

Hard red spring wheat and barley tolerance to postemergence herbicides at Rosemount, MN - 2001. Durgan, Beverly R., Douglas Miller, and Krishona Martinson. 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. 'Alsen', 'Dandy', 'HJ98', 'Ingot', 'Ivan', 'McVey', 'NorPro', 'Parshall', 'Reeder', 'Verde', and '2375' hard red spring wheat varieties, plus 'Lacey' and 'Robust' barley varieties were seeded on April 28 at 85 lb/A and 90 lbs/A for wheat and barley, respectively. Propachlor at 3.5 lbs ai/A was applied preemergence on April 30 to control grassy weeds. Bromoxynil at 0.25 lb ai/A was applied postemergence to control broadleaf weeds. Herbicide treatments were applied to a 7.5 ft strip with a tractor mounted sprayer delivering 10 gpa at 35 psi using 8001 flat fan nozzles. The experimental design was a split block with three replications. Varieties were seeded in strips randomized within each replication. Herbicide treatments were applied across all varieties. Each herbicide x variety plot was 10 feet wide by 17 feet long. Herbicide treatments were applied May 29. Environmental conditions at application are listed below. Crop injury was visually rated. Crop height was measured at maturity and yields taken. Data were summarized by variety and are presented in Tables 1 to 7.

Treatment Date	May 29
Temperature (EF)	
air	67
soil	65
Relative Humidity (%)	54
Dewpoint (EF)	50
Soil Moisture	moist
Wind (mph)	6-9 E
Sky	10% Clouds
Rainfall before application	
Week 1 (inch)	2.15
Rainfall after application	
Week 1 (inch)	0.66
Week 2 (inch)	0.77

Barley

Lacey	
leaf no.	5-5.25
height (inch)	10-13
tillers	0-1
Robust	
leaf no.	5.25
height (inch)	11-14
tillers	1-2

Wheat

Alsen	
leaf no.	5.25
height (inch)	7-9
tillers	3-4
Dandy	
leaf no.	5-5.25
height (inch)	8-12
tillers	2-3
HJ98	
leaf no.	4.75-5.25
height (inch)	8-11
tillers	3-4

Wheat (cont.)

Ingot	
leaf no.	5-5.25
height (inch)	9-12
tillers	2
Ivan	
leaf no.	4.75-5
height (inch)	8-10
tillers	3-4
McVey	
leaf no.	5-5.25
height (inch)	8-12
tillers	3-4
NorPro	
leaf no.	5-5.25
height (inch)	8-10
tillers	3
Parshall	
leaf no.	5-5.25
height (inch)	8-11
tillers	3
Reeder	
leaf no.	5-5.25
height (inch)	8-11
tillers	3-4
Verde	
leaf no.	4.25-4.5
height (inch)	8-10
tillers	3
2375	
leaf no.	4.25-4.75
height (inch)	9-11
tillers	1-2

Fenoxaprop & safener caused chlorosis on the wheat varieties soon after application. These symptoms disappeared by the second rating date and no wheat height or yield reductions occurred. Quinclorac did not cause any visible injury or height reductions on wheat, however yields were reduced on each variety. 'Alsen' and 'Verde' yield reduction was particularly great as a result of quinclorac application. The MKH 6562 + 2,4-D ester treatment cause slight injury symptoms on wheat varieties and these symptoms remained visible at the last rating date. The higher rate of MKH 6562 caused significant yield reductions on the varieties 'Dandy' and 'NorPro'. CGA 184927 & safener resulted in little or no injury symptoms, height reduction, or yield reduction on any wheat variety. The difenzoquat treatments caused significant injury, height reduction, and yield reduction on the wheat varieties 'Alsen', 'Parshall', 'Reeder', and 'Verde'.

The MKH 6562 + 2,4-D ester treatments and the high rate of CGA 184927 caused moderate to severe visible injury on barley and was evident at each rating date. Height reductions resulted on both barley varieties as a result of these treatments. Fenoxaprop & safener, difenzoquat, and the low rate of CGA 184927 resulted in some visible injury early, but symptoms disappeared with time. Barley yields were highly variable and therefore no statistically significant differences could be determined between treatments. (Department of Agronomy and Plant Genetics, University of Minnesota, St. Paul).

