

Hard red spring wheat and barley tolerance to postemergence herbicides at Rosemount, MN - 2004. Durgan, Beverly R., Jochum J. Wiersma, 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 Rosemount, MN on a Waukegon silt loam soil. Following soybeans, the experimental area was chisel plowed in the fall of 2003. In the spring of 2004, the area received 50 lbs/A N then was disked, field cultivated, and harrowed. The HRSW varieties 'Alsen', 'Briggs', 'Freyr', 'Granger', 'Granite', 'Hanna', 'HJ98', 'Knudson', 'NorPro', 'Oklee', and 'Reeder' and the spring barley varieties 'Lacey' and 'Robust' barley were seeded on April 28 at 85 lb/A and 90 lbs/A for HRSW and spring barley, respectively. Bromoxynil at 0.38 lb ai/A was applied postemergence on June 4 to control broadleaf weeds. Herbicide treatments were applied to a 6 ft strip with a backpack sprayer delivering 10 gpa at 35 psi using 11001 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 12 feet wide by 12 feet long. Herbicide treatments were applied May 28 and June 3. Environmental conditions at application are listed below. Crop injury was visually rated. Crop height and yields were measured. Data is summarized by variety and is presented in Tables 1 to 7.

Treatment Date	May 28	June 3
Temperature (°F)		
air	70	70
soil	70	--
Relative Humidity (%)	54	29
Dewpoint (°F)	52	38
Soil Moisture	moist	dry
Wind (mph)	5-10 E	7-10 S
Sky	80% clouds	cloudy
Rainfall before application		
Week 1 (inch)	2.15	2.38
Rainfall after application		
Week 1 (inch)	1.77	1.77
Week 2 (inch)	2.23	0.34
<u>Barley</u>		
Lacey		
leaf no.	4	5.75-6
height (inch)	8-11	10-15
tillers	1	2
Robust		
leaf no.	4	5.5
height (inch)	8-11	10-14
tillers	1-2	2
<u>Wheat</u>		
Alsen		
leaf no.	4	5.5
height (inch)	5-7	8-11
tillers	1-3	2-3
Briggs		
leaf no.	4	5.75-6
height (inch)	6-9	10-13
tillers	2	2-3
Freyr		
leaf no.	4	5.5
height (inch)	6-8	9-13
tillers	1-2	2-3

Wheat (cont.)

Granger		
leaf no.	4	5.5
height (inch)	4-6	7-11
tillers	2	2-3
Granite		
leaf no.	4	5.75
height (inch)	5-8	9-12
tillers	1-2	2-3
Hanna		
leaf no.	4	5.5
height (inch)	5-7	7-11
tillers	3	3
HJ98		
leaf no.	4	4.75-5
height (inch)	6-9	8-11
tillers	2-3	2-3
Knudson		
leaf no.	4	4.75
height (inch)	6-9	9-12
tillers	1-3	2-3
NorPro		
leaf no.	4	5.5
height (inch)	5-7	8-12
tillers	2-3	2-3
Oklee		
leaf no.	4	5
height (inch)	6-10	9-13
tillers	2-3	2-3
Reeder		
leaf no.	4	5.5
height (inch)	7-10	9-13
tillers	2-3	2-3

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

Treatment	Rate (lb/A)	Alsen						Briggs					
		Injury				Height (inch)	Yield (bu/A)	Injury				Height (inch)	Yield (bu/A)
		6/12	6/22	7/09	7/31			6/12	6/22	7/09	7/31		
<u>Postemergence May 23</u>													
Fenoxaprop & safener <sup>1</sup>	0.084	0	0	0	0	34	66	0	0	0	0	41	74
Fenoxaprop & safener	0.167	0	0	0	0	34	67	0	0	0	0	39	75
Flucarbazone + 2,4-D ester + NIS <sup>2</sup>	0.027 + 0.5 + 0.25%	2	2	2	0	34	64	5	2	0	0	37	72
Flucarbazone + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	7	7	5	2	33	63	3	7	2	2	37	69
Flucarbazone + fenoxaprop & safener + NIS	0.027 + 0.041 + 0.25%	8	2	0	0	34	62	0	2	0	0	39	71
Flucarbazone + fenoxaprop & safener + NIS	0.027 + 0.063 + 0.25%	3	0	0	0	35	65	2	0	0	0	38	68
Clodinafop & cloquintocet <sup>3</sup>	0.05	0	0	0	0	35	71	0	2	0	0	39	83
Clodinafop & cloquintocet	0.1	0	0	0	0	33	66	2	2	0	0	39	75
AE F103060 + adjuvant <sup>4</sup>	0.0156 + 1.9%	3	2	0	0	34	67	0	2	2	2	39	79
AE F103060 + adjuvant	0.031 + 1.9%	5	5	0	0	34	66	0	2	0	0	39	77
Trinexapac-ethyl <sup>5</sup>	0.1116	3	2	2	0	35	67	10	8	0	0	38	73
Trinexapac-ethyl	0.2232	8	12	17	17	31	68	15	15	25	25	34	76
<u>Postemergence June 2</u>													
Difenzoquat	1.0	25	22	48	43	27	41	5	5	3	3	37	76
Difenzoquat	1.5	25	20	82	82	22	34	10	13	12	15	35	64
Check		0	0	0	0	36	70	0	0	0	0	39	79
Check		0	0	0	0	35	66	0	0	0	0	39	65
LSD (P=.05)		10	12	6	12	2	7	6	7	4	5	2	ns

