

Wheat and barley response to various postemergence herbicides at Rosemount, MN - 1997. Durgan, Beverly R., Eric Spandl, and Douglas Miller This experiment was designed to evaluate wheat and barley tolerance to various postemergence herbicides. The experiment was conducted at Rosemount, MN on a Waukegon silt loam soil. Following soybeans, the experimental area was fall chisel plowed. In the spring, the area received 50 lbs/A N then was disked, field cultivated, and harrowed. 'Bergen', 'Butte 86', 'Marshall', 'Norm', 'Pioneer 2375', 'Sharp', 'Sonja' hard red spring wheat varieties, 'Laker' durum wheat, 'Robust', and 'Stander' barley varieties were seeded on April 17 at 85 lb/A and 90 lbs/A for wheat and barley, respectively. Ramrod (propachlor at 2.5 lbs ai/A) was applied preemergence to control grassy weeds. All herbicide treatments were applied to a 6 ft strip with a backpack type sprayer delivering 10 gpa at 35 psi using 11001 flat fan nozzles. The experimental design was a split block with four replications. Varieties were seeded in strips randomized within each replication. Herbicide treatments were applied across all ten varieties. Each herbicide x variety plot was 10 feet wide by 8.5 feet long. Herbicide treatments were applied May 21 and May 27. On June 2, Buctril (bromoxynil at 0.25 lb ai/A) was applied to control broadleaf weeds. Environmental conditions at application are listed below. Crop injury was rated visually on June 4, June 18, and July 24. Crop height was measured at maturity and yields taken. Data were summarized by variety and are presented in Tables 1-5.

Treatment Date	May 21	May 27
Target crop stage	3-4 leaf	4-6 leaf
Temperature (°F)		
air	64	56
soil	60	56
Soil Moisture	moist at 1.0"	moist at 0.5"
Wind (mph)	0-5 E	8-10 E
Sky	clear	cloudy
Relative Humidity (%)	29	30
Rainfall before application		
Week 1 (inch)	0.31	0.72
Rainfall after application		
Week 1 (inch)	0.72	0.18
Week 2 (inch)	0.18	0.57
<u>Barley</u>		
Stander		
leaf no.	4-5.25	6-6.5
height (inch)	7-10	11-14
tillers	1-2	3-4
Robust		
leaf no.	4.5-5	6-6.5
height (inch)	7-9	10-11
tillers	3	4-5
<u>Wheat</u>		
Laker Durum		
leaf no.	3-4	5-5.5
height (inch)	5-7	10-11
tillers	1-2	3-4

Bergen		
leaf no.	4.5	4.5-5.5
height (inch)	4-6	9
tillers	3	3-4
Butte 86		
leaf no.	4.5-5.25	5.5
height (inch)	5-8	10-11
tillers	3-4	4-5
Norm		
leaf no.	4.25-4.75	5-5.25
height (inch)	4-7	10-11
tillers	3	3-4
Marshall		
leaf no.	4.25-4.75	5.25-6
height (inch)	4-7	8-10
tillers	3	3-4
Pioneer 2375		
leaf no.	4.5-4.75	5.5
height (inch)	5-8	10-11
tillers	2-3	4-5
Sharp		
leaf no.	4.75-5.25	5-6.5
height (inch)	6-8	9-11
tillers	3-4	3-4
Sonja		
leaf no.	3.75-4.25	5-6
height (inch)	4-7	8-9
tillers	1-3	3-4

Treatments with tralkoxydim, carfentrazone, HOE 1133, or imazamethabenz resulted in little or no injury and no significant height or yield reductions in all varieties compared to the check plots.

The high rate of difenzoquat caused early injury on all varieties, with the greatest injury occurring on '2375' hard red spring wheat and 'Laker' durum. With the exception of '2375' and 'Laker', injury symptoms decreased with time and did not cause any significant height or yield reduction. '2375' did not recover and significant height and yield reduction resulted. 'Laker' durum was injured by all rates of difenzoquat and significant height and yield reduction was also the result.

Overall, greatest injury and height/yield reductions resulted from the treatments with fenoxypop as a component ('Cheyenne' and 'Tiller'). All fenoxaprop treatments caused great injury (generally stand loss) and heavy yield reduction to 'Laker' durum. In barley, early fenoxaprop injury was severe in all treatments, however symptoms abated over the season for the 'Tiller' combinations and the earlier applied 'Cheyenne' treatments. Yields were slightly lower compared to the checks, but the differences were not consistently significant.. Injury increased with time for 'Cheyenne' treatments applied on the second spray date when barley was in the 6 to 6.5 leaf stage. The result was very high yield loss.

