

Hard red spring wheat and barley tolerance to postemergence herbicides at Crookston, MN - 2004. Durgan, Beverly R., Jochum J. Wiersma, James H. Cameron, and Douglas W. Miller. This experiment was designed to evaluate the tolerance of selected Hard Red Spring Wheat (HRSW) and barley varieties to various postemergence herbicides and a plant growth regulator. The experiment was conducted at Crookston, MN on a Donaldson/Wheaton loam. Following soybeans, the experimental area was chisel plowed in the fall of 2003. In the spring of 2004, the experimental area was tilled with a field cultivator to prepare the seedbed. . The HRSW varieties 'Alsen', 'Briggs', 'Freyr', 'Granger', 'Granite', 'Hanna', 'HJ98', 'Knudson', 'NorPro', 'Oklee', and 'Reeder' and the spring barley varieties 'Lacey' and 'Robust' were seeded on April 27 at 105 lbs/A and 98 lbs/A for wheat and barley, respectively. All herbicide treatments were applied with a CO<sub>2</sub> powered backpack type sprayer delivering 10 gpa at 30 psi using 80015 flat fan nozzles. The experimental design was a strip plot 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 9. Environmental conditions are listed below. Crop injury was rated visually. Plant heights and grain yield were measured. Data is summarized by variety and is presented in the tables 1 through 7.

Treatment Date	June 9
Crop stage	4 leaf
Air Temperature (°F)	58
Soil Temperature (°F)	48
Relative Humidity (%)	65
Rainfall before Application	
Week 1 (inch)	0.63
Rainfall after Application	
Week 1 (inch)	0.32
Week 2 (inch)	0.20

Table 1. Hard red spring wheat tolerance to postemergence herbicides at Crookston, MN - 2004 (Durgan, Wiersma, Cameron, and Miller).

Treatment	Rate (lb/A)	Alsen					Briggs				
		Injury			Height (inch)	Yield (bu/A)	Injury			Height (inch)	Yield (bu/A)
		6/17	6/24	7/08			6/17	6/24	7/08		
		-----	(%)	-----			-----	(%)	-----		
<b>Postemergence May 23</b>											
Fenoxaprop & safener <sup>1</sup>	0.084	10	10	12	36	62	13	3	5	36	78
Fenoxaprop & safener	0.167	15	3	5	36	69	13	0	0	34	80
Flucarbazone + 2,4-D ester + NIS <sup>2</sup>	0.027 + 0.5 + 0.25%	20	7	12	37	65	18	7	7	36	73
Flucarbazone + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	5	10	18	37	66	7	12	12	36	71
Trinexapac-ethyl <sup>3</sup>	0.1116	18	8	18	36	69	23	15	15	33	74
Trinexapac-ethyl	0.2232	12	22	15	37	69	13	15	28	34	84
Clodinafop & cloquintocet <sup>4</sup>	0.05	7	2	3	33	69	12	3	7	37	79
Clodinafop & cloquintocet	0.1	10	7	7	36	59	8	3	8	36	77
AE F103060 + adjuvant <sup>5</sup>	0.0156 + 1.9%	7	3	7	36	66	3	3	3	38	77
AE F103060 + adjuvant	0.031 + 1.9%	18	17	12	37	67	22	3	10	36	79
Difenzoquat	1.0	17	48	66	30	55	22	3	1	36	82
Difenzoquat	1.5	18	48	77	35	53	20	13	12	37	82
Check		13	0	5	35	64	10	0	3	36	74
LSD (P=.05)		ns	14	13	ns	ns	ns	19	9	ns	ns

<sup>1</sup> Puma 1E.<sup>2</sup> NIS = Class Preference nonionic surfactant.<sup>3</sup> Palisade EC growth regulator.<sup>4</sup> Discover NG 0.5E.<sup>5</sup> Destiny adjuvant distributed by Agrilience, LLC.

Table 2. Hard red spring wheat tolerance to postemergence herbicides at Crookston, MN - 2004 (Durgan, Wiersma, Cameron, and Miller).

