33	49	12	48	24	48	35	37	68	21	25	49	42
icloram	0.375	46	79	38	77	37	56	34	49	78	57	63	66	61
icloram	0.5	72	75	45	80	30	74	31	70	81	49	48	74	75
,4-D bian	1.0	23	22	23	35	11	30	16	27	5	22	14	27	30
,4-D bian	1.5	9	15	23	33	10	20	6	9	14	38	29	18	19
,4-D bian	2.0	14	20	31	54	8	9	6	11	37	38	28	14	30
ic+2,4-D	0.25+1.0	26	54	29	76	53	69	34	62	41	11	33	63	68
ic+2,4-D	0.25+1.5	35	58	39	91	46	61	31	56	50	23	54	60	71
ic+2,4-D	0.25+2.0	52	78	40	83	53	49	33	45	49	43	49	61	61
ic+2,4-D	0.375+1.0	70	78	38	87	49	64	40	65	67	50	68	70	74
ic+2,4-D	0.375+1.5	68	74	29	84	63	67	29	78	61	55	65	70	81
ic+2,4-D	0.375+2.0	43	81	46	87	65	69	44	39	64	57	56	74	60
ic+2,4-D	0.5+1.0	76	77	44	89	66	79	39	83	61	57	59	78	85
ic+2,4-D	0.5+1.5	79	58	47	78	66	65	30	84	82	87	68	62	84
ic+2,4-D	0.5+2.0	66	75	40	76	66	80	41	81	87	71	71	78	78
LSD(0.05)		27	26	31	22	23	19	21	24	30	34	28	18	18

[a]Experiment at Valley City began in June 1982 and is not included in August 1983 mean.

Table 2. Picloram soil residue following annual applications in 1981, 1982 and 1983 at Dickinson and Sheldon, and in 1982 and 1983 at Valley City, North Dakota.

		Location/Evaluation date									
		Dickinson			Sheldon				Valley City		
		1982	1983		1982		1983		1982	1983	
Treatment	Rate (lb/A)	Aug	June[a]	Aug	June[a]	Aug	June[a]	Aug	Aug	June[a]	Aug
		(ppm)									
Picloram	0.25	0	0	0	0	0.10	0	0	0	0	0.10
Picloram	0.375	0	0	0.01	0	0.12	0	0	0	0	0.08
Picloram	0.5	0	0.01	0.08	0	0.18	0	0.03	0	0	0.09

[a]Soil samples were obtained immediately before the annual picloram treatment was applied.

Economics of Leafy Spurge (*Euphorbia esula* L.) in Pasture and Rangeland

Rodney G. Lym and Calvin G. Messersmith

An experiment to evaluate long term leafy spurge management including forage production was established at four sites in North Dakota in 1980. The predominate grasses were bluegrass (*Poa* spp.) with occasional crested wheatgrass, smooth brome, big bluestem or other native grasses. All sites were established in early June except one site which was established in September 1980. The herbicides applied in 1980 (Year 1) included 2,4-D ((2,4-dichlorophenoxy)acetic acid), dicamba (3,6-dichloro-*o*-anisic acid), picloram (4-amino-3,5,6-trichloropicolinic acid) as liquid (2S) and granule (2%G) formulations, and picloram applied using the roller and wick applicators. The conventional broadcast treatments were applied using a tractor mounted sprayer delivering 8 gpa water at 35 psi. A granular applicator was used to apply the picloram 2%G treatments. The roller and wick applicator height was adjusted to treat the top one-half of the tallest leafy spurge stems. The additive in the roller and wick treatments was a 5% (v:v) oil concentrate (83% paraffin based petroleum oil plus 15% emulsifier). The plots were 15 by 150 ft and treatments were replicated twice at each site in a randomized complete block design. In June 1981 (Year 2) each plot was divided into six 7.5 by 50 ft subplots for retreatments of 2,4-D, picloram 2S, dicamba or no retreatment. Retreatments were applied again in June 1982 (Year 3). Forage yields were obtained from each plot by harvesting a 3 by 25 ft section with a flail mower in July 1981 and a 4 by 15 ft section with a rotary mower in July 1982. Sub-samples were taken by hand along each harvested strip so that leafy spurge and forage weight could be separated. The samples were oven dried and are reported with 12% moisture content. Economic return was estimated by converting

forage production to hay sold for $48.00/T minus the cost of the herbicide and estimated application cost, i.e. 2,4-D = $2.17/lb ai, picloram 2S = $40/lb ai, picloram 2%G = $65/lb ai, dicamba = $10.30/lb ai, broadcast application = $2.05/A and roller or wick application = $4.10/A.

Picloram at 2 lb/A as the 2%G and 2S formulations provided the best leafy spurge control after 27 months averaging 43 and 48% control, respectively, without a retreatment and up to 90% with a retreatment of dicamba at 2.0 lb/A (Table). No original treatment provided satisfactory leafy spurge control by August 1982 without a retreatment. The best retreatments for leafy spurge control were dicamba at 2.0 lb/A, and picloram 2S at 0.25 lb/A alone or in combination with 2,4-D at 1.0 lb/A which provided 61, 59 and 53% control, respectively, when averaged across all initial treatments. Retreatments of 2,4-D at 1.0 lb/A did not improve control compared to no retreatment.

Forage yield increased for 42 of the 59 treatments compared to the control when averaged over 2 years (Table). The four treatments (Year 1 plus Years 2 and 3) which resulted in the highest yields were roller applied picloram at 1:7 (v:v) plus picloram at 0.25 lb/A, picloram 2S at 1.0 lb/A plus dicamba at 1.0 lb/A, control plus picloram at 0.25 lb/A, and control plus picloram + 2,4-D at 0.25 + 1.0 lb/A. The forage production averaged 5294 lb/A for the best four treatments compared to 3209 lb/A for the control. The best leafy spurge control was 91% with picloram 2S at 1.0 lb/A plus dicamba at 2.0 lb/A but the forage yield was intermediate at 4147 lb/A. Picloram roller applied at 1:7 (v:v) resulted in the highest forage production of the original treatments at 4635 lb/A when averaged across all retreatments. All retreatments increased forage production compared to the control.

Seven of the 59 treatments resulted in a positive economic return. The four treatments (Year 1 plus Years 2 and 3) which resulted in the highest economic return were control plus picloram at 0.25 lb/A, control plus picloram + 2,4-D at 0.25 + 1.0 lb/A, control plus 2,4-D at 1 lb/A, and 2,4-D at 2.0 lb/A plus 2,4-D at 1.0 lb/A; the net return averaged $19/A for these four treatments. The most economical long term treatment was picloram 2S at 0.25 lb/A in years two and three without a year one treatment which resulted in 63% leafy spurge control and a return of $23/A. It is expected that this treatment will result in 80 to 90% leafy spurge control after annual applications for three to five years. (Cooperative investigation, Dep. of Agron. and ARS, U.S. Dep. of Agric. Published with the approval of the Agric. Exp. Stn., North Dakota State Univ., Fargo.)

Leafy spurge control and forage production in North Dakota after 27 months. (Lym and Messersmith).

Year one Treatment[a]	Rate (lb/A)	Soln conc[b]	Years two and three herbicide and rate (lb/A) 2,4-D 1.0	Dicamba 1.0	Dicamba 2.0	Picloram 0.25	Picloram +2,4-D 0.25+1.0	Control 0	Mean
			(Percent control)						
2,4-D	2.0	1:15	4	33	48	56	48	12	33
Picloram 2%G	1.0	----	7	28	60	65	45	16	36
Picloram 2%G	2.0	----	33	52	65	66	63	43	53
Picloram 2S	1.0	1:15	52	43	91	47	56	34	54
Picloram 2S	2.0	1:7	72	77	90	67	69	48	71
Picloram(Roller)		1:7	5	30	51	50	41	3	30
Picloram+oil conc.(Roller)		1:7	26	47	63	62	63	29	50
Picloram(Wick)		1:3	12	11	48	52	35	4	30
Picloram+oil conc.(Wick)		1:3	2	49	42	67	75	15	41
Control	---	----	19	29	42	63	26	0	33
Mean			24	42	61	59	53	20	

LSD(0.05):Yr 1=12; Yr 2&3=9; Yr 1 x (Yr 2 & Yr 3)=29

			(1981 + 1982 yield lb/A)						
2,4-D	2.0	1:15	4431	3560	4815	5048	3578	3913	4224
Picloram 2%G	1.0	----	4196	3498	3814	4377	5043	4216	4191
Picloram 2%G	2.0	----	5014	5077	4060	4219	3325	3675	4228
Picloram 2S	1.0	1:15	3351	5346	4147	3451	5049	4106	4242
Picloram 2S	2.0	1:7	3745	3716	3870	3997	4384	3641	3892
Picloram(Roller)		1:7	4824	4588	4147	5490	4152	4606	4635
Picloram+oil conc.(Roller)		1:7	3574	3796	3665	3644	3136	4364	3697
Picloram(Wick)		1:3	5032	4016	4075	4618	3613	3350	4117
Picloram+oil conc.(Wick)		1:3	4047	4045	3817	3003	3392	3035	3557
Control	---	----	4312	4078	4583	5172	5168	3209	4420
Mean			4253	4172	4099	4302	4084	3812	

LSD(0.05):Yr 1=201; Yr 2&3=157; Yr 1 x (Yr 2 & Yr 3)=488

			(1980 + 1981 + 1982 net return $/A)					
2,4-D	2.0	1:15	15	-23	-13	14	-14	11
Picloram 2%G	1.0	----	-52	-85	-98	-63	-49	-43
Picloram 2%G	2.0	----	-97	-112	-157	-132	-158	-121
Picloram 2S	1.0	1:15	-47	-15	-64	-59	-26	-21
Picloram 2S	2.0	1:7	-78	-95	-111	-87	-82	-72
Picloram(Roller)		1:7	-14	-36	-50	-13	-50	-11
Picloram+oil conc.(Roller)		1:7	-50	-61	-85	-64	-81	-23
Picloram(Wick)		1:3	11	-29	-49	-15	-43	-21
Picloram+oil conc.(Wick)		1:3	-19	-35	-61	-59	-54	-35
Control	---	---	18	-4	-12	23	19	----

[a] Applied broadcast except the treatments identified as roller or wick applied.

[b] Picloram (Tordon 22K):water (v:v).

Granular picloram and dicamba for leafy spurge control in pasture. Messersmith, Calvin G. and Rodney G. Lym. Granular and liquid formulations of picloram and dicamba were compared for leafy spurge control in three experiments established in 1980 on 25 June and 3 September near Valley City, and 25 August near Dickinson, ND. An experiment to compare liquid and granular picloram in a sandy soil was established on 11 June 1980 in the Sheyenne National Grasslands near McLeod, ND. Four experiments to compare picloram 2% and 10%G formulations were established on 14 September 1982 and 10 June 1983 near Sheldon, ND and 9 September 1982 and 21 June 1983 near Dickinson. All experiments were in a randomized complete block design with four replications and 10 by 30 ft plots. The granules were applied uniformly by hand, while the liquid formulations were applied with a tractor mounted sprayer at 8.5 gpa. Evaluations were based on percent stand reduction compared to the control. There was a significant interaction between site and treatments, so experimental sites will be discussed individually.