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

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

Treatment	Rate (lb/A)	Freyr						Granger					
		Injury				Height (inch)	Yield (bu/A)	Injury				Height (inch)	Yield (bu/A)
		6/12	6/22	7/09	7/31			6/12	6/22	7/09	7/31		
<u>Postemergence May 23</u>													
Fenoxaprop & safener <sup>1</sup>	0.084	0	0	0	0	36	82	0	0	0	0	44	73
Fenoxaprop & safener	0.167	0	0	0	0	36	84	0	0	0	0	43	72
Flucarbazone + 2,4-D ester + NIS <sup>2</sup>	0.027 + 0.5 + 0.25%	2	3	0	0	36	79	3	3	0	0	42	70
Flucarbazone + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	5	5	2	2	37	80	3	7	2	2	41	70
Flucarbazone + fenoxaprop & safener + NIS	0.0273 + 0.041 + 0.25%	3	2	0	0	38	78	0	2	0	0	43	70
Flucarbazone + fenoxaprop & safener + NIS	0.027 + 0.063 + 0.25%	0	0	0	0	38	77	0	0	0	0	44	73
Clodinafop & cloquintocet <sup>3</sup>	0.05	2	2	0	0	37	83	0	2	0	0	43	73
Clodinafop & cloquintocet	0.1	0	2	0	0	36	78	0	0	0	0	43	72
AE F103060 + adjuvant <sup>4</sup>	0.0156 + 1.9%	2	2	0	0	37	80	0	0	0	0	43	70
AE F103060 + adjuvant	0.031 + 1.9%	3	5	0	0	37	76	8	5	0	0	42	70
Trinexapac-ethyl <sup>5</sup>	0.1116	8	5	2	3	36	80	3	2	2	2	42	74
Trinexapac-ethyl	0.2232	12	8	15	15	34	82	17	13	12	12	37	73
<u>Postemergence June 2</u>													
Difenzoquat	1.0	8	7	7	8	35	76	18	8	7	8	39	70
Difenzoquat	1.5	12	13	12	12	35	70	20	13	18	20	38	60
Check		0	0	0	0	38	81	0	0	0	0	43	73
Check		0	0	0	0	38	77	0	0	0	0	43	66
LSD (P=.05)		6	6	4	5	2	ns	8	5	5	5	2	6

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

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

Treatment	Rate (lb/A)	Granite						Hanna					
		Injury				Height (inch)	Yield (bu/A)	Injury				Height (inch)	Yield (bu/A)
		6/12	6/22	7/09	7/31			6/12	6/22	7/09	7/31		
<u>Postemergence May 23</u>													
Fenoxaprop & safener <sup>1</sup>	0.084	0	0	0	0	37	62	0	0	0	0	39	66
Fenoxaprop & safener	0.167	0	0	0	0	36	62	0	0	0	0	39	63
Flucarbazone + 2,4-D ester + NIS <sup>2</sup>	0.027 + 0.5 + 0.25%	2	2	0	0	36	61	5	3	2	2	38	65
Flucarbazone + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	3	7	2	2	36	59	5	5	2	2	38	61
Flucarbazone + fenoxaprop & safener + NIS	0.027 + 0.041 + 0.25%	3	2	0	0	37	60	0	2	0	0	39	63
Flucarbazone + fenoxaprop & safener + NIS	0.027 + 0.063 + 0.25%	0	0	0	0	37	62	0	0	0	0	39	63
Clodinafop & cloquintocet <sup>3</sup>	0.05	2	2	0	0	37	64	3	3	2	2	39	57
Clodinafop & cloquintocet	0.1	0	2	0	0	36	59	3	0	0	0	38	61
AE F103060 + adjuvant <sup>4</sup>	0.0156 + 1.9%	0	2	0	0	37	63	0	0	0	0	39	60
AE F103060 + adjuvant	0.031 + 1.9%	0	2	0	0	37	62	3	5	0	0	38	60
Trinexapac-ethyl <sup>5</sup>	0.1116	7	5	2	2	36	64	3	2	3	3	38	60
Trinexapac-ethyl	0.2232	13	12	18	20	33	29	8	8	12	12	35	65
<u>Postemergence June 2</u>													
Difenzoquat	1.0	10	10	2	15	33	61	7	5	2	3	36	60
Difenzoquat	1.5	13	13	3	5	31	56	10	13	10	13	34	54
Check		0	0	0	0	37	62	0	0	0	0	40	63
Check		0	0	0	0	37	62	0	0	0	0	39	56
LSD (P=.05)		6	6	4	10	1	ns	ns	6	5	7	1	ns