Treatment	Rate (lb/A)	Freyr					Granger				
		Injury			Height (inch)	Yield (bu/A)	Injury			Height (inch)	Yield (bu/A)
		6/17	6/24	7/08			6/17	6/24	7/08		
		-----	(%)	-----			-----	(%)	-----		
<b>Postemergence May 23</b>											
Fenoxaprop & safener <sup>1</sup>	0.084	7	3	10	37	58	12	3	7	35	73
Fenoxaprop & safener	0.167	5	8	3	33	63	17	0	0	36	78
Flucarbazone + 2,4-D ester + NIS <sup>2</sup>	0.027 + 0.5 + 0.25%	18	5	8	37	57	27	7	7	36	64
Flucarbazone + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	5	8	6	36	62	0	18	17	38	68
Trinexapac-ethyl <sup>3</sup>	0.1116	20	13	13	31	58	22	15	8	32	73
Trinexapac-ethyl	0.2232	8	12	17	33	60	20	30	28	38	75
Clodinafop & cloquintocet <sup>4</sup>	0.05	2	0	0	32	64	12	3	3	38	73
Clodinafop & cloquintocet	0.1	5	3	7	30	63	12	3	3	34	73
AE F103060 + adjuvant <sup>5</sup>	0.0156 + 1.9%	5	0	7	37	66	0	3	13	37	73
AE F103060 + adjuvant	0.031 + 1.9%	12	7	7	35	62	20	13	10	37	74
Difenzoquat	1.0	23	17	10	37	67	18	7	12	40	79
Difenzoquat	1.5	15	13	12	36	69	23	22	20	36	72
Check		12	0	3	33	65	12	0	0	38	70
LSD (P=.05)		ns	ns	ns	ns	ns	ns	17	12	3	ns

<sup>1</sup> Puma 1E.<sup>2</sup> NIS = Class Preference nonionic surfactant.<sup>3</sup> Palisade EC growth regulator.<sup>4</sup> Discover NG 0.5E.<sup>5</sup> Destiny adjuvant distributed by Agrilience, LLC.

Table 3. Hard red spring wheat tolerance to postemergence herbicides at Crookston, MN - 2004 (Durgan, Wiersma, Cameron, and Miller).

Treatment	Rate (lb/A)	Granite					Hanna				
		Injury			Height (inch)	Yield (bu/A)	Injury			Height (inch)	Yield (bu/A)
		6/17	6/24	7/08			6/17	6/24	7/08		
		-----	(%)	-----			-----	(%)	-----		
<b>Postemergence May 23</b>											
Fenoxaprop & safener <sup>1</sup>	0.084	13	7	13	34	79	5	10	12	39	75
Fenoxaprop & safener	0.167	17	3	3	35	76	12	7	3	38	79
Flucarbazone + 2,4-D ester + NIS <sup>2</sup>	0.027 + 0.5 + 0.25%	18	15	13	36	74	13	10	7	38	77
Flucarbazone + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	5	8	7	36	73	5	13	10	38	73
Trinexapac-ethyl <sup>3</sup>	0.1116	17	13	33	34	75	18	13	17	37	75
Trinexapac-ethyl	0.2232	20	37	37	34	80	15	10	22	37	76
Clodinafop & cloquintocet <sup>4</sup>	0.05	5	0	0	33	75	3	0	0	38	77
Clodinafop & cloquintocet	0.1	7	3	0	35	72	7	7	7	35	74
AE F103060 + adjuvant <sup>5</sup>	0.0156 + 1.9%	8	0	7	36	83	3	0	3	40	81
AE F103060 + adjuvant	0.031 + 1.9%	18	17	17	35	74	17	10	10	38	76
Difenzoquat	1.0	23	17	3	37	77	20	17	5	37	84
Difenzoquat	1.5	22	50	10	36	79	20	13	13	38	79
Check		20	0	5	35	75	17	0	7	40	79
LSD (P=.05)		ns	15	13	ns	ns	ns	ns	11	ns	ns

<sup>1</sup> Puma 1E.<sup>2</sup> NIS = Class Preference nonionic surfactant.<sup>3</sup> Palisade EC growth regulator.<sup>4</sup> Discover NG 0.5E.<sup>5</sup> Destiny adjuvant distributed by Agrilience, LLC

Table 4. Hard red spring wheat tolerance to postemergence herbicides at Crookston, MN - 2004 (Durgan, Wiersma, Cameron, and Miller).

