

Early Postemergence Herbicide Weed Control in Onions

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Abstract

*Onions treated with bromoxynil (Buctril7) or oxyfluorfen (Goal7) at the time when the first true leaf was emerging were not injured. No significant onion crop stand reduction occurred from any of the postemergence (POST) treatments. Onion height was not affected by any of the POST treatments through the season. A single application of Goal or Buctril offered up to 7 WAT of very good weed control with excellent crop safety. Onions treated at the typical 2-leaf stage of growth with Buctril or Goal exhibited no significant crop injury. Delayed and reduced control of knotweed (*Polygonum aviculare*) could have contributed to the decreased onion yield in the herbicide treated onions compared to the handweeded check. Onions in the untreated check were significantly reduced compared to Goal treated onions or the handweeded check.*

Introduction

Previous studies conducted during the 1997-98 onion growing season indicated that postemergence (POST) applied herbicides, Buctril and Goal, were safe and effective when applied at earlier than the labeled time for application. Generally, onions should be at the 2-leaf stage of growth before a POST application can be made for weed control. Weeds compete vigorously with the onions when they escape preemergence (PREE) herbicide applications and delay crop maturity and may reduce crop yields and quality. These field studies were conducted to continue the investigations to ensure that Buctril and Goal at reduced rates can be applied safely to onions at an extremely early stage of growth.

Materials and Methods

Two small plot field tests were conducted at the University of Arizona Maricopa Agricultural Center (MAC), Maricopa, AZ and near Waddell, AZ. The tests were set up in a randomized complete block design with three replicates at MAC and four replicates in Waddell. Onions were planted on conventional 40-inch beds at both locations with cv. Desex planted on two seedlines at MAC on 30 October 1998 and cv. Rafiki planted on eight seedlines in Waddell on 28 October. All treatment plots consisted of two beds measuring 25 ft in length. All postemergence (POST) herbicide treatments were applied using a hand-held boom equipped with four flat fan 8002 nozzle tips spaced 20-inches apart. The herbicides were applied with a backpack CO₂ sprayer pressurized to 35 psi and delivering 20 gpa water. Applications were made at Waddell on 20 November when the onions exhibited a flag leaf and the first true leaf began to emerge. Weeds present were *Melilotus officinalis* (yellow sweetclover) at the cotyledon to 1-leaf stage and few small *Malva parviflora* (cheeseweed), *Sisymbrium irio* (London rocket), and *Sonchus oleraceus* (sowthistle). The weather was clear and sunny with the air temperature at 76°F and a slight breeze. Applications at MAC were made on 18 December when the weather was clear with the air temperature at 56°F. The onions at MAC were showing the emergence of the second true leaf. Weeds present at MAC were *Polygonum aviculare* (knotweed) at the 4-6 leaf stage, sowthistle at the 4-6 leaf stage, cheeseweed at the 4-leaf stage, *Chenopodium album* (lambsquarters) at the 4-6 leaf stage, and yellow sweetclover at the 2-3 trifoliolate stage. Visual observations were recorded for weed control and crop injury and crop height, stand establishment, and yield measurements were collected at appropriate intervals.

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Results and Discussion

Very early POST applications of Buctril or Goal caused no visible injury on onions at 11 days after treatment (DAT) or at 7 weeks after treatment (WAT) (Table1). No significant onion crop stand reduction occurred from any of the POST treatments. Onion height was not affected by any of the POST treatments through the season.

Goal gave excellent control of cheeseweed and London rocket at 7 WAT. At 11 DAT, yellow sweetclover was controlled but regrowth occurred from the injured weed and the degree of control was not acceptable at 7 WAT. Buctril did not provide acceptable control of cheeseweed and yellow sweetclover at the lower rates of application. The highest rate tested at 0.125 lb AI/A gave marginally acceptable control of cheeseweed and yellow sweetclover at 11 DAT.

Onions treated with Buctril or Goal at the time when the first true leaf was emerging were not injured in this test during a period of clear warm weather. A single application of Goal or Buctril offered up to 7 WAT of very good weed control with excellent crop safety. Minimal hand-hoeing was necessary to remove the few escape weeds in the test site.

Onions treated at the typical 2-leaf stage of growth with Buctril or Goal exhibited no significant crop injury at 7 WAT (Table 3). Onion yield increased slightly for each of the herbicides as rates increased. Weed control improved numerically as the rate of Buctril increased. Onions yields treated with Goal tended to be slightly higher than when treated with Buctril. Knotweed was marginally controlled by Goal compared to less than acceptable control offered by Buctril. Lambsquarters, cheeseweed, yellow sweetclover, and sowthistle were adequately controlled at 7 WAT by both herbicides. Complete weed control by hand-hoeing throughout the season allowed onions to provide the highest yield since no weed competition occurred. Delayed and reduced control of knotweed could have contributed to the decreased onion yield in the herbicide treated onions compared to the handweeded check. Onions in the untreated check were significantly reduced compared to Goal treated onions or the handweeded check.

