HERBICIDE APPLICATION METHODS FOR CONTROL OF YELLOW NUTSEDGE IN ONIONS

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Introduction

Yellow nutsedge is extremely competitive with onions, and herbicide options for controlling yellow nutsedge in onions are limited. Dual Magnum is registered for controlling yellow nutsedge in onions grown in the Treasure Valley. Outlook has also been evaluated for this use. Dual Magnum has been applied in various ways and questions about the most effective application method led to this trial. In addition, yellow nutsedge tuber production and distribution in the soil were determined.

Methods

Application Methods for Yellow Nutsedge Control

This trial was conducted to determine the effect of application methods of Dual Magnum and Outlook on yellow nutsedge control and onion injury. The trial was established in a cooperators' field heavily infested with yellow nutsedge. Onions were planted on a 3.7-inch spacing in double rows on 22-inch beds on April 13. Plots were four rows wide and 30 ft long and arranged in a randomized complete block design with four replications.

Dual Magnum and Outlook were applied as a broadcast spray, a spray banded in the furrow, and sidedressed. In some treatments, initial applications of Dual Magnum or Outlook were followed with a second application of the same product or an application of Basagran plus crop oil concentrate (COC). Basagran plus COC was also applied twice for comparison. Initial herbicide applications were made on June 8, and second applications were made on July 6. At the first application, onions had three leaves and the yellow nutsedge was 6 inches tall. At the second application, onions had five leaves and the nutsedge was 10 inches tall. Nutsedge control was evaluated throughout the season. Because of poor onion establishment and heavy competition from the yellow nutsedge, onion injury was not evaluated and onion yields were not recorded from this trial.

Data were analyzed using analysis of variance and means were separated using a protected least significant difference at the 5 percent level, LSD (0.05).

Yellow Nutsedge Tuber Yield and Soil Distribution in Untreated Onions

On August 14, soil core samples were randomly taken from a 400-ft^2 area in a field with an extremely high yellow nutsedge population to determine the number, soil distribution,

and production of tubers. The soil core probe had a 4.25-inch diameter and was 10 inches long. Soil cores were replicated four times. Soil from the core samples were separated into 2-inch increments. Soil was washed from the samples, and nutsedge tubers were collected and dried. Non-viable tubers (those that could be crushed easily between the fingers) were removed and the remaining tubers were counted and weighed.

Results and Discussion

Application Methods for Yellow Nutsedge Control

Poor onion stand and extreme yellow nutsedge competition prevented evaluation of onions for herbicide injury and onion harvest. On July 6, sidedress applications of Outlook provided greater yellow nutsedge control than broadcast or in-furrow banded applications (Table 1). Yellow nutsedge control with Dual Magnum was equal between application methods on this date. On July 13, Outlook or Dual Magnum sidedressed had greater yellow nutsedge suppression than when broadcast. On this date, treatments that had received Basagran had the highest yellow nutsedge control. On August 3, all plots with two applications, except for the two broadcast applications of Outlook, had significantly greater yellow nutsedge control than any of the single applications. On this date, treatments with single applications of Dual Magnum had greater control than Outlook treatments regardless of the application method. Adding COC to Dual Magnum and Outlook did not improve yellow nutsedge control.

Yellow Nutsedge Tuber Yield and Soil Distribution in Untreated Onions

Soil cores taken from various soil depths in 2001 showed similar trends in yellow nutsedge tuber numbers and biomass to those taken in 1999 and 2000 (Table 2). The majority of tubers were found in the top 2 inches of soil with tuber numbers decreasing with increasing soil depth (Fig. 1). The greatest weight of tubers was found in the top 4 inches of soil in 2001, whereas in 1999 the 4- to 6-inch soil layer had greater tuber biomass than the 0- to 2-inch layer. Total yellow nutsedge tuber numbers and biomass in 2000 and 2001 were approximately half of that in 1999.