Table 1. Hard red spring wheat tolerance to postemergence herbicides at Rosemount, MN -2001 (Durgan, Miller, and Martinson).

Treatment	Rate (lb/A)	Alsen						Dandy					
		Injury				Height (inch)	Yield (Bu/A)	Injury				Height (inch)	Yield (Bu/A)
		6/6	6/13	6/19	7/5			6/6	6/13	6/19	7/5		
Fenoxaprop & safener ¹	0.084	3	0	0	0	33	56	5	0	0	0	35	57
Fenoxaprop & safener	0.167	5	0	0	2	32	56	7	2	0	2	35	57
Quinclorac ² + NIS ³	0.187 + 0.25%	2	0	0	5	33	21	0	2	0	2	36	48
Quinclorac + NIS	0.28 + 0.25%	3	2	2	8	32	18	0	2	0	3	34	50
MKH 6562 ⁴ + 2,4-D ester + NIS	0.027 + 0.5 + 0.25%	8	0	0	7	31	49	2	2	0	2	35	54
MKH 6562 + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	12	2	2	7	31	50	3	2	3	5	34	50
CGA 184927 & safener ⁵ + adjuvant ⁶	0.05 + 0.8%	0	0	0	0	32	51	0	0	0	0	36	54
CGA 184927 & safener + adjuvant	0.1 + 0.8%	2	0	0	0	33	53	0	0	0	0	35	58
Difenzoquat	1.0	13	13	28	63	30	36	8	3	7	3	35	53
Difenzoquat	1.5	15	23	48	85	25	22	12	3	5	8	34	53
Imazamethabenz ⁷ + difenzoquat + NIS	0.23 + 0.5 + 0.25%	10	2	2	2	32	47	7	3	2	2	34	57
Check		0	0	0	0	33	56	0	0	0	0	36	62
Check		0	0	0	0	34	57	0	0	0	0	36	58
Check		0	0	0	0	31	52	0	0	0	0	37	57
Check		0	0	0	0	33	54	0	0	0	0	36	59
LSD (P=.05)		4	3	9	5	2	6	3	ns	3	ns	2	5

LSD (P=.05)

¹ Puma 1E.² Paramount 75DF.³ NIS = Class Preference nonionic surfactant.⁴ Everest 70DF.⁵ Discover 2E.⁶ adjuvant = DSV adjuvant.⁷ Assert LC 2.5E

Table 2. Hard red spring wheat tolerance to postemergence herbicides at Rosemount, MN - 2001 (Durgan, Miller, and Martinson).

Treatment	Rate (lb/A)	HJ98						Ingot					
		Injury				Height (inch)	Yield (Bu/A)	Injury				Height (inch)	Yield (Bu/A)
		6/6	6/13	6/19	7/5			6/6	6/13	6/19	7/5		
Fenoxaprop & safener ¹	0.084	12	0	0	0	32	53	3	0	2	2	39	53
Fenoxaprop & safener	0.167	18	0	0	0	31	55	3	0	0	3	39	54
Quinclorac ² + NIS ³	0.187 + 0.25%	0	0	0	0	32	45	2	2	0	0	41	42
Quinclorac + NIS	0.28 + 0.25%	0	0	0	2	32	42	2	0	0	2	39	41
MKH 6562 ⁴ + 2,4-D ester + NIS	0.027 + 0.5 + 0.25%	3	2	3	5	32	54	7	2	2	7	38	49
MKH 6562 + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	7	2	3	5	30	52	5	0	2	7	39	51
CGA 184927 & safener ⁵ + adjuvant ⁶	0.05 + 0.8%	0	0	0	0	32	53	0	2	0	0	40	49
CGA 184927 & safener + adjuvant	0.1 + 0.8%	2	0	0	0	31	57	3	0	0	0	39	52
Difenzoquat	1.0	8	0	0	0	31	51	15	2	2	3	38	49
Difenzoquat	1.5	10	3	2	2	31	57	17	2	2	12	37	45
Imazamethabenz ⁷ + difenzoquat + NIS	0.23 + 0.5 + 0.25%	7	0	0	0	32	55	10	2	3	2	40	48
Check		0	0	0	0	33	56	0	0	0	0	40	51
Check		0	0	0	0	33	55	0	0	0	0	40	52
Check		0	0	0	0	32	56	0	0	0	0	39	49
Check		0	0	0	0	32	53	0	0	0	0	39	50
LSD (P=.05)		4	ns	ns	3	1	8	3	ns	ns	6	ns	5

