PROJECT TITLE: Downy Brome Control with Imazamox and Herbicide Resistant Winter Wheat.

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PROJECT PERSONNEL: Doug Holen, Research Associate, NWARC

OBJECTIVES: To evaluate the efficacy of imazamox to downy brome and the tolerance of 'Fidel' herbicide resistant winter wheat.

RESULTS:

Imazamox (Raptor) was applied at 0, 0.16, 0.33, 0.50, 0.66, 0.83, and 1.0-times the normal use rate. Treatments were applied in the fall and early spring when downy brome plants were at the 2-leaf, and 2-tiller stage of development, respectively.

Overall, winter wheat injury was minor. Winter wheat yield components did not respond to any of the treatments. This is probably related to the low downy brome populations present, which consisted of only 8 plants per square foot in the nontreated check.

While downy brome densities were low, the weed population present did provide for an assessment of herbicide activity toward downy brome. Downy brome plant density results indicate the complete mortality was not achieved (Figure 2). However, the impact on downy brome head/tiller production (Figure 4) as well as total, vegetative and reproductive dry weights was impressive. Downy brome total dry weight reductions of 90 percent were achieved at the 0.66X rate (Figure 3). Generally, fall applications were the most efficacious. This response was most evident at the lower rates. As application rates approached the 0.66X dosage, the difference between application timings became negligible. Downy brome seed production was dramatically reduced at the higher rates (Figure 5). Correspondingly, few seeds were detected in the harvested grain (Figure 6). The data tables present the actual results. The graphs present the data on a percentage basis relative to the nontreated control plots.

SUMMARY:

Imazamox appears to have excellent activity toward downy brome. In addition, Fidel appears to have the needed tolerance toward imazamox, at least in western MT.

FUTURE PLANS:

This study will be repeated to confirm the consistency of the observed treatment response. Future studies will integrate the herbicide with competitive cropping systems.

Downy Brome Control with Imazamox and Herbicide Resistant Winter Wheat

Site Description

Crop: W. Wheat / Dbrome Variety: Fidel Planting Date: 9-24-97
Planting Method: Plot drill Rate, Unit: 70 / 8 Lbs./A
Depth, Unit: 1.5" Row Spacing, Unit: 6"
Soil Moisture: Good Emergence Date: 10-3-97 / 10-9-

Plot Width, Unit: 10 FT Plot Length, Unit: 15 FT Reps: 3
Site location: R-3 Study Design: RCB
Plot Maintenance:

Fertility:	9-23-97	36 Lbs. N and 40 Lbs. P
	3-26-98	50 Lbs. N
Weed Control:	4- 2-98	Bronate at 1.5 pt/A
Irrigation:	5- 6-98	.6" with wheel line

Soil Description

Texture: Coarse Silty Mixed % OM: 2.7 % Sand: 40 % Silt: 50 % Clay: 10
pH: 7.1 Soil Name: Creston Silt Loam

Application Information

Application Date:	11-3-97	4-10-98
Time of Day:	1:30 PM	11:15 AM
Application Method:	BACKPACK	BACKPACK
Application Timing:	FALL	SPRING
Air Temp., Unit:	46 F	52 F
% Relative Humidity:	64	48
Wind Velocity, Unit:	1 MPH	2 MPH
Dew Presence (Y/N):	Y	N
Soil Temp., Unit:	42 F	48 F
Soil Moisture:	GOOD	GOOD
% Cloud Cover:	10	10

Plant Species		Plant Stage	Density at Application
W. wheat	11- 3-97	2.5 to 3 Leaf	
D. brome	11- 3-97	1.5 to 2 Leaf	10 plants/ft2
W. wheat	4-10-98	4 Leaf and 2 Tiller	
D. brome	4-10-98	4 Leaf and 2 Tiller	7 plants/ft2

Application Equipment

Sprayer Type	Speed MPH	Nozzle Type	Nozzle Size	Nozzle Height	Nozzle Spacing	Boom Width	GPA	Carrier	PSI
Backpack	2.5	Flatfan	11002XR	14"	20"	10'	20	H2O	20