Treatment	Rate (lb/A)	HJ98					Knudson				
		Injury			Height (inch)	Yield (bu/A)	Injury			Height (inch)	Yield (bu/A)
		6/17	6/24	7/08			6/17	6/24	7/08		
		-----	(%)	-----			-----	(%)	-----		
<b>Postemergence May 23</b>											
Fenoxaprop & safener <sup>1</sup>	0.084	8	10	7	36	84	8	7	10	36	84
Fenoxaprop & safener	0.167	5	3	0	35	82	15	0	3	35	86
Flucarbazone + 2,4-D ester + NIS <sup>2</sup>	0.027 + 0.5 + 0.25%	17	3	7	36	79	20	5	8	36	81
Flucarbazone + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	3	15	13	34	73	3	15	11	35	80
Trinexapac-ethyl <sup>3</sup>	0.1116	18	3	13	37	78	20	12	17	34	77
Trinexapac-ethyl	0.2232	5	17	18	33	81	10	17	17	37	84
Clodinafop & cloquintocet <sup>4</sup>	0.05	3	0	3	36	82	0	0	7	35	87
Clodinafop & cloquintocet	0.1	7	0	3	32	82	8	0	3	36	76
AE F103060 + adjuvant <sup>5</sup>	0.0156 + 1.9%	0	3	7	36	79	5	0	7	34	80
AE F103060 + adjuvant	0.031 + 1.9%	17	10	12	35	79	25	13	10	35	79
Difenzoquat	1.0	17	13	5	37	80	30	10	4	34	81
Difenzoquat	1.5	17	20	12	34	79	18	22	12	36	76
Check		13	0	3	35	79	8	0	0	36	78
LSD (P=.05)		ns	14	10	ns	ns	ns	11	ns	ns	7

<sup>1</sup> Puma 1E.<sup>2</sup> NIS = Class Preference nonionic surfactant.<sup>3</sup> Palisade EC growth regulator.<sup>4</sup> Discover NG 0.5E.<sup>5</sup> Destiny adjuvant distributed by Agrilience, LLC

Table 5. Hard red spring wheat tolerance to postemergence herbicides at Crookston, MN - 2004 (Durgan, Wiersma, Cameron, and Miller).

Treatment	Rate (lb/A)	NorPro					Oklee				
		Injury			Height (inch)	Yield (bu/A)	Injury			Height (inch)	Yield (bu/A)
		6/17	6/24	7/08			6/17	6/24	7/08		
		----- (%) -----					----- (%) -----				
<b>Postemergence May 23</b>											
Fenoxaprop & safener <sup>1</sup>	0.084	7	3	8	37	55	13	10	12	35	78
Fenoxaprop & safener	0.167	10	0	3	38	53	12	3	5	33	76
Flucarbazone + 2,4-D ester + NIS <sup>2</sup>	0.027 + 0.5 + 0.25%	12	10	7	34	60	15	10	3	35	75
Flucarbazone + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	3	13	12	33	55	3	15	10	33	69
Trinexapac-ethyl <sup>3</sup>	0.1116	18	8	12	38	62	20	27	23	31	66
Trinexapac-ethyl	0.2232	10	10	10	34	58	17	43	37	32	74
Clodinafop & cloquintocet <sup>4</sup>	0.05	13	0	0	37	60	5	3	0	30	82
Clodinafop & cloquintocet	0.1	13	2	3	35	58	7	7	8	29	71
AE F103060 + adjuvant <sup>5</sup>	0.0156 + 1.9%	8	0	3	35	63	3	3	7	34	82
AE F103060 + adjuvant	0.031 + 1.9%	22	5	10	38	61	12	10	13	30	74
Difenzoquat	1.0	17	3	0	35	63	18	13	10	33	76
Difenzoquat	1.5	22	23	23	36	60	20	18	32	32	76
Check		15	0	5	33	55	20	0	7	33	77
LSD (P=.05)		ns	9	11	ns	ns	ns	17	15	ns	ns

<sup>1</sup> Puma 1E.<sup>2</sup> NIS = Class Preference nonionic surfactant.<sup>3</sup> Palisade EC growth regulator.<sup>4</sup> Discover NG 0.5E.<sup>5</sup> Destiny adjuvant distributed by Agrilience, LLC

Table 6. Hard red spring wheat tolerance to postemergence herbicides at Crookston, MN - 2004 (Durgan, Wiersma, Cameron, and Miller).

