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### Potato PPO Inhibitor Crop Safety - Sandy Soil

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Location: Hanock Ag Research Station R-3 Pivot, Hancock WI

Plot Information:

Soil Type: Plainfield Loamy Sand, O.M. 0.9%, pH 5.4 (83% sand, 5% silt, 12% clay)  
 Crop: Potato 'Russet Burbank'  
 Date Planted: 4/30/19  
 Row Spacing: 36"  
 Plant Spacing: 12"  
 Date Harvested: 9/11/19  
 Plot Size-Design: 12'x20'-4 reps  
 Rating Dates: 6/3, 6/11, 6/20, 8/14

Weed Control Rating Scale: 0% = no control, 100% = complete control  
 Phytotoxicity Rating Scale: 0% = no injury, 100% = plant death  
 Application Equipment: Backpack CO2 pressure sprayer. GPA 20, PSI 27, MPH 3.3,  
 Nozzle: XR8003VS, Nozzle spacing 18", Height 18"

Herbicide Application Data:

Date	5/20/19	
Time	4:00 pm	
Treatment	H.S.	
Soil Moisture		
	SF	dry
	1"	moist
	3"	moist
Soil Temp (F°)		
	SF	68.3
	3"	61.8
Air Temp (F°)	63.5	
Wind (mph/dir.)	3.8 W	
%RH	33.4%	
Sky Condition-% clouds	50%	
Crop Stage	hook	
Weed & Size	-----	

*Summary:* This trial evaluated crop safety and weed control of treatments containing PPO Inhibitor mode of action herbicides. Of particular interest is the potential of reduced rates as a means of overcoming the injury potential observed from these herbicides under cold and wet environmental conditions. Injury observed in this trial was in the form of stunting relative to the standard treatment of Dual Magnum + Metribuzin (trt 01). Environmental conditions following application were conducive to injury and resulted in 10% or greater stunting at all rates of Chateau (flumioxazin) herbicide. Injury persisted longer at higher rates, but all treatments recovered completely. Only minimal stunting was observed in Spartan (sulfentrazone) containing treatments. Although injury was greater in flumioxazin treatments yield trends included fewer B sized tubers and greater 4-6 oz and 6-10 oz tubers than the sulfentrazone containing treatments (see data for significant differences). Total yield however was not significantly different from the standard treatment for any of the PPO inhibitor containing treatments. Late season weed control of common ragweed was significantly better in the flumioxazin containing treatments.

Weed Abbreviations:

COLQ = Common Lambsquarter	LASW = Ladysthumb Smartweed
RRPW = Redroot Pigweed	HANS = Hairy Nightshade
CORW = Common Ragweed	SMPW = Smooth Pigweed

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2019 Field Season Precipitation/Irrigation (R-3 Pivot)

<u>Date</u>	<u>Type</u>	<u>Amount (inches)</u>	<u>Date</u>	<u>Type</u>	<u>Amount (inches)</u>
30-Apr	Precipitation	0.07	17-Jul	Irrigation	0.6
1-May	Precipitation	0.33	18-Jul	Precipitation	0.23
6-May	Precipitation	0.06	19-Jul	Irrigation	0.5
9-May	Precipitation	0.65	19-Jul	Precipitation	0.07
10-May	Precipitation	0.2	20-Jul	Precipitation	1.6
15-May	Irrigation	0.3	21-Jul	Precipitation	1.21
18-May	Precipitation	0.41	23-Jul	Irrigation	0.4
19-May	Precipitation	0.59	24-Jul	Irrigation	0.25
22-May	Precipitation	0.3	25-Jul	Irrigation	0.4
23-May	Irrigation	0.3	27-Jul	Irrigation	0.4
23-May	Precipitation	0.03	29-Jul	Precipitation	0.61
24-May	Precipitation	0.11	30-Jul	Irrigation	0.4
26-May	Irrigation	0.3	1-Aug	Irrigation	0.5
28-May	Precipitation	1.81	3-Aug	Irrigation	0.5
30-May	Irrigation	0.4	5-Aug	Irrigation	0.4
2-Jun	Irrigation	0.35	5-Aug	Precipitation	0.12
2-Jun	Precipitation	0.15	6-Aug	Precipitation	0.98
4-Jun	Irrigation	0.35	8-Aug	Precipitation	0.37
5-Jun	Precipitation	0.22	10-Aug	Irrigation	0.4
7-Jun	Irrigation	0.4	11-Aug	Precipitation	0.29
9-Jun	Irrigation	0.4	12-Aug	Precipitation	0.13
10-Jun	Precipitation	0.24	13-Aug	Irrigation	0.4
11-Jun	Irrigation	0.25	13-Aug	Precipitation	0.01
12-Jun	Precipitation	0.4	14-Aug	Precipitation	0.41
13-Jun	Precipitation	0.32	16-Aug	Precipitation	0.12
14-Jun	Irrigation	0.3	18-Aug	Precipitation	0.22
14-Jun	Precipitation	0.03	19-Aug	Irrigation	0.4
15-Jun	Precipitation	1.04	22-Aug	Irrigation	0.4
16-Jun	Precipitation	0.79	24-Aug	Irrigation	0.4
19-Jun	Irrigation	0.35	26-Aug	Precipitation	0.02
19-Jun	Precipitation	0.03	27-Aug	Irrigation	0.4
21-Jun	Irrigation	0.35	27-Aug	Precipitation	0.1
23-Jun	Irrigation	0.3	28-Aug	Precipitation	0.11
24-Jun	Precipitation	0.12	29-Aug	Irrigation	0.4
25-Jun	Irrigation	0.35	2-Sep	Irrigation	0.5
25-Jun	Precipitation	0.26	3-Sep	Precipitation	0.41
27-Jun	Irrigation	0.4	4-Sep	Precipitation	0.02
28-Jun	Precipitation	1.39	5-Sep	Irrigation	0.3
30-Jun	Irrigation	0.35	9-Sep	Precipitation	0.11
1-Jul	Precipitation	0.78	10-Sep	Precipitation	1.2
2-Jul	Precipitation	1.6	11-Sep	Precipitation	0.11
3-Jul	Precipitation	0.02			
4-Jul	Irrigation	0.35			
5-Jul	Precipitation	0.64			
6-Jul	Precipitation	0.07			
7-Jul	Irrigation	0.35			
9-Jul	Irrigation	0.4			
11-Jul	Irrigation	0.5			
13-Jul	Irrigation	0.5			
15-Jul	Irrigation	0.5			
16-Jul	Precipitation	0.35			