Leafy spurge control with picloram and dicamba was better as a fall than spring applied treatment, especially when evaluated 24 and 36 months after treatment (Table 1). Picloram 2%G at 1.5 and 2.0 lb/A fall applied provided 97 and 98% leafy spurge control after three years compared to 38 and 72%, respectively, when spring applied. Picloram 2S at 2.0 lb/A provided 79 and 94% control after 3 years when spring and fall applied, respectively. Dicamba 4S and 5%G at 8.0 lb/A provided 13 and 6% control when spring applied and 83 and 78% control when fall applied, respectively. Fall applied dicamba at 8.0 lb/A and picloram at 2 lb/A provided similar control after 1 year, but control with granular and liquid dicamba dropped to 83% after 2 and 3 years, respectively. The spring, 1980 applied dicamba and picloram, except picloram at 2.0 lb/A, did not give satisfactory leafy spurge control by 1982 and 1983, respectively. Leafy spurge control at Valley City was better than at Dickinson with both picloram and dicamba. At Dickinson only picloram 2%G at 2 lb/A gave satisfactory leafy spurge control after 1 year at 91% but fell rapidly to 29% control after 2 years (Table 1). Dicamba did not give satisfactory control after 1 year with either the liquid or granular formulation.

Picloram 2S and 2%G at equal rates provided similar leafy spurge control over a 36 month period when evaluated on the sandy soil of the Sheyenne National Grasslands (Table 2). Picloram 2S and 2%G provided 87 and 85% control in May, 1983, respectively, but decreased to 34 and 43%, respectively, by August 1983.

Picloram 2 and 10%G at equal rates, generally provided similar leafy spurge control at both Sheldon and Dickinson (Table 3). Fall applications of picloram 2 and 10%G at all application rates except 2.0 lb/A, provided better leafy spurge control after 9 months than spring applications after 3 months. This difference could be due to insufficient moisture to completely disperse the granules following the June application. Leafy spurge control declined rapidly between the June and August evaluations of the fall 1982 applied treatments, whereas the fall 1980 applications at Valley City maintained good control. The differences in control may be related to the leafy spurge plant vigor because the 1980 treatments were established following a very dry growing season, whereas the 1982 treatments were established during a moist fall period.

Granular and liquid formulations of dicamba and picloram generally provided similar leafy spurge control at comparable rates. In general, leafy spurge control declined more rapidly in western North Dakota than at eastern sites and in experiments established in the wetter years of 1982 and 1983 compared to 1980. (Cooperative investigation by Dep. of Agron. and ARS, U. S. Dep. of Agric. Published with the approval of the Agric. Exp. Sta., North Dakota State Univ., Fargo.)

Table 1. Granular picloram and dicamba for leafy spurge control at various locations in North Dakota. (Messersmith and Lym).

Herbicide	Rate (lb/A)	Location/evaluation date: Valley City, Spring treatment (25 June 1980) 6-81	9-81	6-82	9-82	6-83	9-83	Valley City, Fall treatment (3 Sept 1980) 6-81	9-81	6-82	9-82	6-83	9-83	Dickinson (25 Aug 1980) 6-82	9-82	6-83	9-83
		(% control)															
Picloram 2%G	1.0	97	80	53	25	44	22	95	86	84	55	76	52	76	25	15	1
Picloram 2%G	1.5	98	89	87	22	77	38	99	100	100	96	98	97	95	45	38	14
Picloram 2%G	2.0	99	98	90	53	85	72	100	100	99	100	100	98	97	91	80	29
Dicamba 5%G	4.0	74	55	9	3	4	0	94	74	43	31	31	29	58	20	9	0
Dicamba 5%G	6.0	82	54	25	3	16	5	96	99	89	58	55	55	66	30	11	0
Dicamba 5%G	8.0	91	75	45	19	29	6	99	100	98	83	84	78	94	51	33	12
Picloram 2S	2.0	100	99	98	90	94	79	100	100	100	100	98	94	95	30	14	0
Dicamba 4S	8.0	94	74	28	12	42	13	99	99	100	97	92	83	84	19	5	0
LSD (0.05)		9	14	21	17	20	11	3	10	22	29	24	24	21	22	18	8

Table 2. Leafy spurge control using picloram liquid and granules in a sandy soil in the Sheyenne National Grasslands. (Messersmith and Lym).

Herbicide formulation	Rate	Evaluation date					
		May 81	Aug 81	May 82	Aug 82	May 83	Aug 83
	(lb/A)	(% control)					
Picloram 2S	0.5	73	13	3	1	0	0
Picloram 2S	1.0	98	73	24	25	15	9
Picloram 2S	2.0	100	99	94	88	87	34
Picloram 2%G	0.5	53	5	0	0	0	0
Picloram 2%G	1.0	97	72	23	14	14	8
Picloram 2%G	2.0	100	98	90	89	85	43
LSD (0.05)		25	12	14	12	15	8

Table 3. Leafy spurge control using picloram 2%G, 10%G and 2S as spring or fall applied treatments at Sheldon and Dickinson, ND. (Messersmith and Lym).

Herbicide formulation	Rate	Location/treatment/evaluation date					
		Sheldon			Dickinson		
		Fall (19 Sept 1982)		Spring (10 June 1983)	Fall (9 Sept 1982)		Spring (June 198
		June 83	Aug 83	Aug 83	June 83	Sept 83	Sept
	(lb/A)	(% control)					
Picloram 2%G	0.5	66	26	28	38	5	38
Picloram 2%G	1.0	86	41	38	69	15	57
Picloram 2%G	1.5	87	67	86	90	37	62
Picloram 2%G	2.0	99	76	97	96	53	76
Picloram 10%G	0.5	39	11	26	34	9	25
Picloram 10%G	1.0	83	60	54	84	21	32
Picloram 10%G	1.5	81	60	74	88	35	78
Picloram 10%G	2.0	87	63	92	89	40	68
Picloram 2S	2.0	94	67	93	94	42	96
LSD (0.05)		16	30	22	18	28	23

Herbicide screening trials for leafy spurge control. Lym, Rodney G. and Calvin G. Messersmith. Five experiments to evaluate several herbicides for leafy spurge control were established 26 May, 30 June and 7 September 1982 in a quarry near Lisbon, ND. The herbicides DPX-T6376 plus surfactant WK at 0.05%, chlorflurenol + dicamba (Chlorflurenol + Dicamba Weed and Feed, The Andersons Co., Maumee, Ohio), HOE-00661, SC-0224, 2,4-D lithum salt (Guth Corp. Hillside, IL) 2,4-D + 2,4-DP + dicamba, (Trimec PBI/Gordon) amitrole, bentazon, and paraquat were compared to 2,4-D dimethylamine, glyphosate and picloram for leafy spurge control. The liquid herbicides were applied using a tractor sprayer delivering 8.5 gpa at 35 psi. The granules were applied uniformly by hand. All plots were 10 by 30 ft in a randomized complete block design with four replications except experiment five which had 10 by 70 ft plots unreplicated. On 26 May 1982 the leafy spurge was in the yellow bract growth stage and 12 to 20 inches tall. The weather was overcast, 65 F with 84% relative humidity. On 30 June 1982 the leafy spurge was beginning seed set and 24 to 30 inches tall. The weather was clear, 74 F and 40% relative humidity. The weather on 7 September was overcast, 78 F and 60% relative humidity and the leafy spurge was moisture stressed. Evaluations are based on percent stand reduction as compared to the control and data are shown in the table.

In general, no compounds evaluated except picloram provided satisfactory leafy spurge control. DPX-T6376 did not control leafy spurge at any rate evaluated. Chlorflurenol + dicamba at 0.25 + 0.16 lb/A gave similar leafy spurge control to dicamba 5%G at 2.0 lb/A but less than dicamba 4L at 2.0 lb/A. Paraquat at 1.0 lb/A gave 100% leafy spurge top growth control initially but the plants recovered by October 1982. Amitrole at 5.0 and 10.0 lb/A provided 70 and 82% leafy spurge control, respectively, after 1 year but fell to 10 and 19%, respectively, by August 1983. HOE-00661 at 1.0 and 2.0 lb/A applied on 30 June 1982 provided 100% topgrowth control initially but had fallen to 19 and 40% control, respectively, by June 1983. HOE-00661 was less effective when applied in May or September compared to the June treatment. The 2,4-D + 2,4-DP + dicamba mixture provided similar control to 2,4-D alone and bentazon had very little activity on leafy spurge.

The herbicide SC-0224 at 0.75 and 1.0 lb/A gave 75 and 80% leafy spurge control, respectively, 9 months after application and was similar to glyphosate at 0.75 lb/A. Neither herbicide provided satisfactory control 1 year after application. The lithium salt of 2,4-D provided similar leafy spurge control to 2,4-D dimethylamine and was difficult to keep in solution. Picloram at 2.0 lb/A was the only herbicide evaluated to provide long term leafy spurge control. (Cooperative investigation Dep. of Agronomy and ARS, U. S. Dep. of Agric. Published with the approval of the Agric. Exp. Stn., North Dakota State Univ., Fargo.)

Table. Leafy spurge control by various herbicides. (Lym and Messersmith)

Treatment	Rate (lb/A)	Control 1 June 1983 (%)	Control 22 August 1983 (%)
Experiment 1 (treated 26 May 82)			
DPX-T6376 + WK(metsulfuron)	1.0 + 0.5%	0	0
DPX-T6376 + WK(metsulfuron)	2.0 + 0.5%	0	0
DPX-T6376 + WK(metsulfuron)	4.0 + 0.5%	0	0
DPX-T6376 + WK(metsulfuron)	8.0 + 0.5%	1	0
Picloram	2.0	100	95
2,4-D dinethylamine salt	1.0	20	0
LSD (0.05)		10	2
Experiment 2 (treated 30 June 82)			
Chlorflurenol + dicamba	0.25 + 0.16	12	0
Dicamba 5G	2.0	14	0
Dicamba 4L	2.0	35	0
Paraquat	1.0	1	0
Amitrole	5.0	70	10
Amitrole	10.0	82	19
HOE-00661	1.0	19	4
HOE-00661	2.0	40	3
LSD (0.05)		21	10
Experiment 3 (treated 26 May 1982)			
2,4-D + 2,4-DP + dicamba[a]	0.9 + 0.9 + 0.2	24	14
2,4-D + 2,4-DP + dicamba	1.8 + 1.8 + 0.4	15	3
2,4-D + 2,4-DP + dicamba	3.6 + 3.6 + 0.9	34	8
Bentazon	2.0	8	0
Bentazon	4.0	2	0
Bentazon	6.0	7	0
Picloram	2.0	99	92
2,4-D dimethylamine salt	2.0	19	3
LSD (0.05)		17	13
Experiment 4 (treated 26 May 82)			
HOE-00661	1.0	5	0
Glyphosate	1.0	39	0
Picloram	2.0	100	98
2,4-D dimethylamine salt	2.0	65	14
LSD (0.05)		24	3

Table. Leafy spurge control by various herbicides. (Lym and Messersmith)

Treatment	Rate (lb/A)	Control 1 June 1983 (%)	Control 22 August 1983 (%)
Experiment 5 (treated 7 Sept 82)			
SC-0224	0.75	75	0
SC-0224	1.0	80	10
Glyphosate	0.75	77	10
HOE-00661	0.75	0	0
HOE-00661	1.0	22	0
2,4-D + lithium salt	2.0	17	0
2,4-D + lithium salt	3.0	12	0
2,4-D + dimethylamine salt	2.0	0	0

[a] Isocotyl ester of 2,4-D + butoxyethanol ester of 2,4-DP + dicamba.

