

PROJECT TITLE: Fidel Herbicide Tolerance Study

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OBJECTIVE:

To evaluate the tolerance of the winter wheat variety 'Fidel' to applications of Raptor.

Results:

Raptor is a new member of the imidazolinone herbicide family which has shown activity toward downy brome and jointed goatgrass. This product has demonstrated tolerance toward legumes but not cereals. The exception being 'Fidel', a winter wheat cultivar developed by American Cyanamid. This study was conducted to evaluate the tolerance of Fidel to applications of Raptor as a function of herbicide rate, surfactant type and crop growth stage. The planting was late (10/21/96) and the crop did not emerge until the following spring. Raptor was applied at the 2 and 4- leaf growth stage of the crop on 4/21/97 and 4/28/97, respectively.

Winter wheat crop injury increased as herbicide rates increased. Crop injury was not observed or was minor when Raptor was applied at the 1X (0.02 lb ai/A) and 2X rates. While significant crop injury did occur at the 4X and 8X dosages, there was no effect on yield or the associated yield components. The observed injury appears to only have effected heading dates and delay crop maturity. Injury appeared to be less severe when Raptor was applied with a nonionic surfactant, but these differences were not significant. An application of Raptor was also made to a small planting of Judith winter wheat. This was done to confirm the sensitivity of wheat to this chemical. No yield data is available since Raptor killed the entire wheat planting. Although only one susceptible variety was screened, it appears that the resistant trait is needed if Raptor is to be used.

Summary:

Fidel appears to have excellent tolerance to Raptor under the conditions of this experiment and yielded well considering the late planting.

Future Plans:

Additional studies should be conducted under more typical planting conditions to verify crop tolerance to Raptor applications.

## Fidel / Raptor Tolerance Study

### Site Description

Crop: Winter Wheat	Variety: Fidel	Planting Date: 10-21-96
Planting Method: Plot drill		Rate, Unit: 94 Lbs./A
Depth, Unit: 1.5"	Row Spacing, Unit: 6"	
Soil Moisture: Good		Emergence Date: Spring
Plot Width, Unit: 10 FT	Plot Length, Unit: 15 FT	
Reps: 3	Site Location: R-3	Study Design: RCB
Plot Maintenance:		
Fertility:	9-19-96      32 Lbs. N and 40 Lbs. S	
	5- 9-97      96 Lbs. N and 46 Lbs. P	
Weed Control:	5-19-97      Bronate at 1.5 pt.	

### 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:	4-21-97	4-28-97
Time of Day:	3:30 PM	2:00 PM
Application Method:	BACKPACK	BACKPACK
Application Timing:	POST (2LF)	POST (4LF)
Air Temp., Unit:	58 F	57 F
% Relative Humidity:	44	57
Wind Velocity, Unit:	2-4 MPH	0-4 MPH
Dew Presence (Y/N):	N	N
Soil Temp., Unit:	59 F	52 F
Soil Moisture:	GOOD	GOOD
% Cloud Cover:	90	95

Weed Species	Weed Stage	Density at Application
4-21 Fidel	2 to 3 leaf	12 plants/ linear ft.
4-28 Fidel	3 to 5 leaf	

### Application Equipment

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

Table 1.

