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Dry Bulb Onion Herbicide Efficacy 2019 - Muck Soil

Jed B. Colquhoun / Daniel J. Heider / Richard A. Rittmeyer

University of Wisconsin Horticulture Department

Location: Jack's Pride Farm, Randolph WI

Plot Information:

Soil Type: Houghton Muck, 51% sand - 30% silt - 18 % clay, OM 19.9%, pH 6.6

Variety: 'Cortland'

Date Planted: 4-24-2019

Emergence: 5-10-19

Row Spacing: 6' wide raised be with 6 rows spaced 12" apart

Plant Spacing: 1" in row

Date Harvested: 9-7-2019

Plot Size-Design: 6' x 15', 3 reps

Rating Dates: 5-23, 6-3, 6-11, 6-27, 7/12

Phytotoxicity (PHYGEN) Rating Scale: 0% = no crop injury, 100% = dead crop plants

Phytotoxicity (PHYSTU) Rating Scale: % stunting relative to Handweeded Check

Weed Control Rating Scale: 0% = no control, 100% = complete control

Application Equipment: Backpack CO2 pressure sprayer. GPA 20, PSI 27, MPH 3.3,

Nozzle - XR8003VS, Nozzle spacing 18", Height 18".

Herbicide Application Data:

Date	5-3-19	5-31-19	6-4-19	6-4-19	6-26-19	7-5-19
Time	7:00 pm	5:00 pm	7:45 AM	9:30 AM	4:00 PM	1:00 PM
Treatment	PRE	1-LF	2-LF	2-LF	4-6 LF	6-8 LF
Application Timing	A	B	C	CC	D	E
Soil Moisture						
SF	moist	dry	dry	dry	dry	dry
1"	moist	moist	moist	moist	moist	moist
3"	moist	moist	moist	moist	moist	moist
Soil Temp (F°)						
SF	47.9	64.6	64.6	70.9	91.6	84.6
3"	53.3	60.1	60.1	62.6	87.2	73.7
Air Temp (F°)	52.8	64.9	64.9	70.1	86.8	79.8
Wind (mph/dir.)	2.8 SE	2.1 W	1.4 S	1.6 SW	2.2 W	2.9 SW
%RH	43.2%	51.7%	73.9%	58.2%	50.8%	45.8%
Sky Condition (% clouds)	20%	10%	20%	50%	100%	10%
Crop Stage	-----	1-LF	2-LF	2-LF	4-6 LF	6-8 LF
Weed & Size	-----	COLQ 1"	COLQ 1"	COLQ 1"	COLQ 2-3"	-----
		RRPW .5"	RRPW .5"	RRPW .5"	RRPW2-3"	-----
		TAMU .5"	TAMU .5"	TAMU .5"	TAMU .5-3"	-----

Notes: PRE application made when onion shoots were 1/8-1/4" from emergence

Weed Abbreviations

COLQ = Common Lambsquarter

TAMU = Tansy Mustard

RRPW = Redroot Pigweed

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Summary: Onion crops in general provide minimal crop canopy and as a result season long weed management requires vigilant scouting and sequential herbicide applications; even more so when grown on high organic matter muck soils. Currently few herbicide options exist for use in onion. The treatments evaluated were designed to try and achieve satisfactory weed control with minimal inputs. Injury ratings were taken on all rating dates, however data is only provided for dates on which any injury was observed. Crop safety was deemed acceptable in all treatments in this trial. 2019 was much wetter than normal with nearly continuous rains all season long, including several large rain events. In light of all the moisture, weed control was excellent in all treatments. Tansy mustard and large crabgrass control began to break near the end of the season, but it was relatively minor and inconsequential on yield or quality. The Zidua rates and timings all provided satisfactory weed control given the weed spectrum of this trial. Although slight yield differences were observed among treatments, all were considered highly acceptable. The length of residual weed control and high degree of crop safety suggests that Zidua based treatments will likely have a strong fit in muck grown dry bulb onion herbicide programs.

