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Always consult a current label prior to making any pesticide application.*

Potato Off-Target Herbicide Exposure

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Location: Hanock Ag Research Station R-3 Pivot, Hancock WI (2019)

Plot Information:

Soil Type: Plainfield Loamy Sand, O.M. 0.9%, pH 5.4 (83% sand, 5% silt, 12% clay)

Crop: Potato 'Atlantic'

Date Planted: mother tuber 5/16/18 | daughter tuber 5/14/19

Row Spacing: 36"

Plant Spacing: 12"

Date Harvested: 9/11/19

Plot Size-Design: 1-row x 20'-4 reps

Rating Dates: 1/31, 2/4, 2/11, 2/14, 6/10, 6/17, 6/24

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	6/14/18	6/24/18	6/28/18	7/2/18	7/5/18
Time	2:00 pm	10:00 am	1:30 pm	6:15 am	8:15 am
Treatment	Pre-Hook	Hook	Tuber Init.	T. Init+3-4 d	T. Init+6-8d
Soil Moisture					
SF	dry	moist	dry	dry	dry
1"	moist	moist	moist	moist	dry
3"	moist	moist	moist	moist	dry
Soil Temp (F°)					
SF	87.8	89.2	103.0	69.5	80.4
3"	77.5	74.3	84.6	69.2	72.6
Air Temp (F°)	77.6	82.0	89.0	67.7	77.1
Wind (mph/dir.)	1.8 S	1.2 NE	0.8 NE	0.6 W	0.8 W
%RH	45.3%	67.4%	55.1%	79.5%	84.0%
Sky Condition-% clouds	98%	0%	30%	0%	90%
Crop Stage	Pre-Hook	Hook	Tuber Init.	T. Init+4 d	T. Init+7 d
	10-12"	18-20"	25%	90%	100%
		3% Flower	Flower	Flower	Flower

Additional Applications

6/1/18 - 1 pt/a Dual Magnum + 2 pt/a Linex = 1 oz/a Matrix

6/25/18 - 15 oz/a Quadris + 1.92 oz/a Warrior

5/20/19 - 1 pt/a Dual Magnum + 0.5 lb/a Tricor

Notes:

Potato crop was exposed to sublethal rates of herbicide in 2018. Daughter tubers were collected and planted in both the greenhouse and field in 2019 to evaluate daughter tuber effects.

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Potato Herbicide Efficacy Trial - Hancock, WI - 2019