Fenoxaprop injury was generally much lower for the hard red spring wheat varieties compared to barley. However, in contrast to the trend observed with the barley, 'Tiller'

Table 1. Barley tolerance to postemergence herbicides at Rosemount, MN - 1997 (Durgan, Spandl, and Miller).

Treatment	Rate (lb/A)	Stander					Robust				
		Injury			Height	Yield	Injury			Height	Yield
		6/4	6/18	7/24	7/24		6/4	6/18	7/24	7/24	
-----	(%)	-----	(inch)	(Bu/A)	-----	(%)	-----	(inch)	(Bu/A)		
Postemergence (May 21)											
Tralkoxydim + TF8035 COC	0.18 + 0.5%	4	5	2	28	82	6	5	0	32	78
Tralkoxydim + TF8035 COC	0.36 + 0.5%	0	1	1	29	81	1	1	0	32	80
Fenoxaprop & MCPA ¹ + thifensulfuron & tribenuron ²	0.09 & 0.37 + 0.009 & 0.0047	28	28	10	28	78	18	15	0	31	83
Fenoxaprop & MCPA + thifensulfuron & tribenuron	0.14 & 0.55 + 0.014 & 0.007	29	30	10	28	83	18	16	2	29	77
Carfentrazone-ethyl & MCPA ³ + 28%N ⁴	0.031 & 0.5 + 2.0%	4	2	1	31	91	2	5	0	34	78
Carfentrazone-ethyl & 2,4-D ⁵ + 28%N	0.031 & 0.34 + 2.0%	0	0	0	29	83	0	0	2	34	86
Postemergence (May 27)											
HOE 1133	0.104	0	2	2	30	79	0	5	0	31	67
HOE 1133	0.208	0	4	0	30	88	1	4	1	30	73
Difenzoquat	0.75	4	2	2	28	81	4	0	0	33	82
Difenzoquat	1.0	5	1	1	29	84	6	6	0	31	78
Difenzoquat	1.5	12	6	2	29	89	11	8	2	32	77
Imazamethabenz ⁶ + difenzoquat + NIS ⁷	0.23 + 0.5 + 0.25%	0	2	0	30	89	2	2	0	33	75
Fenoxaprop & MCPA + thifensulfuron & tribenuron	0.09 & 0.37 + 0.009 & 0.0047	36	92	95	16	7	38	85	90	20	21
Fenoxaprop & MCPA + thifensulfuron & tribenuron	0.14 & 0.55 + 0.014 & 0.007	35	90	94	17	11	35	85	89	22	19
Fenoxaprop & 2,4-D & MCPA ⁸	0.09 & 0.12 & 0.37	40	42	18	22	76	39	35	12	28	84
Fenoxaprop & 2,4-D & MCPA	0.14 & 0.18 & 0.55	32	41	18	24	78	39	38	11	28	61
Check		0	0	0	29	81	0	0	0	32	81
Check		0	0	0	29	86	0	0	0	33	77
Check		0	0	0	28	88	0	0	0	33	85
Check		0	0	0	32	93	0	0	0	34	81
LSD (0.05)		6	5	3	4	13	6	6	4	4	19

¹ Premix = Cheyenne 2.69E.

² Premix = Harmony Extra 75DF.

³ Premix = Affinity MCPA 66DF.

⁴ 28%N = 28% UAN fertilizer solution.

⁵ Premix = Affinity 2,4-D 74DF.

⁶ Assert 67SG.

⁷ NIS = Class Preference nonionic surfactant.

⁸ Premix = Tiller 2.77E.

Table 2. Hard red spring wheat tolerance to postemergence herbicides at Rosemount, MN - 1997 (Durgan, Spandl, and Miller).

