

Hard red spring wheat and barley tolerance to postemergence herbicides at Crookston, MN - 1999.

Durgan, Beverly R. James Cameron and Douglas W. Miller. This experiment was designed to evaluate wheat and barley tolerance to various postemergence herbicides. The experiments were 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. 'AC Barrie', 'Forge', Gunner', 'HJ98', 'Ingot', 'Ivan', 'McVey', 'Oxen', 'Sharpshooter', 'Verde', '2375" hard red spring wheat varieties, 'MN Brite' and 'Robust' barley varieties were seeded on April 30 at 1.75 Bu/A and 2 Bu/A for wheat and barley, respectively. Propachlor (3 lbs ai/A) was broadcast to reduce grassy weed interference. Bromoxynil (0.25 lb ai/A) was broadcast to reduce broadleaf weed interference. 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 nine varieties. Each herbicide x variety plot was 8 by 8 ft. Herbicide treatments were applied June 4 and June 7. Environmental conditions are listed below. Crop injury was rated visually on June 11 and July 9, and July 20. Crop height was measured and yields taken. Data were summarized by variety and are presented in Tables 1-7.

Treatment Date	June 4	June 7
Target crop stage	3-4 leaf	4-5 leaf
Soil Moisture	moist	moist at 0.5"
Wind (mph)	0-5 N	0-5 W
Cloud Cover	clear	clear
Rainfall before Application		
Week 1 (inch)	0.64	0.40
Rainfall after Application		
Week 1 (inch)	1.48	1.09
Week 2 (inch)	0.00	0.08

All treatments resulted in minor injury symptoms compared to the untreated check. The wheat variety Oxen showed the best overall tolerance to all treatments. The fenoxaprop treatments caused only minor injury to wheat and did not affect yields. Fenoxaprop & MCPA + thifensulfuron & tribenuron caused greater early injury symptoms on barley than Fenoxaprop & safener, but did not affect barley yields. Tralkoxydim, MKH-6562, and difenzoquat treatments generally exhibited more significant injury at the first rating date compared to the fenoxaprop treatments. Tralkoxydim injury was greatest on Gunner wheat and the barley varieties. Tralkoxydim caused reduced barley yields. MKH-6562 significantly lowered barley yields. Several wheat varieties showed a trend toward lower yields at the high rate of MKH-6562 but the differences were usually not significant. Difenzoquat caused severe injury on Gunner and Verde wheat, resulting in significant yield reduction. (Department of Agronomy and Plant Genetics, University of Minnesota, St. Paul).

Table 1. Hard red spring wheat tolerance to postemergence herbicides at Crookston, MN -1999 (Durgan and Cameron).

Treatment	Rate (lb/A)	2375					McVey				
		Injury			Height inch	Yield Bu/A	Injury			Height inch	Yield Bu/A
		6/11	7/9	7/20			6/11	7/9	7/20		
<u>Postemergence (June 4)</u>											
Fenoxaprop & safener <sup>1</sup>	0.104	13	8	12	34	52	7	12	10	34	53
Fenoxaprop & safener	0.208	7	10	12	32	44	7	10	12	11	49
Tralkoxydim + TF8035 COC <sup>2</sup>	0.18 + 0.5%	20	15	17	32	46	13	17	17	34	49
Tralkoxydim + TF8035 COC	0.36 + 0.5%	15	18	20	34	46	15	17	17	33	46
MKH 6562 + NIS <sup>3</sup>	0.027 + 0.25%	23	15	13	32	48	35	13	17	31	42
MKH 6562 + NIS	0.054 + 0.25%	27	15	15	29	40	37	18	22	27	35
Fenoxaprop & MCPA <sup>4</sup> + thifensulfuron & tribenuron <sup>5</sup>	0.09 & 0.37 + 0.009 & 0.005	10	13		13	35	54	12	13	13	35
	53										
Fenoxaprop & MCPA + thifensulfuron & tribenuron	0.14 & 0.55 + 0.014 & 0.007	13	10	10	35	52	10	10	12	35	53
Check		0	0	0	37	49	0	0	0	37	46
<u>Postemergence (June7)</u>											
Difenzoquat	1.0	20	10	10	35	42	20	10	10	35	40
Difenzoquat	1.5	18	13	15	32	40	17	12	12	34	39
Imazamethabenz <sup>6</sup> + difenzoquat + NIS	0.23 + 0.5 + 0.25%	13	12	13	33	32	12	15	10	35	50
LSD (P=.05)		ns	7	9	2	ns	11	5	7	3	9

1 Puma 1E.

2 TF8035 COC = Supercharge.

3 NIS = Class Preference nonionic surfactant.

4 Premix = Cheyenne 2.69E.

5 Premix = Harmony Extra 75DF.

6 Assert LC 2.5E.

Table 2. Hard red spring wheat tolerance to postemergence herbicides at Crookston, MN -1999 (Durgan and Cameron).