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	Unit	Appl Timing	Greenhouse Grow-out % Injury Phyto Ratings				
					1/31/19	2/4/19	2/7/19	2/11/19	2/14/19
1	Untreated Check				30.0 d-g	6.6 cd	1.3 d	0.0 c	0.0 c
2	Clarity	0.16 oz/a		PRE-HOOK	29.4 d-h	3.2 cd	1.3 d	0.0 c	0.0 c
	AMS	0.025 lb/a		PRE-HOOK					
3	Roundup Weathermax	0.24 oz/a		PRE-HOOK	23.1 e-h	5.1 cd	6.3 bcd	0.0 c	0.0 c
	AMS	0.085 lb/a		PRE-HOOK					
4	Express	0.005 oz/a		PRE-HOOK	12.5 fgh	0.0 d	0.0 d	0.0 c	0.0 c
	NIS	0.0025 % v/v		PRE-HOOK					
	AMS	0.02 lb/a		PRE-HOOK					
5	Clarity	0.16 oz/a		HOOK	24.4 e-h	3.9 cd	3.8 d	0.0 c	0.0 c
	AMS	0.025 lb/a		HOOK					
6	Roundup Weathermax	0.24 oz/a		HOOK	6.9 gh	4.1 cd	5.0 cd	1.1 bc	0.0 c
	AMS	0.085 lb/a		HOOK					
7	Express	0.005 oz/a		HOOK	37.5 b-f	10.3 abc	8.1 a-d	0.0 c	0.0 c
	NIS	0.0025 % v/v		HOOK					
	AMS	0.02 lb/a		HOOK					
8	Clarity	0.16 oz/a		TUBER INIT	33.4 c-g	14.9 abc	7.5 a-d	0.4 c	0.0 c
	AMS	0.025 lb/a		TUBER INIT					
9	Roundup Weathermax	0.24 oz/a		TUBER INIT	54.7 a-d	12.8 abc	7.5 a-d	1.7 abc	0.0 c
	AMS	0.085 lb/a		TUBER INIT					
10	Express	0.005 oz/a		TUBER INIT	2.5 h	3.8 cd	2.5 d	0.0 c	0.0 c
	NIS	0.0025 % v/v		TUBER INIT					
	AMS	0.02 lb/a		TUBER INIT					
11	Clarity	0.16 oz/a		T.INIT+3-4d	59.7 abc	34.1 a	18.8 a	7.1 a	8.8 b
	AMS	0.025 lb/a		T.INIT+3-4d					
12	Roundup Weathermax	0.24 oz/a		T.INIT+3-4d	46.9 a-e	9.2 bc	3.1 d	0.4 c	0.0 c
	AMS	0.085 lb/a		T.INIT+3-4d					
13	Express	0.005 oz/a		T.INIT+3-4d	32.5 d-g	11.0 abc	10.6 a-d	0.8 bc	0.0 c
	NIS	0.0025 % v/v		T.INIT+3-4d					
	AMS	0.02 lb/a		T.INIT+3-4d					
14	Clarity	0.16 oz/a		T.INIT+6-8d	65.6 a	28.5 ab	16.3 abc	7.1 a	7.5 b
	AMS	0.025 lb/a		T.INIT+6-8d					
15	Roundup Weathermax	0.24 oz/a		T.INIT+6-8d	60.9 ab	28.4 ab	17.8 ab	4.2 ab	15.6 a
	AMS	0.085 lb/a		T.INIT+6-8d					
16	Express	0.005 oz/a		T.INIT+6-8d	31.3 d-g	10.0 bc	3.1 d	0.0 c	0.0 c
	NIS	0.0025 % v/v		T.INIT+6-8d					
	AMS	0.02 lb/a		T.INIT+6-8d					