Treatment	Rate (lb/A)	Bergen					Sonja				
		Injury			Height	Yield	Injury			Height	Yield
		6/4	6/18	7/24	7/24		6/4	6/18	7/24	7/24	
-----	(%)	-----	(inch)	(Bu/A)	-----	(%)	-----	(inch)	(Bu/A)		
Postemergence (May 21)											
Tralkoxydim + TF8035 COC	0.18 + 0.5%	0	1	0	27	56	0	2	2	28	54
Tralkoxydim + TF8035 COC	0.36 + 0.5%	0	4	1	28	54	0	0	1	28	53
Fenoxaprop & MCPA ¹ + thifensulfuron & tribenuron ²	0.09 & 0.37 + 0.009 & 0.005	2	4	2	27	51	1	6	6	26	46
Fenoxaprop & MCPA + thifensulfuron & tribenuron	0.14 & 0.55 + 0.014 & 0.007	2	6	2	26	48	4	8	5	25	47
Carfentrazone-ethyl & MCPA ³ + 28%N ⁴	0.031 & 0.5 + 2.0%	0	6	2	28	50	0	4	1	28	52
Carfentrazone-ethyl & 2,4-D ⁵ + 28%N	0.031 & 0.34 + 2.0%	0	4	0	28	52	0	2	0	26	52
Postemergence (May 27)											
HOE 1133	0.104	5	8	0	27	57	2	2	2	25	56
HOE 1133	0.208	6	2	1	27	56	6	4	2	28	57
Difenzoquat	0.75	4	6	0	27	54	5	6	2	25	49
Difenzoquat	1.0	6	8	4	27	53	5	5	2	27	53
Difenzoquat	1.5	12	8	11	26	49	16	11	4	24	43
Imazamethabenz ⁶ + difenzoquat + NIS ⁷	0.23 + 0.5 + 0.25%	1	4	2	26	54	2	5	1	26	49
Fenoxaprop & MCPA + thifensulfuron & tribenuron	0.09 & 0.37 + 0.009 & 0.005	11	24	16	23	45	10	24	16	23	48
Fenoxaprop & MCPA + thifensulfuron & tribenuron	0.14 & 0.55 + 0.014 & 0.007	11	22	18	24	45	14	31	18	25	47
Fenoxaprop & 2,4-D & MCPA ⁸	0.09 & 0.12 & 0.37	31	30	24	24	37	24	26	15	23	39
Fenoxaprop & 2,4-D & MCPA	0.14 & 0.18 & 0.55	29	30	24	23	36	29	34	22	22	42
Check		0	0	0	28	54	0	0	0	26	54
Check		0	0	0	26	56	0	0	0	27	51
Check		0	0	0	27	56	0	0	0	28	56
Check		0	0	0	28	53	0	0	0	27	45
LSD (0.05)		6	6	4	2	7	5	6	7	3	8

¹ Premix = Cheyenne 2.69E.

² Premix = Harmony Extra 75DF.

³ Premix = Affinity MCPA 66DF.

⁴ 28%N = 28% UAN fertilizer solution.

⁵ Premix = Affinity 2,4-D 74DF.

⁶ Assert 67SG.

⁷ NIS = Class Preference nonionic surfactant.

⁸ Premix = Tiller 2.77E.

Table 3. Hard red spring wheat tolerance to postemergence herbicides at Rosemount, MN - 1997 (Durgan, Spandl, and Miller).

