# Postemergence Herbicide Weed Control in Cole Crops Study

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## *Abstract*

*Weed control ratings at 3 weeks after treatment (WAT) showed that knotweed (Polygonum argyrocoleon) and yellow sweetclover (Melilotus officinalis) were not controlled by oxyfluorfen (Goal®), pyridate (Lentagran®), clopyralid (Stinger®), sulfentrazone (FMC), or carfentrazone (FMC). Carfentrazone at 0.50 lb AI/A gave good control (>89%) of London rocket (Sisymbrium irio) and sowthistle (Sonchus oleraceus). A lower rate at 0.125 lb AI/A provided acceptable control (85%). Carfentrazone at 0.50 lb AI/A caused severe broccoli and cabbage injury and crop stand reduction. Sulfentrazone at 0.50 lb AI/A gave nearly acceptable control of knotweed, London rocket, and sowthistle. Cabbage was severely injured and broccoli appeared to be more tolerant and injury was marginally acceptable (15%). Stinger and Goal gave nearly acceptable control of sowthistle. Goal at 0.094 lb AI/A gave 80% control of London rocket. Goal caused marginally acceptable injury (12 to 17%) and Stinger caused minimal crop injury. Goal appears to be ineffective against weeds at less than 0.094 lb AI/A and crop safety is very marginal. Lentagran was relatively safe on broccoli and cabbage but did not control the existing weed spectrum.*


## Introduction

Currently, there is no effective and safe postemergence (POST) herbicide available for cole crop production areas in the desert southwest. Broadleaved weeds, especially, are difficult to control and the mustard weeds are nearly impossible to control in the cole crops. Preemergence (PREE) herbicides supplemented by cultivations and hand-hoeing reduce most of the major weed infestations. Goal is labelled for use in transplanted cole crops and is phytotoxic when applied POST on cole crops. Lentagran is labelled for use in cabbage but has a limited weed spectrum which it controls. Stinger has previously demonstrated safety on cole crops but the weed spectrum appears to be limited. Sulfentrazone and carfentrazone are newly introduced herbicides that are being investigated for safety in several crops. These field tests were conducted to evaluate and determine weed control efficacy and crop safety of POST applied herbicides for potential use in cole crops.

## Materials and Methods

Two small plot field tests were conducted at the University of Arizona Maricopa Agricultural Center, Maricopa, AZ. The land was prepared per typical cultural practices and broccoli (cv. Captain) and cabbage (cv. Headstart) were planted on 40-inch beds with two seedlines per bed in November 1996. The crops were furrowed irrigated and watered as necessary. The tests were established with two beds per plot measuring 20 ft long and treatments replicated three times

in a randomized complete block design. The broccoli and cabbage were planted adjacent to each other in the same field. The POST herbicide treatments were applied using a $CO_2$ backpack sprayer equipped with a hand-held boom with four 8002 flat fan nozzle tips. The broadcast sprays were delivered in 22 gpa of water pressurized to 40 psi. At the time of applications on 09 January 1997, the cabbage was at the 2- to 4-leaf stage of growth and broccoli at the 2- to 3-leaf stage. Weeds present were *Sisymbrium irio* (London rocket) at the 2- to 3-leaf stage, *Polygonum argyrocoleon* (knotweed) at the 2- to 4-leaf stage, *Sonchus oleraceus* (sowthistle) at the 2-leaf stage, and *Melilotus officinalis* (yellow sweetclover) at the 2-leaf stage. The weather conditions at the time applications was clear skies with air temperature at 60 F and slight breeze at less than 3 mph. Visual observations were made on 31 Jan and 24 Feb when weed control and crop injury were rated.