Acknowledgments

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Table 1. Early Postemergence Herbicide Weed Control in Onions (Umeda and MacNeil)

| Treatment | Rate (lb AI/A) | <u>Onion Injury</u> | | <u>Onion Stand</u> | <u>Onion Height</u> | |
|-----------------|-------------------|---------------------|--------|--------------------|---------------------|--------|
| | | 01 Dec | 06 Jan | 28 Jan | 28 Jan | 07 Apr |
| | | % | | No./ft | inch | |
| Untreated check | | 0 | 0 | 41 | 11.3 | 24.0 |
| Buctril | 0.063 | 0 | 0 | 38 | 11.1 | 24.1 |
| Buctril | 0.094 | 0 | 0 | 39 | 10.3 | 24.4 |
| Buctril | 0.125 | 0 | 0 | 39 | 10.5 | 24.5 |
| Goal | 0.063 | 0 | 0 | 37 | 10.5 | 23.9 |
| Goal | 0.125 | 0 | 0 | 39 | 11.3 | 25.4 |
| LSD (p=0.05) | | 0 | 0 | 6.9 | 1.44 | 1.76 |

Herbicides applied on 20 November 1998 at Waddell, AZ

Onion stand = no. of plants / ft in 8 seedlines / bed, height = avg. ht. of 5 plants / plot

Table 2. Early Postemergence Herbicide Weed Control in Onions (Umeda and MacNeil)

| Treatment | Rate (lb AI/A) | <u>Weed Control (%)</u> | | | | |
|-----------------|-------------------|-------------------------|--------|--------|--------|--------|
| | | MALPA | | MEUOF | | SSYIR |
| | | 01 Dec | 06 Jan | 01 Dec | 06 Jan | 06 Jan |
| Untreated check | | 0 | 0 | 0 | 0 | 0 |
| Buctril | 0.063 | 69 | 74 | 68 | 50 | 91 |
| Buctril | 0.094 | 70 | 81 | 80 | 69 | 97 |
| Buctril | 0.125 | 83 | 83 | 88 | 80 | 99 |
| Goal | 0.063 | - | - | 89 | 80 | 99 |
| Goal | 0.125 | 99 | 99 | 93 | 81 | 98 |
| LSD (p=0.05) | | 12.4 | 6.7 | 9.6 | 11.7 | 5.6 |

Herbicides applied on 20 November 1998 at Waddell, AZ

MALPA = *Malva parviflora* (cheeseweed), MEUOF = *Melilotus officinalis* (yellow sweetclover), SSYIR = *Sisymbrium irio* (London rocket)

Table 3. Postemergence Herbicide Weed Control in Onions (Umeda and MacNeil)

| Treatment | Rate (lb AI/A) | Onion | Onion | Weed Control | | | | |
|------------------|-------------------|-------------|--------------|--------------|-------|-------|-------|-------|
| | | Injury % | Yield lb. | POLAV | CHEAL | MALPA | MEUOF | SONOL |
| Untreated check | | 0 | 10.3 | 0 | 0 | 0 | 0 | 0 |
| Handweeded check | | 0 | 27.7 | 99 | 99 | 99 | 99 | 99 |
| Buctril | 0.125 | 0 | 13.4 | 57 | 96 | 95 | 83 | 95 |
| Buctril | 0.25 | 0 | 13.5 | 78 | 96 | 91 | 90 | 98 |
| Buctril | 0.375 | 10 | 14.7 | 80 | 96 | 96 | 93 | 99 |
| Goal | 0.125 | 0 | 17.1 | 85 | 98 | 98 | 90 | 98 |
| Goal | 0.25 | 0 | 19.6 | 83 | 98 | 95 | 90 | 99 |
| LSD (p=0.05) | | 0 | 6.5 | 11 | 3 | 8.4 | 8.9 | 3.2 |

Herbicides applied on 18 December 1998 at MAC, rated 03 February 1999, harvested 20 May 1999.

Onion yield = weight / 5 ft of 2 rows harvested

POLAV = *Polygonum aviculare* (knotweed), CHEAL = *Chenopodium album* (lambsquarters), MALPA = *Malva parviflora* (cheeseweed), MEUOF = *Melilotus officinalis* (yellow sweetclover), SONOL = *Sonchus oleraceus* (sowthistle)