Treatment	Rate (lb/A)	AC Barrie					Gunner				
		Injury			Height inch	Yield Bu/A	Injury			Height inch	Yield Bu/A
		6/11	7/9	7/20			6/11	7/9	7/20		
<u>Postemergence (June 4)</u>											
Fenoxaprop & safener <sup>1</sup>	0.104	10	8	10	38	37	10	12	17	35	45
Fenoxaprop & safener	0.208	8	7	10	37	29	10	10	13	35	40
Tralkoxydim + TF8035 COC <sup>2</sup>	0.18 + 0.5%	27	13	15	37	31	23	13	13	35	37
Tralkoxydim + TF8035 COC	0.36 + 0.5%	38	13	13	37	29	53	22	23	34	35
MKH 6562 + NIS <sup>3</sup>	0.027 + 0.25%	33	15	13	35	28	22	10	10	34	42
MKH 6562 + NIS	0.054 + 0.25%	37	15	13	34	30	30	15	12	33	38
Fenoxaprop & MCPA <sup>4</sup> + thifensulfuron & tribenuron <sup>5</sup>	0.09 & 0.37 + 0.009 & 0.005	15	13		13	38	33	12	23	20	36
	42										
Fenoxaprop & MCPA + thifensulfuron & tribenuron	0.14 & 0.55 + 0.014 & 0.007	15	10	15	38	33	18	17	36	36	42
Check		0	0	0	38	29	0	0	0	36	40
<u>Postemergence (June7)</u>											
Difenzoquat	1.0	18	10	10	38	31	22	76	73	28	12
Difenzoquat	1.5	18	13	13	38	35	27	69	59	27	11
Imazamethabenz <sup>6</sup> + difenzoquat + NIS	0.23 + 0.5 + 0.25%	13	13	12	38	38	18	45	48	34	30
LSD (P=.05)		16	6	5	2	ns	12	24	20	2	9

1 Puma 1E.

2 TF8035 COC = Supercharge.

3 NIS = Class Preference nonionic surfactant.

4 Premix = Cheyenne 2.69E.

5 Premix = Harmony Extra 75DF.

6 Assert LC 2.5E.

Table 3. Hard red spring wheat tolerance to postemergence herbicides at Crookston, MN -1999 (Durgan and Cameron).

Treatment	Rate (lb/A)	Forge					Verde				
		Injury			Height inch	Yield Bu/A	Injury			Height inch	Yield Bu/A
		6/11	7/9	7/20			6/11	7/9	7/20		
<u>Postemergence (June 4)</u>											
Fenoxaprop & safener <sup>1</sup>	0.104	10	12	13	35	47	15	15	15	35	53
Fenoxaprop & safener	0.208	10	12	15	35	46	13	10	13	35	59
Tralkoxydim + TF8035 COC <sup>2</sup>	0.18 + 0.5%	15	13	12	34	39	18	15	16	35	59
Tralkoxydim + TF8035 COC	0.36 + 0.5%	27	13	12	33	36	18	12	15	34	51
MKH 6562 + NIS <sup>3</sup>	0.027 + 0.25%	20	13	15	33	40	28	13	15	30	51
MKH 6562 + NIS	0.054 + 0.25%	28	15	15	33	40	38	17	17	29	44
Fenoxaprop & MCPA <sup>4</sup> + thifensulfuron & tribenuron <sup>5</sup>	0.09 & 0.37 + 0.009 & 0.005	10	13		12	34	47	15	13	12	33
	58										
Fenoxaprop & MCPA + thifensulfuron & tribenuron	0.14 & 0.55 + 0.014 & 0.007	10	10	10	34	48	12	13	13	33	59
Check		0	0	0	35	46	0	0	0	36	53
<u>Postemergence (June7)</u>											
Difenzoquat	1.0	18	10	12	33	39	22	78	70	29	18
Difenzoquat	1.5	20	13	15	33	37	28	72	67	28	15
Imazamethabenz <sup>6</sup> + difenzoquat + NIS	0.23 + 0.5 + 0.25%	13	14	12	33	43	15	47	37	30	38
LSD (P=.05)		11	5	5	ns	7	11	23	25	2	9

1 Puma 1E.

2 TF8035 COC = Supercharge.

3 NIS = Class Preference nonionic surfactant.

4 Premix = Cheyenne 2.69E.

5 Premix = Harmony Extra 75DF.

6 Assert LC 2.5E.

Table 4. Hard red spring wheat tolerance to postemergence herbicides at Crookston, MN -1999 (Durgan and Cameron).