Fall applied fallow herbicides, Fargo 1982-83. Fall treatments were applied October 4 to soil with 2000 lb/A of wheat stubble using a bicycle wheel plot sprayer delivering 17 gpa at 35 psi. Half of each plot was treated with glyphosate (3 oz/A) using a bicycle wheel plot sprayer delivering 8.5 gpa at 35 psi on June 1. The experimental design was a randomized complete block with 4 replications and experimental units 10 by 25 ft.. Weed densities were moderate to light and were evaluated for control July 8.

		--------Percent Control July 8--------							
	Rate					-------Glyp--------			
Treatment	lb/A	Wioa	Kocz	Fipc	Fxtl	Wioa	Kocz	Fipc	Fxtl
Chlorsulfuron	0.03	10	99	100	50	96	100	100	53
Chlorsulfuron	0.06	20	100	100	86	97	78	100	93
Chlorsulfuron	0.09	29	100	100	94	98	100	100	98
DPX-T6376	0.03	26	100	100	73	96	100	100	76
DPX-T6376	0.06	40	100	100	91	97	100	100	94
Cyanazine-W+Metribuzin-W	2.5+0.5	31	100	100	33	95	100	100	31
Cyanazine-W+Atrazine-W	2.5+0.5	20	89	94	45	95	99	100	46
Cyanazine-W+R-40244	2.5+0.5	0	100	100	10	97	100	100	10
Cyanazine-W+Terbutryn	2.5+2.0	10	95	100	0	98	98	100	5
Terbutryn+Atrazine-W	2.0+0.5	13	95	100	44	97	94	100	46
Terb+Metolachlor+Atra-W	2+2+0.5	15	94	100	48	91	99	100	49
Hexazinone+R-40244	0.5+0.5	35	100	100	79	94	100	100	77
Hexazinone+Chlorsulfuron	0.5+0.03	54	100	100	94	98	100	100	95
Hexazinone+Metribuzin-W	0.5+0.5	73	98	100	81	95	99	100	79
Buthidazole+Metribuzin-W	0.75+0.5	56	100	100	94	98	100	100	98
Buthidazole+Chlorsulfuron	0.75+0.03	44	100	100	88	98	100	100	92
Isouron+Atrazine-W	0.5+0.5	46	100	100	91	100	100	100	98
Metribuzin-W+R-40244	0.5+0.5	35	100	100	28	99	99	100	30
Propham+Chlorsulfuron	4+0.03	10	100	100	58	94	100	100	61
Propham+Chlorsulfuron	4+0.6	3	100	100	60	91	100	100	59
Napropamide	4	15	58	75	71	96	83	100	79
Control		0	0	0	0	90	66	100	0
Mean		27	92	94	60	96	96	100	62
High mean		73	100	100	94	100	100	100	98
Low mean		0	0	0	0	90	66	100	0
Coeff. of variation		57	5	7	27	4	10	0	27
LSD(1 Percent)		28	8	12	30	8	19	0	31
LSD(5 Percent)		21	6	9	23	6	14	0	23
No. of reps		4	4	4	4	4	4	4	4

Summary

Foxtail control was good to excellent with chlorulfuron and DPX-T6376 at 0.06 lb/A or with hexazinone, buthidazole and 1souron combinations with several herbicides. Broadleaf weed control was excellent and wild oat control poor with all fall applied treatments. The applicaiton of glyphosate June 1 resulted in excellent wild oat control.

Fall applied fallow herbicides, Minot 1982-83. Fall treatments were applied October 21 to soil with 2500 lb/A of wheat stubble using a bicycle wheel plot sprayer delivering 17 gpa at 35 psi. The experimental design was a randomized complete block with 4 replications and experimental units were 10 by 25 ft.. Grass densities were moderate and broadleaf dinsities variable. Weed control ratings were on July 19.

Treatment	Rate lb/A	Percent Control		
		Wioa	Fxtl	Bdlf
Chlorsulfuron	0.03	10	73	100
Chlorsulfuron	0.06	54	94	100
Chlorsulfuron	0.09	65	98	100
DPX-T6376	0.03	93	92	100
DPX-T6376	0.06	93	100	100
Cyanazine-W+Metribuzin-W	2.5+0.5	49	83	95
Cyanazine-W+Atrazine-W	2.5+0.5	56	58	94
Cyanazine-W+R-40244	2.5+0.5	40	55	94
Cyanazine-W+Terbutryn	2.5+2.0	45	48	90
Terbutryn+Atrazine-W	2.0+0.5	45	33	96
Terb+Metolachlor+Atra-W	2+2+0.5	55	66	98
Hexazinone+R-40244	0.5+0.5	78	95	93
Hexazinone+Chlorsulfuron	0.5+0.03	91	94	100
Hexazinone+Metribuzin-W	0.5+0.5	94	97	99
Buthidazole+Metribuzin-W	0.75+0.5	96	99	100
Buthidazole+Chlorsulfuron	0.75+0.03	95	99	100
Isouron+Atrazine-W	0.5+0.5	69	76	94
Metribuzin-W+R-40244	0.5+0.5	75	63	96
Propham+Chlorsulfuron	4+0.03	54	85	100
Propham+Chlorsulfuron	4+0.06	92	99	100
Napropamide	4	81	97	0
Control		0	0	0
Mean		65	77	89
High mean		96	100	100
Low mean		0	0	0
Coeff. of variation		29	23	5
LSD(1 Percent)		35	33	8
LSD(5 Percent)		26	25	6
No. of reps		4	4	4

Summary

Broadleaf weed control was 90% or better with all herbicide treatments except napropamide. Wild oat and green foxtail control was good to excellent with DPX-T6376 and napropamide alone or with chlorsulfuron and metribuzin combinations with hexazinone and buthidazole. Wild oat control with propham decreased as chlorsulfuron rate in the mixture increased from 0.03 to 0.06 lb/A.

Fall applied herbicides fallow, Williston 1982-83. Treatments were applied October 20 to soil with 1500 lb/A of wheat stubble using a bicycle wheel plot sprayer delivering 17 gpa at 35 psi. The experimental design was a randomized complete block with 4 replications and experimental units were 10 by 25 ft.. Weed densities were moderate and were evauated for control July 13.

Treatment	Rate lb/A	% Control			
		Fxtl	Tamu	Ruth	Kocz
Chlorsulfuron	0.03	89	100	100	100
Chlorsulfuron	0.06	99	100	100	100
Chlorsulfuron	0.09	99	100	100	100
DPX-T6376	0.03	97	100	100	100
DPX-T6376	0.06	98	100	100	100
Cyanazine-W+Metribuzin-W	2.5+0.5	69	100	95	100
Cyanazine-W+Atrazine-W	2.5+0.5	50	100	78	100
Cyanazine-W+R-40244	2.5+0.5	58	100	85	100
Cyanazine-W+Terbutryn	2.5+2.0	33	100	71	100
Terbutryn+Atrazine-W	2.0+0.5	6	100	75	100
Terb+Metolachlor+Atra-W	2+2+0.5	78	100	79	100
Hexazinone+R-40244	0.5+0.5	91	100	83	95
Hexazinone+Chlorsulfuron	0.5+0.03	99	100	100	100
Hexazinone+Metribuzin-W	0.5+0.5	97	100	90	100
Buthidazole+Metribuzin-W	0.75+0.5	100	100	95	100
Buthidazole+Chlorsulfuron	0.75+0.03	99	100	100	100
Isouron+Atrazine-W	0.5+0.5	83	100	80	100
Metribuzin-W+R-40244	0.5+0.5	51	100	69	100
Propham+Chlorsulfuron	4+0.03	96	100	100	100
Propham+Chlorsulfuron	4+0.6	100	100	100	100
Napropamide	4	92	0	0	0
Control		0	0	0	0
Mean		76	91	82	91
High mean		100	100	100	100
Low mean		0	0	0	0
Coeff. of variation		13	0	11	2
LSD(1 Percent)		19	0	16	4
LSD(5 Percent)		14	0	12	3
No. of reps		4	4	4	2

Summary

Broadspectrum weed control was good to excellent with chlorsulfuron alone or in combination with hexazinone and buthidazole.

Postemergence herbicide applications in fallow, Fargo 1983. Treatments were applied in standing wheat stubble June 1 to 1 to 3-leaf wild oat and 1 to 4 inch broadleaf weeds with a bicycle wheel plot sprayer delivering 8.5 gpa at 35 psi. The experiment was a randomized complete block with 4 replications and experimental units were 10 by 25 feet. Wild oat densities were heavy and broadleaf densities light. Weed control was evaluated June 20.

Treatment	Rate oz/A	Percent Control		
		Wioa	Wibw	Cath
Paraquat+Surf	4+.5%	49	33	13
Paraquat+Surf	8+.5%	70	68	28
Paraquat+Chlorsulfuron+S	8+.5+.5%	76	88	83
Paraquat+Metribuzin-F+S	8+8+.5%	91	90	50
Paraquat+Ametryn+S	4+24+.5%	99	99	68
Paraquat+R-40244+S	4+8+.5%	78	90	25
Paraquat+R-40244+S	8+8+.5%	92	92	55
Glyphosate +Surf	4+.5%	100	98	85
Glyphosate+Surf	8+.5%	100	95	83
Glyp+Chlorsulfuron+S	4+.25+.5%	100	97	84
Glyp+Chlorsulfuron+S	4+.5+.5%	96	94	89
Glyp+R-40244+S	4+8+.5%	99	96	87
Glyp+R-40244+S	8+8+.5%	100	100	95
Glyp+Pend+Dicamba+S	4+24+2+.5%	99	89	84
SC-0224	4	100	95	78
SC-0224	8	100	97	88
SC-0224+Chlorsulfuron+S	4+.5+.5%	100	97	89
SC-0224+R-40244	4+8	100	95	88
SC-0224+R-40244	8+8	100	99	90
Ametryn+Surf	24+.5%	76	90	20
Terbutryn+Surf	24+.5%	65	72	28
Terbutryn+Chlorsulfuron+S	24+.5+.5%	81	95	86
Terbutryn+Metribuzin-F+S	24+8+.5%	90	93	49
Terbutryn+R-40244+S	24+8+.5%	87	93	48
HOE-00661	4	53	55	7
HOE-00661	8	82	89	35
HOE-00661+Chlorsulfuron+S	4+.5+.5%	44	75	83
HOE-00661+Metribuzin-F	4+8	71	94	40
HOE-00661+R-40244	4+8	53	81	43
DPX-Y6202+OC	2+.25G	95	0	0
DPX-Y6202+Clsu+OC	2+.5+.5%	97	95	84
DPX-Y6202+R-40244+OC	2+8+.5%	97	95	47
Control	0	0	0	0
Mean		83	83	58
High mean		100	100	95
Low mean		0	0	0
Coeff. of variation		11	12	16
LSD(1 Percent)		16	18	17
LSD(5 Percent)		12	14	13
No. of reps		4	4	4

Summary

Wild oat control was good with glyphosate, SC-0224 and DPX-Y6202 alone or in combination with other herbicides and metribuzin or ametryn combinations with paraquat and terbutryn. Wild buckwheat control was good with glyphosate and SC-0224 alone or herbicide combinations with chlorsulfuron, metribuzin and R-40244. Canada thistle control was fair with glyphosate and SC-0224 or herbicide combinations with chlorsulfuron.

Postermergence herbicide applicatons in fallow, Minot 1983. Treatments were applied in standing stubble June 8 to 1 to 4 inch weeds with a bicycle wheel plot sprayer delivering 8.5 gpa at 35 psi. The experiment was a randomized complete block with 4 replications and experimental units were 10 by 25 ft.. Weed densities were moderate and were evaluated for control July 19.