Figure 1. Downy Brome Control

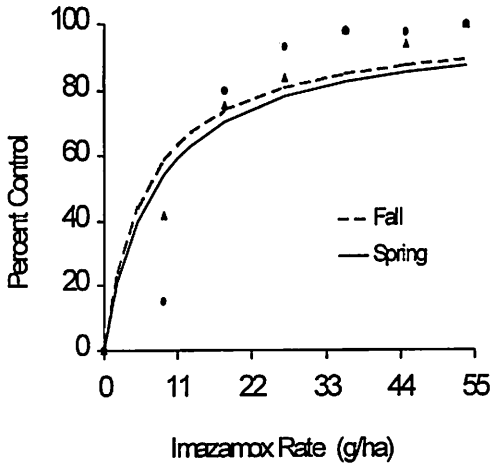


Figure 2. Downy Brome Plant Density / 4 ft

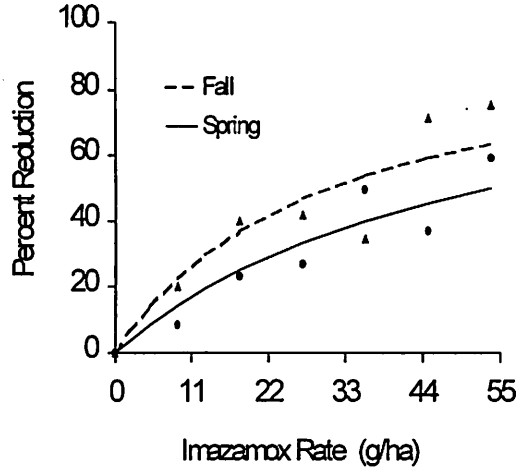


Figure 3. Downy Brome Biomass / 4 ft

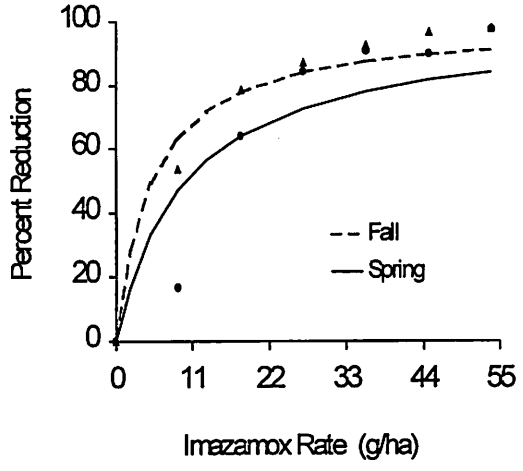


Figure 4. Downy Brome Panicles / 4 ft

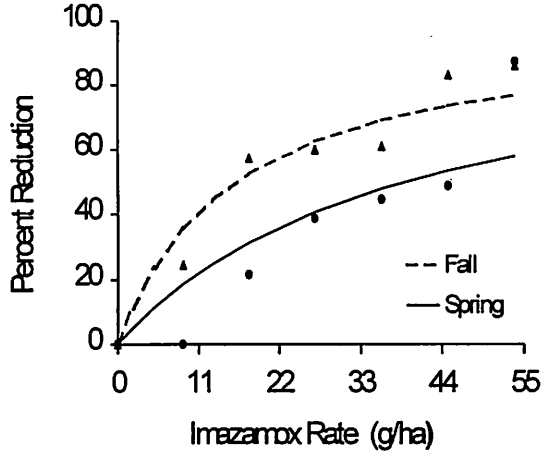


Figure 5. Downy Brome 20 Panicle Seed Yield

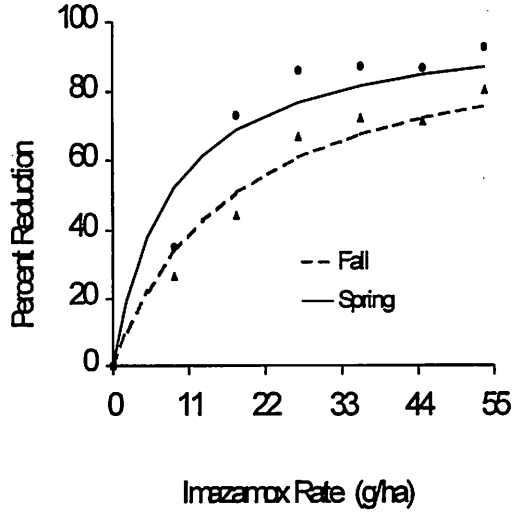
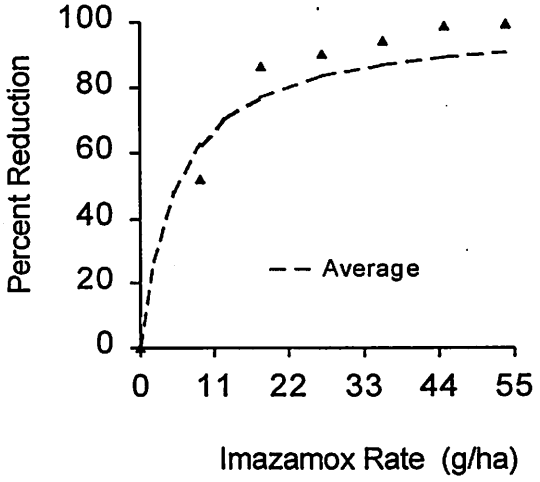