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Trt No.	Treatment Name	Rate	Appl Unit	Timing	6/10/2019		6/17/2019	
					Stand/20 seed	% Injury	Stand/20 seed	% Injury
1	Untreated Check				15 abc	45 abc	15.3 ab	37.5 ab
2	Clarity	0.16 oz/a		PRE-HOOK	14.8 abc	50 ab	15.8 ab	35 ab
	AMS	0.025 lb/a		PRE-HOOK				
3	Roundup Weathermax	0.24 oz/a		PRE-HOOK	15 abc	35 abc	16 ab	27.5 ab
	AMS	0.085 lb/a		PRE-HOOK				
4	Express	0.005 oz/a		PRE-HOOK	15.8 abc	50 ab	15.8 ab	41.3 ab
	NIS	0.0025 % v/v		PRE-HOOK				
	AMS	0.02 lb/a		PRE-HOOK				
5	Clarity	0.16 oz/a		HOOK	16.5 abc	32.5 bc	16.5 ab	22.5 b
	AMS	0.025 lb/a		HOOK				
6	Roundup Weathermax	0.24 oz/a		HOOK	14.8 abc	42.5 abc	15.3 ab	32.5 ab
	AMS	0.085 lb/a		HOOK				
7	Express	0.005 oz/a		HOOK	12.8 c	55 a	12.8 b	45 a
	NIS	0.0025 % v/v		HOOK				
	AMS	0.02 lb/a		HOOK				
8	Clarity	0.16 oz/a		TUBER INIT	14.8 abc	40 abc	14.8 ab	27.5 ab
	AMS	0.025 lb/a		TUBER INIT				
9	Roundup Weathermax	0.24 oz/a		TUBER INIT	17.5 a	35 abc	17.5 a	25 ab
	AMS	0.085 lb/a		TUBER INIT				
10	Express	0.005 oz/a		TUBER INIT	16.8 ab	42.5 abc	17 a	27.5 ab
	NIS	0.0025 % v/v		TUBER INIT				
	AMS	0.02 lb/a		TUBER INIT				
11	Clarity	0.16 oz/a		T.INIT+3-4d	13.3 bc	45 abc	14 ab	37.5 ab
	AMS	0.025 lb/a		T.INIT+3-4d				
12	Roundup Weathermax	0.24 oz/a		T.INIT+3-4d	16 abc	37.5 abc	16 ab	30 ab
	AMS	0.085 lb/a		T.INIT+3-4d				
13	Express	0.005 oz/a		T.INIT+3-4d	16.3 abc	25 c	16.3 ab	22.5 b
	NIS	0.0025 % v/v		T.INIT+3-4d				
	AMS	0.02 lb/a		T.INIT+3-4d				
14	Clarity	0.16 oz/a		T.INIT+6-8d	16 abc	45 abc	16 ab	32.5 ab
	AMS	0.025 lb/a		T.INIT+6-8d				
15	Roundup Weathermax	0.24 oz/a		T.INIT+6-8d	17.3 a	40 abc	17.5 a	27.5 ab
	AMS	0.085 lb/a		T.INIT+6-8d				
16	Express	0.005 oz/a		T.INIT+6-8d	15.5 abc	40 abc	16.3 ab	27.5 ab
	NIS	0.0025 % v/v		T.INIT+6-8d				
	AMS	0.02 lb/a		T.INIT+6-8d				

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Trt No.	Treatment Name	Rate	Appl Unit	Timing	6/24/2019		Tuber Yield 9/11/19 cwt/a	
					Stand/20 seed	% Injury	B's	Culls
1	Untreated Check				15.3 ab	3.3 ab	16.17 ab	9.05 b
2	Clarity	0.16 oz/a		PRE-HOOK	15.8 ab	5 ab	13.58 ab	9.65 b
	AMS	0.025 lb/a		PRE-HOOK				
3	Roundup Weathermax	0.24 oz/a		PRE-HOOK	16 ab	0.8 b	13.19 ab	12.50 ab
	AMS	0.085 lb/a		PRE-HOOK				
4	Express	0.005 oz/a		PRE-HOOK	15.5 ab	7.3 ab	13.82 ab	14.43 ab
	NIS	0.0025 % v/v		PRE-HOOK				
	AMS	0.02 lb/a		PRE-HOOK				
5	Clarity	0.16 oz/a		HOOK	16.5 ab	2.3 ab	18.52 ab	11.22 ab
	AMS	0.025 lb/a		HOOK				
6	Roundup Weathermax	0.24 oz/a		HOOK	15.3 ab	15.8 a	11.18 b	18.39 a
	AMS	0.085 lb/a		HOOK				
7	Express	0.005 oz/a		HOOK	12.8 b	7.9 ab	13.55 ab	13.74 ab
	NIS	0.0025 % v/v		HOOK				
	AMS	0.02 lb/a		HOOK				
8	Clarity	0.16 oz/a		TUBER INIT	14.8 ab	5 ab	10.72 b	10.78 b
	AMS	0.025 lb/a		TUBER INIT				
9	Roundup Weathermax	0.24 oz/a		TUBER INIT	17.5 a	2.3 ab	23.62 a	9.23 b
	AMS	0.085 lb/a		TUBER INIT				
10	Express	0.005 oz/a		TUBER INIT	17 a	5 ab	15.92 ab	13.43 ab
	NIS	0.0025 % v/v		TUBER INIT				
	AMS	0.02 lb/a		TUBER INIT				
11	Clarity	0.16 oz/a		T.INIT+3-4d	14 ab	7.4 ab	13.44 ab	8.32 b
	AMS	0.025 lb/a		T.INIT+3-4d				
12	Roundup Weathermax	0.24 oz/a		T.INIT+3-4d	16 ab	6.1 ab	19.05 ab	9.98 b
	AMS	0.085 lb/a		T.INIT+3-4d				
13	Express	0.005 oz/a		T.INIT+3-4d	16.3 ab	0.8 b	20.36 ab	14.77 ab
	NIS	0.0025 % v/v		T.INIT+3-4d				
	AMS	0.02 lb/a		T.INIT+3-4d				
14	Clarity	0.16 oz/a		T.INIT+6-8d	16 ab	8.2 ab	19.30 ab	10.01 b
	AMS	0.025 lb/a		T.INIT+6-8d				
15	Roundup Weathermax	0.24 oz/a		T.INIT+6-8d	17.5 a	2.9 ab	19.10 ab	10.47 b
	AMS	0.085 lb/a		T.INIT+6-8d				
16	Express	0.005 oz/a		T.INIT+6-8d	16.3 ab	0.8 b	19.54 ab	11.82 ab
	NIS	0.0025 % v/v		T.INIT+6-8d				
	AMS	0.02 lb/a		T.INIT+6-8d				