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Trt No.	Treatment Name	Rate	Appl Unit	Timing	5/23/2019	% Weed Control 6-3-2019		
					Stand/A	COLQ	RRPW	TAMU
1	Handweeded Check				217800 b	100 a	100 a	100 a
2	Zidua	1.25 oz/a		PRE	211024 b	99.3 ab	100 a	100 a
	Goal Tender	3 oz/a		2-LF				
	Chateau	2 oz/a		4-6 LF				
3	Zidua	2.5 oz/a		PRE	216832 b	100 a	100 a	100 a
	Goal Tender	3 oz/a		2-LF				
	Chateau	2 oz/a		4-6 LF				
4	Zidua	3.5 oz/a		PRE	233288 ab	100 a	100 a	100 a
	Goal Tender	3 oz/a		2-LF				
	Chateau	2 oz/a		4-6 LF				
5	Zidua	5 oz/a		PRE	216832 b	100 a	100 a	100 a
	Goal Tender	3 oz/a		2-LF				
	Chateau	2 oz/a		4-6 LF				
6	Prowl H2O	4 pt/a		PRE	214896 b	100 a	100 a	99.8 ab
	Zidua	1.25 oz/a		1-LF				
	Goal Tender	3 oz/a		2-LF				
	Chateau	2 oz/a		4-6 LF				
7	Prowl H2O	4 pt/a		PRE	222640 ab	100 a	99.3 a	98.5 ab
	Zidua	2.5 oz/a		1-LF				
	Goal Tender	3 oz/a		2-LF				
	Chateau	2 oz/a		4-6 LF				
8	Prowl H2O	4 pt/a		PRE	231352 ab	100 a	100 a	97.6 abc
	Zidua	3.5 oz/a		1-LF				
	Goal Tender	3 oz/a		2-LF				
	Chateau	2 oz/a		4-6 LF				
9	Prowl H2O	4 pt/a		PRE	232320 ab	100 a	100 a	100 a
	Zidua	5 oz/a		1-LF				
	Goal Tender	3 oz/a		2-LF				
	Chateau	2 oz/a		4-6 LF				
10	Prowl H2O	4 pt/a		PRE	244904 a	100 a	100 a	100 a
	Goal Tender	3 oz/a		2-LF				
	Zidua	1.25 oz/a		2-LF				
	Chateau	2 oz/a		4-6 LF				
11	Prowl H2O	4 pt/a		PRE	229416 ab	100 a	100 a	99.8 ab
	Goal Tender	3 oz/a		2-LF				
	Zidua	2.5 oz/a		2-LF				
	Chateau	2 oz/a		4-6 LF				
12	Prowl H2O	4 pt/a		PRE	232320 ab	98.7 b	99.3 a	78 d
	Goal Tender	3 oz/a		2-LF				
	Zidua	3.5 oz/a		2-LF				
	Chateau	2 oz/a		4-6 LF				
13	Prowl H2O	4 pt/a		PRE	225544 ab	100 a	100 a	92.5 bcd
	Goal Tender	3 oz/a		2-LF				
	Zidua	5 oz/a		2-LF				
	Chateau	2 oz/a		4-6 LF				
14	Prowl H2O	4 pt/a		PRE	222640 ab	100 a	100 a	85.9 cd
	Goal Tender	3 oz/a		2-LF				
	Chateau	1.25 oz/a		2-LF				
	Dual Magnum	1.33 pt/a		4-6 LF				
	Prowl H2O	4 pt/a		6-8 LF				

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Trt	Treatment	Rate	Appl	5/23/2019	% Weed Control 6-3-2019			
No.	Name	Rate	Unit	Timing	Stand/A	COLQ	RRPW	TAMU
15	Prowl H2O	4 pt/a		PRE	210056 b	97 c	98.3 ab	91.8 bcd
	Goal Tender	3 oz/a		2-LF				
	Outlook	18 oz/a		2-LF				
	Chateau	2 oz/a		4-6 LF				
	Prowl H2O	4 pt/a		6-8 LF				
16	Prowl H2O	4 pt/a		PRE	219736 b	99.3 ab	96.7 b	82.6 d
	Goal Tender	3 oz/a		2-LF				
	Buctril	8 oz/a		2-LF				
	Chateau	2 oz/a		4-6 LF				
	Dual Magnum	1.33 pt/a		6-8 LF				

