Hard red spring wheat and barley tolerance to postemergence herbicides at Crookston, MN - 2001. Durgan, Beverly R., James Cameron, Douglas W. Miller, and Krishona Martinson. This experiment was designed to evaluate wheat and barley tolerance to various postemergence herbicides. The experiment was conducted at Crookston, MN on a Donaldson and Wheaton loam soil. Following weedy fallow, the experimental area received 100 lb/A of N and was fall plowed. In the spring the experimental area was disked 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 May 14 at 1.75 Bu/A and 2 Bu/A for wheat and barley, respectively. All herbicide treatments were applied with a backpack type sprayer delivering 10 gpa at 30 psi using 80015 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 8 by 8 ft. Herbicide treatments were applied June 7 and June 12. Environmental conditions are listed below. Crop injury was rated visually on June 14, June 21, and July 11. Crop height was measured at maturity and yields were taken. Data were summarized by variety and are presented in Tables 1 to 7.

Treatment Date	June 7	June 12
crop stage	3 leaf 2 tillers	4 leaf 3 tillers
Air Temperature (EF)	82	69
Relative Humidity (%)	40	55
Wind (mph)	2 S	2 S
Sky	Clear	Clear
Rainfall before Application		
Week 1 (inch)	0.21	0.39
Rainfall after Application		
Week 1 (inch)	0.43	0.05
Week 2 (inch)	0.03	2.64

Fenoxaprop & safener, quinclorac, and CGA 184927 & safener caused little or no visible injury symptoms, height reduction, or yield reduction on any of the wheat varieties. MKH 6562 + 2,4-D ester caused moderate injury symptoms on all wheat varieties. Injury was greatest on the variety 'McVey' which also had a reduced yield as a result of this treatment. Difenzoquat caused visible injury to all wheat varieties. The most severe injury, height and yield reductions occurred on the wheat varieties 'Alsen', 'Parshall', 'Reeder', and 'Verde'. Varieties with moderate injury and yield reductions were 'HJ98', 'Ingot', 'McVey', 'NorPro', and '2375'. 'Dandy' and 'Ivan' had the least visible injury caused by difenzoquat.

Fenoxaprop & safener and quinclorac caused no significant visible injury symptoms, height reduction, or yield reduction on barley. CGA 184927 & safener and difenzoquat caused some early injury symptoms but they disappeared as the season progressed and no height or yield reductions were observed. MKH 6562 + 2,4-D ester caused significant barley injury resulting in height and yield reductions, especially at the higher MKH 6562 rate. (Department of Agronomy and Plant Genetics, University of Minnesota, St. Paul).

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

		Alsen					Dandy				
		Injury					Injury				
Treatment	Rate	6/14	6/21	7/11	Height	Yield	6/14	6/21	7/11	Height	Yield
	(lb/A)	---------- (%) ----------			(inch)	(Bu/A)	---------- (%) ----------			(inch)	(Bu/A)
Postemergence (June 7)											
Fenoxaprop & safener[1]	0.084	0	0	0	34	50	0	0	0	31	46
Fenoxaprop & safener	0.167	0	2	0	31	52	0	0	3	32	52
Quinclorac [2] + NIS[3]	0.187 + 0.25%	2	0	0	33	47	2	0	3	29	44
Quinclorac + NIS	0.28 + 0.25%	5	0	2	32	47	0	0	3	30	47
MKH 6562[4] + 2,4-D ester + NIS	0.027 + 0.5 + 0.25%	12	5	12	31	45	7	2	27	32	49
MKH 6562 + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	17	10	22	31	43	13	13	20	30	44
CGA 184927 & safener[5] + adjuvant[6]	0.05 + 0.8%	0	2	2	33	47	0	2	0	34	56
CGA 184927 & safener + adjuvant	0.1 + 0.8%	2	2	0	33	48	2	0	3	31	54
Postemergence (June 12)											
Difenzoquat	1.0	--	23	90	27	19	--	18	30	30	44
Difenzoquat	1.5	--	33	88	25	12	--	27	27	30	40
Imazamethabenz[7] + difenzoquat + NIS	0.23 + 0.5 + 0.25%	--	10	62	28	30	--	10	7	33	54
Check		0	0	0	32	48	0	0	0	33	50
LSD (P=.05)		6	7	11	4	8	5	5	13	ns	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