LSD (P=.05)

¹ Puma 1E.² Paramount 75DF.³ NIS = Class Preference nonionic surfactant.⁴ Everest 70DF.⁵ Discover 2E.⁶ adjuvant = DSV adjuvant.⁷ Assert LC 2.5E

Table 3. Hard red spring wheat tolerance to postemergence herbicides at Rosemount, MN - 2001 (Durgan, Miller, and Martinson).

Treatment	Rate (lb/A)	Ivan						McVey					
		Injury				Height (inch)	Yield (Bu/A)	Injury				Height (inch)	Yield (Bu/A)
		6/6	6/13	6/19	7/5			6/6	6/13	6/19	7/5		
Fenoxaprop & safener ¹	0.084	12	3	2	2	30	54	5	0	0	3	33	58
Fenoxaprop & safener	0.167	17	3	0	3	30	53	10	0	0	2	32	56
Quinclorac ² + NIS ³	0.187 + 0.25%	0	0	0	0	30	44	0	2	0	2	34	46
Quinclorac + NIS	0.28 + 0.25%	0	0	0	2	30	37	0	3	0	2	34	49
MKH 6562 ⁴ + 2,4-D ester + NIS	0.027 + 0.5 + 0.25%	2	2	0	3	30	54	7	3	2	8	33	50
MKH 6562 + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	5	2	2	3	28	51	8	5	3	10	34	50
CGA 184927 & safener ⁵ + adjuvant ⁶	0.05 + 0.8%	0	0	2	0	30	55	0	3	0	0	35	53
CGA 184927 & safener + adjuvant	0.1 + 0.8%	2	0	0	0	30	54	5	0	0	0	33	57
Difenzoquat	1.0	8	5	3	3	30	48	12	2	0	2	34	54
Difenzoquat	1.5	13	7	0	7	28	45	15	5	2	8	34	50
Imazamethabenz ⁷ + difenzoquat + NIS	0.23 + 0.5 + 0.25%	10	3	0	2	30	53	12	0	2	0	35	54
Check		0	0	0	0	30	60	0	0	0	0	35	61
Check		0	0	0	0	31	52	0	0	0	0	35	57
Check		0	0	0	0	30	51	0	0	0	0	35	57
Check		0	0	0	0	30	53	0	0	0	0	35	57
LSD (P=.05)		4	3	ns	ns	1	7	4	3	ns	3	ns	ns

LSD (P=.05)

¹ Puma 1E.² Paramount 75DF.³ NIS = Class Preference nonionic surfactant.⁴ Everest 70DF.⁵ Discover 2E.⁶ adjuvant = DSV adjuvant.⁷ Assert LC 2.5E

Table 4. Hard red spring wheat tolerance to postemergence herbicides at Rosemount, MN - 2001 (Durgan, Miller, and Martinson).