Treatment	Rate oz/A	Percent Control			
		Fxtl	Tamu	Ruth	Gfpw
Paraquat+Surf	4+.5%	54	68	81	90
Paraquat+Surf	8+.5%	55	90	90	93
Paraquat+Chlorsulfuron+S	8+.5+.5%	98	93	99	98
Paraquat+Metribuzin-F+S	8+8+.5%	98	100	100	100
Paraquat+Ametryn+S	4+24+.5%	79	98	91	98
Paraquat+R-40244+S	4+8+.5%	74	98	94	98
Paraquat+R-40244+S	8+8+.5%	83	99	100	100
Glyphosate +Surf	4+.5%	60	94	78	95
Glyphosate+Surf	8+.5%	55	96	85	95
Glyp+Chlorsulfuron+S	4+.25+.5%	99	100	100	100
Glyp+Chlorsulfuron+S	4+.5+.5%	99	100	100	100
Glyp+R-40244+S	4+8+.5%	69	100	86	100
Glyp+R-40244+S	8+8+.5%	83	100	98	100
Glyp+Pend+Dicamba+S	4+24+2+.5%	92	99	98	100
SC-0224	4	63	88	86	100
SC-0224	8	64	99	100	100
SC-0224+Chlorsulfuron+S	4+.5+.5%	99	100	100	100
SC-0224+R-40244	4+8	71	98	88	98
SC-0224+R-40244	8+8	68	98	94	100
Ametryn+Surf	24+.5%	53	89	50	80
Terbutryn+Surf	24+.5%	64	86	78	95
Terbutryn+Chlorsulfuron+S	24+.5+.5%	88	99	99	100
Terbutryn+Metribuzin-F+S	24+8+.5%	93	98	89	100
Terbutryn+R-40244+S	24+8+.5%	68	93	86	100
HOE-00661	4	53	75	33	80
HOE-00661	8	45	90	48	90
HOE-00661+Chlorsulfuron+S	4+.5+.5%	97	100	100	100
HOE-00661+Metribuzin-F	4+8	90	96	85	95
HOE-00661+R-40244	4+8	64	85	84	90
DPX-Y6202+OC	2+.25G	71	0	0	0
DPX-Y6202+Clsu+OC	2+.5+.5%	99	100	100	100
DPX-Y6202+R-40244+OC	2+8+.5%	76	98	85	98
Control	0	0	0	0	0
Mean		73	89	82	91
High mean		99	100	100	100
Low mean		0	0	0	0
Coeff. of variation		13	7	15	5
LSD(1 Percent)		18	12	23	12
LSD(5 Percent)		14	9	17	9
No. of reps		4	4	4	2

Summary

Broadspectrum seed control was excellent with chlorsulfuron in combination with paraquat, glyphosate, SC-0224, terbutryn, HOE-00661, and DPX-Y6202 or metribuzin in combination with paraquat, terbutryn and HOE-00661. Broadleaf weed control was generally excellent with R-40244 combinations.

Postemergence herbicide application fallow, Williston 1983. Treatments were applied in standing wheat with a bicycle wheel plot sprayer delivering 8.5 gpa at 35 psi. The experiment was a randomized complete block with 4 replications and experimental units were 10 by 25 feet. Weed densities were moderate and were evaluated for control July 13.

Treatment	Rate oz/A	Percent Control				
		Fxtl	Tamu	Ruth	Kocz	Howe
Paraquat+Surf	4+.5%	41	100	100	100	100
Paraquat+Surf	8+.5%	40	100	100	98	100
Paraquat+Chlorsulfuron+S	8+.5+.5%	100	100	100	100	100
Paraquat+Metribuzin-F+S	8+8+.5%	91	100	100	100	100
Paraquat+Ametryn+S	4+24+.5%	64	100	100	100	100
Paraquat+R-40244+S	4+8+.5%	71	100	91	100	100
Paraquat+R-40244+S	8+8+.5%	58	100	100	98	100
Glyphosate +Surf	4+.5%	60	100	100	90	100
Glyphosate+Surf	8+.5%	49	100	93	94	100
Glyp+Chlorsulfuron+S	4+.25+.5%	99	100	100	100	100
Glyp+Chlorsulfuron+S	4+.5+.5%	100	100	100	100	100
Glyp+R-40244+S	4+8+.5%	75	100	45	100	100
Glyp+R-40244+S	8+8+.5%	66	95	95	100	100
Glyp+Pend+Dicamba+S	4+24+2+.5%	88	100	100	100	100
SC-0224	4	55	100	98	100	100
SC-0224	8	60	100	95	100	100
SC-0224+Chlorsulfuron+S	4+.5+.5%	99	100	100	100	100
SC-0224+R-40244	4+8	74	100	95	98	100
SC-0224+R-40244	8+8	71	100	100	100	100
Ametryn+Surf	24+.5%	10	50	38	50	0
Terbutryn+Surf	24+.5%	63	56	90	93	100
Terbutryn+Chlorsulfuron+S	24+.5+.5%	46	88	93	93	80
Terbutryn+Metribuzin-F+S	24+8+.5%	84	64	93	100	100
Terbutryn+R-40244+S	24+8+.5%	79	98	76	100	90
HOE-00661	4	54	63	43	65	100
HOE-00661	8	59	94	73	68	70
HOE-00661+Chlorsulfuron+S	4+.5+.5%	97	100	98	96	100
HOE-00661+Metribuzin-F	4+8	82	100	66	93	100
HOE-00661+R-40244	4+8	49	88	63	100	90
DPX-Y6202+OC	2+.25G	89	0	0	0	0
DPX-Y6202+Clsu+OC	2+.5+.5%	100	100	98	93	100
DPX-Y6202+R-40244+OC	2+8+.5%	74	80	39	80	70
Control	0	0	0	0	0	0
Mean		68	87	81	88	88
High mean		100	100	100	100	100
Low mean		0	0	0	0	0
Coeff. of variation		20	22	20	16	0
LSD(1 Percent)		26	35	30	26	0
LSD(5 Percent)		19	26	23	20	0
No. of reps		4	4	4	4	1

Summary

Broadspectrum weed control was excellent with chlorsulfuron in combination with glyphosate, SC-0224, HOE-00661, and DPX-Y6202 or metribuzin in combination with paraquat. Weed control was generally better with terbutryn than ametryn. Russian thistle control with R-40244 combinations was variable.

Split applications in fallow, Fargo 1983. Chlorsulfuron and metribuzin were applied May 4 and Dowco 453, PP-009, HOE-00581, DPX-Y6202 and glyphosate June 1. Wild oat were in the 1 to 3-leaf stage when treatments were applied June 1. Treatments were applied with a bicycle wheel sprayer delivering 17 gpa for May 4 and 8.5 gpa for June 1 treatments both at 35 psi. The experiment was a randomized complete block with 4 replications and experimental units 10 by 25 ft.. Weed densities were moderate to heavy and control was evaluated July 8.

Treatment	Rate oz/A	------Percent Control------ Wioa	Kocz
Clsu	.25	0	93
Clsu/Dowco453+OC PE+P	.25+2+.25G	97	91
Clsu/PP-9+OC PE+P	.25+4+.25G	91	88
Clsu/HOE00581+OC PE+P	.25+2+.25G	74	95
Clsu/DPX-Y6+OC PE+P	.25+2+.25G	98	92
Clsu/Glyp+S PE+P	.25+3+.5%	64	96
Metr-F	8	19	94
Metr-F/Dowco453+OC PE+P	8+2+.25G	98	96
Metr-F/PP-9+OC PE+P	8+4+.25G	95	95
Metr-F/HOE00581+OC PE+P	8+2+.25G	88	93
Metr-F/DPX-Y6+OC PE+P	8+2+.25G	98	95
Metr-F/Glyp+S PE+P	8+3+.5%	87	98
Dowco453+OC P	2+.25G	99	0
PP-009+OC P	4+.25G	96	0
HOE00581+OC P	2+.25G	79	0
Glyphosate+S P	3+.5%	48	58
Control	0	0	0
Mean		72	70
High mean		99	98
Low mean		0	0
Coeff. of variation		11	9
LSD(1 Percent)		15	11
LSD(5 Percent)		11	8
No. of reps		4	4

Summary

Kochia control was good with chlorsulfuron or metribuzin and wild oat control excellent with Dowco 453, PP-009 or DPX-Y6202. Wild oat control with glyphosate and HOE-00581 was better when applied as a split treatment with metribuzin than when applied alone or as a split treatment with chlorsulfuron.

Split applications in fallow, Minot 1983. Chlorsulfuron and metribuzin were applied May 25 and Dowco 453, PP-009, HOE-00581, DPX-Y6202 and glyphosate June 8. Wild oat were in the 3 to 4-leaf stage and foxtail 1 inch when treatments were applied June 8. Treatments were applied with a bicycle wheel plot sprayer delivering 17 gpa at 35 psi. The experiment was a randomized complete block with 4 replications and experimental units 10 by 25 ft.. Grass weed densities were heavy and broadleaf weed densities light. Weed control ratings were on July 20.

Treatment	Rate oz/A	Percent Control Fxtl	Wioa	Bdlf
Clsu PE	.2	10	0	96
Clsu/Dowco453+OC PE+P	.25+2+.25	92	94	95
Clsu/PP-9+OC PE+P	.25+4+.25	55	69	94
Clsu/HOE00581+OC PE+P	.25+2+.25	75	45	95
Clsu/DPX-Y6+OC PE+P	.25+2+.25	91	81	95
Clsu/Glyp+S PE+P	.25+3+.5	76	53	99
Metr-F PE		15	0	68
Metr-F/Dowco453+OC PE+P	8+2+.25	90	89	70
Metr-F/PP-9+OC PE+P	8+4+.25	75	65	64
Metr-F/HOE00581+OC PE+P	8+2+.25	81	55	70
Metr-F/DPX-Y6+OC PE+P	8+2+.25	88	73	59
Metr-F/Glyp+S PE+P	8+3+.5	85	60	81
Dowco453+OC P	2+.25	89	88	0
PP-009+OC P	4+.25	45	55	0
HOE00581+OC P	2+.25	65	44	0
DPX-Y6202+OC P	2+.25	83	69	23
Glyphosate+S P	3+.5	55	43	68
Control		0	0	0
Mean		65	54	60
High mean		92	94	99
Low mean		0	0	0
Coeff. of variation		20	28	21
LSD(1 Percent)		25	29	24
LSD(5 Percent)		18	22	18
No. of reps		4	4	4

Summary

Broadleaf weed control was good with chlorsulfuron treatments and variable with metribuzin treatments. Grass weed control was best with Dowco 453 or DPX-Y6202 treatments.

Split applications in fallow, Williston 1983. Chlorsulfuron and metribuzin were applied May 26 and Dowco 453, PP-009, HOE-00561, DPX-Y6202 and glyphosate June 7. Volunteer wheat was in the 3 to 4-leaf stage and green foxtail 1 inch when treatments were applied June 7. Treatments were applied with a bicycle wheel plot sprayer delivering 17 gpa for May 26 and 8.5 gpa for June 7 treatments both at 35 psi. The experiment was a randomized complete block with 4 replications and experimental units 10 by 25 ft.. Wild oat densities were moderate to light and control ratings were on July 13.