Figure 6. Downy Brome Grain Contamination



Downy Brome Control with Imazamox and Herbicide Resistant Winter Wheat

Trt No	Treatment Name	Rate	Grow Stg	DBROME CONTROL PERCENT 5-13-98	DBROME HT INCH 6-11-98	DBROME PLNT/FT2 6-11-98	DBROME HEAD/FT2 6-11-98	DBROME DWT VEG GRMS/F2 6-11-98	DBROME DWT REP GRMS/F2 6-11-98	DBROM DWT T GRMS/ 6-11-
1	UNTREATED		FALL	0.0	36.3	6.2	13.6	5.6	3.2	8.8
2	RAPTOR	.008	FALL	41.7	31.7	5.5	10.7	2.6	1.4	4.0
2	NIS	.25								
2	UAN 28%	1								
3	RAPTOR	.016	FALL	75.3	26.7	3.4	5.7	1.3	0.6	1.9
3	NIS	.25								
3	UAN 28%	1								
4	RAPTOR	.024	FALL	83.7	25.3	3.1	5.1	0.8	0.3	1.1
4	NIS	.25								
4	UAN 28%	1								
5	RAPTOR	.032	FALL	98.3	26.0	3.7	5.4	0.5	0.2	0.7
5	NIS	.25								
5	UAN 28%	1								
6	RAPTOR	.040	FALL	94.0	20.7	1.6	2.2	0.2	0.1	0.3
6	NIS	.25								
6	UAN 28%	1								
7	RAPTOR	.048	FALL	100.0	18.7	1.7	2.1	0.2	0.0	0.2
7	NIS	.25								
7	UAN 28%	1								
8	HANDWEEDED		FALL	100.0	12.0	0.3	0.0	0.0	0.0	0.0
9	UNTREATED		SPRING	0.0	34.3	8.4	21.7	7.2	3.8	11.0
10	RAPTOR	.008	SPRING	15.0	35.3	11.8	27.1	5.9	3.0	9.0
10	NIS	.25								
10	UAN 28%	1								
11	RAPTOR	.016	SPRING	80.0	23.0	9.3	26.5	2.9	1.3	4.2
11	NIS	.25								
11	UAN 28%	1								
12	RAPTOR	.024	SPRING	93.3	18.7	6.7	15.6	1.5	0.3	1.9
12	NIS	.25								
12	UAN 28%	1								
13	RAPTOR	.032	SPRING	98.0	18.3	4.3	12.7	0.9	0.1	1.1
13	NIS	.25								
13	UAN 28%	1								
14	RAPTOR	.040	SPRING	97.7	19.3	4.9	10.2	0.8	0.2	1.0
14	NIS	.25								
14	UAN 28%	1								

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Downy Brome Control with Imazamox and Herbicide Resistant Winter Wheat

Trt No	Treatment Name	Rate	Grow Stg	DBROME CONTROL PERCENT 5-13-98	DBROME HT INCH 6-11-98	DBROME PLNT/FT2 6-11-98	DBROME HEAD/FT2 6-11-98	DBROME DWT VEG GRMS/F2 6-11-98	DBROME DWT REP GRMS/F2 6-11-98	DBROME DWT TOT GRMS/F2 6-11-98
15	RAPTOR	.048	SPRING	100.0	13.0	3.6	2.7	0.2	0.0	0.3
15	NIS	.25								
15	UAN 28%	1								
16	HANDWEEDED		SPRING	100.0	30.0	0.2	0.4	0.1	0.0	0.1
17	RAPTOR	.024	FALL	100.0	7.0	1.7	0.8	0.0	0.0	0.0
17	NIS	.25								
17	UAN 28%	1								
17	RAPTOR	.024	SPRING							
17	NIS	.25								
17	UAN 28%	1								
LSD (.05) =				11.1	10.1	4.6	9.9	1.6	0.9	2.5
Standard Dev.=				6.68377	6.05566	2.76366	5.96141	.967690	.527725	1.48744
CV =				8.90	25.97	61.47	62.35	53.59	61.03	55.49
Treatment F				90.115	5.951	4.065	6.689	16.942	17.235	17.169
Treatment Prob(F)				0.0001	0.0001	0.0004	0.0001	0.0001	0.0001	0.0001