Treatment	Rate (lb/A)	Sharp					Norm				
		Injury			Height	Yield	Injury			Height	Yield
		6/4	6/18	7/24	7/24		6/4	6/18	7/24	7/24	
-----	(%)	-----	(inch)	(Bu/A)	-----	(%)	-----	(inch)	(Bu/A)		
Postemergence (May 21)											
Tralkoxydim + TF8035 COC	0.18 + 0.5%	0	1	0	37	50	0	2	1	29	48
Tralkoxydim + TF8035 COC	0.36 + 0.5%	0	1	0	37	48	0	2	1	29	47
Fenoxaprop & MCPA ¹ + thifensulfuron & tribenuron ²	0.09 & 0.37 + 0.009 & 0.005	1	6	2	37	48	4	6	6	30	45
Fenoxaprop & MCPA + thifensulfuron & tribenuron	0.14 & 0.55 + 0.014 & 0.007	4	9	1	37	48	4	5	2	28	45
Carfentrazone-ethyl & MCPA ³ + 28%N ⁴	0.031 & 0.5 + 2.0%	0	4	1	38	51	0	6	4	28	47
Carfentrazone-ethyl & 2,4-D ⁵ + 28%N	0.031 & 0.34 + 2.0%	0	0	0	38	52	0	2	1	30	51
Postemergence (May 27)											
HOE 1133	0.104	2	5	0	36	48	4	4	0	30	46
HOE 1133	0.208	4	5	0	36	49	4	2	1	28	50
Difenzoquat	0.75	5	9	0	36	52	6	4	1	30	51
Difenzoquat	1.0	5	11	4	36	49	8	8	2	27	44
Difenzoquat	1.5	14	15	6	33	46	15	11	15	29	42
Imazamethabenz ⁶ + difenzoquat + NIS ⁷	0.23 + 0.5 + 0.25%	0	6	0	37	49	2	4	1	32	52
Fenoxaprop & MCPA + thifensulfuron & tribenuron	0.09 & 0.37 + 0.009 & 0.005	15	31	15	31	41	10	21	16	26	45
Fenoxaprop & MCPA + thifensulfuron & tribenuron	0.14 & 0.55 + 0.014 & 0.007	15	30	10	33	45	14	25	18	26	42
Fenoxaprop & 2,4-D & MCPA ⁸	0.09 & 0.12 & 0.37	24	31	12	32	40	26	29	22	26	40
Fenoxaprop & 2,4-D & MCPA	0.14 & 0.18 & 0.55	24	31	15	30	41	24	30	21	24	46
Check		0	0	0	37	46	0	0	0	28	46
Check		0	0	0	38	53	0	0	0	32	50
Check		0	0	0	37	51	0	0	0	29	50
Check		0	0	0	38	54	0	0	0	30	52
LSD (0.05)		6	6	4	3	6	4	5	6	2	ns

¹ Premix = Cheyenne 2.69E.

² Premix = Harmony Extra 75DF.

³ Premix = Affinity MCPA 66DF.

⁴ 28%N = 28% UAN fertilizer solution.

⁵ Premix = Affinity 2,4-D 74DF.

⁶ Assert 67SG.

⁷ NIS = Class Preference nonionic surfactant.

⁸ Premix = Tiller 2.77E.

Table 4. Hard red spring wheat tolerance to postemergence herbicides at Rosemount, MN - 1997 (Durgan, Spandl, and Miller).

Treatment	Rate (lb/A)	Marshall					Butte 86				
		Injury			Height	Yield	Injury			Height	Yield
		6/4	6/18	7/24	7/24		6/4	6/18	7/24	7/24	
-----	(%)	-----	(inch)	(Bu/A)	-----	(%)	-----	(inch)	(Bu/A)		
Postemergence (May 21)											
Tralkoxydim + TF8035 COC	0.18 + 0.5%	0	1	2	28	58	0	1	0	37	53
Tralkoxydim + TF8035 COC	0.36 + 0.5%	0	1	4	28	57	0	0	0	36	55
Fenoxaprop & MCPA ¹ + thifensulfuron & tribenuron ²	0.09 & 0.37 + 0.009 & 0.005	0	5	1	28	54	4	8	1	35	47
Fenoxaprop & MCPA + thifensulfuron & tribenuron	0.14 & 0.55 + 0.014 & 0.007	1	2	5	28	53	4	6	1	36	49
Carfentrazone-ethyl & MCPA ³ + 28%N ⁴	0.031 & 0.5 + 2.0%	1	2	4	28	56	0	2	0	38	55
Carfentrazone-ethyl & 2,4-D ⁵ + 28%N	0.031 & 0.34 + 2.0%	0	2	5	26	54	1	4	0	36	54
Postemergence (May 27)											
HOE 1133	0.104	0	2	2	28	61	0	4	0	36	53
HOE 1133	0.208	4	1	2	29	60	2	5	0	36	59
Difenzoquat	0.75	6	8	2	26	53	5	9	1	34	47
Difenzoquat	1.0	6	5	6	29	58	8	8	0	37	54
Difenzoquat	1.5	15	9	4	27	50	12	15	2	34	47
Imazamethabenz ⁶ + difenzoquat + NIS ⁷	0.23 + 0.5 + 0.25%	1	5	1	28	54	1	4	0	34	51
Fenoxaprop & MCPA + thifensulfuron & tribenuron	0.09 & 0.37 + 0.009 & 0.005	6	14	12	25	50	14	24	12	32	47
Fenoxaprop & MCPA + thifensulfuron & tribenuron	0.14 & 0.55 + 0.014 & 0.007	4	12	10	27	54	16	30	16	34	49
Fenoxaprop & 2,4-D & MCPA ⁸	0.09 & 0.12 & 0.37	9	9	8	26	55	19	24	9	32	45
Fenoxaprop & 2,4-D & MCPA	0.14 & 0.18 & 0.55	11	9	9	26	56	21	24	9	32	46
Check		0	0	0	29	59	0	0	0	38	57
Check		0	0	0	28	54	0	0	0	36	55
Check		0	0	0	28	59	0	0	0	38	53
Check		0	0	0	28	58	0	0	0	36	53
LSD (0.05)		4	5	5	2	ns	4	5	4	3	8

¹ Premix = Cheyenne 2.69E.