Treatment	Rate oz/A	Percent Control			
		Fxtl	Ruth	Kocz	Vwht
Clsu PE	.25	75	56	80	0
Clsu/Dowco453+OC PE+P	.25+2+.25G	99	60	88	90
Clsu/PP-9+OC PE+P	.25+4+.25G	82	58	80	95
Clsu/HOE00581+OC PE+P	.25+2+.25G	97	49	85	60
Clsu/DPX-Y6+OC PE+P	.25+2+.25G	99	59	100	100
Clsu/Glyp+S PE+P	.25+3+.5%	98	81	95	95
Metr-F PE	8	71	40	83	65
Metr-F/Dowco453+OC PE+P	8+2+.25G	97	42	100	100
Metr-F/PP-9+OC PE+P	8+4+.25G	78	44	95	98
Metr-F/HOE00581+OC PE+P	8+2+.25G	97	48	100	75
Metr-F/DPX-Y6+OC PE+P	8+2+.25G	98	39	95	100
Metr-F/Glyp+S PE+P	8+3+.5%	97	59	100	99
Dowco453+OC P	2+.25G	90	0	0	100
PP-009+OC P	4+.25G	41	0	0	95
HOE00581+OC P	2+.25G	75	8	0	45
DPX-Y6202+OC P	2+.25G	85	0	0	98
Glyphosate+S P	3+.5%	53	8	75	85
Control	0	0	0	0	0
Mean		80	36	65	78
High mean		99	81	100	100
Low mean		0	0	0	0
Coeff. of variation		17	54	11	13
LSD(1 Percent)		25	37	20	30
LSD(5 Percent)		19	28	15	22
No. of reps		4	4	2	2

Summary

None of the treatments adequately controlled Russian thistle. Foxtail control was good with post herbicides on chlorsulfuron or metubuzin treated plots, volunteer wheat good with all post treatments except HOE-00581 and kochia with all treatments containing chlorsulfuron or metribuzin.

Dalapon for weed control in fallow, Fargo 1983. Treatments were applied in standing wheat stubble June 1 to 1 to 2 inch weeds using a bicycle wheel plot sprayer delivering 8.5 gpa at 35 psi. The experiment was a randomized complete block with 4 replications and experimental units were 10 by 20 ft.. Weed densities were moderate and control was evaluated July 15.

Treatment	Rate oz/A	Percent Control			
		Wimu	Fxtl	Wioa	Kocz
Glyphosate+2=4-D +Surf	3+8+.5%	93	64	70	94
Paraquat+2=4-D +Surf	4+8+.5%	93	48	48	94
Dalapon+2=4-D +Surf	24+8+.5%	95	36	0	93
Dalapon+2=4-D +Surf	48+8+.5%	93	91	44	90
Dalapon+2=4-D +Surf	72+8+.5%	95	97	80	94
Control	0	0	0	0	0
Mean		78	56	40	77
High mean		95	97	80	94
Low mean		0	0	0	0
Coeff. of variation		4	35	41	6
LSD(1 Percent)		7	41	34	10
LSD(5 Percent)		5	30	25	7
No. of reps		4	4	4	4

Summary

Wild mustard and kochia control was good with all 2,4-D treatments and foxtail control good with dalapon at 48 and 72 oz/A. Wild oat control did not exceed 80% with any treatment.

False chamomile control in fallow, Mohall 1983. Treatments were applied in standing wheat stubble June 15 to 2 to 6 inch false chamomile with a bicycle wheel plot sprayer delivering 8.5 gpa at 35 psi. The experiment was a randomized complete block with 4 replications and experimental units were 10 by 20 ft.. Weed densities were heavy and control was evaluated July 20.

Treatment	Rate oz/A	--------% Control-------- Fxtl	Fach
Paraquat+Surf	4+.5	35	59
Paraquat+Chlorsulfuron+S	4+.25+.5	80	91
Paraquat+DPX-T6376+Surf	4+.25+.5	90	100
Paraquat+Metribuzin-F+S	4+4+.5	78	61
Paraquat+Ametryn+S	4+2+.5	75	82
Paraquat+Terbutryn+S	4+24+.5	84	88
Paraquat+R-40244+Surf	4+8+.5	70	74
Paraquat+Cyanazine-W+Surf	4+32+.5	86	96
Glyphosate+Surf	4+.5	49	59
Glyphosate+Chlorsulfuron+S	4+.25+.5	87	100
Glyphosate+Ametryn+Surf	4+24+.5	43	79
Glyphosate+Terbutryn+Surf	4+24+.5	78	83
Ametryn+Surf	24+.5	59	63
Terbutryn+Surf	24+.5	43	50
Control		0	0
Mean		64	72
High mean		90	100
Low mean		0	0
Coeff. of variation		27	17
LSD(1 Percent)		33	23
LSD(5 Percent)		25	17
No. of reps		4	4

Summary

False chamomile and green foxtail control in fallow was good to excellent with chorsulfuron or DPX-T6376 in combination with paraquat and glyphosate or paraquat combinations with terbutryn and cyanazine.

False chamomile control in potholes, Mohall 1983. Treatments were applied June 15 to 2 to 6 inch false chamomile with a bicycle wheel plot sprayer delivering 8.5 gpa at 35 psi. The experiment was a randomized complete block with 4 replications and experimental units were 10 by 20 ft.. Weed densities were heavy and control was evaluated July 20.

Treatment	Rate oz/A	% control Fach
Glyphosate+Surf	6+.5%	78
Glyphosate+Surf	12+.5%	94
Paraquat+Surf	8+.5%	91
SC-0224	6	77
SC-0224	12	93
HOE-00661	4	71
HOE-00661	8	89
Amitrol	8	74
Amitrol	16	93
Terbutryn+Surf	24+.5%	71
Ametryn+Surf	24+.5%	70
Control	0	0
Mean		75
High mean		94
Low mean		0
Coeff. of variation		14
LSD(1 Percent)		20
LSD(5 Percent)		15
No. of reps		4

Summary

False chamomile control was good with glyphosate or SC-0224 at 12 oz/A, paraquat or HOE-00661 at 8 oz/A, and amitrol at 16 oz/A.

Wheat on fall applied fallow herbicides, Fargo 1981-83. Fallow herbicides were applied in standing wheat stubble Oct. 20, 1981. Precipitation totaled 26.5 inch during the 19 month period between herbicide application and wheat seeding. Era wheat was seeded May 5, 1983 into untilled soil. Wheat injury and stand reduction were evaluated June 10. The experiment was a randomized complete block with 4 replications and experimental units were 8 by 30 ft.

Treatment	Rate lb/A	1982 Control	Wheat % IR	Wheat % SR
Cyanazine	2.5	63	0	0
Chlorsulfuron	0.03	89	0	0
Chlorsulfuron	0.06	90	0	0
Chlorsulfuron	0.09	92	0	0
Isouron	0.4	62	0	0
Isouron	0.5	66	0	1
Isouron	0.6	74	0	0
Cyan + atra	2.5+0.5	65	0	3
Cyan + atra + prph	2.5+0.5+3	64	0	4
Cyan + terb	2.5+2	68	0	0
Cyan + metr	2.5+0.5	60	0	0
Cyan + isou	2.5+0.5	67	0	1
Cyan + clsu	2.5+0.03	89	0	1
Clsu + atra	0.03+0.5	88	0	1
Clsu + metr	0.03+0.5	89	0	0
Clsu + terb	0.03+2	89	0	0
Clsu + isou	0.03+0.5	90	0	0
Clsu + prph	0.03+3	90	0	0
Isou + atra	0.5+0.5	68	0	3
Isou + atra + prph	0.5+0.5+3	74	0	3
Isou + metr	0.5 + 0.5	73	0	1
Isou + terb	0.5+2	66	0	4
Metr + atra	0.5+0.5	66	0	1
Terb + atra	2+0.5	62	0	1
Terb + atra + prph	2+0.5+3	68	0	0
Terb + metr	2+0.5	71	0	0
Terb + meto + atra	2+2+0.5	62	0	1
Hexa + diur	0.5+1	75	0	3
Hexa + clsu	0.5+0.03	91	0	1
Buth + clsu	0.75+0.03	89	0	1
Buth + metr	0.75+0.5	76	0	1
LSD (0.05)		8	-	3

Summary

No chemical fallow treatment reduced wheat stand over 5% with a 19 month interval between application and seeding.

Barley on fall applied fallow herbicides, Minot 1981-83. Fallow herbicides were applied in standing wheat stubble Oct. 26, 1981. Precipitation totaled 29.5 inch during the 19 month period between herbicide application and barley seeding. A ND experimental barley was seeded May 2, 1983. Barley injury and stand reduction were evaluated July 19. The experiment was a randomized complete block with 4 replications and experimental units were 8 by 30 ft.

Treatment	Rate lb/A	1982 Control	Barley	
			% IR	% SR
Cyanazine	2.5	78	0	0
Chlorsulfuron	0.03	97	0	0
Chlorsulfuron	0.06	99	0	3
Chlorsulfuron	0.09	99	0	3
Isouron	0.4	79	3	5
Isouron	0.5	86	0	10
Isouron	0.6	91	0	8
Cyan + atra	2.5+0.5	87	0	0
Cyan + atra + prph	2.5+0.5+3	86	0	0
Cyan + terb	2.5+2	91	0	1
Cyan + metr	2.5+0.5	81	0	0
Cyan + isou	2.5+0.5	92	1	6
Cyan + clsu	2.5+0.03	99	0	1
Clsu + atra	0.03+0.5	73	0	1
Clsu + metr	0.03+0.5	97	0	0
Clsu + terb	0.03+2	97	0	0
Clsu + isou	0.03+0.5	99	0	4
Clsu + prph	0.03+3	90	0	0
Isou + atra	0.5+0.5	93	0	3
Isou + atra + prph	0.5+0.5+3	93	1	6
Isou + metr	0.5+0.5	94	1	6
Isou + terb	0.5+2	94	0	6
Metr + atra	0.5+0.5	87	0	1
Terb + atra	2+0.5	81	0	0
Terb + atra + prph	2+0.5+3	86	0	3
Terb + metr	2+0.5	91	0	0
Terb + meto + atra	2+2+0.5	87	0	4
Hexa + diur	0.5+1	89	1	5
Hexa + clsu	0.5+0.03	99	1	5
Buth + clsu	0.75+0.03	98	0	4
Buth + metr	0.75+0.5	96	0	1
LSD (0.05)		13	2	4

Summary

Isouron at 0.5 lb/A or higher reduced barley stand 6 to 10% with a 19 month interval between application and seeding.

Wheat on fall applied fallow herbicides, Williston 1981-83. Fallow herbicides were applied in standing wheat stubble Oct. 27, 1981. Precipitation totaled 22.7 inch during the 19 month interval between herbicide application and wheat seeding. Coteau wheat was seeded into untilled soil May 23. Wheat injury and stand reductions were evaluated July 13. The experiment was a randomized complete block with 4 replications and experimental units 8 by 30 ft.