Treatment	Rate (lb/A)	Reeder				
		Injury			Height (inch)	Yield (bu/A)
		6/17	6/24	7/08		
		----- (%) -----				
<b>Postemergence May 23</b>						
Fenoxaprop & safener <sup>1</sup>	0.084	8	10	10	37	68
Fenoxaprop & safener	0.167	12	13	7	39	70
Flucarbazone + 2,4-D ester + NIS <sup>2</sup>	0.027 + 0.5 + 0.25%	13	5	8	38	71
Flucarbazone + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	3	15	12	36	69
Trinexapac-ethyl <sup>3</sup>	0.1116	18	13	17	34	64
Trinexapac-ethyl	0.2232	10	17	22	36	73
Clodinafop & cloquintocet <sup>4</sup>	0.05	7	0	7	41	74
Clodinafop & cloquintocet	0.1	10	3	7	35	71
AE F103060 + adjuvant <sup>5</sup>	0.0156 + 1.9%	0	0	3	36	74
AE F103060 + adjuvant	0.031 + 1.9%	17	7	10	38	75
Difenzoquat	1.0	20	35	40	35	52
Difenzoquat	1.5	17	47	83	38	45
Check		12	0	3	37	72
LSD (P=.05)		ns	18	22	ns	7

<sup>1</sup> Puma 1E.<sup>2</sup> NIS = Class Preference nonionic surfactant.<sup>3</sup> Palisade EC growth regulator.<sup>4</sup> Discover NG 0.5E.<sup>5</sup> Destiny adjuvant distributed by Agrilience, LLC

Table 7. Barley tolerance to postemergence herbicides at Crookston, MN - 2004 (Durgan, Wiersma, Cameron, and Miller).

Treatment	Rate (lb/A)	Lacey					Robust				
		Injury			Height (inch)	Yield (bu/A)	Injury			Height (inch)	Yield (bu/A)
		6/17	6/24	7/08			6/17	6/24	7/08		
		-----	(%)	-----			-----	(%)	-----		
<b>Postemergence May 23</b>											
Fenoxaprop & safener <sup>1</sup>	0.084	10	18	22	36	122	8	20	35	32	112
Fenoxaprop & safener	0.167	8	8	7	34	123	10	27	20	36	114
Flucarbazone + 2,4-D ester + NIS <sup>2</sup>	0.027 + 0.5 + 0.25%	12	32	28	37	118	20	37	20	36	103
Flucarbazone + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	0	50	34	38	99	5	58	35	38	81
Trinexapac-ethyl <sup>3</sup>	0.1116	15	30	30	35	120	17	30	32	36	113
Trinexapac-ethyl	0.2232	10	40	23	35	133	13	33	37	36	124
Clodinafop & cloquintocet <sup>4</sup>	0.05	7	62	42	34	135	0	58	43	34	116
Clodinafop & cloquintocet	0.1	7	50	20	36	124	17	68	33	36	118
AE F103060 + adjuvant <sup>5</sup>	0.0156 + 1.9%	3	42	27	37	135	3	40	30	35	121
AE F103060 + adjuvant	0.031 + 1.9%	18	28	13	37	128	20	35	18	38	117
Difenzoquat	1.0	25	17	9	38	130	30	17	11	36	110
Difenzoquat	1.5	20	17	22	37	136	17	13	20	36	114
Check		13	0	13	40	135	10	0	17	37	128
LSD (P=.05)		ns	28	ns	ns	16	ns	28	ns	ns	16

<sup>1</sup> Puma 1E.

<sup>2</sup> NIS = Class Preference nonionic surfactant.

<sup>3</sup> Palisade EC growth regulator.

<sup>4</sup> Discover NG 0.5E.

<sup>5</sup> Destiny adjuvant distributed by Agrilience, LLC