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					2-4 oz	4-6 oz	6-10 oz	10-13 oz
1	Untreated Check				98.23 b-e	145.56 a	128.95 abc	19.65 -
2	Clarity	0.16 oz/a		PRE-HOOK	81.51 cde	116.04 ab	130.59 abc	33.06 -
	AMS	0.025 lb/a		PRE-HOOK				
3	Roundup Weathermax	0.24 oz/a		PRE-HOOK	80.03 cde	136.08 ab	133.48 abc	35.08 -
	AMS	0.085 lb/a		PRE-HOOK				
4	Express	0.005 oz/a		PRE-HOOK	90.98 b-e	122.23 ab	124.72 bc	30.74 -
	NIS	0.0025 % v/v		PRE-HOOK				
	AMS	0.02 lb/a		PRE-HOOK				
5	Clarity	0.16 oz/a		HOOK	129.65 ab	149.07 a	131.52 abc	31.45 -
	AMS	0.025 lb/a		HOOK				
6	Roundup Weathermax	0.24 oz/a		HOOK	82.80 cde	121.14 ab	170.72 a	40.59 -
	AMS	0.085 lb/a		HOOK				
7	Express	0.005 oz/a		HOOK	69.41 e	95.53 b	126.60 bc	34.17 -
	NIS	0.0025 % v/v		HOOK				
	AMS	0.02 lb/a		HOOK				
8	Clarity	0.16 oz/a		TUBER INIT	90.26 cde	124.27 ab	134.00 abc	33.55 -
	AMS	0.025 lb/a		TUBER INIT				
9	Roundup Weathermax	0.24 oz/a		TUBER INIT	138.98 a	141.62 ab	119.12 c	20.06 -
	AMS	0.085 lb/a		TUBER INIT				
10	Express	0.005 oz/a		TUBER INIT	92.16 b-e	151.32 a	161.46 ab	27.74 -
	NIS	0.0025 % v/v		TUBER INIT				
	AMS	0.02 lb/a		TUBER INIT				
11	Clarity	0.16 oz/a		T.INIT+3-4d	78.79 de	112.36 ab	112.66 c	21.38 -
	AMS	0.025 lb/a		T.INIT+3-4d				
12	Roundup Weathermax	0.24 oz/a		T.INIT+3-4d	92.37 b-e	113.27 ab	140.70 abc	39.00 -
	AMS	0.085 lb/a		T.INIT+3-4d				
13	Express	0.005 oz/a		T.INIT+3-4d	103.28 a-e	137.46 ab	144.45 abc	27.60 -
	NIS	0.0025 % v/v		T.INIT+3-4d				
	AMS	0.02 lb/a		T.INIT+3-4d				
14	Clarity	0.16 oz/a		T.INIT+6-8d	86.05 cde	122.40 ab	131.68 abc	40.46 -
	AMS	0.025 lb/a		T.INIT+6-8d				
15	Roundup Weathermax	0.24 oz/a		T.INIT+6-8d	119.04 abc	129.47 ab	129.64 abc	27.22 -
	AMS	0.085 lb/a		T.INIT+6-8d				
16	Express	0.005 oz/a		T.INIT+6-8d	112.63 a-d	134.39 ab	124.74 bc	14.99 -
	NIS	0.0025 % v/v		T.INIT+6-8d				
	AMS	0.02 lb/a		T.INIT+6-8d				