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Trt No.	Treatment Name	Rate	Appl Unit	Timing	% Weed Control 6-11-2019		
					COLQ	RRPW	TAMU
1	Handweeded Check				100 -	100 -	100 -
2	Zidua	1.25 oz/a		PRE	100 -	100 -	100 -
	Goal Tender	3 oz/a		2-LF			
	Chateau	2 oz/a		4-6 LF			
3	Zidua	2.5 oz/a		PRE	100 -	100 -	100 -
	Goal Tender	3 oz/a		2-LF			
	Chateau	2 oz/a		4-6 LF			
4	Zidua	3.5 oz/a		PRE	100 -	100 -	100 -
	Goal Tender	3 oz/a		2-LF			
	Chateau	2 oz/a		4-6 LF			
5	Zidua	5 oz/a		PRE	100 -	100 -	100 -
	Goal Tender	3 oz/a		2-LF			
	Chateau	2 oz/a		4-6 LF			
6	Prowl H2O	4 pt/a		PRE	100 -	100 -	100 -
	Zidua	1.25 oz/a		1-LF			
	Goal Tender	3 oz/a		2-LF			
	Chateau	2 oz/a		4-6 LF			
7	Prowl H2O	4 pt/a		PRE	100 -	100 -	100 -
	Zidua	2.5 oz/a		1-LF			
	Goal Tender	3 oz/a		2-LF			
	Chateau	2 oz/a		4-6 LF			
8	Prowl H2O	4 pt/a		PRE	100 -	100 -	100 -
	Zidua	3.5 oz/a		1-LF			
	Goal Tender	3 oz/a		2-LF			
	Chateau	2 oz/a		4-6 LF			
9	Prowl H2O	4 pt/a		PRE	100 -	100 -	100 -
	Zidua	5 oz/a		1-LF			
	Goal Tender	3 oz/a		2-LF			
	Chateau	2 oz/a		4-6 LF			
10	Prowl H2O	4 pt/a		PRE	100 -	100 -	100 -
	Goal Tender	3 oz/a		2-LF			
	Zidua	1.25 oz/a		2-LF			
	Chateau	2 oz/a		4-6 LF			
11	Prowl H2O	4 pt/a		PRE	100 -	100 -	100 -
	Goal Tender	3 oz/a		2-LF			
	Zidua	2.5 oz/a		2-LF			
	Chateau	2 oz/a		4-6 LF			
12	Prowl H2O	4 pt/a		PRE	100 -	100 -	100 -
	Goal Tender	3 oz/a		2-LF			
	Zidua	3.5 oz/a		2-LF			
	Chateau	2 oz/a		4-6 LF			
13	Prowl H2O	4 pt/a		PRE	100 -	100 -	100 -
	Goal Tender	3 oz/a		2-LF			
	Zidua	5 oz/a		2-LF			
	Chateau	2 oz/a		4-6 LF			
14	Prowl H2O	4 pt/a		PRE	100 -	100 -	100 -
	Goal Tender	3 oz/a		2-LF			
	Chateau	1.25 oz/a		2-LF			
	Dual Magnum	1.33 pt/a		4-6 LF			
	Prowl H2O	4 pt/a		6-8 LF			

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Trt No.	Treatment Name	Rate	Unit	Appl Timing	% Weed Control 6-11-2019		
					COLQ	RRPW	TAMU
15	Prowl H2O	4	pt/a	PRE	100 -	100 -	100 -
	Goal Tender	3	oz/a	2-LF			
	Outlook	18	oz/a	2-LF			
	Chateau	2	oz/a	4-6 LF			
	Prowl H2O	4	pt/a	6-8 LF			
16	Prowl H2O	4	pt/a	PRE	100 -	100 -	100 -
	Goal Tender	3	oz/a	2-LF			
	Buctril	8	oz/a	2-LF			
	Chateau	2	oz/a	4-6 LF			
	Dual Magnum	1.33	pt/a	6-8 LF			

