EVALUATION OF BASAGRAN® HERBICIDE FOR YELLOW NUTSEDGE CONTROL IN BULB ONION

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Introduction

Yellow nutsedge continues to present a challenge to onion growers in the Treasure Valley of eastern Oregon. The herbicides registered for use in onion production that have activity on yellow nutsedge include Outlook®, Dual Magnum®, and Nortron®. This necessitates testing of other products that are known to control yellow nutsedge in other crops. Basagran® is a foliar-applied herbicide marketed by Arysta LifeScience Corp. and has been identified by several researchers as a candidate for use on onions to control yellow nutsedge if and when a label is granted by the Environmental Protection Agency. ***It is important to recognize that these tests are experimental only, and the use of Basagran in onion production is NOT recommended by researchers or its manufacturer.*** This study was part of a multistate effort to test the tolerance of different onion types to Basagran in different environments.

Materials and Methods

The study was laid out in a split-plot design with varieties ('Vaquero' and 'Ranchero') forming the main plots and herbicide treatments (Table 1) as subplots. The soil was conventionally tilled, disked, and 22-inch beds made during fall 2006. Each plot had 4 rows that were 7.33 ft wide and 30 ft long with 4 replications. Onions were seeded using a double row planter with 3.93-inch spacing within the row. Lorsban® 15G was applied immediately after planting at 3.7 oz/1,000 ft of row. Furrow irrigation began on April 2, 2007 and continued as needed based on soil moisture content. Prior to onion emergence, Roundup Original® Max was applied at 1 pt/acre on the entire study area to control emerged weeds.

Treatments including Prowl® H2O were applied on April 11, 2007 using a pressurized CO_2 sprayer. Treatments including Surround crop protectant were applied on April 30, 2007. Basagran was applied post-emergence (POST) at different timings starting when onions were at the two-leaf stage. Basagran application timing was as follows: POST 1 = onions at 2-leaf stage; POST 2 = onions at 3-leaf stage; POST 3 = 2 weeks after POST 2; POST 4 = 2 weeks after POST 3; and POST 5 = 2 weeks after POST 4. Treatments were applied with and without crop oil at 1 percent V/V.

Onions were sprayed for thrips and general insect control starting May 15 and continuing until July 16, 2007. Onion tops and weeds were flailed on September 7 and

the two center rows in each plot were lifted later that day. Onions were harvested on September 12 and graded using standard categories; small (<2.25 inches diameter), medium (2.25 to 3 inches), jumbo (3 to 4 inches), colossal (4 to 4.25 inches), and supercolossal (>4.25 inches in diameter). Evaluation for single centers was done on September 21-24 on 20 onions from each plot.

Results and Discussion

Onion varieties responded similarly to herbicide treatments and therefore only averages for the two varieties are presented. No injury was observed on onions treated with Basagran at 0.5 pt/acre alone. However, addition of crop oil concentrate (COC) at 1 percent V/V resulted in 6 percent crop injury that was still visible 14 days after application. Evaluations done 24 days later indicated that injury had subsided and did not reduce marketable yield (Tables 1 and 2). Similarly, application of Basagran at 1 pt/acre plus COC starting when onions were at the 3-leaf stage and followed by 2 sequential applications every 2 weeks resulted in 11 percent onion injury that reduced marketable onion yield by 13 percent. When Basagran at 1 pt/acre was applied alone on onions bigger than the 3-leaf stage, the injury was as high as 20 percent and the yield was reduced by 16 percent. The greatest onion injury (26 and 36 percent with and without COC, respectively) was observed when Basagran was applied at 2 pt/acre starting when onions were at the 3-leaf stage followed by 2 sequential applications every 2 weeks thereafter. Marketable onion yield reduction was 21 and 28 percent when Basagran was applied at 2 pt/acre with and without COC, respectively, compared to the standard herbicides (treatment 2). Results indicate that a significantly high level of onion injury by Basagran was possibly exacerbated by the addition of COC. Tests will continue to identify safe rates and possible mixing adjuvants.

Table 1. Response of dry bulb onion (var. Ranchero and Vaquero) to Basagran herbicide application timing on June 25 and July 2, 2007, Malheur Experiment Station, Oregon State University, Ontario, OR.