Treatment	Rate (lb/A)	Ivan					Oxen				
		Injury			Height inch	Yield Bu/A	Injury			Height inch	Yield Bu/A
		6/11	7/9	7/20			6/11	7/9	7/20		
<u>Postemergence (June 4)</u>											
Fenoxaprop & safener <sup>1</sup>	0.104	12	15	13	33	57	7	12	12	34	57
Fenoxaprop & safener	0.208	10	17	15	32	51	7	12	13	34	56
Tralkoxydim + TF8035 COC <sup>2</sup>	0.18 + 0.5%	27	13	17	33	55	7	13	12	34	59
Tralkoxydim + TF8035 COC	0.36 + 0.5%	20	13	13	32	57	8	13	12	34	55
MKH 6562 + NIS <sup>3</sup>	0.027 + 0.25%	20	17	13	32	56	7	13	10	33	58
MKH 6562 + NIS	0.054 + 0.25%	23	15	17	30	57	10	15	15	32	60
Fenoxaprop & MCPA <sup>4</sup> + thifensulfuron & tribenuron <sup>5</sup>	0.09 & 0.37 + 0.009 & 0.005	17	13		13	33	64	10	13	12	34
	62										
Fenoxaprop & MCPA + thifensulfuron & tribenuron	0.14 & 0.55 + 0.014 & 0.007	15	17	17	33	60	10	10	10	32	65
Check		0	0	0	34	55	0	0	0	34	60
<u>Postemergence (June7)</u>											
Difenzoquat	1.0	20	10	10	33	51	15	10	12	34	57
Difenzoquat	1.5	23	13	13	32	39	18	13	13	34	55
Imazamethabenz <sup>6</sup> + difenzoquat + NIS	0.23 + 0.5 + 0.25%	17	14	12	32	53	15	14	12	34	44
LSD (P=.05)		9	ns	7	2	ns	8	5	5	ns	ns

1 Puma 1E.

2 TF8035 COC = Supercharge.

3 NIS = Class Preference nonionic surfactant.

4 Premix = Cheyenne 2.69E.

5 Premix = Harmony Extra 75DF.

6 Assert LC 2.5E.

Table 5. Hard red spring wheat tolerance to postemergence herbicides at Crookston, MN -1999 (Durgan and Cameron).

Treatment	Rate (lb/A)	Sharpshooter					HJ98				
		Injury			Height inch	Yield Bu/A	Injury			Height inch	Yield Bu/A
		6/11	7/9	7/20			6/11	7/9	7/20		
<u>Postemergence (June 4)</u>											
Fenoxaprop & safener <sup>1</sup>	0.104	12	8	12	36	46	17	12	10	34	46
Fenoxaprop & safener	0.208	10	10	12	36	48	13	10	12	33	57
Tralkoxydim + TF8035 COC <sup>2</sup>	0.18 + 0.5%	23	12	12	35	43	18	22	17	33	51
Tralkoxydim + TF8035 COC	0.36 + 0.5%	27	12	12	34	41	33	12	12	32	51
MKH 6562 + NIS <sup>3</sup>	0.027 + 0.25%	17	15	12	34	45	28	15	17	31	52
MKH 6562 + NIS	0.054 + 0.25%	22	15	13	33	42	30	15	17	29	42
Fenoxaprop & MCPA <sup>4</sup> + thifensulfuron & tribenuron <sup>5</sup>	0.09 & 0.37 + 0.009 & 0.005	15	23		20	36	52	15	13	13	34
	58										
Fenoxaprop & MCPA + thifensulfuron & tribenuron	0.14 & 0.55 + 0.014 & 0.007	13	10	12	36	50	15	10	10	33	59
Check		0	0	0	36	44	0	0	0	35	57
<u>Postemergence (June7)</u>											
Difenzoquat	1.0	20	10	12	37	44	15	10	10	34	51
Difenzoquat	1.5	18	13	15	36	39	17	15	13	33	41
Imazamethabenz <sup>6</sup> + difenzoquat + NIS	0.23 + 0.5 + 0.25%	12	11	13	36	45	12	11	10	32	49
LSD (P=.05)		ns	ns	ns	2	ns	14	9	8	2	ns

1 Puma 1E.

2 TF8035 COC = Supercharge.

3 NIS = Class Preference nonionic surfactant.

4 Premix = Cheyenne 2.69E.

5 Premix = Harmony Extra 75DF.

6 Assert LC 2.5E.

Table 6. Hard red spring wheat tolerance to postemergence herbicides at Crookston, MN -1999 (Durgan and Cameron).