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

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

Treatment	Rate (lb/A)	HJ98						Knudson					
		Injury				Height (inch)	Yield (bu/A)	Injury				Height (inch)	Yield (bu/A)
		6/12	6/22	7/09	7/31			6/12	6/22	7/09	7/31		
<u>Postemergence May 23</u>													
Fenoxaprop & safener <sup>1</sup>	0.084	0	0	0	0	40	68	0	0	0	0	41	72
Fenoxaprop & safener	0.167	0	0	0	0	39	68	0	0	0	0	40	70
Flucarbazone + 2,4-D ester + NIS <sup>2</sup>	0.027 + 0.5 + 0.25%	2	2	2	0	39	63	5	2	2	0	40	66
Flucarbazone + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	7	7	2	3	38	63	3	5	2	2	39	66
Flucarbazone + fenoxaprop & safener + NIS	0.027 + 0.041 + 0.25%	3	2	0	0	40	64	3	2	0	0	40	66
Flucarbazone + fenoxaprop & safener + NIS	0.027 + 0.063 + 0.25%	2	0	0	0	40	65	0	0	0	0	41	71
Clodinafop & cloquintocet <sup>3</sup>	0.05	0	0	0	0	40	71	0	2	0	0	41	79
Clodinafop & cloquintocet	0.1	3	3	0	0	39	63	0	0	0	0	40	76
AE F103060 + adjuvant <sup>4</sup>	0.0156 + 1.9%	2	2	0	0	40	69	0	0	0	0	41	73
AE F103060 + adjuvant	0.031 + 1.9%	5	5	0	0	39	64	0	2	0	0	40	64
Trinexapac-ethyl <sup>5</sup>	0.1116	7	3	0	0	39	70	3	5	3	3	39	75
Trinexapac-ethyl	0.2232	10	12	10	13	35	72	22	23	5	7	35	73
<u>Postemergence June 2</u>													
Difenzoquat	1.0	7	5	2	3	36	68	7	7	15	15	37	63
Difenzoquat	1.5	17	17	8	12	34	57	13	13	23	23	36	60
Check		0	0	0	0	40	68	0	0	0	0	40	69
Check		0	0	0	0	40	68	0	0	0	0	40	66
LSD (P=.05)		7	6	2	5	1	7	8	8	6	6	1	ns

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

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

Treatment	Rate (lb/A)	NorPro						Oklee					
		Injury				Height (inch)	Yield (bu/A)	Injury				Height (inch)	Yield (bu/A)
		6/12	6/22	7/09	7/31			6/12	6/22	7/09	7/31		
<u>Postemergence May 23</u>													
Fenoxaprop & safener <sup>1</sup>	0.084	0	0	0	0	40	66	0	0	0	0	40	70
Fenoxaprop & safener	0.167	0	0	0	0	40	68	0	0	0	0	40	70
Flucarbazone + 2,4-D ester + NIS <sup>2</sup>	0.027 + 0.5 + 0.25%	5	3	2	2	39	65	5	2	0	0	39	66
Flucarbazone + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	2	5	2	2	38	64	5	7	2	2	39	68
Flucarbazone + fenoxaprop & safener + NIS	0.027 + 0.041 + 0.25%	3	2	0	0	40	67	3	2	0	0	40	69
Flucarbazone + fenoxaprop & safener + NIS	0.027 + 0.063 + 0.25%	0	0	0	0	40	63	3	0	0	0	41	69
Clodinafop & cloquintocet <sup>3</sup>	0.05	7	2	2	2	40	68	2	2	0	0	40	72
Clodinafop & cloquintocet	0.1	2	2	0	0	39	68	0	2	0	0	40	69
AE F103060 + adjuvant <sup>4</sup>	0.0156 + 1.9%	0	2	0	0	40	69	0	2	0	0	40	69
AE F103060 + adjuvant	0.031 + 1.9%	3	5	0	0	39	66	3	5	0	0	39	66
Trinexapac-ethyl <sup>5</sup>	0.1116	8	7	3	7	39	68	8	5	8	8	39	70
Trinexapac-ethyl	0.2232	7	7	5	8	35	65	28	25	33	30	35	64
<u>Postemergence June 2</u>													
Difenzoquat	1.0	10	7	5	7	36	64	13	10	17	22	36	70
Difenzoquat	1.5	22	13	15	17	35	53	18	13	27	28	35	69
Check		0	0	0	0	40	69	0	0	0	0	40	68
Check		0	0	0	0	40	66	0	0	0	0	40	75
LSD (P=.05)		7	6	4	7	1	6	10	9	7	7	8	ns