## Results and Discussion

Weed control ratings on 31 Jan at 3 weeks after treatment (WAT) showed that knotweed and yellow sweetclover were not controlled by any of the herbicide treatments. Carfentrazone at 0.50 lb AI/A gave good control (>89%) of London rocket and sowthistle. A lower rate at 0.125 lb AI/A provided acceptable control (85%). Carfentrazone at 0.50 lb AI/A caused severe broccoli and cabbage injury and crop stand reduction. Sulfentrazone at 0.50 lb AI/A gave nearly acceptable control of knotweed, London rocket, and sowthistle. Cabbage was severely injured and broccoli appeared to be more tolerant and injury was marginally acceptable (15%). Stinger and Goal gave nearly acceptable control of sowthistle. Goal at 0.094 lb AI/A gave 80% control of London rocket. Goal caused marginally acceptable injury (12 to 17%) and Stinger caused minimal crop injury. Lentagran was relatively safe on broccoli and cabbage but did not control the existing weed spectrum.

These results indicate that range between weed control efficacy and crop tolerance for the herbicide rates may not be very wide and that further evaluations of carfentrazone and sulfentrazone at lower rates may be necessary. Lentagran and Stinger need to be tested on a broader spectrum of weeds. Goal appears to be ineffective against weeds at less than 0.094 lb AI/A and crop safety is very marginal.

Table. Postemergence herbicide weed control in cole crops. (Umeda, Gal, and Murrieta)

| Treatment | Rate | Crop Injury | | | | WeedControl* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (lb AI/A) | Broccoli | | Cabbage | | POLAG | | SSYIR | | SONOL | | MEUOF | |
| | | 31 Jan | 24 Feb | 31 Jan | 24 Feb | 31 Jan | 24 Feb | 31 Jan | 24 Feb | 31 Jan | 24 Feb | 31 Jan | 24 Feb |
| | | | | | | % | | | | | | | |
| Untreated check | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Oxyfluorfen | 0.063 | 12 | 0 | 12 | 5 | 71 | 55 | 65 | 48 | 80 | 56 | 38 | 25 |
| Oxyfluorfen | 0.094 | 12 | 5 | 17 | 5 | 76 | 51 | 80 | 47 | 84 | 50 | 58 | 45 |
| Pyridate | 0.5 | 8 | 5 | 12 | 10 | 35 | 8 | 46 | 21 | 73 | 45 | 16 | 36 |
| Pyridate | 1.0 | 5 | 8 | 7 | 3 | 27 | 20 | 33 | 20 | 77 | 57 | 33 | 39 |
| Clopyralid | 0.14 | 5 | 8 | 12 | 7 | 39 | 45 | 45 | 38 | 84 | 74 | 59 | 51 |
| Clopyralid | 0.28 | 5 | 2 | 3 | 3 | 40 | 61 | 41 | 20 | 83 | 81 | 79 | 64 |
| Sulfentrazone | 0.125 | 7 | 7 | 15 | 8 | 68 | 57 | 67 | 39 | 75 | 55 | 25 | 17 |
| Sulfentrazone | 0.25 | 10 | 8 | 15 | 8 | 64 | 64 | 63 | 35 | 79 | 58 | 40 | 14 |
| Sulfentrazone | 0.5 | 15 | 7 | 53 | 13 | 82 | 78 | 81 | 63 | 85 | 70 | 40 | 27 |
| Carfentrazone | 0.125 | 22 | 20 | 27 | 13 | 73 | 53 | 86 | 70 | 84 | 55 | 35 | 19 |
| Carfentrazone | 0.5 | 52 | 82 | 60 | 43 | 79 | 59 | 98 | 81 | 89 | 66 | 67 | 27 |
| LSD (p=0.05) | | 19.1 | 9.5 | | | | | | | | | | |

POST herbicide applications made on 09 January 1997.

*Average percent weed control of two tests.

POLAG = *Polygonum argyrocoleon* (knotweed), SSYIR = *Sisymbrium irio* (London rocket), SONOL = *Sonchus oleraceus* (sowthistle), MEUOF = *Melilotus officinalis* (yellow sweetclover)