Treatment	Rate/acre	Timing[a]	Crop injury on 6/25/07 17 days after 1st application	Crop injury 7/2/07 24 days after 1st application
			%	
Untreated			0	0
Prowl H2O	2 pt	PRE	0	0
Buctril 4EC	21.3 fl oz	POST 1		
Goal 2XL	2 pt	POST 1		
Buctril 4EC	2 pt	POST 2		
Goal 2XL	0.5 pt	POST 2		
Goal 2XL	1 pt	5 Leaf		
Basagran	0.5 pt	POST 1; 2; 3	0	0
Basagran	0.5 pt	POST 2; 3; 4	6	1
COC	1% V/V			
Basagran	1 pt	POST 2; 3; 4	5	1
Basagran	1 pt	POST 2; 3; 4	11	1
COC	1% V/V			
Basagran	2 pt	POST 2; 3; 4	26	5
Basagran	2 pt	POST 2; 3; 4	36	6
COC	1% V/V			
Basagran	1 pt	POST 1; 2; 3	4	1
GoalTender	0.126 pt	POST 1; 3		
Basagran	1 pt	POST 2; 4	19	3
GoalTender	0.126 pt	POST 1; 2; 4		
NIS	0.25% V/V			
Buctril	0.5 pt	1st leaf	0	0
Surround	12.5 lb			
Buctril	1 pt	1st leaf	1	0
Surround	25 pt			
LSD P ≤ 0.05			6.8	1.3

[a]Herbicide application timing: PRE = Preemergence; POST 1 = Onion at 2-leaf stage; POST 2 = Onions at 3-leaf stage; POST 3 = 2 weeks after POST 2; POST 4 = 2 weeks after POST 3; POST 5 = 2 weeks after POST 4

Table 2. Dry bulb onion (var. Ranchero and Vaquero) yield in response to Basagran herbicide application, Malheur Experiment Station, Oregon State University, Ontario, OR, 2007.

Variety comparison across herbicides			Small <2.25"	Medium 2.25-3"	Jumbo 3-4"	Colossal 4-4.25	S. Col. >4.25"	Marketable
			---------- Yield (cwt/acre) ----------					
Ranchero			4.1	16.4	508.2	536.0	233.4	1294.0
Vaquero			4.0	20.1	626.5	415.1	114.1	1175.8
			NS	NS	NS	NS	NS	NS
Comparison across varieties								
Treatment	Rate/acre	Timing[a]						
Untreated			0.0	0.0	0.0	0.0	0.0	0.0
Prowl H2O	2 pt	PRE	4.1	17.2	571.3	635.6	294.2	1518.2
Buctril 4EC	21.3 fl oz	POST 1						
Goal 2XL	2 pt	POST 1						
Buctril 4EC	2 pt	POST 2						
Goal 2XL	0.5 pt	POST 2						
Goal 2XL	1 pt	5 Leaf						
Basagran	0.5 pt	POST 1; 2; 3	5.4	26.1	645.3	509.4	195.2	1376.1
Basagran	0.5 pt	POST 2; 3; 4	3.9	17.6	616.5	585.2	215.5	1434.9
COC	1% V/V							
Basagran	1 pt	POST 2; 3; 4	4.6	12.8	566.3	548.0	196.1	1323.2
Basagran	1 pt	POST 2; 3; 4	3.4	20.4	720.4	479.2	101.8	1321.8
COC	1% V/V							
Basagran	2 pt	POST 2; 3; 4	1.5	12.8	609.6	449.5	122.9	1194.9
Basagran	2 pt	POST 2; 3; 4	10.1	36.4	660.9	321.8	70.2	1089.3
COC	1% V/V							
Basagran	1 pt	POST 1; 2; 3	3.4	18.2	657.1	573.9	186.5	1435.8
GoalTender	0.126 pt	POST 1; 3						
Basagran	1 pt	POST 2; 4	7.1	26.0	628.4	464.3	157.0	1275.7
GoalTender	0.126 pt	POST 1; 2; 4						
NIS	0.25% V/V							
Buctril	0.5 pt	1st leaf	1.8	15.4	546.0	577.2	270.5	1409.2
Surround	12.5 lb							
Buctril	1 pt	1st leaf	3.3	16.1	586.5	562.5	275.0	1440.2
Surround	25 pt							
Least Significant Difference P = 0.05			3.7	13.0	93.8	103.8	71.5	119.7

[a]Herbicide application timing: PRE = Preemergence; POST 1 = Onion at 2-leaf stage; POST 2 = Onions at 3-leaf stage; POST 3 = 2 weeks after POST 2; POST 4 = 2 weeks after POST 3; POST 5 = 2 weeks after POST 4.