## Fidel / Raptor Tolerance Study

Treatment Name	Rate		Grow Stg	FIDEL	FIDEL	FIDEL	FIDEL	FIDEL
	Rate	Unit		CROP INJ PERCENT 5-5-97	CROP INJ PERCENT 5-12-97	CROP INJ PERCENT 5-19-97	CROP INJ PERCENT 5-27-97	H DATE JULIAN
UNTREATED				0.0	0.0	0.0	0.3	164.0
RAPTOR NIS UAN 28%	.020 .25 1	lb ai/A % v/v qt pr/A	2-LF	0.0	3.3	0.0	0.0	164.3
RAPTOR NIS UAN 28%	.040 .25 1	lb ai/A % v/v qt pr/A	2-LF	0.0	3.3	3.3	3.3	164.3
RAPTOR NIS UAN 28%	.080 .25 1	lb ai/A % v/v qt pr/A	2-LF	6.7	30.0	28.3	23.3	165.0
RAPTOR NIS UAN 28%	.160 .25 1	lb ai/A % v/v qt pr/A	2-LF	55.0	66.7	73.3	75.0	166.7
RAPTOR SUN-IT II UAN 28%	.020 .75 1	lb ai/A % v/v qt pr/A	2-LF	0.0	5.0	6.7	3.3	164.0
RAPTOR SUN-IT II UAN 28%	.040 .75 1	lb ai/A % v/v qt pr/A	2-LF	3.3	11.7	3.3	3.3	164.0
RAPTOR SUN-IT II UAN 28%	.080 .75 1	lb ai/A % v/v qt pr/A	2-LF	28.3	48.3	45.0	36.7	165.0
RAPTOR SUN-IT II UAN 28%	.160 .75 1	lb ai/A % v/v qt pr/A	2-LF	56.7	78.3	81.7	83.3	167.0
RAPTOR NIS UAN 28%	.020 .25 1	lb ai/A % v/v qt pr/A	4-LF	3.3	6.7	8.3	0.0	164.0
RAPTOR NIS UAN 28%	.040 .25 1	lb ai/A % v/v qt pr/A	4-LF	0.0	13.3	18.3	10.0	165.0
RAPTOR NIS UAN 28%	.080 .25 1	lb ai/A % v/v qt pr/A	4-LF	3.3	33.3	40.0	43.3	165.7
RAPTOR NIS UAN 28%	.160 .25 1	lb ai/A % v/v qt pr/A	4-LF	3.3	60.0	83.3	85.0	168.0

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Table 1. (Cont.)

### Fidel / Raptor Tolerance Study

Treatment Name	Rate	Rate Unit	Grow Stg	FIDEL	FIDEL	FIDEL	FIDEL	FIDEL
				CROP INJ PERCENT 5-5-97	CROP INJ PERCENT 5-12-97	CROP INJ PERCENT 5-19-97	CROP INJ PERCENT 5-27-97	H DATE JULIAN
RAPTOR SUN-IT II UAN 28%	.020 .75 1	lb ai/A % v/v qt pr/A	4-LF	0.0	3.3	3.3	3.3	164.3
RAPTOR SUN-IT II UAN 28%	.040 .75 1	lb ai/A % v/v qt pr/A	4-LF	0.0	16.7	13.3	10.0	164.3
RAPTOR SUN-IT II UAN 28%	.080 .75 1	lb ai/A % v/v qt pr/A	4-LF	0.0	50.0	66.7	63.3	167.3
RAPTOR SUN-IT II UAN 28%	.160 .75 1	lb ai/A % v/v qt pr/A	4-LF	10.0	68.3	91.7	91.7	170.7
LSD (.05)	=			15.4	15.4	18.5	21.9	1.6
CV	=			92.19	31.47	33.29	41.68	0.59
Treatment Prob(F)				0.0001	0.0001	0.0001	0.0001	0.0001

Table 2.