Downy Brome Control with Imazamox and Herbicide Resistant Winter Wheat

Trt No	Treatment Name	Rate	Grow Stg	WWT CI % 14 DAYS	WWT CI % 56 DAYS	WWT PLANT/ FT2 6-11-98	WWT HEAD/ FT2 6-11-98	WWT DWT/FT2 GRAMS 6-11-98	WWT TEST WT LB/BU	WWT YIELD BU/A
1	UNTREATED		FALL	0.0	0.0	11.3	38.4	74.8	54.6	61.1
2	RAPTOR	.008	FALL	0.0	0.0	10.0	30.2	62.5	53.1	60.6
2	NIS	.25								
2	UAN 28%	1								
3	RAPTOR	.016	FALL	0.0	0.0	10.1	31.7	77.2	54.1	70.7
3	NIS	.25								
3	UAN 28%	1								
4	RAPTOR	.024	FALL	0.0	3.3	10.3	31.5	64.6	51.8	57.5
4	NIS	.25								
4	UAN 28%	1								
5	RAPTOR	.032	FALL	0.0	3.3	10.4	31.4	71.0	52.0	57.0
5	NIS	.25								
5	UAN 28%	1								
6	RAPTOR	.040	FALL	0.0	0.0	8.4	33.9	69.9	53.6	65.9
6	NIS	.25								
6	UAN 28%	1								
7	RAPTOR	.048	FALL	0.0	11.7	11.4	35.1	71.7	54.7	68.0
7	NIS	.25								
7	UAN 28%	1								
8	HANDWEEDED		FALL	0.0	6.7	11.3	37.8	74.1	53.7	64.1
9	UNTREATED		SPRING	0.0	0.0	11.6	37.0	68.4	55.2	63.1
10	RAPTOR	.008	SPRING	0.0	0.0	10.9	35.5	70.6	54.7	60.0
10	NIS	.25								
10	UAN 28%	1								
11	RAPTOR	.016	SPRING	3.3	0.0	10.7	30.7	67.7	55.0	58.8
11	NIS	.25								
11	UAN 28%	1								
12	RAPTOR	.024	SPRING	0.0	11.7	10.8	28.8	63.3	52.3	53.1
12	NIS	.25								
12	UAN 28%	1								
13	RAPTOR	.032	SPRING	0.0	3.3	9.5	30.9	72.1	54.8	59.5
13	NIS	.25								
13	UAN 28%	1								
14	RAPTOR	.040	SPRING	13.3	3.3	10.4	30.7	64.3	54.5	59.0
14	NIS	.25								
14	UAN 28%	1								

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Downy Brome Control with Imazamox and Herbicide Resistant Winter Wheat

Trt No	Treatment Name	Rate	Grow Stg	WWT CI % 14 DAYS	WWT CI % 56 DAYS	WWT PLANT/ FT2 6-11-98	WWT HEAD/ FT2 6-11-98	WWT DWT/FT2 GRAMS 6-11-98	WWT TEST WT LB/BU	WWT YIELD BU/A
15	RAPTOR	.048	SPRING	6.7	6.7	9.6	32.3	66.4	54.7	62.3
15	NIS	.25								
15	UAN 28%	1								
16	HANDWEEDED		SPRING	0.0	3.3	12.1	36.9	67.1	54.9	64.8
17	RAPTOR	.024	FALL	3.3	3.3	9.2	29.3	62.7	54.9	68.8
17	NIS	.25								
17	UAN 28%	1								
17	RAPTOR	.024	SPRING							
17	NIS	.25								
17	UAN 28%	1								
LSD (.05) =				6.3	6.8	2.9	8.4	16.5	2.9	11.7
Standard Dev.=				3.75408	4.04857	1.74939	5.05290	9.9046	1.75727	7.02117
CV =				239.32	121.46	16.72	15.28	14.41	3.25	11.32
Treatment F				2.696	2.733	0.908	1.136	0.608	1.192	1.301
Treatment Prob(F)				0.0083	0.0076	0.5679	0.3665	0.8535	0.3251	0.2556