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2019 Maintenance Fertilizer and Pesticides (R-3 Pivot)

<u>Date</u>	<u>Product</u>	<u>Rate</u>	<u>Unit</u>
9-Apr	0-0-60	450	lb/A
9-Apr	0-0-0-17S-21Ca	500	lb/A
30-Apr	6-30-22-4S, Platinum impreg.	550	lb/A
20-May	21-0-0-24S	360	lb/A
11-Jun	34-0-0	350	lb/A
28-Jun	Fortuna 75WDG	1.5	lb/A
28-Jun	Asana XL	3	oz/A
28-Jun	Agri-Mek SC	3.5	oz/A
28-Jun	NIS	0.5	pt/A
5-Jul	Initiate 720	1.5	pt/A
8-Jul	32-0-0 UAN	166	lb/A
12-Jul	Tanos	8	oz/A
12-Jul	Initiate 720	1.5	pt/A
12-Jul	Coragen	7.5	oz/A
12-Jul	Asana XL	6	oz/A
12-Jul	COC	1	pt/A
19-Jul	Initiate 720	1.5	pt/A
19-Jul	Coragen	3.5	oz/A
19-Jul	MSO	8	oz/A
24-Jul	32-0-0 UAN	166	lb/A
26-Jul	Headline SC	12	oz/A
26-Jul	Initiate 720	1.5	pt/A
2-Aug	Initiate 720	1.5	pt/A
9-Aug	Initiate 720	1.5	pt/A
9-Aug	Tanos	8	oz/A
16-Aug	Revus Top	7	oz/A
16-Aug	Fortuna 75WDG	1.5	lb/A
16-Aug	NIS	1	pt/A
23-Aug	Tanos	8	oz/A
23-Aug	Fortuna 75WDG	1.5	lb/A
30-Aug	Forum	6	oz/A
30-Aug	Fortuna 75WDG	1.5	lb/A
3-Sep	Diquat 2L AG	1.5	pt/A
3-Sep	NIS	1	pt/A

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Trt No.	Treatment Name	Rate	Appl Unit	Timing	6/3/2019	6/11/2019	% Weed Control 6/11/2019			
					% Injury	% Injury	COLQ	RRPW	CORW	HANS
1	Dual Magnum Metribuzin	1 pt/a 0.5 lb/a	HS HS		0 c	0 d	100 -	100 -	85.2 b	100 -
2	Dual Magnum Chateau	1 pt/a 0.5 oz/a	HS HS		10 b	6.5 b	99.3 -	100 -	99.4 a	100 -
3	Dual Magnum Chateau	1 pt/a 1 oz/a	HS HS		15 a	11.6 a	100 -	100 -	99.8 a	100 -
4	Dual Magnum Chateau	1 pt/a 1.5 oz/a	HS HS		16.6 a	15 a	100 -	100 -	100 a	100 -
5	Dual Magnum Spartan	1 pt/a 1 oz/a	HS HS		0 c	0 d	100 -	100 -	84.5 b	100 -
6	Dual Magnum Spartan	1 pt/a 2 oz/a	HS HS		0 c	0 d	100 -	100 -	78.4 b	100 -
7	Dual Magnum Spartan	1 pt/a 3 oz/a	HS HS		1.1 c	2.7 c	100 -	100 -	73.8 b	100 -

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).