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

		HJ98					Ingot				
		Injury					Injury				
Treatment	Rate	6/14	6/21	7/11	Height	Yield	6/14	6/21	7/11	Height	Yield
	(lb/A)	---------- (%) ----------			(inch)	(Bu/A)	---------- (%) ----------			(inch)	(Bu/A)
Postemergence (June 7)											
Fenoxaprop & safener[1]	0.084	0	0	0	31	53	0	0	0	34	53
Fenoxaprop & safener	0.167	0	0	3	32	56	0	0	7	33	54
Quinclorac [2] + NIS[3]	0.187 + 0.25%	0	0	3	30	51	0	0	3	35	50
Quinclorac + NIS	0.28 + 0.25%	0	0	3	31	52	0	0	3	36	47
MKH 6562[4] + 2,4-D ester + NIS	0.027 + 0.5 + 0.25%	18	8	25	30	50	13	5	13	34	48
MKH 6562 + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	20	17	25	28	50	15	7	18	34	47
CGA 184927 & safener[5] + adjuvant[6]	0.05 + 0.8%	0	2	2	32	54	0	3	0	41	50
CGA 184927 & safener + adjuvant	0.1 + 0.8%	0	0	0	31	57	0	0	0	36	46
Postemergence (June 12)											
Difenzoquat	1.0	--	20	40	28	43	--	20	40	32	39
Difenzoquat	1.5	--	23	38	31	40	--	18	35	33	38
Imazamethabenz[7] + difenzoquat + NIS	0.23 + 0.5 + 0.25%	--	8	12	31	48	--	5	12	33	49
Check		0	0	0	31	60	0	0	0	36	50
LSD (P=.05)		4	9	15	ns	10	5	5	19	ns	9

[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 Crookston, MN -2001 (Durgan, Cameron, Miller, and Martinson).

		Ivan					McVey				
		Injury					Injury				
Treatment	Rate	6/14	6/21	7/11	Height	Yield	6/14	6/21	7/11	Height	Yield
	(lb/A)	---------- (%) ----------			(inch)	(Bu/A)	---------- (%) ----------			(inch)	(Bu/A)
Postemergence (June 7)											
Fenoxaprop & safener[1]	0.084	0	0	0	27	48	0	0	0	32	60
Fenoxaprop & safener	0.167	0	0	3	30	55	0	0	5	33	55
Quinclorac [2] + NIS[3]	0.187 + 0.25%	2	0	3	28	46	0	2	3	31	55
Quinclorac + NIS	0.28 + 0.25%	0	0	0	27	46	0	2	3	33	53
MKH 6562[4] + 2,4-D ester + NIS	0.027 + 0.5 + 0.25%	10	8	15	29	44	20	8	33	29	46
MKH 6562 + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	7	13	18	27	43	18	22	32	28	44
CGA 184927 & safener[5] + adjuvant[6]	0.05 + 0.8%	0	2	0	29	47	0	2	3	31	52
CGA 184927 & safener + adjuvant	0.1 + 0.8%	0	0	2	28	47	0	0	0	30	52
Postemergence (June 12)											
Difenzoquat	1.0	--	18	27	26	39	--	23	33	28	41
Difenzoquat	1.5	--	18	37	25	30	--	25	53	28	35
Imazamethabenz[7] + difenzoquat + NIS	0.23 + 0.5 + 0.25%	--	5	12	25	44	--	8	10	28	49
Check		0	0	0	27	49	0	0	0	31	57
LSD (P=.05)		4	4	11	3	ns	2	8	16	ns	8

[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 Crookston, MN -2001 (Durgan, Cameron, Miller, and Martinson).

		NorPro					Parshall				
		Injury					Injury				
Treatment	Rate	6/14	6/21	7/11	Height	Yield	6/14	6/21	7/11	Height	Yield
	(lb/A)	---------- (%) ----------			(inch)	(Bu/A)	---------- (%) ----------			(inch)	(Bu/A)
Postemergence (June 7)											
Fenoxaprop & safener[1]	0.084	0	0	3	29	50	0	0	0	38	52
Fenoxaprop & safener	0.167	0	0	0	30	47	0	0	3	36	55
Quinclorac [2] + NIS[3]	0.187 + 0.25%	0	0	0	28	51	0	0	0	36	49
Quinclorac + NIS	0.28 + 0.25%	0	0	0	29	48	0	0	3	35	46
MKH 6562[4] + 2,4-D ester + NIS	0.027 + 0.5 + 0.25%	12	7	25	30	46	8	0	23	36	52
MKH 6562 + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	15	13	25	16	41	12	8	18	34	51
CGA 184927 & safener[5] + adjuvant[6]	0.05 + 0.8%	2	2	0	30	46	0	0	0	39	40
CGA 184927 & safener + adjuvant	0.1 + 0.8%	0	0	0	28	53	2	2	0	37	49
Postemergence (June 12)											
Difenzoquat	1.0	--	27	30	26	35	--	20	72	35	28
Difenzoquat	1.5	--	25	32	27	31	--	25	60	33	24
Imazamethabenz[7] + difenzoquat + NIS	0.23 + 0.5 + 0.25%	--	7	17	28	44	--	12	43	36	32
Check		0	0	0	31	50	0	0	0	37	48
LSD (P=.05)		4	6	14	3	12	4	5	18	ns	12

[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 Crookston, MN -2001 (Durgan, Cameron, Miller, and Martinson).

