

Hard red spring wheat and barley tolerance to postemergence herbicides at Rosemount, MN - 2002. 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', 'Granite', 'Hanna', 'HJ98', 'Knutson', 'NorPro', 'Parshall', 'Reeder', 'Walworth', and '2375' hard red spring wheat varieties, plus 'Lacey' and 'Robust' barley varieties were seeded on April 30 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 on June 11 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 12 feet wide by 12 feet long. Herbicide treatments were applied May 29 and June 5. 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	June 5
Temperature (°F)		
air	84	75
soil	72	--
Relative Humidity (%)	40	49
Dewpoint (°F)	58	39
Soil Moisture	moist at 0.25 inch	moist
Wind (mph)	0-4 S	0-5 WSW
Sky	15% clouds	15% clouds
Rainfall before application		
Week 1 (inch)	0.62	3.09
Rainfall after application		
Week 1 (inch)	3.09	1.64
Week 2 (inch)	1.64	1.03

Barley

<u>Lacey</u>		
leaf no.	4	5.25-5.75
height (inch)	6-8	9-11
tillers	1	1-2
<u>Robust</u>		
leaf no.	3-4	5.25-5.5
height (inch)	5-7	8-10
tillers	1-2	1-2

Wheat

<u>Alsen</u>		
leaf no.	3-4	5.5-5.75
height (inch)	5-7	8-10
tillers	1-2	2-3
<u>Dandy</u>		
leaf no.	3	5.25-5.5
height (inch)	5-7	9-11
tillers	2-3	3
<u>Granite</u>		
leaf no.	3	5.5
height (inch)	4-6	7-9
tillers	2	2-3

Wheat (cont.)

Hanna		
leaf no.	3-4	5.5
height (inch)	4-6	8-10
tillers	2-3	2-3
HJ98		
leaf no.	3	5.5-5.75
height (inch)	4-6	8-10
tillers	1-2	2-4
Knutson		
leaf no.	3	5.25-5.5
height (inch)	6-8	9-11
tillers	1-2	2
NorPro		
leaf no.	3-4	5.5
height (inch)	4-6	9-11
tillers	3	3
Parshall		
leaf no.	3-4	5.5-5.75
height (inch)	5-7	8-10
tillers	2	2
Reeder		
leaf no.	3	5.25
height (inch)	4-6	7-9
tillers	1	1-2
Walworth		
leaf no.	3-4	4.75-5.25
height (inch)	5-7	8-10
tillers	1-2	2
2375		
leaf no.	3-4	5.25-5.5
height (inch)	5-7	9-11
tillers	2	2

MKH 6562 + 2,4-D ester tank mix caused growth reduction in all wheat varieties and resulted in significantly lower yields in all wheat varieties except Parshall and Walworth. Little injury and no yield reductions were noted in the MKH 6562 + fenoxaprop tank mix. Fenoxaprop & safener and the CGA - 184927 treatments also caused little or no wheat injury and resulted in no yield loss. AE F130060 + AW F107892 caused slight to moderate growth reduction on all wheat varieties and resulted in yield reduction on the varieties Dandy, Granite, Hanna, HJ98, and Knutson. The difenzoquat treatments caused the greatest injury and yield reductions to the wheat varieties Alsen and Reeder with moderate injury and yield reduction on the variety Parshall. Slight chlorosis was noted on the other wheat varieties with a slight yield reduction observed on the varieties Knutson and Norpro as a result of difenzoquat.

Fenoxaprop & safener caused the least injury on the barley varieties. Difenzoquat and the AE F130060 + AW F107892 treatments caused slight to moderate injury symptoms (stunting and chlorosis). CGA 184927 caused moderate barley injury and the higher rate resulted in yield reductions compared to the checks. MKH 6562 + fenoxaprop also caused moderate barley injury but yields were lower only for the variety Robust. MKH 6562 + 2,4-D ester caused the greatest barley injury and significantly lowered barley yields. (Department of Agronomy and Plant Genetics, University of Minnesota, St. Paul).

Table 1. Hard red spring wheat tolerance to postemergence herbicides at Rosemount, MN -2002 (Durgan, Miller, and Martinson).