Treatment	Rate (lb/A)	Ingot				
		Injury			Height inch	Yield Bu/A
		6/11	7/9	7/20		
<u>Postemergence (June7)</u>						
Fenoxaprop & safener <sup>1</sup>	0.104	7	12	12	38	51
Fenoxaprop & safener	0.208	7	10	12	38	50
Tralkoxydim + TF8035 COC <sup>2</sup>	0.18 + 0.5%	15	12	10	38	47
Tralkoxydim + TF8035 COC	0.36 + 0.5%	17	12	10	38	46
MKH 6562 + NIS <sup>3</sup>	0.027 + 0.25%	13	23	20	37	52
MKH 6562 + NIS	0.054 + 0.25%	18	15	15	33	48
Fenoxaprop & MCPA <sup>4</sup> + thifensulfuron & tribenuron <sup>5</sup>	0.09 & 0.37 + 0.009 & 0.005	12	13	13	37	55
Fenoxaprop & MCPA + thifensulfuron & tribenuron	0.14 & 0.55 + 0.014 & 0.007	10	10	12	37	55
Check		0	0	0	38	51
<u>Postemergence (June7)</u>						
Difenzoquat	1.0	20	10	12	36	50
Difenzoquat	1.5	20	13	15	36	43
Imazamethabenz <sup>6</sup> + difenzoquat + NIS	0.23 + 0.5 + 0.25%	15	11	12	36	46
LSD (P=.05)		11	8	6	2	6

1 Puma 1E.

2 TF8035 COC = Supercharge.

3 NIS = Class Preference nonionic surfactant.

4 Premix = Cheyenne 2.69E.

5 Premix = Harmony Extra 75DF.

6 Assert LC 2.5E.

Table 7. Barley tolerance to postemergence herbicides at Crookston, MN -1999 (Durgan and Cameron).

Treatment	Rate (lb/A)	MN Brite					Robust				
		Injury			Height	Yield	Injury			Height	Yield
		6/11	7/9	7/20			6/11	7/9	7/20		
----- % -----			inch	Bu/A	----- % -----			inch	Bu/A		
<u>Postemergence (June 4)</u>											
Fenoxaprop & safener <sup>1</sup>	0.104	10	12	13	36	91	8	12	13	35	84
Fenoxaprop & safener	0.208	18	10	12	35	88	15	10	13	35	89
Tralkoxydim + TF8035 COC <sup>2</sup>	0.18 + 0.5%	32	15	15	35	74	40	22	20	34	68
Tralkoxydim + TF8035 COC	0.36 + 0.5%	50	17	15	35	64	50	20	25	34	66
MKH 6562 + NIS <sup>3</sup>	0.027 + 0.25%	43	48	47	30	56	50	53	47	28	49
MKH 6562 + NIS	0.054 + 0.25%	43	28	27	24	44	42	38	35	27	37
Fenoxaprop & MCPA <sup>4</sup> + thifensulfuron & tribenuron <sup>5</sup>	0.09 & 0.37 + 0.009 & 0.005	42	18		22	34	84	47	18	23	35
	84										
Fenoxaprop & MCPA + thifensulfuron & tribenuron	0.14 & 0.55 + 0.014 & 0.007	43	10	12	36	89	40	10	15	35	85
Check		0	0	0	36	92	0	0	0	33	90
<u>Postemergence (June7)</u>											
Difenzoquat	1.0	22	10	12	34	83	27	13	13	33	79
Difenzoquat	1.5	37	12	15	33	75	33	15	15	33	70
Imazamethabenz <sup>6</sup> + difenzoquat + NIS	0.23 + 0.5 + 0.25%	22	12	13	34	81	30	12	15	33	76
<u>LSD (P=.05)</u>		18	15	17	3	13	17	15	13	2	15

1 Puma 1E.

2 TF8035 COC = Supercharge.

3 NIS = Class Preference nonionic surfactant.

4 Premix = Cheyenne 2.69E.

5 Premix = Harmony Extra 75DF.

6 Assert LC 2.5E.