Table 1. Yellow nutsedge control in response to herbicide application methods in onions, Malheur Experiment Station, Oregon State University, Ontario, OR, 2001.

				Yellow nutsedge control		
Treatment	Rate	Timing*	Application method	7-6	7-13	8-3
	lb ai/acre	leaf		----------		
Dual Magnum	1.25000000000	3-leaf	Sidedress	42.000000	50.000000	38.000000
Outlook	0.64000000000	3-leaf	Sidedress	44.000000	35.000000	15.000000
Dual Magnum	1.25000000000	3-leaf	Broadcast	38.000000	25.000000	30.000000
Outlook	0.64000000000 00000	3-leaf	Broadcast	18.000000 00000000 0	8.0000000 00000000	0.0000000 00000000
Dual Magnum	1.25000000000 00000	3-leaf	Band in furrow	38.000000 00000000 0	38.000000 000000000	22.000000 000000000
Outlook	0.64000000000 00000	3-leaf	Band in furrow	26.000000 00000000 0	22.000000 000000000	10.000000 000000000
Dual Magnum Dual Magnum	1.25 1.25	3-leaf 5-leaf	Sidedress Broadcast	73.000000 00000000 0	51.000000 000000000	71.000000 000000000
Outlook Outlook	0.64 0.64	3-leaf 5-leaf	Sidedress Broadcast	58.000000 00000000 0	58.000000 000000000	62.000000 000000000
Dual Magnum Dual Magnum	1.25 1.25	3-leaf 5-leaf	Broadcast Broadcast	36.000000 00000000 0	43.000000 000000000	63.000000 000000000
Outlook Outlook	0.64 0.64	3-leaf 5-leaf	Broadcast Broadcast	28.000000 00000000 0	25.000000 000000000	37.000000 000000000
Basagran + COC Basagran + COC	1.0 + 1% v/v 1.0 + 1% v/v	3-leaf 5-leaf	Broadcast Broadcast	23.000000 00000000 0	88.000000 000000000	65.000000 000000000
Dual Magnum Basagran + COC	0.64 1.0 + 1% v/v	3-leaf 5-leaf	Broadcast Broadcast	34.000000 00000000 0	88.000000 000000000	78.000000 000000000
Outlook Basagran + COC	0.64 1.0 + 1% v/v	3-leaf 5-leaf	Broadcast Broadcast	25.000000 00000000 0	88.000000 000000000	63.000000 000000000
Dual Magnum + COC	1.25 + 1% v/v	3-leaf	Broadcast	35.000000 00000000 0	35.000000 000000000	25.000000 000000000
Outlook + COC	0.64 + 1% v/v	3-leaf	Broadcast	27.000000 00000000 0	24.000000 000000000	10.000000 000000000

Untreated	0.0000000	0.0000000	0.0000000
LSD (0.05)	15.000000	14.000000	18.000000

* Treatments were applied to 3-leaf onions on June 8 and to 5-leaf onions on July 6.

Table 2. Yellow nutsedge tuber number and weight at various soil depths in 1999, 2000, and 2001, Malheur Experiment Station, Oregon State University, Ontario, OR.

	Tuber number			Tuber weight		
Soil depth *	1999.000	2000.00	2001.000	1999.000	2000.000	2001.000
inches	----------No./m^2----------			----------g/m^2----------		
0-2	7,325	2,842	5,494	242	177	308
2-4	5,758	1,941	3,526	360	161	325
4-6	3,644	1,312	984	430	151	127
6-8	1,640	820	82	175	85	7
8-10	1,385	109	246	112	30	12
LSD (0.05)	1,436	NS	1,904	168	NS	171
Total	19,752	7,024	10,332	1,319	604	779

*Samples were taken with a 4.25-inch diameter soil probe 10 inches long.

Figure 1. Relationship of yellow nutsedge tuber density and soil depth from combined data from samples taken in 1999, 2000, and 2001.