Treatment	Rate (lb/A)	Alsene						Dandy							
		Injury					Height (inch)	Yield (bu/A)	Injury					Height (inch)	Yield (bu/A)
		6/6	6/10	6/20	6/27	7/9			6/6	6/10	6/20	6/27	7/9		
Postemergence May 29															
Fenoxaprop & safener ¹	0.084	2	0	0	0	0	32	34	0	0	0	5	0	35	42
Fenoxaprop & safener	0.167	2	2	0	0	0	31	34	2	3	0	5	0	33	45
MKH 6562 ² + 2,4-D ester + NIS ³	0.027 + 0.5 + 0.25%	20	8	13	27	13	30	29	27	13	15	35	7	32	33
MKH 6562 + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	25	17	12	32	13	29	26	37	20	17	40	5	33	32
MKH 6562 + fenoxaprop & safener + NIS	0.027 + 0.041 + 0.25%	2	0	0	5	0	31	33	5	2	0	3	0	34	42
MKH 6562 + fenoxaprop & safener + NIS	0.027 + 0.063 + 0.25%	3	3	3	2	0	32	32	2	2	0	0	0	35	45
CGA-184927 & CGA-185072 ⁵ + adjuvant ⁶	0.05 + 0.8%	3	3	0	3	0	32	34	2	2	3	0	0	33	43
CGA 184927 & CGA-185072 + adjuvant ⁶	0.1 + 0.8%	2	2	0	5	0	31	32	0	2	0	3	0	34	43
AE F130060 + AW F107892 + adjuvant ⁷	0.00225 + 0.0134 + 2.5%	7	2	5	12	0	32	32	8	5	2	15	0	32	39
AE F130060 + AW F107892 + adjuvant ⁷	0.0045 + 0.0268 + 2.5%	8	2	5	15	2	31	31	12	3	7	22	0	33	40
Postemergence June 5															
Difenzoquat	1.0	--	12	40	83	57	25	8	--	13	10	10	3	33	42
Difenzoquat	1.5	--	17	40	85	57	23	7	--	17	13	18	0	34	43
Check		0	0	0	0	0	32	35	0	0	0	0	0	34	44
Check		0	0	0	0	0	34	34	0	0	0	0	0	35	45
LSD (P=.05)		4	5	7	7	11	3	4	6	5	5	11	3	1	3

¹ Puma 1E.² Everest 70DF.³ NIS = Class Preference nonionic surfactant.⁴ Everest 70DF.⁵ Discover 2E.⁶ adjuvant = DSV adjuvant.⁷ adjuvant = Destiny.

Table 2. Hard red spring wheat tolerance to postemergence herbicides at Rosemount, MN - 2002 (Durgan, Miller, and Martinson).

Treatment	Rate (lb/A)	Granite						Hanna							
		Injury					Height (inch)	Yield (bu/A)	Injury					Height (inch)	Yield (bu/A)
		6/6	6/10	6/20	6/27	7/9			6/6	6/10	6/20	6/27	7/9		
Postemergence May 29															
Fenoxaprop & safener ¹	0.084	2	0	3	0	0	32	40	3	0	3	0	0	39	35
Fenoxaprop & safener	0.167	0	3	0	0	0	33	41	2	2	0	0	0	38	37
MKH 6562 ² + 2,4-D ester + NIS ³	0.027 + 0.5 + 0.25%	18	12	10	10	10	30	31	27	15	17	38	10	36	27
MKH 6562 + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	25	17	10	18	8	29	28	32	23	25	50	10	36	23
MKH 6562 + fenoxaprop & safener + NIS	0.027 + 0.041 + 0.25%	3	3	0	0	0	32	38	5	2	3	5	0	39	39
MKH 6562 + fenoxaprop & safener + NIS	0.027 + 0.063 + 0.25%	2	2	0	0	0	33	39	3	3	0	2	3	38	36
CGA-184927 & CGA-185072 ⁵ + adjuvant ⁶	0.05 + 0.8%	3	5	0	0	0	31	41	2	2	2	7	0	37	37
CGA 184927 & CGA-185072 + adjuvant ⁶	0.1 + 0.8%	2	5	0	0	0	32	40	2	2	2	3	0	38	38
AE F130060 + AW F107892 + adjuvant ⁷	0.00225 + 0.0134 + 2.5%	8	5	3	0	0	31	36	17	13	12	28	3	37	34
AE F130060 + AW F107892 + adjuvant ⁷	0.0045 + 0.0268 + 2.5%	12	12	8	2	3	30	36	17	15	20	37	7	38	32
Postemergence June 5															
Difenzoquat	1.0	--	17	8	0	3	30	41	--	8	10	13	0	38	36
Difenzoquat	1.5	--	15	8	2	5	31	41	--	13	10	7	3	38	39
Check		0	0	0	0	0	32	42	0	0	0	0	0	40	38
Check		0	0	0	0	0	32	41	0	0	0	0	0	40	39
LSD (P=.05)		5	4	6	5	5	1	3	6	5	7	10	4	2	3

¹ Puma 1E.² Everest 70DF.³ NIS = Class Preference nonionic surfactant.⁴ Everest 70DF.⁵ Discover 2E.⁶ adjuvant = DSV adjuvant.⁷ adjuvant = Destiny.