## Fidel / Raptor Tolerance Study

Trt No	Treatment Name	Form Amt	Fm Ds Rate	Grow Stg	FIDEL PLANTS FT2	FIDEL HEADS FT2	FIDEL DRY MAT GRM/PLNT	FIDEL YIELD BU/ACRE	FIDEL TEST WT LBS/BU	FIDEL 1000 KWT GRAMS	FIDEL PROTEIN PERCENT
1	UNTREATED				15	30	4.4	80.4	60.3	45.6	11.97
2	RAPTOR	1	EC .020	2-LF	16	34	4.8	83.1	60.3	45.4	11.83
2	NIS	1	EC .25								
2	UAN 28%	100	EC 1								
3	RAPTOR	1	EC .040	2-LF	16	35	5.6	91.4	60.2	45.8	12.20
3	NIS	1	EC .25								
3	UAN 28%	100	EC 1								
4	RAPTOR	1	EC .080	2-LF	14	27	5.1	82.1	60.0	45.7	12.30
4	NIS	1	EC .25								
4	UAN 28%	100	EC 1								
5	RAPTOR	1	EC .160	2-LF	16	36	4.4	79.9	54.7	45.2	12.37
5	NIS	1	EC .25								
5	UAN 28%	100	EC 1								
10	RAPTOR	1	EC .020	2-LF	15	33	5.4	90.1	60.0	45.7	12.03
10	SUN-IT II	100	EC .75								
10	UAN 28%	100	EC 1								
11	RAPTOR	1	EC .040	2-LF	15	30	4.9	87.9	60.0	45.6	12.03
11	SUN-IT II	100	EC .75								
11	UAN 28%	100	EC 1								
12	RAPTOR	1	EC .080	2-LF	15	30	5.1	88.3	60.1	46.7	12.50
12	SUN-IT II	100	EC .75								
12	UAN 28%	100	EC 1								
13	RAPTOR	1	EC .160	2-LF	12	30	5.9	87.1	58.9	45.2	12.43
13	SUN-IT II	100	EC .75								
13	UAN 28%	100	EC 1								
6	RAPTOR	1	EC .020	4-LF	14	28	5.7	84.0	60.4	45.6	11.87
6	NIS	1	EC .25								
6	UAN 28%	100	EC 1								
7	RAPTOR	1	EC .040	4-LF	15	35	5.3	91.3	60.1	46.5	12.27
7	NIS	1	EC .25								
7	UAN 28%	100	EC 1								
8	RAPTOR	1	EC .080	4-LF	16	34	5.4	86.6	62.5	46.7	12.43
8	NIS	1	EC .25								
8	UAN 28%	100	EC 1								
9	RAPTOR	1	EC .160	4-LF	17	31	4.2	80.8	59.5	47.1	12.27
9	NIS	1	EC .25								
9	UAN 28%	100	EC 1								
14	RAPTOR	1	EC .020	4-LF	14	30	5.2	92.9	59.8	46.0	12.07
14	SUN-IT II	100	EC .75								
14	UAN 28%	100	EC 1								
15	RAPTOR	1	EC .040	4-LF	11	30	6.6	95.2	59.8	46.4	11.97
15	SUN-IT II	100	EC .75								
15	UAN 28%	100	EC 1								

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Table 2. (Cont.)

## Fidel / Raptor Tolerance Study

Trt No	Treatment Name	Form Amt	Fm Ds Rate	Grow Stg	FIDEL PLANTS FT2	FIDEL HEADS FT2	FIDEL DRY MAT GRM/PLNT	FIDEL YIELD BU/ACRE	FIDEL TEST WT LBS/BU	FIDEL 1000 KWT GRAMS	FIDEL PROTEIN PERCENT
16	RAPTOR	1	EC .080	4-LF	13	32	6.4	89.0	59.8	45.8	12.17
16	SUN-IT II	100	EC .75								
16	UAN 28%	100	EC 1								
17	RAPTOR	1	EC .160	4-LF	12	31	6.9	96.4	52.1	45.3	12.07
17	SUN-IT II	100	EC .75								
17	UAN 28%	100	EC 1								
LSD (.05)	=				5	8	2.1	17.1	5.0	1.8	0.43
Standard Dev.	=				3.10084	4.73540	1.27180	10.2407	2.96968	1.10527	.255869
CV	=				21.52	15.02	23.69	11.71	5.01	2.41	2.10
Block F					12.462	13.239	4.017	0.312	1.022	1.371	0.446
Block Prob(F)					0.0001	0.0001	0.0278	0.7343	0.3712	0.2684	0.6440
Treatment F					0.748	0.946	1.062	0.755	1.934	0.815	1.915
Treatment Prob(F)					0.7272	0.5312	0.4264	0.7201	0.0549	0.6605	0.0576