		Reeder					Verde				
		Injury					Injury				
Treatment	Rate	6/14	6/21	7/11	Height	Yield	6/14	6/21	7/11	Height	Yield
	(lb/A)	---------- (%) ----------			(inch)	(Bu/A)	---------- (%) ----------			(inch)	(Bu/A)
Postemergence (June 7)											
Fenoxaprop & safener[1]	0.084	0	0	0	33	54	0	0	0	32	48
Fenoxaprop & safener	0.167	0	0	0	32	53	2	0	0	35	51
Quinclorac [2] + NIS[3]	0.187 + 0.25%	0	0	3	32	50	3	0	3	31	43
Quinclorac + NIS	0.28 + 0.25%	0	0	3	32	50	5	0	0	30	41
MKH 6562[4] + 2,4-D ester + NIS	0.027 + 0.5 + 0.25%	15	8	22	34	46	13	10	20	33	41
MKH 6562 + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	10	8	18	29	45	13	12	20	28	39
CGA 184927 & safener[5] + adjuvant[6]	0.05 + 0.8%	0	2	2	34	51	3	3	0	31	47
CGA 184927 & safener + adjuvant	0.1 + 0.8%	0	0	0	34	50	0	0	0	29	48
Postemergence (June 12)											
Difenzoquat	1.0	--	23	92	28	14	--	27	90	24	9
Difenzoquat	1.5	--	27	92	22	17	--	32	90	27	11
Imazamethabenz[7] + difenzoquat + NIS	0.23 + 0.5 + 0.25%	--	13	77	25	23	--	12	80	27	17
Check		0	0	0	34	50	0	0	0	31	41
LSD (P=.05)		5	7	9	5	12	6	9	9	4	5

[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 Crookston, MN -2001 (Durgan, Cameron, Miller, and Martinson).

		2375				
		Injury				
Treatment	Rate	6/14	6/21	7/11	Height	Yield
	(lb/A)	---------- (%) ----------			(inch)	(Bu/A)
Postemergence (June 7)						
Fenoxaprop & safener[1]	0.084	0	0	0	33	57
Fenoxaprop & safener	0.167	0	0	2	33	59
Quinclorac [2] + NIS[3]	0.187 + 0.25%	0	2	3	32	50
Quinclorac + NIS	0.28 + 0.25%	5	0	3	31	53
MKH 6562[4] + 2,4-D ester + NIS	0.027 + 0.5 + 0.25%	17	8	23	29	49
MKH 6562 + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	17	20	23	29	48
CGA 184927 & safener[5] + adjuvant[6]	0.05 + 0.8%	2	3	0	33	50
CGA 184927 & safener + adjuvant	0.1 + 0.8%	0	3	7	32	51
Postemergence (June 12)						
Difenzoquat	1.0	--	22	38	30	42
Difenzoquat	1.5	--	23	68	27	35
Imazamethabenz[7] + difenzoquat + NIS	0.23 + 0.5 + 0.25%	--	7	10	34	50
Check		0	0	0	30	51
LSD (P=.05)		6	8	13	ns	8

[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 Crookston, MN -2001 (Durgan, Cameron, Miller, and Martinson).

		Lacey					Robust				
		Injury					Injury				
Treatment	Rate	6/14	6/21	7/11	Height	Yield	6/14	6/21	7/11	Height	Yield
	(lb/A)	---------- (%) ----------			(inch)	(Bu/A)	---------- (%) ----------			(inch)	(Bu/A)
Postemergence (June 7)											
Fenoxaprop & safener[1]	0.084	0	0	0	32	90	0	0	0	34	68
Fenoxaprop & safener	0.167	0	0	0	30	87	2	0	0	32	72
Quinclorac [2] + NIS[3]	0.187 + 0.25%	0	0	3	32	85	2	2	0	34	71
Quinclorac + NIS	0.28 + 0.25%	0	0	0	34	92	2	0	0	34	79
MKH 6562[4] + 2,4-D ester + NIS	0.027 + 0.5 + 0.25%	17	23	27	30	81	20	33	38	33	52
MKH 6562 + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	15	35	47	27	66	18	43	57	28	53
CGA 184927 & safener[5] + adjuvant[6]	0.05 + 0.8%	3	5	3	32	90	7	7	3	35	76
CGA 184927 & safener + adjuvant	0.1 + 0.8%	15	8	0	31	82	17	7	2	33	70
Postemergence (June 12)											
Difenzoquat	1.0	--	0	0	34	83	--	20	10	34	73
Difenzoquat	1.5	--	20	8	34	81	--	27	13	34	66
Imazamethabenz[7] + difenzoquat + NIS	0.23 + 0.5 + 0.25%	--	2	3	30	87	--	3	3	33	75
Check		0	0	0	34	90	0	0	0	34	69
LSD (P=.05)		6	8	8	4	ns	9	8	10	3	15

[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