Table 3. Hard red spring wheat tolerance to postemergence herbicides at Rosemount, MN - 2002 (Durgan, Miller, and Martinson).

Treatment	Rate (lb/A)	HJ98						Knutson							
		Injury					Height (inch)	Yield (bu/A)	Injury					Height (inch)	Yield (bu/A)
		6/6	6/10	6/20	6/27	7/9			6/6	6/10	6/20	6/27	7/9		
Postemergence May 29															
Fenoxaprop & safener ¹	0.084	3	2	1	0	0	32	40	0	0	0	0	0	32	40
Fenoxaprop & safener	0.167	0	2	0	0	0	33	41	0	0	0	0	0	31	39
MKH 6562 ² + 2,4-D ester + NIS ³	0.027 + 0.5 + 0.25%	33	15	13	23	8	31	29	22	13	8	25	8	30	32
MKH 6562 + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	37	23	22	32	15	30	26	30	18	15	35	10	30	32
MKH 6562 + fenoxaprop & safener + NIS	0.027 + 0.041 + 0.25%	5	2	3	2	0	32	38	3	2	2	0	0	31	39
MKH 6562 + fenoxaprop & safener + NIS	0.027 + 0.063 + 0.25%	7	3	0	0	0	33	40	3	2	0	0	2	31	40
CGA-184927 & CGA-185072 ⁵ + adjuvant ⁶	0.05 + 0.8%	3	0	0	3	0	33	40	0	0	0	0	0	31	39
CGA 184927 & CGA-185072 + adjuvant ⁶	0.1 + 0.8%	0	0	0	0	0	32	42	0	2	0	0	0	32	39
AE F130060 + AW F107892 + adjuvant ⁷	0.00225 + 0.0134 + 2.5%	17	10	7	17	2	31	34	20	12	10	33	3	29	34
AE F130060 + AW F107892 + adjuvant ⁷	0.0045 + 0.0268 + 2.5%	27	17	20	27	10	30	30	22	15	15	38	5	29	32
Postemergence June 5															
Difenzoquat	1.0	--	12	7	13	2	32	43	--	12	20	15	3	30	38
Difenzoquat	1.5	--	12	10	3	0	33	41	--	15	12	15	5	29	37
Check		0	0	0	0	0	33	38	0	0	0	0	0	32	41
Check		0	0	0	0	0	32	43	0	0	0	0	0	32	42
LSD (P=.05)		6	5	6	9	4	1	3	8	5	7	9	5	2	2

¹ Puma 1E.² Everest 70DF.³ NIS = Class Preference nonionic surfactant.⁴ Everest 70DF.⁵ Discover 2E.⁶ adjuvant = DSV adjuvant.⁷ adjuvant = Destiny.

Table 4. Hard red spring wheat tolerance to postemergence herbicides at Rosemount, MN - 2002 (Durgan, Miller, and Martinson).

Treatment	Rate (lb/A)	NorPro						Parshall							
		Injury					Height (inch)	Yield (bu/A)	Injury					Height (inch)	Yield (bu/A)
		6/6	6/10	6/20	6/27	7/9			6/6	6/10	6/20	6/27	7/9		
Postemergence May 29															
Fenoxaprop & safener ¹	0.084	0	0	0	0	0	30	41	2	0	0	3	0	39	39
Fenoxaprop & safener	0.167	0	2	0	0	0	30	43	2	2	0	0	0	38	38
MKH 6562 ² + 2,4-D ester + NIS ³	0.027 + 0.5 + 0.25%	18	12	8	28	15	28	32	17	8	10	35	8	36	35
MKH 6562 + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	12	15	13	23	17	27	30	23	12	13	42	7	35	34
MKH 6562 + fenoxaprop & safener + NIS	0.027 + 0.041 + 0.25%	5	0	0	0	0	30	40	2	2	0	3	0	37	36
MKH 6562 + fenoxaprop & safener + NIS	0.027 + 0.063 + 0.25%	3	2	0	0	2	30	41	5	3	2	2	0	39	38
CGA-184927 & CGA-185072 ⁵ + adjuvant ⁶	0.05 + 0.8%	3	2	0	3	0	31	42	2	2	0	0	0	39	38
CGA 184927 & CGA-185072 + adjuvant ⁶	0.1 + 0.8%	0	0	0	0	0	30	41	2	2	2	3	0	39	37
AE F130060 + AW F107892 + adjuvant ⁷	0.00225 + 0.0134 + 2.5%	10	3	5	12	3	30	39	13	5	8	17	0	37	36
AE F130060 + AW F107892 + adjuvant ⁷	0.0045 + 0.0268 + 2.5%	12	8	7	10	3	29	38	13	5	10	18	0	36	35
Postemergence June 5															
Difenzoquat	1.0	--	13	12	15	3	30	38	--	12	17	60	23	34	24
Difenzoquat	1.5	--	17	18	7	3	29	38	--	15	33	60	27	33	22
Check		0	0	0	0	0	32	44	0	0	0	0	0	38	38
Check		0	0	0	0	0	31	43	0	0	0	0	0	39	38
LSD (P=.05)		5	5	8	11	9	2	4	6	6	8	9	4	3	3

