PROJECT TITLE: Herbicide Resistant Winter Wheat Tolerance Study

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PROJECT PERSONNEL: Doug Holen, Research Associate, NWARC

OBJECTIVES: To evaluate the tolerance of the winter wheat variety 'Fidel' to applications of imazamox.

RESULTS:

Imazamox (Raptor) is a new member of the imidazolinone herbicide family and is chemically related to Assert and Pursuit. Legumes have demonstrated tolerance toward this product, but not cereals. The exception being 'Fidel', a herbicide resistant winter wheat cultivar developed by American Cyanamid. This study was conducted to evaluate the tolerance of Fidel to applications of imazamox as a function of herbicide rate, surfactant type, and crop growth stage.

Raptor was applied at 1, 2, and 4-times the normal use rate with either a nonionic surfactant (NIS) or methylated seed oil (MSO). Treatments were applied in the fall, early spring and late spring when winter wheat was in the 3 leaf, 4 leaf - 2 tiller, and 2-4 tillering stages, respectively.

Overall, injury increased with rate, and was greatest when Raptor was applied with MSO compared to similar treatments applied with NIS. Crop injury was greatest with the early spring applications, and ranged from 6 to 81 percent as rates increased from the 1X to 4X dose. Late spring applications had the lowest yields, even though crop injury was minor. Treatments applied in the fall or early spring produced yields comparable to the nontreated check, regardless of the degree of crop injury observed.

SUMMARY:

Although severe injury is initially observed at the excessive rates, the variety appears to grow out it and suffers no measurable yield loss.

FUTURE PLANS:

Tolerance studies should be expanded to include other areas of the state.

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Site Description

Crop: Winter Wheat Variety: Fidel Planting Date: 9-24-97
Planting Method: Plot drill Rate, Unit: 70 Lbs./A
Depth, Unit: 1.5" Row Spacing, Unit: 6"
Soil Moisture: Good Emergence Date: 10-3-98

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 45 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:	10-20-97	4-10-98	4-28-98
Time of Day:	1:30 PM	11:15 AM	11:15 AM
Application Method:	BACKPACK	BACKPACK	BACKPACK
Application Timing:	2 LEAF	E. SPRING	L. SPRING
Air Temp., Unit:	55 F	52 F	62 F
% Relative Humidity:	45	48	60
Wind Velocity, Unit:	0 MPH	1 MPH	0 MPH
Dew Presence (Y/N):	N	N	N
Soil Temp., Unit:	50 F	48 F	60 F
Soil Moisture:	GOOD	GOOD	GOOD
% Cloud Cover:	0	95	0

Plant Species		Plant Stage
W. wheat	10-20-97	2.5 to 3 Leaf
W. wheat	4-10-98	4 Leaf and 2 Tiller
W. wheat	4-28-98	4.5 and 2-4 Tiller

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	H20	20

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Trt No	Treatment Name	Rate	Rate Unit	Grow Stg	WWT INJURY PERCENT 6-14-98	WWT INJURY PERCENT 6-28-98	WWT PLNT/FT2 TOTAL 6-30-98	WWT DRY WT GRM/FT2 6-30-98	WWT TEST WT LBS/BU 7-30-98	WWT YIELD BU/A
1	RAPTOR	0.04	lb ai/A	FALL	0.0	0.0	11.2	93.8	55.3	71.9
1	NIS	.25	% v/v							
1	UAN 28%	1	qt pr/A							
2	RAPTOR	0.08	lb ai/A	FALL	0.0	0.0	12.8	111.3	55.4	72.9
2	NIS	.25	% v/v							
2	UAN	1	qt pr/A							
3	RAPTOR	0.16	lb ai/A	FALL	0.0	0.0	9.4	97.9	55.2	67.9
3	NIS	.25	% v/v							
3	UAN 28%	1	qt pr/A							
4	RAPTOR	0.04	lb ai/A	E.SPR	0.0	1.7	9.1	101.8	56.0	75.2
4	NIS	.25	% v/v							
4	UAN 28%	1	qt pr/A							
5	RAPTOR	0.08	lb ai/A	E.SPR	3.3	8.3	10.4	95.5	55.3	76.4
5	NIS	.25	% v/v							
5	UAN 28%	1	qt pr/A							
6	RAPTOR	0.16	lb ai/A	E.SPR	16.7	31.7	10.4	98.8	55.2	68.8
6	NIS	.25	% v/v							
6	UAN 28%	1	qt pr/A							
7	RAPTOR	0.04	lb ai/A	E.SPR	8.3	6.7	10.8	100.7	56.3	79.0
7	SUNIT	.75	qt pr/A							
7	UAN 28%	1	qt pr/A							
8	RAPTOR	0.08	lb ai/A	E.SPR	11.7	28.3	9.8	104.8	55.4	81.3
8	SUNIT	.75	qt pr/A							
8	UAN 28%	1	qt pr/A							
9	RAPTOR	0.16	lb ai/A	E.SPR	38.3	81.7	11.5	94.3	54.4	74.4
9	SUNIT	.75	qt pr/A							
9	UAN 28%	1	qt pr/A							
10	RAPTOR	0.04	lb ai/A	L.SPR	0.0	0.0	8.4	96.0	55.3	74.0
10	NIS	.25	% v/v							
10	UAN 28%	1	qt pr/A							
11	RAPTOR	0.08	lb ai/A	L.SPR	3.3	6.7	9.8	91.2	55.0	68.6
11	NIS	.25	% v/v							
11	UAN 28%	1	qt pr/A							
12	RAPTOR	0.16	lb ai/A	L.SPR	0.0	0.0	10.9	102.4	54.8	64.7
12	NIS	.25	% v/v							
12	UAN 28%	1	qt pr/A							

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Trt No	Treatment Name	Rate	Rate Unit	Grow Stg	WWT INJURY PERCENT 6-14-98	WWT INJURY PERCENT 6-28-98	WWT PLNT/FT2 TOTAL 6-30-98	WWT DRY WT GRM/FT2 6-30-98	WWT TEST WT LBS/BU 7-30-98	WWT YIELD BU/A
13	RAPTOR	0.04	lb ai/A	L.SPR	6.7	6.7	11.4	97.6	55.4	64.8
13	SUNIT	.75	qt pr/A							
13	UAN 28%	1	qt pr/A							
14	RAPTOR	0.08	lb ai/A	L.SPR	0.0	3.3	11.3	107.1	53.3	65.1
14	SUNIT	.75	qt pr/A							
14	UAN 28%	1	qt pr/A							
15	RAPTOR	0.16	lb ai/A	L.SPR	10.0	21.7	10.5	88.4	54.4	64.8
15	SUNIT	.75	qt pr/A							
15	UAN 28%	1	qt pr/A							
16	NONTREATED				0.0	0.0	11.1	113.5	55.7	77.1
LSD (.05) =					9.4	8.4	3.4	22.5	2.0	10.1
Standard Dev.=					5.62731	5.03115	2.03569	13.5005	1.22828	6.06213
CV =					91.56	40.93	19.30	13.54	2.23	8.46
Treatment F					9.569	53.284	0.827	0.790	0.988	2.412
Treatment Prob(F)					0.0001	0.0001	0.6422	0.6783	0.4909	0.0195