Trt No.	Treatment Name	Rate	Appl Unit	Timing	6/20/2019	% Weed Control 6/20/2019				
					% Injury	COLQ	RRPW	CORW	HANS	LASW
1	Dual Magnum Metribuzin	1 pt/a 0.5 lb/a	HS HS		0 b	96 b	100 -	86.7 bc	86.7 b	96.7 -
2	Dual Magnum Chateau	1 pt/a 0.5 oz/a	HS HS		0 b	99.3 ab	100 -	95 ab	100 a	100 -
3	Dual Magnum Chateau	1 pt/a 1 oz/a	HS HS		0.6 b	100 a	100 -	95 ab	99.3 a	100 -
4	Dual Magnum Chateau	1 pt/a 1.5 oz/a	HS HS		11.6 a	100 a	100 -	100 a	100 a	100 -
5	Dual Magnum Spartan	1 pt/a 1 oz/a	HS HS		0 b	100 a	100 -	81.7 c	96.7 a	100 -
6	Dual Magnum Spartan	1 pt/a 2 oz/a	HS HS		0 b	100 a	100 -	81.7 c	100 a	100 -
7	Dual Magnum Spartan	1 pt/a 3 oz/a	HS HS		0 b	100 a	100 -	81.7 c	95 a	100 -

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).

Trt No.	Treatment Name	Rate	Appl Unit	Timing	% Weed Control 8/14/2019					
					COLQ	RRPW	CORW	HANS	LASW	SMPW
1	Dual Magnum Metribuzin	1 pt/a 0.5 lb/a	HS HS		100 -	100 -	70 bc	100 -	95 ab	96.7 -
2	Dual Magnum Chateau	1 pt/a 0.5 oz/a	HS HS		100 -	100 -	83.3 ab	100 -	95 ab	96.7 -
3	Dual Magnum Chateau	1 pt/a 1 oz/a	HS HS		100 -	100 -	91.7 a	100 -	100 a	100 -
4	Dual Magnum Chateau	1 pt/a 1.5 oz/a	HS HS		100 -	100 -	91.7 a	100 -	100	100 -
5	Dual Magnum Spartan	1 pt/a 1 oz/a	HS HS		96.7 -	100 -	63.3 c	100 -	88.3 b	100 -
6	Dual Magnum Spartan	1 pt/a 2 oz/a	HS HS		100 -	100 -	60 c	100 -	93.3 ab	100 -
7	Dual Magnum Spartan	1 pt/a 3 oz/a	HS HS		100 -	100 -	63.3 c	100 -	100 a	100 -

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Trt No.	Treatment Name	Rate	Unit	Appl Timing	Tuber Yield (cwt/A) 9/11/2019				
					B's	Culls	2-4 oz	4-6 oz	6-10 oz
1	Dual Magnum Metribuzin	1 pt/a 0.5 lb/a	HS HS	HS	38.44 abc	11.77 -	207.56 abc	171.81 b	106.68 ab
2	Dual Magnum Chateau	1 pt/a 0.5 oz/a	HS HS	HS	33.43 bc	14.41 -	195.61 bc	223.91 a	118.31 ab
3	Dual Magnum Chateau	1 pt/a 1 oz/a	HS HS	HS	32.21 c	14.24 -	184.22 c	205.64 ab	131.93 a
4	Dual Magnum Chateau	1 pt/a 1.5 oz/a	HS HS	HS	30.91 c	16.03 -	170.90 c	212.21 ab	146.17 a
5	Dual Magnum Spartan	1 pt/a 1 oz/a	HS HS	HS	46.06 a	9.94 -	229.85 ab	164.33 b	62.90 b
6	Dual Magnum Spartan	1 pt/a 2 oz/a	HS HS	HS	45.70 ab	10.13 -	208.08 abc	169.29 b	83.70 ab
7	Dual Magnum Spartan	1 pt/a 3 oz/a	HS HS	HS	41.44 abc	8.07 -	243.25 a	164.54 b	91.76 ab

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Trt No.	Treatment Name	Rate	Unit	Appl Timing	Tuber Yield (cwt/A) 9/11/2019			
					10-13 oz	13-16 oz	>16 oz	Total Yield
1	Dual Magnum Metribuzin	1 pt/a 0.5 lb/a	HS HS	HS	9.60 abc	0 -	0 -	550.95 ab
2	Dual Magnum Chateau	1 pt/a 0.5 oz/a	HS HS	HS	20.41 ab	0 -	0 -	606.56 a
3	Dual Magnum Chateau	1 pt/a 1 oz/a	HS HS	HS	5.00 bc	0 -	0 -	578.90 ab
4	Dual Magnum Chateau	1 pt/a 1.5 oz/a	HS HS	HS	23.62 a	0 -	0 -	606.75 a
5	Dual Magnum Spartan	1 pt/a 1 oz/a	HS HS	HS	3.38 c	0 -	0 -	517.42 b
6	Dual Magnum Spartan	1 pt/a 2 oz/a	HS HS	HS	6.24 bc	0 -	0 -	524.03 b
7	Dual Magnum Spartan	1 pt/a 3 oz/a	HS HS	HS	15.19 abc	0 -	0 -	571.64 ab

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