¹ Puma 1E.² Everest 70DF.³ NIS = Class Preference nonionic surfactant.⁴ Everest 70DF.⁵ Discover 2E.⁶ adjuvant = DSV adjuvant.⁷ adjuvant = Destiny.

Table 5. Hard red spring wheat tolerance to postemergence herbicides at Rosemount, MN - 2002 (Durgan, Miller, and Martinson).

Treatment	Rate (lb/A)	Reeder						Walworth							
		Injury					Height (inch)	Yield (bu/A)	Injury					Height (inch)	Yield (bu/A)
		6/6	6/10	6/20	6/27	7/9			6/6	6/10	6/20	6/27	7/9		
<u>Postemergence May 29</u>															
Fenoxaprop & safener ¹	0.084	0	0	0	0	0	34	36	0	2	0	0	0	33	35
Fenoxaprop & safener	0.167	2	2	0	0	0	33	37	0	2	0	0	0	32	37
MKH 6562 ² + 2,4-D ester + NIS ³	0.027 + 0.5 + 0.25%	20	10	8	28	10	31	30	15	15	12	30	7	32	33
MKH 6562 + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	30	13	10	33	10	30	30	22	20	12	33	7	31	33
MKH 6562 + fenoxaprop & safener + NIS	0.027 + 0.041 + 0.25%	3	0	2	0	0	32	35	3	7	3	0	0	32	35
MKH 6562 + fenoxaprop & safener + NIS	0.027 + 0.063 + 0.25%	2	2	0	2	0	34	35	7	5	3	3	2	32	36
CGA-184927 & CGA-185072 ⁵ + adjuvant ⁶	0.05 + 0.8%	3	2	0	3	0	33	40	5	5	0	0	0	33	37
CGA 184927 & CGA-185072 + adjuvant ⁶	0.1 + 0.8%	2	2	0	2	0	33	37	8	8	0	0	0	32	35
AE F130060 + AW F107892 + adjuvant ⁷	0.00225 + 0.0134 + 2.5%	10	2	7	17	0	32	36	8	5	2	7	3	31	34
AE F130060 + AW F107892 + adjuvant ⁷	0.0045 + 0.0268 + 2.5%	13	5	7	15	3	32	36	12	8	5	10	0	31	33
<u>Postemergence June 5</u>															
Difenzoquat	1.0	--	17	35	92	60	23	5	--	15	5	15	2	31	36
Difenzoquat	1.5	--	15	48	93	73	18	1	--	17	7	17	5	30	37
Check		0	0	0	0	0	32	39	0	0	0	0	0	31	36
Check		0	0	0	0	0	34	37	0	0	0	0	0	32	37
LSD (P=.05)		6	3	10	5	11	3	3	10	5	5	8	5	ns	3

¹ Puma 1E.² Everest 70DF.³ NIS = Class Preference nonionic surfactant.⁴ Everest 70DF.⁵ Discover 2E.⁶ adjuvant = DSV adjuvant.⁷ adjuvant = Destiny.

Table 6. Hard red spring wheat tolerance to postemergence herbicides at Rosemount, MN - 2002 (Durgan, Miller, and Martinson).