Treatment	Rate lb/A	1982 Control	Wheat % IR	Wheat % SR	Wheat bu/A
Cyanazine	2.5	56	0	0	17.9
Chlorsulfuron	0.03	80	0	0	18.8
Chlorsulfuron	0.06	82	0	0	20.1
Chlorsulfuron	0.09	89	0	0	21.0
Isouron	0.4	65	0	3	19.1
Isouron	0.5	72	0	20	14.9
Isouron	0.6	74	3	25	15.5
Cyan + atra	2.5+0.5	59	0	3	19.1
Cyan + atra + prph	2.5+0.5+3	73	0	0	19.3
Cyan + terb	2.5+2	59	0	3	19.7
Cyan + metr	2.5+0.5	61	0	0	19.8
Cyan + isou	2.5+0.5	78	0	14	16.1
Cyan + clsu	2.5+0.03	80	0	0	18.4
Clsu + atra	0.03+0.5	74	0	0	19.7
Clsu + metr	0.03+0.5	82	0	1	20.2
Clsu + terb	0.03+2	82	0	0	19.9
Clsu + isou	0.03+0.5	98	0	8	18.9
Clsu + prph	0.03+3	86	0	0	18.1
Isou + atra	0.5+0.5	65	0	9	16.7
Isou + atra + prph	0.5+0.5+3	80	0	14	16.3
Isou + metr	0.5+0.5	64	1	16	16.3
Isou + terb	0.5+2	75	3	16	16.8
Metr + atra	0.5+0.5	66	0	0	18.4
Terb + atra	2+0.5	70	0	0	17.9
Terb + atra + prph	2+0.5+3	57	0	3	17.5
Terb + metr	2+0.5	67	0	3	19.5
Terb + metr + atra	2+2+0.5	71	0	3	19.8
Hexa + diur	0.5+1	76	3	1	20.3
Hexa + clsu	0.5+0.03	93	0	0	18.6
Buth + clsu	0.75+0.03	96	0	4	19.8
Buth + metr	0.75+0.5	90	0	0	19.2
Control	--	0	0	0	18.7
LSD (0.05)		13	2	7	3.3

Summary

Treatments containing isouron at 0.5 lb/A or higher reduced wheat stand 14 to 25% and yield 1.9 to 3.8 bu/A with a 19 month interval between application and seeding.

Wheat on fall applied cyanazine treatments, Fargo 1981-83. Cyanazine treatments were applied in standing wheat stubble Oct. 20, 1981. Precipitation totaled 26.5 inch during the 19 month period between herbicide application and wheat seeding. Era wheat was seeded May 5, 1983 into untilled soil. Wheat injury and stand reduction were evaluated June 10. The experiment was a randomized complete block with 4 replications and experimental units were 8 by 30 ft.

Treatment	Rate lb/A	1982 Control	Wheat	
			% IR	% SR
Cyanazine	2	65	0	0
Cyanazine	3	71	0	0
Cyanazine - SRG	2	84	0	0
Cyanazine - SRG	3	88	0	15
LSD (0.05)		5	-	4

Summary

Weed control was better with cyanazine slow release granules than the wettable powder formulation in 1982. However, the 3 lb/A rate of the slow release formulation reduced wheat stand 15% when seeded 19 months after application.

Barley on fall applied cyanazine treatments, Minot 1981-83. Cyanazine treatments were applied in standing wheat stubble Oct. 26, 1981. Precipitation totaled 29.5 inch during the 19 month interval between herbicide application and barley seeding. A ND experimental barley was seeded May 2, 1983. Barley injury and stand reduction were evaluated July 19. The experiment was a randomized complete block with 4 replications and experimental units were 8 by 30 ft.

Treatment	Rate lb/A	1982 Control	Barley	
			% IR	% SR
Cyanazine	2	66	0	0
Cyanazine	3	71	0	0
Cyanazine - SRG	2	90	1	6
Cyanazine - SRG	3	91	3	6
	LSD (0.05)	7	2	3

Summary

The 2 and 3 lb/A rate of the slow release formulation of cyanazine reduced barley stand 6% when seeded 19 months after application.

Wheat on fall applied cyanazine treatments, Williston 1981-83. Cyanazine treatments were applied in standing wheat stubble Oct. 27, 1981. Precipitation totaled 22.7 inch during the 19 month interval between herbicide application and wheat seeding. Coteau wheat was seeded into untilled soil May 23. Wheat injury and stand reductions were evaluated July 13. The experiment was a randomized complete block with 4 replications and experimental units 8 by 30 ft.

Treatment	Rate lb/A	1982 Control	Wheat		
			% IR	% SR	bu/A
Cyanazine	2	54	0	0	18.9
Cyanazine	3	62	0	0	18.0
Cyanazine - SRG	2	79	3	0	17.2
Cyanazine - SRG	3	80	38	55	9.2
Control	-	0	0	0	17.5
	LSD (0.05)	5	10	16	5.1

Summary

Weed control was better with cyanazine slow release granules than the wettable powder formulation in 1982. However, the 3 lb/A rate of the slow release formulation reduced wheat stand and yield over 50% when seeded 19 months after application.

Wheat on postemergence fallow herbicides, Fargo 1982-83. Postemergence treatments were applied in standing wheat stubble May 26, 1982. Precipitation totaled 19.3 inch during the 11 month interval between application and seeding. Era wheat was seeded May 5, 1983 into untilled soil. Wheat injury and stand reduction were evaluated June 10. The experiment was a randomized complete block with 4 replications and experimental units were 8 by 20 ft.

Treatment	Rate lb/A	1982 Control	Wheat	
			% IR	% SR
Para + clsu + s	0.5+0.015+.5%	81	0	0
Para + clsu + s	0.5+0.03+.5%	84	0	0
Para + DPXT6376 + s	0.5+0.015+.5%	86	0	0
Para + DPXT6376 + s	0.5+0.3+.5%	89	0	0
Para + Napr + s	0.5+1+.5%	65	0	0
Para + Napr + s	0.5+2+.5%	63	0	3
Para + Napr + s	0.5+3+.5%	61	0	0
Para + cyan + s	0.5+2+.5%	87	0	0
Para + metr + s	0.5+0.5+.5%	81	0	0
Glyp + clsu + s	0.37+0.03+.5%	97	0	0
Glyp + clsu + s	0.5+0.03+.5%	99	0	0
Glyp + R-40244 + s	0.5+0.5+.5%	88	0	1
R-40244	0.5	58	0	0
R-40244	1	58	0	0
Clsu + s	0.03+.5%	70	0	0
Terb + clsu + s	1.5+0.015+.5%	92	0	1
Terb + clsu + s	1.5+0.03+.5%	92	0	0
Terb + cyan + s	1.5+2+.5%	87	0	0
Terb + 2,4-D + s	1.5+0.5+.5%	74	0	0
Terb + dica + s	1.5+0.25+.5%	74	0	0
SC-0224 + R-40244	0.5+0.5	84	0	0
SC-0224 + clsu + s	0.5+0.015+.5%	99	0	1
SC-0224 + clsu + s	0.5+0.03+.5%	97	0	1
HOE-00661 + clsu	0.5+0.015	79	0	0
HOE-00661 + clsu	0.5 + 0.03	75	0	0
LSD (0.05)		10	-	2

Summary

Wheat stands were not reduced over 3% by any treatment with an 11 month interval between application and seeding.

Wheat on postemergence fallow herbicides, Williston 1982-83. Postemergence treatments were applied in standing wheat stubble June 4, 1982. Precipitation totaled 14.1 inch during the 11 month interval between application and seeding. Coteau wheat was seeded May 23, 1983 into untilled soil. Wheat injury and stand reduction were evaluated July 13. The experiment was a randomized complete block with 4 replications and experimental units 8 by 20 ft.

Treatment	Rate lb/A	1982 Control	Wheat % IR	Wheat % SR	Wheat bu/A
Para + clsu + s	0.5+0.015+.5%	92	0	0	18.5
Para + clsu + s	0.5+0.03+.5%	99	0	6	18.4
Para + DPXT6376 + s	0.5+0.015+.5%	93	0	3	18.0
Para + DPXT6376 + s	0.5+0.03+.5%	95	0	0	17.8
Para + napr + s	0.5+1+.5%	76	0	3	17.4
Para + napr + s	0.5+2+.5%	84	0	5	16.5
Para + napr + s	0.5+3+.5%	87	0	11	15.2
Para + cyan + s	0.5+2+.5%	92	0	0	17.0
Para + metr + s	0.5+0.5+.5%	100	0	0	19.3
Glyp + clsu + s	0.37+0.03+.5%	100	0	0	20.6
Glyp + clsu + s	0.5+0.03+.5%	100	0	1	18.8
Glyp + R-402441 + s	0.5+0.5+.5%	95	0	3	18.1
R-40244	0.5	55	0	0	20.2
R-40244	1	62	0	0	18.6
Clsu + s	0.03+.5%	74	0	1	17.1
Terb + clsu + s	1.5+0.015+.5%	78	0	1	17.0
Terb + clsu + s	1.5+0.03+.5%	80	0	1	18.3
Terb + cyan + s	1.5+2+.5%	51	0	0	18.2
Terb + 2,4-D + s	1.5+0.5+.5%	59	0	1	17.3
Terb + dica + s	1.5+0.25+.5%	56	0	0	15.8
SC-0224 + R-40244	0.5+0.5	99	0	0	17.4
SC-0224 + clsu + s	0.5+0.015+.5%	100	0	0	18.8
SC-0224 + clsu + s	0.5+0.03+.5%	100	0	1	17.8
HOE-00661 + clsu	0.5+0.015	77	0	1	17.6
HOE-00661 + clsu	0.5+0.03	78	0	0	18.7
Control	--	0	0	0	16.7
LSD (0.05)		9	-	7	2.8

Summary

Napropamid at 3 lb/A reduced wheat stand 11% with an 11 month interval between application and seeding. No other treatment resulted in a significant stand reduction.

Wheat on split fallow treatments, Fargo 1982-83. Chlorsulfuron and atrazine were applied May 25 and PP-009 June 8, 1982 in standing wheat stubble. Precipitation totaled 19.3 inch during the 11 month period between application and wheat seeding. Era wheat was seeded May 5, 1983 into untilled soil. Wheat injury and stand reduction were evaluated June 10. The experiment was a randomized complete block with 4 replications and experimental units were 8 by 20 ft.

Treatment	Rate oz/A	1982 Control	Wheat	
			% IR	% SR
Chlorsulfuron	0.5	76	0	0
Clsu + PP-009 + OC	0.5+1+1 QT	94	0	0
Clsu + PP-009 + OC	0.5+2+1 QT	99	0	0
Clsu + PP-009 + OC	0.5+4+1 QT	99	0	0
Atrazine	8	59	0	3
Atra + PP-009 + OC	8+1+1 QT	83	0	3
Atra + PP-009 + OC	8+2+1 QT	86	0	1
Atra + PP-009 + OC	8+4+1 QT	85	0	3
PP-009 + OC	4+1 QT	44	0	1
LSD (0.05)		7	-	3

Summary

Wheat stands were not reduced over 3% by any treatment with an 11 month interval between application and seeding.

Conventional versus no-till production of seven crops, Fargo 1983. Trials were established in silty clay soil (experiment initiated 1977) to compare conventional (fall plowing, spring cultivation, and harrowing) or no-till (seeding directly into standing stubble) production systems. Crop variety, seeding date, plant stand and yield are presented in the table. Small grains and flax were seeded with a modified press drill and row crops with a flex planter. The experiment was a randomized complete block with a split plot arrangement and 4 replications. Experimental units were 15 by 40 ft.

			Conventional		No-till	
Crop	Variety	Seeding date	Stand Plants/3 ft	Yield units/A	Stand plants/3ft	Yield units/A
Wheat	Era	5/9	34	44.7 bu	31	46.2 bu
Barley	Park	5/9	21	63.5 bu	21	61.4 bu
Flax	Culbert	5/9	44	7.1 bu	47	14.4 bu
Corn	Pioneer 3992	5/23	5	72.0 bu	5	71.1 bu
Sunflowers	Seed Tech 315	5/23	5	1062 lb	5	1046 lb
Soybeans	Evans	5/19	18	38.3 bu	19	45.8 bu
Sugarbeets	Bush Monofort	5/5	6	13.3 T	7	14.2 T

Summary

Wheat, barley, corn, sunflower or sugarbeet yields were similar and flax or soybean yields higher under no-till compared with conventional-till systems in 1983.