Treatment	Rate (lb/A)	NorPro						Parshall					
		Injury				Height (inch)	Yield (Bu/A)	Injury				Height (inch)	Yield (Bu/A)
		6/6	6/13	6/19	7/5			6/6	6/13	6/19	7/5		
Fenoxaprop & safener ¹	0.084	5	0	0	0	29	61	3	0	0	2	39	52
Fenoxaprop & safener	0.167	12	0	0	2	29	56	3	0	0	0	39	51
Quinclorac ² + NIS ³	0.187 + 0.25%	0	0	0	0	30	49	0	2	0	0	40	40
Quinclorac + NIS	0.28 + 0.25%	0	0	0	3	29	48	0	2	0	2	39	42
MKH 6562 ⁴ + 2,4-D ester + NIS	0.027 + 0.5 + 0.25%	5	0	0	2	29	57	7	2	2	3	37	47
MKH 6562 + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	7	0	0	3	29	55	8	3	5	5	37	49
CGA 184927 & safener ⁵ + adjuvant ⁶	0.05 + 0.8%	0	0	0	0	30	58	0	0	0	0	40	50
CGA 184927 & safener + adjuvant	0.1 + 0.8%	2	0	0	0	29	60	2	0	0	0	39	55
Difenzoquat	1.0	12	0	0	3	30	56	12	12	18	40	36	38
Difenzoquat	1.5	13	2	0	7	29	58	15	17	22	48	33	34
Imazamethabenz ⁷ + difenzoquat + NIS	0.23 + 0.5 + 0.25%	8	0	0	0	30	63	7	5	8	7	38	47
Check		0	0	0	0	30	60	0	0	0	0	39	53
Check		0	0	0	0	30	64	0	0	0	0	40	56
Check		0	0	0	0	30	61	0	0	0	0	39	52
Check		0	0	0	0	30	63	0	0	0	0	41	59
LSD (P=.05)		3	ns	ns	ns	ns	5	4	4	5	10	2	8

LSD (P=.05)

¹ Puma 1E.² Paramount 75DF.³ NIS = Class Preference nonionic surfactant.⁴ Everest 70DF.⁵ Discover 2E.⁶ adjuvant = DSV adjuvant.⁷ Assert LC 2.5E

Table 5. Hard red spring wheat tolerance to postemergence herbicides at Rosemount, MN - 2001 (Durgan, Miller, and Martinson).

Treatment	Rate (lb/A)	Reeder						Verde					
		Injury				Height (inch)	Yield (Bu/A)	Injury				Height (inch)	Yield (Bu/A)
		6/6	6/13	6/19	7/5			6/6	6/13	6/19	7/5		
Fenoxaprop & safener ¹	0.084	2	0	0	3	33	63	5	0	0	0	32	57
Fenoxaprop & safener	0.167	2	0	0	3	33	60	10	0	0	0	31	59
Quinclorac ² + NIS ³	0.187 + 0.25%	0	0	0	0	34	49	0	2	0	0	32	11
Quinclorac + NIS	0.28 + 0.25%	0	0	0	2	34	51	0	0	0	2	32	10
MKH 6562 ⁴ + 2,4-D ester + NIS	0.027 + 0.5 + 0.25%	5	2	0	3	33	54	7	3	0	5	31	51
MKH 6562 + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	7	3	0	7	32	56	7	3	0	3	29	52
CGA 184927 & safener ⁵ + adjuvant ⁶	0.05 + 0.8%	0	7	0	0	32	54	0	0	0	0	32	51
CGA 184927 & safener + adjuvant	0.1 + 0.8%	2	0	0	2	32	58	3	0	0	0	31	59
Difenzoquat	1.0	13	12	33	70	28	36	13	18	35	65	29	37
Difenzoquat	1.5	17	22	47	85	22	21	13	23	47	85	26	26
Imazamethabenz ⁷ + difenzoquat + NIS	0.23 + 0.5 + 0.25%	10	5	3	12	31	51	9	8	8	2	32	52
Check		0	0	0	0	33	60	0	0	0	0	33	61
Check		0	0	0	0	33	62	0	0	0	0	33	61
Check		0	0	0	0	33	58	0	0	0	0	33	57
Check		0	0	0	0	33	59	0	0	0	0	33	63
LSD (P=.05)		3	8	7	5	2	7	4	5	7	5	2	8

LSD (P=.05)

¹ Puma 1E.² Paramount 75DF.³ NIS = Class Preference nonionic surfactant.⁴ Everest 70DF.⁵ Discover 2E.⁶ adjuvant = DSV adjuvant.⁷ Assert LC 2.5E

Table 6. Hard red spring wheat tolerance to postemergence herbicides at Rosemount, MN - 2001 (Durgan, Miller, and Martinson).