Treatment	Rate (lb/A)	2375							Height (inch)	Yield (Bu/A)
		Injury					Height (inch)	Yield (Bu/A)		
		6/6	6/10	6/20	6/27	7/9				
<u>Postemergence May 29</u>										
Fenoxaprop & safener ¹	0.084	0	0	5	0	0	34	36		
Fenoxaprop & safener	0.167	0	2	0	0	0	35	36		
MKH 6562 ² + 2,4-D ester + NIS ³	0.027 + 0.5 + 0.25%	28	17	25	40	20	30	23		
MKH 6562 + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	35	22	25	48	20	29	20		
MKH 6562 + fenoxaprop & safener + NIS	0.027 + 0.041 + 0.25%	5	2	3	0	0	32	33		
MKH 6562 + fenoxaprop & safener + NIS	0.027 + 0.063 + 0.25%	7	0	2	0	0	34	35		
CGA-184927 & CGA-185072 ⁵ + adjuvant ⁶	0.05 + 0.8%	0	2	0	0	0	34	36		
CGA 184927 & CGA-185072 + adjuvant ⁶	0.1 + 0.8%	0	2	2	0	2	34	36		
AE F130060 + AW F107892 + adjuvant ⁷	0.00225 + 0.0134 + 2.5%	8	3	7	8	0	34	35		
AE F130060 + AW F107892 + adjuvant ⁷	0.0045 + 0.0268 + 2.5%	15	8	15	13	3	33	33		
<u>Postemergence June 5</u>										
Difenzoquat	1.0	--	15	12	17	7	33	32		
Difenzoquat	1.5	--	17	15	20	10	33	32		
Check		0	0	0	0	0	35	36		
Check		0	0	0	0	0	34	33		
LSD (P=.05)		8	5	9	8	6	2	5		

¹ Puma 1E.² Everest 70DF.³ NIS = Class Preference nonionic surfactant.⁴ Everest 70DF.⁵ Discover 2E.⁶ adjuvant = DSV adjuvant.⁷ adjuvant = Destiny.

Table 7. Barley tolerance to postemergence herbicides at Rosemount, MN - 2002 (Durgan, Miller, and Martinson).

Treatment	Rate (lb/A)	Lacey							Robust						
		Injury					Height (inch)	Yield (bu/A)	Injury					Height (inch)	Yield (bu/A)
		6/6	6/10	6/20	6/27	7/9			6/6	6/10	6/20	6/27	7/9		
<u>Postemergence May 29</u>															
Fenoxaprop & safener ¹	0.084	3	5	3	0	0	34	49	3	7	0	0	0	37	38
Fenoxaprop & safener	0.167	2	5	0	0	0	36	47	0	3	0	0	0	33	40
MKH 6562 ² + 2,4-D ester + NIS ³	0.027 + 0.5 + 0.25%	20	27	20	53	23	28	35	27	35	32	53	25	33	31
MKH 6562 + 2,4-D ester + NIS	0.054 + 0.5 + 0.25%	25	32	32	67	32	26	34	25	40	38	70	32	29	30
MKH 6562 + fenoxaprop & safener + NIS	0.027 + 0.041 + 0.25%	20	22	23	20	8	31	43	22	28	30	38	12	31	33
MKH 6562 + fenoxaprop & safener + NIS	0.027 + 0.063 + 0.25%	23	20	25	23	10	30	43	23	25	35	30	8	33	32
CGA-184927 & CGA-185072 ⁵ + adjuvant ⁶	0.05 + 0.8%	17	15	27	17	7	31	44	17	20	20	23	7	35	36
CGA 184927 & CGA-185072 + adjuvant ⁶	0.1 + 0.8%	23	20	27	32	13	30	36	27	20	33	38	12	34	33
AE F130060 + AW F107892 + adjuvant ⁷	0.00225 + 0.0134 + 2.5%	13	12	8	8	2	32	46	13	10	12	7	0	36	38
AE F130060 + AW F107892 + adjuvant ⁷	0.0045 + 0.0268 + 2.5%	10	7	10	10	7	30	45	10	8	13	12	0	36	33
<u>Postemergence June 5</u>															
Difenzoquat	1.0	--	15	3	2	3	33	53	--	13	12	0	0	37	43
Difenzoquat	1.5	--	17	7	2	3	34	53	--	18	8	3	2	36	40
Check		0	0	0	0	0	33	46	0	0	0	0	0	37	38
Check		0	0	0	0	0	34	50	0	0	0	0	0	39	41
<u>LSD (P=.05)</u>		6	8	9	11	7	3	7	7	7	12	13	8	4	4

¹ Puma 1E.

² Everest 70DF.

³ NIS = Class Preference nonionic surfactant.

⁴ Everest 70DF.

⁵ Discover 2E.

⁶ adjuvant = DSV adjuvant.

⁷ adjuvant = Destiny.