Conventional versus no-till production of wheat, Fargo 1983. Trials were established in silty clay soil (experiment initiated 1976) to compare conventional and no-till production of seven crops in 1982. Era wheat was seeded on this same plot area May 5, 1983. The entire experimental area was treated with diclofop plus bromoxynil when the wheat was in the 3-leaf stage the experiment was a randomized complete block with a split plot arrangement and 4 replications. Experimental units were 15 by 40 ft.

1982 Crop	Wheat		Weeds/3 sq ft			
	Heads/3 ft	Yield bu/A	Wioa	Kocz	Grft	Cath
			conventional			
Wheat	132	43.0	3	1	6	0
Barley	148	47.6	1	1	6	0
Flax	140	42.8	8	2	7	0
Corn	140	39.5	1	0	4	0
Soybean	140	53.9	1	1	7	0
Sunflower	128	43.3	0	0	6	0
Sugarbeet	144	52.2	1	1	3	0
Mean	139	46.0	2	1	6	0
			no-till			
Wheat	142	44.6	1	2	4	0
Barley	140	47.3	0	2	5	1
Flax	150	46.8	2	4	6	1
Corn	128	38.4	0	2	6	1
Soybean	140	57.4	0	0	7	1
Sunflower	144	45.9	0	2	4	0
Sugarbeet	136	49.4	0	2	6	1
Mean	146	47.1	0	2	5	1
LSD (0.05) Till =	NS	NS	2	NS	NS	1
Crop =	NS	7.1	NS	NS	NS	NS
Crop X Till =	NS	NS	NS	NS	NS	NS

Summary

Wheat stand counts and yield were similar in conventional or no-till treatments when averaged over previous crop. Wheat yields ranged from 39 to 54 bu/A under conventional-till and 38 to 57 bu/A under no-till depending on previous crop. Wheat yields were highest under both systems when the previous crop was soybeans and lowest when the previous crop was corn.

Influence of tillage and herbicides on weeds in wheat, Fargo 1983. The experiment was established in the fall of 1977 on a silty clay soil. Tillage and herbicides have been applied to the same area each year (except chlorsulfuron was first applied in the fall of 1979). Chlorsulfuron (0.25 oz/A) was applied Oct. 4, Era wheat seeded and glyphosate (6 oz/A) applied May 4. Diclofop (12 oz/A) was applied to 2 to 3-leaf wheat and wild oat June 1 and 2,4-D (4 oz/A) to 4 inch broadleaf weeds and 5-leaf wheat June 17. The experiment was a randomized complete block with a split block arrangement and 4 replications. Experimental units were 15 by 25 ft.

	Weeds/3 sq ft									
		Wioa					Fxtl			
Tillage	None	Dic	2,4-D	Ditd	Mean	None	Dic	2,4-D	Ditd	Mean
NT-clsu	46	1	111	2	40	9	2	9	2	5
NT-glyp	70	3	126	7	52	6	2	5	4	4
Disc	83	6	144	4	59	8	2	8	3	5
Plow	93	6	134	10	61	8	1	10	4	6
C. Plow	130	11	200	10	88	10	1	8	5	6
Mean	84	5	143	7		8	2	8	3	
LSD 0.05 Till			= 14					NS		
Herb			= 18					5		
Till x Herb			= 50					NS		
		Kocz					Wimu			
NT-clsu	1	1	0	0	0.5	1	2	0	0	1
NT-glyp	14	21	9	11	14	8	16	1	0	6
Disc	25	35	14	17	23	22	36	1	2	15
Plow	9	7	1	3	5	12	32	0	0	11
C. Plow	14	10	3	4	8	16	38	0	2	14
Mean	13	15	5	7		12	25	0	1	
LSD 0.05 Till			= 5					2		
Herb			= 7					2		
Till x Herb			= 9					4		
		Cath					Pest			
NT-clsu	0.5	0.5	0	0	0.25	0	0	0	0	0
NT-glyp	3	5	0.5	1	2.25	2	3	0	1	1.5
Disc	3	2	0	0	1.25	1	0	0	0	0.25
Plow	0	0	0	0	0	0	0	0	0	0
C. Plow	2	2	0	0	1	1	1	0	0	0.5
Mean	1.7	1.9	0.1	0.25		0.8	0.8	0	0.2	
LSD 0.05 Till			= 2					1		
Herb			= 1					0.5		
Till x Herb			= 3					2		

Summary

Fall application of 0.25 oz/A Chlorsulfuron effectively controlled broadleaf weed species in no-till plots. Canada thistle populations were higher in reduced or no-till glyphosate plots than in plowed plots especially without 2,4-D.

Influence of tillage and herbicides on wheat, Fargo 1983. The experiment was established in the fall of 1977 on a silty clay soil. Tillage and herbicides have been applied to the same area each year (except chlorsulfuron was first applied in the fall of 1979). Chlorsulfuron (0.25 oz/A) was applied October 4, 1982; Era wheat seeded and glyphosate (6 oz/A) applied May 4, 1983. Diclofop (12 oz/A) was applied to 2 to 3-leaf wheat and wild oat June 1 and 2,4-D (4 oz/A) to 4 inch broadleaf weeds and 5-leaf wheat June 17. The experiment was a randomized complete block with a split block arrangement and 4 replications. Experimental units were 15 by 25 ft.

	Wheat									
	Bu/A					Heads/3 ft row				
Tillage	None	Dic	2,4-D	Ditd	Mean	None	Dic	2,4-D	Ditd	Mean
NT-clsu	17.3	41.4	21.8	37.8	29.6	27	38	32	33	32
NT-glyp	3.6	12.3	5.8	28.5	12.6	11	24	14	32	20
Disc	2.9	9.1	4.1	22.9	9.8	11	22	12	28	18
Plow	4.3	9.2	4.6	27.7	11.5	9	17	12	36	18
C. Plow	1.8	7.8	3.2	26.2	9.8	9	19	10	32	18
Mean	6.0	16.0	7.9	28.6		13	24	16	32	
LSD (0.05) Till	= 5							12		
Herb	= 4							7		
Till x Herb	= 8							19		

Summary

Wheat yields were higher in no-till plots treated with chlorsulfuron than in any other tillage treatment regardless of postemergence herbicide. Wheat yields related closely to weed control in all tillage systems.

Fall applied herbicides for weed control in no-till wheat, Fargo 1982-83. Treatments were applied in wheat stubble (2000 lb/A) October 4, 1982 and Era wheat seeded May 5 1983 in 6 inch row spacings. All treatments were applied with a bicycle wheel plot sprayer delivering 17 gpa at 35 psi. The experiment was a randomized complete block with 4 replications and experimental units were 10 by 17 ft.. Weed control and crop injury ratings were on July 11.

		----Wheat----		Percent Control	
Treatment	Rate lb/A	%ir	%sr	Kocz	Wimu
Chlorsulfuron	0.015	0	0	87	84
Chlorsulfuron	0.03	0	0	100	100
Chlorsulfuron	0.06	0	0	98	99
Pendimethalin	1.5	0	0	56	0
Pendimethalin	2	0	0	81	0
Cyanazine-W	3	0	0	74	58
Terbutryn	2	0	0	20	20
Pendimethalin+Chlorsulfuron	1.5+.015	0	0	99	94
Pendimethalin+Chlorsulfuron	1.5+0.03	0	0	99	98
Control	0	0	0	0	0
Mean		0	0	71	55
High mean		0	0	100	100
Low mean		0	0	0	0
Coeff. of variation		0	0	18	20
LSD(1 Percent)		0	0	25	22
LSD(5 Percent)		0	0	19	16
No. of reps		4	4	4	4

Summary

No wheat injury or stand reduction was observed with any treatment. Kochia and wild mustard control with chlorsulfuron was good alone or in combinations with pendimethalin.

Weed control in no-till soybeans, Fargo 1982-83. Fall treatments (F) were applied in wheat stubble (2000 lb/A) on October 27, 1982. Evans soybeans were seeded with a flex planter and spring preemergence treatments (S) applied May 19. Postemergence treatments (P) were applied June 23 to 1 to 3 inch weeds and 2nd trifoliolate soybeans. Herbicides were applied with a bicycle wheel sprayer delivering 17gpa for preemergence and 8.5 gpa for postemergence treatments both at 35 psi. The experiment was a randomized complete block with 4 replications and experimental units were 10 by 20 feet. Weed densities were heavy and control evaluated July 7.

Treatment	Rate oz/A	---Soybean--- %ir	%sr	--% control-- Kocz	Wimu
Cyan-DF+2,4-D (F)+Clam (S)	3+3+.5+1.5	1	0	98	90
Cyan-DF+Pend+2,4-D F +Pend S	3+2+.5+1	1	0	97	88
Cyan-DF+Alac+2,4-DF+Alac S	3+3+.5+1.5	0	0	56	70
Glyp+Clam+S (S)	.37+3+.5%	0	0	55	53
Glyphosate+Pend+S	.37+2+.5%	0	0	80	68
Glyp+Alachlor+S (S)	.37+3+.5%	0	0	31	25
Glyp+Pend+Clam+S (S)	.37+2+2+.5%	0	0	67	79
BA+2,4-D+OC(PE)/BA+Bent+Acif+OC(P)	.5+.5+.3+.5+.12	0	0	79	99
Control weedy		0	0	0	0
Mean		0	0	63	63
High mean		1	0	98	99
Low mean		0	0	0	0
Coeff. of variation		433	0	22	25
LSD(1 Percent)		2	0	28	32
LSD(5 Percent)		2	0	20	23
No. of reps		4	4	4	4

Summary

Weed control was excellent with cyanazine plus 2,4-D and chloramben or cyanazine plus 2,4-D and pendimethalin and fair to good with BAS-9052 plus 2,4-D pre and Bas-9052 plus bentazon and acifluorfen postemergence. Little soybean injury was observed with any treatment.

Fall and spring applied herbicide in no-till sunflower, Fargo 1982-82. Fall treatments (F) were applied October 26 and spring treatments (S) May 20 both in standing wheat stubble 2000 lb/A residue with a bicycle wheel plot sprayer delivering 17 gpa at 35 psi. Seed Tech 315 hybrid sunflower were seeded May 23 with a John Deere flex planter. The experiment was a randomized complete block with 4 replications and experimental units were 10 by 25 ft.. Weed densities were heavy and were evaluated for control on June 28.

Treatment	Rate lb/A	Percent Control inj	std	Wiao	Wimu	Kocz
Pendimethalin (F)+Glyp (S)	2+0.37+0.5%	0	0	76	33	89
Pendimethalin (F)+Glyp (S)	3+0.37+0.5%	0	0	83	35	94
Pend (F)+Glyp+R-40244 (S)	2+.37+.5+.5%	0	0	64	99	99
Pend+R40244 (F)+Glyp (S)	2+.5+.37+.5%	1	0	56	85	98
Pend (F)+Glyp+Clam (S)	2+.37+1.5+.5%	1	0	61	61	78
Pend+Clam (F)+Glyp (S)	2+1.5+.37+.5%	3	3	68	74	89
Pend (F)+Glyp+Prom (S)	2+.37+1.5+.5%	1	0	71	58	93
Pend+Prom (F)+Glyp (S)	2+1.5+.37+.5%	3	0	80	51	96
Glyphosate+Pend (S)	0.37+2+.5%	1	0	60	78	95
Glyp+Pend+R40244 (S)	.37+2+.5+.5%	1	0	71	100	100
Glyp+Pend+Clam (S)	.37+2+1.5+.5%	0	0	33	78	59
Glyp+Pend+Prom (S)	.37+2+1.5+.5%	4	4	71	43	92
Control weedy		0	0	0	0	0
Mean		1	0	61	61	83
High mean		4	4	83	100	100
Low mean		0	0	0	0	0
Coeff. of variation		229	500	17	39	9
LSD(1 Percent)		5	5	20	46	15
LSD(5 Percent)		4	3	15	34	11
No. of reps		4	4	4	4	4

Summary

Little crop injury or stand reduction was observed with any treatment. Wild oat control with glyphosate was variable but was generally higher when applied alone rather than in combination with other herbicides. Wild mustard control was excellent with spring and good with fall applications of R-40244. Kochia control was generally good with all treatments except application of glyphosate-pendimethalin-chloramben.