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					13-16 oz	>16 oz	Total Yield
1	Untreated Check				1.63 b	0.00 -	420.71
2	Clarity	0.16 oz/a		PRE-HOOK	6.21 ab	1.82 -	398.83 ab
	AMS	0.025 lb/a		PRE-HOOK			
3	Roundup Weathermax	0.24 oz/a		PRE-HOOK	6.04 ab	2.06 -	423.48 ab
	AMS	0.085 lb/a		PRE-HOOK			
4	Express	0.005 oz/a		PRE-HOOK	4.41 ab	0.00 -	404.84 ab
	NIS	0.0025 % v/v		PRE-HOOK			
	AMS	0.02 lb/a		PRE-HOOK			
5	Clarity	0.16 oz/a		HOOK	4.12 ab	0.00 -	485.07 a
	AMS	0.025 lb/a		HOOK			
6	Roundup Weathermax	0.24 oz/a		HOOK	5.85 ab	2.12 -	457.50 a
	AMS	0.085 lb/a		HOOK			
7	Express	0.005 oz/a		HOOK	2.71 ab	1.83 -	364.96 b
	NIS	0.0025 % v/v		HOOK			
	AMS	0.02 lb/a		HOOK			
8	Clarity	0.16 oz/a		TUBER INIT	2.47 ab	2.08 -	412.57 ab
	AMS	0.025 lb/a		TUBER INIT			
9	Roundup Weathermax	0.24 oz/a		TUBER INIT	2.17 ab	1.83 -	460.59 a
	AMS	0.085 lb/a		TUBER INIT			
10	Express	0.005 oz/a		TUBER INIT	6.12 ab	6.15 -	479.37 a
	NIS	0.0025 % v/v		TUBER INIT			
	AMS	0.02 lb/a		TUBER INIT			
11	Clarity	0.16 oz/a		T.INIT+3-4d	1.12 b	0.00 -	352.03 b
	AMS	0.025 lb/a		T.INIT+3-4d			
12	Roundup Weathermax	0.24 oz/a		T.INIT+3-4d	3.56 ab	1.96 -	422.23 ab
	AMS	0.085 lb/a		T.INIT+3-4d			
13	Express	0.005 oz/a		T.INIT+3-4d	2.72 ab	0.00 -	455.18 a
	NIS	0.0025 % v/v		T.INIT+3-4d			
	AMS	0.02 lb/a		T.INIT+3-4d			
14	Clarity	0.16 oz/a		T.INIT+6-8d	0.68 b	0.00 -	412.61 ab
	AMS	0.025 lb/a		T.INIT+6-8d			
15	Roundup Weathermax	0.24 oz/a		T.INIT+6-8d	17.34 a	4.37 -	459.86 a
	AMS	0.085 lb/a		T.INIT+6-8d			
16	Express	0.005 oz/a		T.INIT+6-8d	1.11 b	3.88 -	427.61 ab
	NIS	0.0025 % v/v		T.INIT+6-8d			
	AMS	0.02 lb/a		T.INIT+6-8d			

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