Treatment	Rate (lb/A)	2375					
		Injury				Height (inch)	Yield (Bu/A)
		6/6	6/13	6/19	7/5		
Fenoxaprop & safener ¹	0.084	7	0	0	3	35	58
Fenoxaprop & safener	0.167	15	0	0	2	34	60
Quinclorac ² + NIS ³	0.187 + 0.25%	0	0	0	0	37	56
Quinclorac + NIS	0.28 + 0.25%	0	0	2	2	36	50
MKH 6562 ⁴ + 2,4-D ester + NIS	0.027 + 0.5 + 0.25%	7	2	3	8	35	59
MKH 6562 + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	7	3	2	7	34	57
CGA 184927 & safener ⁵ + adjuvant ⁶	0.05 + 0.8%	0	3	0	0	35	59
CGA 184927 & safener + adjuvant	0.1 + 0.8%	2	0	0	2	34	61
Difenzoquat	1.0	8	0	0	8	34	59
Difenzoquat	1.5	10	5	0	10	34	56
Imazamethabenz ⁷ + difenzoquat + NIS	0.23 + 0.5 + 0.25%	7	2	0	5	36	63
Check		0	0	0	0	36	65
Check		0	0	0	0	38	62
Check		0	0	0	0	36	62
Check		0	0	0	0	37	64
LSD (P=.05)		4	3	ns	6	2	5

LSD (P=.05)

¹ Puma 1E.² Paramount 75DF.³ NIS = Class Preference nonionic surfactant.⁴ Everest 70DF.⁵ Discover 2E.⁶ adjuvant = DSV adjuvant.⁷ Assert LC 2.5E

Table 7. Barley tolerance to postemergence herbicides at Rosemount, MN - 2001 (Durgan, Miller, and Martinson).

Treatment	Rate (lb/A)	Lacey						Robust					
		Injury				Height (inch)	Yield (Bu/A)	Injury				Height (inch)	Yield (Bu/A)
		6/6	6/13	6/19	7/5			6/6	6/13	6/19	7/5		
		----- (%) -----						----- (%) -----					
Fenoxaprop & safener ¹	0.084	10	3	7	3	32	66	10	5	10	3	37	68
Fenoxaprop & safener	0.167	8	5	2	2	33	55	12	5	3	0	38	64
Quinclorac ² + NIS ³	0.187 + 0.25%	0	5	2	5	31	61	0	3	2	8	37	59
Quinclorac + NIS	0.28 + 0.25%	0	0	0	0	33	50	0	2	3	10	36	76
MKH 6562 ⁴ + 2,4-D ester + NIS	0.027 + 0.5 + 0.25%	7	13	10	28	29	72	10	33	40	33	31	67
MKH 6562 + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	10	25	23	38	28	68	12	37	42	45	32	70
CGA 184927 & safener ⁵ + adjuvant ⁶	0.05 + 0.8%	15	8	8	3	32	67	13	8	5	3	37	62
CGA 184927 & safener + adjuvant	0.1 + 0.8%	20	30	40	23	30	67	20	33	40	23	32	74
Difenzoquat	1.0	13	5	10	2	33	65	15	3	7	0	37	70
Difenzoquat	1.5	15	8	12	2	33	66	15	10	8	3	36	70
Imazamethabenz ⁷ + difenzoquat + NIS	0.23 + 0.5 + 0.25%	10	3	7	0	33	51	12	5	0	2	38	71
Check		0	0	0	0	35	68	0	0	0	0	39	73
Check		0	0	0	0	35	67	0	0	0	0	39	70
Check		0	0	0	0	34	69	0	0	0	0	38	69
Check		0	0	0	0	35	67	0	0	0	0	37	71
LSD (P=.05)		6	5	11	11	2	ns	6	8	9	11	2	ns

¹ Puma 1E.

² Paramount 75DF.

³ NIS = Class Preference nonionic surfactant.

⁴ Everest 70DF.

⁵ Discover 2E.

⁶ adjuvant = DSV adjuvant.

⁷ Assert LC 2.5E