VOLUNTEER POTATO CONTROL IN ONIONS

Corey V. Ransom, Charles A. Rice, and Joey K. Ishida
Malheur Experiment Station
Oregon State University
Ontario, OR, 2001

Introduction

Many producers raise onions in rotation with potatoes. During potato harvest not all of the potato tubers are removed from the field. Tubers remaining in the field can survive the winter and become a weed in the following crop. Volunteer potatoes are extremely competitive with onions and are not effectively controlled with herbicides currently registered for use on onions. Volunteer potatoes can serve as hosts for late blight, verticillium wilt, viruses, and nematodes. Starane, a new herbicide registered for volunteer potato control in corn, may control volunteer potatoes effectively in onions. Starane was evaluated for volunteer potato control and for onion tolerance.

Methods

A trial was established at the Malheur Experiment Station to evaluate Starane, Buctril, and Goal for volunteer potato control in onions. The soil was an Owyhee Silt Loam with pH 7.2 and 1.6 percent organic matter. Potatoes were planted prior to onion seeding on April 27. Potatoes were planted in one-half of each plot so that herbicide effects on onions could be evaluated with and without potato competition. Single drop 'Norkotah' potato tubers were planted 6 inches deep directly into the two center rows of each plot with a spacing of one seed every 3 ft. Potato tubers weighed approximately 2 oz each. Onions (cv. 'Vision', Petoseed) were planted at a 3.7-inch spacing in double rows on 22-inch beds on April 29. Plots were four rows wide by 40 ft long. Lorsban was applied on a 6-inch band over each onion row at 3.7 oz per 1,000 ft of row. Onions were sidedressed with 150 lb N/acre as urea on May 23.

Annual weeds were controlled by applying Roundup (0.75 lb ai/acre) plus Prowl (1.5 lb ai/acre) prior to onion emergence on April 17 and Select (0.125 lb ai/acre) on May 18. Herbicide treatments were applied with a CO2-pressurized backpack sprayer calibrated to deliver 20 gal/acre at 30 psi. Herbicide treatments for volunteer potato control were applied on May 19, May 31, and June 14. At the first application, onions had two true leaves and potato plants were 5 inches tall. At the second application, onions had four true leaves and potatoes were 9 inches tall. The last application was to six-leaf onions and 16-inch-tall potatoes. All plots were maintained free of weeds other than volunteer potatoes by hand weeding regardless of herbicide effectiveness to allow the evaluation of the negative effects of volunteer potatoes on the onions.

Insecticides and fungicides were applied for thrips and downy mildew control as needed. On September 14, prior to onion harvest, potato tubers were dug, counted, and weighed for all potato plants in each plot to determine the effect of the herbicide treatments on tuber production. Tubers were placed in cold storage after harvest and maintained at approximately 90 percent relative humidity. The temperature was gradually reduced to 45°F. Tubers were taken directly from storage and evaluated for sprouting on February 28, 2002. Sprouting was evaluated by counting the number of tubers without sprouts, the number of tubers with sprouts < 0.25 inch long, the number of tubers with sprouts > 0.25 inch long, and the total number of sprouts. Decomposing tubers were not evaluated. Tuber and sprout

numbers were used to calculate the percent of tubers sprouting and the average number of sprouts per tuber.

Onion yield and grade were determined by harvesting the two center rows from each plot on September 13 and grading the onions by size on September 20.

Results and Discussion

Onion injury was greatest immediately after Starane applications and lessened over time (Table 1). Injury from herbicide applications to two-leaf onions ranged from 24 to 38 percent on May 24. Starane applied to two-leaf onions at 0.25 lb ai/acre produced greater injury than Starane applied at 0.125 lb ai/acre. On June 27, 13 days after the six-leaf application, onion injury was greatest in plots treated with Buctril plus Goal (two-leaf) followed by Starane (four-leaf) followed by Buctril plus Goal (six-leaf). On July 11, all treatments except Starane (0.25 lb ai/acre) applied at the two-leaf and four-leaf timings injured onions greater than the untreated check.

Volunteer potato control on June 27 and July 11 was greatest with treatments of or including Starane (0.5 lb ai/acre) applied to four-leaf onions or Starane (0.125 lb ai/acre) applied sequentially to two-, four-, and six-leaf onions (Table 1). Volunteer potato was completely controlled on July 11 with Starane applied at 0.5 lb ai/acre.

Volunteer potato tuber yields were variable and were not different among treatments with regard to number of tubers produced per plant, total weight of tubers per plant, or the average weight of individual tubers (Table 1). Evaluations of tuber sprouting showed that all treatments reduced the percent of tubers producing sprouts > 0.25 inch long and the average number of sprouts per tuber (Table 2). All treatments including Starane significantly reduced the percent of tubers with sprouts > 0.25 inch, percent of tubers sprouting, and the average sprouts per tuber compared to the sequential treatment of Buctril plus Goal.

Competition from volunteer potatoes was severely reduced due to disease symptoms visible on the majority of potato plants, including those in the untreated check. Despite reduced competition from volunteer potatoes, onion yields were generally greater in plots without volunteer potatoes (Table 3). Marketable onion yields were similar in plots both with and without potatoes for treatments including Starane (0.125 lb ai/acre) applied to two-, four-, and six-leaf onions, Starane (0.25 lb ai/acre) applied to four- and six-leaf onions, and Buctril plus Goal followed by Starane (0.5 lb ai/acre) followed by Buctril plus Goal. Early potato competition evidently reduced onion yields in plots treated with Starane (0.5 lb ai/acre) at the four-leaf onion growth stage.

Table 1. Onion injury and volunteer potato control with postemergence herbicide treatments, Malheur Experiment Station, Oregon State University, Ontario, OR, 2001.

*Treatments were applied on May 19 (2-leaf), May 31 (4-leaf), and June 14 (6-leaf).

Table 2. Volunteer potato tuber sprouting after storage in response to postemergence herbicide treatments, Malheur Experiment Station, Oregon State University, Ontario, OR, 2001.

*Treatments were applied on May 19 (2-leaf), May 31 (4-leaf), and June 14 (6-leaf).
†Tubers were evaluated for sprouting on February 28, 2002.

Table 3. Marketable onion yield in response to Starane applications, Malheur Experiment Station, Oregon State University, Ontario, OR, 2001.

*Treatments were applied on May 19 (2-leaf), May 31 (4-leaf), and June 14 (6-leaf).
†Onion yields followed by the same letter are not statistically different from each other.