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Trt No.	Treatment Name	Rate	Appl Unit	Timing	PHYSTU 6-27-19	% Weed Control 6-27-2019		
					% Injury	COLQ	RRPW	TAMU
1	Handweeded Check				0 b	100 -	100 a	100 a
2	Zidua	1.25 oz/a		PRE	0 b	99.3 -	94.3 ab	86.7 b
	Goal Tender	3 oz/a		2-LF				
	Chateau	2 oz/a		4-6 LF				
3	Zidua	2.5 oz/a		PRE	0 b	100 -	97.7 ab	95 a
	Goal Tender	3 oz/a		2-LF				
	Chateau	2 oz/a		4-6 LF				
4	Zidua	3.5 oz/a		PRE	0 b	100 -	99.3 a	97 a
	Goal Tender	3 oz/a		2-LF				
	Chateau	2 oz/a		4-6 LF				
5	Zidua	5 oz/a		PRE	1.1 a	100 -	100 a	100 a
	Goal Tender	3 oz/a		2-LF				
	Chateau	2 oz/a		4-6 LF				
6	Prowl H2O	4 pt/a		PRE	0 b	100 -	98.7 a	96 a
	Zidua	1.25 oz/a		1-LF				
	Goal Tender	3 oz/a		2-LF				
	Chateau	2 oz/a		4-6 LF				
7	Prowl H2O	4 pt/a		PRE	0 b	100 -	99.3 a	97.7 a
	Zidua	2.5 oz/a		1-LF				
	Goal Tender	3 oz/a		2-LF				
	Chateau	2 oz/a		4-6 LF				
8	Prowl H2O	4 pt/a		PRE	0 b	100 -	100 a	97.7 a
	Zidua	3.5 oz/a		1-LF				
	Goal Tender	3 oz/a		2-LF				
	Chateau	2 oz/a		4-6 LF				
9	Prowl H2O	4 pt/a		PRE	0 b	100 -	99.3 a	99.3 a
	Zidua	5 oz/a		1-LF				
	Goal Tender	3 oz/a		2-LF				
	Chateau	2 oz/a		4-6 LF				
10	Prowl H2O	4 pt/a		PRE	0 b	100 -	96 ab	96 a
	Goal Tender	3 oz/a		2-LF				
	Zidua	1.25 oz/a		2-LF				
	Chateau	2 oz/a		4-6 LF				
11	Prowl H2O	4 pt/a		PRE	0 b	100 -	99.3 a	97 a
	Goal Tender	3 oz/a		2-LF				
	Zidua	2.5 oz/a		2-LF				
	Chateau	2 oz/a		4-6 LF				
12	Prowl H2O	4 pt/a		PRE	0 b	99.3 -	100 a	88.3 b
	Goal Tender	3 oz/a		2-LF				
	Zidua	3.5 oz/a		2-LF				
	Chateau	2 oz/a		4-6 LF				
13	Prowl H2O	4 pt/a		PRE	0 b	100 -	100 a	97 a
	Goal Tender	3 oz/a		2-LF				
	Zidua	5 oz/a		2-LF				
	Chateau	2 oz/a		4-6 LF				
14	Prowl H2O	4 pt/a		PRE	0 b	100 -	100 a	95 a
	Goal Tender	3 oz/a		2-LF				
	Chateau	1.25 oz/a		2-LF				
	Dual Magnum	1.33 pt/a		4-6 LF				
	Prowl H2O	4 pt/a		6-8 LF				

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Trt	Treatment	Rate	Appl	PHYSTU 6-27-19	% Weed Control 6-27-2019			
No.	Name	Rate	Unit	Timing	% Injury	COLQ	RRPW	TAMU
15	Prowl H2O	4 pt/a		PRE	0 b	100 -	91.7 b	76.7 c
	Goal Tender	3 oz/a		2-LF				
	Outlook	18 oz/a		2-LF				
	Chateau	2 oz/a		4-6 LF				
	Prowl H2O	4 pt/a		6-8 LF				
16	Prowl H2O	4 pt/a		PRE	0 b	100 -	98.3 ab	76.7 c
	Goal Tender	3 oz/a		2-LF				
	Buctril	8 oz/a		2-LF				
	Chateau	2 oz/a		4-6 LF				
	Dual Magnum	1.33 pt/a		6-8 LF				