Weed control in no-till sunflowers, Fargo 1983. Seed Tech 315 hybrid sunflowers were seeded in standing wheat stubble (2000lb//A) with a flex planter May 23. Preemergence treatments (PE) were applied May 23 and postemergence (P) treatments June 23 to 1 to 5 inch weeds and 4 to 8-leaf sunflower. Herbicides were applied with a bicycle wheel plot sprayer delivering 17 gpa for PE and 8.5 gpa for P treatments both at 35 psi. The experiment was a randomized complete block with 4 replications and experimental units were 10 by 25ft.. Weed densities were moderate to heavy and control evaluated July 7.

Treatment	Rate oz/A	---Snfl--- %ir	%sr	-----Percent control----- Fxtl	Wioa	Kocz	Wimu
Para+Surf PE	.5+.5%	0	0	0	41	59	10
Para+Pend+S PE	.5+2+.5%	0	0	85	45	80	25
Para+Meto+S PE	.5+2.5+.5%	0	0	78	50	84	35
Para+R40244+S PE	.5+.5+.5%	0	0	5	33	98	100
Para+Clam-W+S PE	.5+2.5+.5%	0	0	75	44	83	50
Para+Pend+Clam-W+S PE	.5+2+2.5+.5%	0	0	89	45	83	45
Para+Pend+R40244+S PE	.5+2+.5+.5%	0	0	94	58	100	99
Para+Meto+Clam-W+S PE	.5+2.5+2.5+.5%	0	0	84	58	88	65
Para+Meto+R40244+S PE	.5+2.5+.5+.5%	0	0	89	59	96	98
Para+Pend+S/Desm PE+P	.5+2+.5%+.3	0	0	94	60	84	61
Para+Pend+S/Acif PE+P	.5+2+.5%+.125	5	0	91	53	96	91
Par+R40+S/BAS+OCPE+P	.5+.5+.5+.25+1qt	3	0	99	100	97	98
Par+S/BAS+R4+OC PE+P	.5+.5+.25+.12+1q	28	0	98	99	79	98
Par+S/BA+Des+OC PE+P	.5+.5+.25+.3+1qt	5	0	96	95	63	56
Par+S/BAS+Aci+OCPE+P	.5+.5+.25+.12+1q	28	0	100	100	84	91
Par+R4+S/Dow+OCPE+P	.5+.5+.5+.12+1qt	0	0	100	100	97	100
Par+R4+S/PP09+OCPE+P	.5+.5+.5+.25+1qt	3	0	92	84	84	80
Par+R4+S/DPXy+OCPE+P	.5+.5+.5+.12+1qt	0	0	100	99	96	88
24De+R4+BAS/BASPE+P	.5+.5+.1+1q+.1+1q	0	0	99	97	97	100
Weedy Control	0	0	0	0	0	0	0
Mean		4	0	78	66	82	69
High mean		28	0	100	100	100	100
Low mean		0	0	0	0	0	0
Coeff. of variation		134	0	11	28	11	26
LSD(1 Percent)		9	0	16	35	17	34
LSD(5 Percent)		7	0	12	26	13	26
No. of reps		4	4	4	4	4	4

Summary

Foxtail control was 75% or greater with all treatments except R-40244 alone, wild oat control 95% or greater with all postemergence grass control herbicides except PP-009, kochia control 79% or greater with all treatments except BAS-9052 plus desmedipham and wild mustard control excellent with all treatments containing R-40244. Postemergence applications of BAS-9052 with R-40244 or acifluorfen were the only treatments which injured sunflower.

Weed control in no-till sunflowers, Minot 1983. Hybrid 894 sunflowers were seeded with a buffalo till planter June 6. Preemergence (PE) treatments were applied June 6 and postemergence (P) treatments June 25 to 1 to 4 inch weeds and 2 to 4-leaf sunflower. Treatments were applied with a bicycle wheel plot sprayer delivering 17 gpa at 35 psi. The experiment was a randomized complete block with 4 replications (only 3 evaluated) and experimental units 10 by 25 ft.. Weed densities were variable and control evaluated July 13.

Treatment	Rate lb/A	-Sunflower %ir	%sr	--------Percent Control-------- Fipc	Fxtl	Ruth	Prpw	Kocz
Glyp+Surf PE	.37+.5%	0	0	27	23	73	0	0
Glyp+Pend+S PE	.37+2+.5%	0	0	83	96	85	90	45
Gly+R40244+S PE	.37+.5+.5%	0	0	97	93	93	90	48
Glyp+Clam-W+S PE	.37+2.5+.5%	0	0	72	96	95	85	75
Gly+Pen+Clam+S PE	.37+2+2.5+.5%	0	0	90	96	87	90	55
Gly+Pen+R40244+S PE	.37+2+.5+.5%	0	0	98	98	96	100	65
Gly+Pen+Prom+S PE	.37+2+1.5+.5%	0	0	78	96	87	90	55
Gly+Pen+S/Desm PE+P	.37+2+.5%+.3	0	0	80	91	82	90	55
Gl+Pe+S/Acif PE+P	.37+2+.5%+.125	0	0	75	93	78	80	55
G+R4+S/BAS PE+P	.37+.5+.5+.25+1	0	0	98	98	97	100	78
G+S/BAS+R4 PE+P	.37+.5+.25+.12+1	10	0	100	100	100	100	95
G+S/BAS+De PE+P	.37+.5+.25+.3+1q	5	0	87	95	85	100	40
G+S/BAS+Ac PE+P	.37+.5+.25+.12+1	3	0	92	99	85	90	65
Weedy control		0	0	0	0	0	0	0
Mean		1	0	77	84	82	79	52
High mean		10	0	100	100	100	100	95
Low mean		0	0	0	0	0	0	0
Coeff. of variation		412	0	14	13	12	0	24
LSD(1 Percent)		12	0	25	25	21	0	29
LSD(5 Percent)		9	0	18	19	16	0	21
No. of reps		3	3	3	3	3	3	3

Summary

Sunflower stands were poor and weed stands variable. Pre or postemergence herbicide treatments increased weed control compared to glyphosate alone. Weed control was generally best with pre or postemergence applications of R-40244 in-combination with postemergence applications of BAS-9052.

Weed control in no-till sunflowers, Langdon 1983. Sigco 444 A sunflowers were seeded with a flex planter June 3. Preemergence treatments (PE) were applied June 3 and postemergence treatments (P) June 25 to 2 to 4-leaf sunflower and emerging to 4 inch weeds. Treatments were applied with a bicycle wheel plot sprayer delivering 17 gpa for PE and 8.5 gpa for P treatments both at 35 psi. The experiment was a randomized complete block with 4 replications and experimental units 10 by 20 ft.. Weed densities were heavy.

Treatments	Rate oz/A	--Sunflower-- %ir	%sr	Percent Control Fxtl	Colq
Paraquat+Surf PE	.5+.5%	1	0	25	46
Para+Pend+S PE	.5+2+.5%	5	0	73	86
Para+R40244+S PE	.5+.5+.5%	8	0	50	89
Para+Clam-W+S PE	.5+2.5+.5%	0	0	70	54
Para+Pend+Clam-W+S PE	.5+2+2.5+.5%	0	0	94	89
Para+Pend+R40244+S PE	.5+2+.5+.5%	0	0	86	97
Para+Pend+Prom+S PE	.5+2+1.5+.5%	0	0	84	97
Para+Pend+S/Desm PE+P	.5+2+.5%+.3	4	0	63	69
Para+Pend+S/Acif PE+P	.5+2+.5%+.125	0	0	81	74
Para+R40+S/BAS PE+P	.5+.5+.5%+.25+1qt	0	0	90	85
Par+S/BAS+Desm PE+P	.5+.5%+.25+.3+1qt	13	0	80	54
Weedy Control	0	0	0	0	0
Mean		3	0	66	70
High mean		13	0	94	97
Low mean		0	0	0	0
Coeff. of variation		250	0	23	23
LSD(1 Percent)		12	0	29	31
LSD(5 Percent)		9	0	22	23
No. of reps		4	4	4	4

Summary

Pre or postmergence herbicide treatments increased weed control compared to paraquat alone. Weed control was generally best with preemergence combinations of pendimethalin with chloramben, prometryn and R-40244 or a preapplication of R-40244 and a post application of BAS-9052.

Weed control in no-till sunflower, Sarles 1983. Sheyenne Dakota Gold confectionary sunflowers were seeded in 18 inch row spacings and preemergence treatments applied June 2. Postemergence applications were to 2 to 4-leaf sunflower and inch weeds on June 23. All treatments were applied with a bicycle wheel plot sprayer delivering 17 gpa for pre and 8.5 gpa for postemergence treatments both at 35 psi. The experiment was a randomized complete block with 4 replications and experimental units were 10 by 25 ft. Weed stands were moderate and control was rated on July 26.

Treatment[a]	Application	Rate lb/A	%SF IR	% Control Grft	Fipc	Shpu	Rrpw	Wibw
Glyp	PE	0.37	0	36	78	59	70	21
Glyp+pend	PE	0.37+2	1	80	87	85	90	46
Glyp+R-40244	PE	0.37+0.5	1	71	98	98	91	58
Glyp+clam	PE	0.37+2.5	7	74	95	91	69	66
Glyp+pend+clam	PE	0.37+2+2.5	0	90	95	89	97	89
Glyp+pend+R-40	PE	0.37+2+0.5	2	83	97	96	95	93
Glyp+pend+prom	PE	0.37+2+1.5	15	82	93	84	83	70
Glyp+pend/desm	PE+P	0.37+2+0.3	12	85	91	82	81	81
Glyp+pend/acif	PE+P	0.37+2+0.12	12	82	98	82	79	79
Glyp+R-40/Bas-9052+OC	PE+P	0.37+0.5+0.25	1	97	100	98	95	49
Glyp/BAS-9052+OC+R-40	PE+P	0.37+0.25+0.12	2	94	90	81	45	42
Glyp/BAS-9052+OC+desm	PE+P	0.37+0.25+0.3	18	92	97	81	70	50
Glyp/BAS-9052+OC+acif	PE+P	0.37+0.25+0.12	54	96	97	96	90	27
LSD (0.05)			9	15	11	17	12	22

[a]Glyp applied with 0.5% surf, OC = oil concentrate 1 qt/A

Summary

Green foxtail, sheperdspurse, field pennycress and redroot pigweed control was fair to excellent with all pre or postemergence treatments except glyphosate alone. The only treatments which adequately controlled wild buckwheat were pendimethalin combinations with chloramben, R-40244, prometryn, desmedipham or acifluorfen. Sunflower was injured 54% by postemergence applications of BAS-9052 and acifluorfen.