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

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

Treatment	Rate (lb/A)	Reeder					
		Injury				Height (inch)	Yield (bu/A)
		6/12	6/22	7/09	7/31		
<u>Postemergence May 23</u>							
Fenoxaprop & safener <sup>1</sup>	0.084	0	0	0	0	40	66
Fenoxaprop & safener	0.167	0	0	0	0	40	69
Flucarbazone + 2,4-D ester + NIS <sup>2</sup>	0.027 + 0.5 + 0.25%	2	3	2	0	39	67
Flucarbazone + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	5	5	7	5	38	66
Flucarbazone + fenoxaprop & safener + NIS	0.027 + 0.041 + 0.25%	0	2	0	0	40	67
Flucarbazone + fenoxaprop & safener + NIS	0.027 + 0.063 + 0.25%	2	0	0	0	40	65
Clodinafop & cloquintocet <sup>3</sup>	0.05	0	0	5	0	40	72
Clodinafop & cloquintocet	0.1	2	2	0	0	39	66
AE F103060 + adjuvant <sup>4</sup>	0.0156 + 1.9%	2	2	2	2	40	71
AE F103060 + adjuvant	0.031 + 1.9%	3	5	0	0	39	66
Trinexapac-ethyl <sup>5</sup>	0.1116	7	3	2	2	39	70
Trinexapac-ethyl	0.2232	8	7	10	12	35	67
<u>Postemergence June 2</u>							
Difenzoquat	1.0	28	22	83	82	36	25
Difenzoquat	1.5	33	23	87	87	35	15
Check		0	0	0	0	40	70
Check		0	0	0	0	40	68
LSD (P=.05)		10	12	6	3	1	8

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

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

Treatment	Rate (lb/A)	Lacey						Robust					
		Injury				Height (inch)	Yield (bu/A)	Injury				Height (inch)	Yield (bu/A)
		6/12	6/22	7/09	7/31			6/12	6/22	7/09	7/31		
<u>Postemergence May 23</u>													
Fenoxaprop & safener <sup>1</sup>	0.084	0	0	0	0	40	112	0	0	0	0	40	95
Fenoxaprop & safener	0.167	0	0	0	0	39	115	0	0	0	0	40	92
Flucarbazone + 2,4-D ester + NIS <sup>2</sup>	0.027 + 0.5 + 0.25%	23	30	13	17	39	108	37	37	15	13	39	87
Flucarbazone + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	33	53	25	25	38	93	53	53	23	23	38	82
Flucarbazone + fenoxaprop & safener + NIS	0.027 + 0.041 + 0.25%	5	5	0	0	40	106	7	5	0	0	40	91
Flucarbazone + fenoxaprop & safener + NIS	0.027 + 0.063 + 0.25%	2	12	0	0	40	100	20	18	0	0	40	90
Clodinafop & cloquintocet <sup>3</sup>	0.05	53	55	20	23	40	109	47	48	20	25	40	87
Clodinafop & cloquintocet	0.1	55	62	15	13	39	103	58	58	17	13	40	81
AE F103060 + adjuvant <sup>4</sup>	0.0156 + 1.9%	25	30	10	12	40	104	33	33	12	12	40	86
AE F103060 + adjuvant	0.031 + 1.9%	32	47	17	20	39	100	37	42	17	20	39	88
Trinexapac-ethyl <sup>5</sup>	0.1116	13	15	8	10	39	113	12	15	3	3	39	101
Trinexapac-ethyl	0.2232	28	30	32	35	35	116	35	33	22	23	35	105
<u>Postemergence June 2</u>													
Difenzoquat	1.0	5	12	3	3	36	111	12	12	3	3	36	96
Difenzoquat	1.5	13	13	10	10	35	100	17	25	8	17	35	88
Check		0	0	0	0	40	106	0	0	0	0	40	86
Check		0	0	0	0	40	101	0	0	0	0	40	88
LSD (P=.05)		9	14	15	17	1	ns	13	16	11	14	1	11

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