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Onion Herbicide Eff.-Randolph, WI-2019				PHYSTU					Yield	
Trt	Treatment	Rate	Appl	7/12/19	% Weed Control 7-12-2019				7/12/2019	
No.	Name	Rate	Unit	Timing	% Injury	COLQ	RRPW	TAMU	LACG	tons/A
1	Handweeded Check				0 b	100 a	100 -	90 bc	99.4 ab	10.913 ab
2	Zidua	1.25 oz/a		PRE	0 b	100 a	100 -	100 a	94.8 abc	11.306 ab
	Goal Tender	3 oz/a		2-LF						
	Chateau	2 oz/a		4-6 LF						
3	Zidua	2.5 oz/a		PRE	0 b	100 a	100 -	100 a	91.2 bc	9.076 b
	Goal Tender	3 oz/a		2-LF						
	Chateau	2 oz/a		4-6 LF						
4	Zidua	3.5 oz/a		PRE	0 b	99.3 ab	100 -	100 a	96.7 abc	10.017 ab
	Goal Tender	3 oz/a		2-LF						
	Chateau	2 oz/a		4-6 LF						
5	Zidua	5 oz/a		PRE	1.9 a	100 a	100 -	100 a	100 a	11.055 ab
	Goal Tender	3 oz/a		2-LF						
	Chateau	2 oz/a		4-6 LF						
6	Prowl H2O	4 pt/a		PRE	0 b	100 a	100 -	97.7 ab	96.7 abc	10.855 ab
	Zidua	1.25 oz/a		1-LF						
	Goal Tender	3 oz/a		2-LF						
	Chateau	2 oz/a		4-6 LF						
7	Prowl H2O	4 pt/a		PRE	0 b	100 a	100 -	96.7 ab	99.4 ab	12.205 a
	Zidua	2.5 oz/a		1-LF						
	Goal Tender	3 oz/a		2-LF						
	Chateau	2 oz/a		4-6 LF						
8	Prowl H2O	4 pt/a		PRE	0 b	100 a	100 -	99.3 ab	99.4 ab	10.314 ab
	Zidua	3.5 oz/a		1-LF						
	Goal Tender	3 oz/a		2-LF						
	Chateau	2 oz/a		4-6 LF						
9	Prowl H2O	4 pt/a		PRE	0 b	100 a	100 -	100 a	100 a	11.771 a
	Zidua	5 oz/a		1-LF						
	Goal Tender	3 oz/a		2-LF						
	Chateau	2 oz/a		4-6 LF						
10	Prowl H2O	4 pt/a		PRE	0 b	100 a	100 -	100 a	100 a	10.750 ab
	Goal Tender	3 oz/a		2-LF						
	Zidua	1.25 oz/a		2-LF						
	Chateau	2 oz/a		4-6 LF						
11	Prowl H2O	4 pt/a		PRE	0 b	100 a	100 -	95 abc	98.3 ab	11.298 ab
	Goal Tender	3 oz/a		2-LF						
	Zidua	2.5 oz/a		2-LF						
	Chateau	2 oz/a		4-6 LF						
12	Prowl H2O	4 pt/a		PRE	0 b	100 a	100 -	93.3 abc	93.3 bc	11.820 a
	Goal Tender	3 oz/a		2-LF						
	Zidua	3.5 oz/a		2-LF						
	Chateau	2 oz/a		4-6 LF						
13	Prowl H2O	4 pt/a		PRE	0 b	100 a	100 -	100 a	98.9 ab	12.292 a
	Goal Tender	3 oz/a		2-LF						
	Zidua	5 oz/a		2-LF						
	Chateau	2 oz/a		4-6 LF						
14	Prowl H2O	4 pt/a		PRE	0 b	100 a	100 -	95 abc	96.7 abc	10.132 ab
	Goal Tender	3 oz/a		2-LF						
	Chateau	1.25 oz/a		2-LF						
	Dual Magnum	1.33 pt/a		4-6 LF						
	Prowl H2O	4 pt/a		6-8 LF						

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Trt	Treatment	Rate	Appl	7/12/19	% Weed Control 7-12-2019				7/12/2019	
No.	Name	Rate	Unit	Timing	% Injury	COLQ	RRPW	TAMU	LACG	tons/A
15	Prowl H2O	4 pt/a		PRE	0 b	98.3 b	100 -	86.7 c	85.2 c	10.024 ab
	Goal Tender	3 oz/a		2-LF						
	Outlook	18 oz/a		2-LF						
	Chateau	2 oz/a		4-6 LF						
	Prowl H2O	4 pt/a		6-8 LF						
16	Prowl H2O	4 pt/a		PRE	0 b	100 a	100 -	99.3 ab	90.4 bc	11.581 a
	Goal Tender	3 oz/a		2-LF						
	Buctril	8 oz/a		2-LF						
	Chateau	2 oz/a		4-6 LF						
	Dual Magnum	1.33 pt/a		6-8 LF						

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