² Premix = Harmony Extra 75DF.

³ Premix = Affinity MCPA 66DF.

⁴ 28%N = 28% UAN fertilizer solution.

⁵ Premix = Affinity 2,4-D 74DF.

⁶ Assert 67SG.

⁷ NIS = Class Preference nonionic surfactant.

⁸ Premix = Tiller 2.77E.

Table 5. Hard red spring and durum wheat tolerance to postemergence herbicides at Rosemount, MN - 1997 (Durgan, Spandl, and Miller).

Treatment	Rate (lb/A)	2375					Laker				
		Injury			Height	Yield	Injury			Height	Yield
		6/4	6/18	7/24	7/24		6/4	6/18	7/24	7/24	
-----	(%)	-----	(inch)	(Bu/A)	-----	(%)	-----	(inch)	(Bu/A)		
Postemergence (May 21)											
Tralkoxydim + TF8035 COC	0.18 + 0.5%	0	1	0	32	55	2	1	1	29	37
Tralkoxydim + TF8035 COC	0.36 + 0.5%	0	1	1	33	54	0	2	0	28	36
Fenoxaprop & MCPA ¹ + thifensulfuron & tribenuron ²	0.09 & 0.37 + 0.009 & 0.005	2	6	1	32	47	56	89	89	18	3
Fenoxaprop & MCPA + thifensulfuron & tribenuron	0.14 & 0.55 + 0.014 & 0.007	4	5	0	31	50	56	84	86	17	4
Carfentrazone-ethyl & MCPA ³ + 28%N ⁴	0.031 & 0.5 + 2.0%	2	4	0	33	50	1	4	0	26	37
Carfentrazone-ethyl & 2,4-D ⁵ + 28%N	0.031 & 0.34 + 2.0%	0	2	0	31	52	0	4	0	29	38
Postemergence (May 27)											
HOE 1133	0.104	2	2	0	32	51	4	6	2	26	35
HOE 1133	0.208	4	6	0	32	55	11	10	2	27	37
Difenzoquat	0.75	6	11	0	32	49	10	29	10	28	29
Difenzoquat	1.0	9	15	6	30	48	11	54	16	26	23
Difenzoquat	1.5	19	31	15	27	37	20	60	20	25	19
Imazamethabenz ⁶ + difenzoquat + NIS ⁷	0.23 + 0.5 + 0.25%	4	8	0	30	50	5	10	4	24	32
Fenoxaprop & MCPA + thifensulfuron & tribenuron	0.09 & 0.37 + 0.009 & 0.005	11	26	11	31	48	35	91	96	14	1
Fenoxaprop & MCPA + thifensulfuron & tribenuron	0.14 & 0.55 + 0.014 & 0.007	18	28	15	30	46	40	92	99	14	0
Fenoxaprop & 2,4-D & MCPA ⁸	0.09 & 0.12 & 0.37	26	34	16	27	42	41	94	99	11	0
Fenoxaprop & 2,4-D & MCPA	0.14 & 0.18 & 0.55	29	34	18	28	41	42	92	99	6	0
Check		0	0	0	33	56	0	0	0	27	35
Check		0	0	0	32	57	0	0	0	25	36
Check		0	0	0	32	54	0	0	0	26	35
Check		0	0	0	34	52	0	0	0	27	39
LSD (0.05)		4	11	4	3	6	7	11	4	7	6

¹ Premix = Cheyenne 2.69E.

² Premix = Harmony Extra 75DF.

³ Premix = Affinity MCPA 66DF.

⁴ 28%N = 28% UAN fertilizer solution.

⁵ Premix = Affinity 2,4-D 74DF.

⁶ Assert 67SG.

⁷ NIS = Class Preference nonionic surfactant.

⁸ Premix = Tiller 2.77E.