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# Selective Post-Emergence Control of *Oxalis corniculata* in *Cymbidium hybrida*<sup>1</sup>

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## Abstract

This investigation was performed to determine the effectiveness of selective post-emergent herbicides for control of *Oxalis corniculata* L., creeping woodsorrel in container grown cymbidium orchids. Triclopyr, [(3,5,6-trichloro-2-pyridinyl)oxy] acetic acid, (Turflo) and 2,4-D Amine, (2,4-dichlorophenoxy) acetic acid (Weedar 64) were applied as spot and broadcast treatments. Weed and crop phytotoxicity were monitored. Turflon (Triclopyr) at 1.12 kg/ha (1.0 lb ai/A) provided complete oxalis control with both spot and broadcast treatments. No crop phytotoxicity was noted. Weedar 64 (2,4-D amine) spot treated at 4 gm ai/l reduced oxalis populations by 60% after 8 weeks, with no observed crop injury.

**Index Words:** Cymbidiums, weed control, herbicides, 2,4-D, triclopyr, Turflon

## Introduction

The environment created for nursery stock is quite often the optimum environment for many weed species. Fertile soil, regular watering, and controlled light intensity are necessary to grow good nursery stock, but also are inviting for the introduction and growth of weeds. Weed infestations in container stock are especially damaging, and difficult to control, since crop and foliage are often entwined. Control of weed growth in orchid culture has historically been accomplished by hand-weeding or by roguing out and discarding infested containers.

Rentoul (1) reports that light is the first consideration in orchid culture with partial shading optimum. Holt (2) found that low to moderate light levels greatly enhance the growth of *oxalis corniculata* L., creeping woodsorrel. Rentoul (1) also reported that ideal temperatures for orchid growth are between 18°C and 27°C (64–81°F). Holt (2) found the optimum growth of oxalis to occur at 16°C to 27°C (61–81°F). It seems that light and temperature requirements of both species are almost identical. The conditions created for orchid growth are an invitation to oxalis infestation. Oxalis is one of the most serious weeds in container grown plants (2).

Much work has been done on control of oxalis in turf-grasses. Elmore (3) reports that oxalis is the principal turf pest in many areas. Historically, Silvex (2,4,5-TP) has been used for selective, non-phytotoxic control of oxalis in turf. With its banning, research was begun on replacement herbicides. 2,4-D has been widely used, giving adequate to unsatisfactory results on oxalis (3). The most promising herbicide for selective control of *Oxalis corniculata* L., in turf, is triclopyr, sold as Turflon.

Elmore (3) applied triclopyr to oxalis in *Festuca arundinaceae* (Schreb.) (tall fescue) and *Lolium perenne* L. (Italian rye-grass) at rates of 0.56 kg/ha (0.5 lb/A) and 1.12 kg/ha (1.0 lb/A). Warm season turfgrass species showed some

sensitivity to the herbicide. Spaulding (5) also reported success in controlling oxalis in turf with triclopyr. It is apparent that triclopyr is very active on *Oxalis corniculata* L., with little or no phytotoxicity to turf grasses.

Weed control in container grown orchids is difficult. This study was initiated to study the effectiveness of several herbicides for selective control of *Oxalis corniculata* L., creeping woodsorrel in container grown cymbidium orchids.

## Materials and Methods

A group of 30 mature cymbidium orchids in 15 L (#5) containers, were selected on the basis of uniform orchid size and health, with a uniform oxalis infestation. Spot treatments were applied to the point of runoff using a hand-held sprayer. Broadcast applications were applied with a hand-held compressed air small plot sprayer. The pressure was 2.1 kg/cm<sup>2</sup> (30 psi) and the volume was 430 l/ha (45.9 g/A). Each plant was rated for phytotoxicity, on a scale of 0 to 10, where 0 represented no injury, and 10 represented plant death. Oxalis control was rated on an identical scale, where 0 represented no control, and 10 represented complete death of the oxalis. All research was performed at the Weed Research Unit, California Polytechnic State University, San Luis Obispo. All herbicide rates are based on active ingredients. A completely randomized design, with three replications, was utilized. All orchids were grown in an aluminum lathhouse, with 50% shading. The soil media was a mix of fir bark and sawdust (1:1 by vol).

Treatment #1 was a control group, receiving no herbicides. Identical watering and care was given to this group, as those plants receiving herbicide applications.

For treatments #2 and #3, Turflon (triclopyr) butoxyethyl ester was spot applied to runoff at rates of 1.3 gm ai/l (0.17 oz/gal) and 2.6 gm ai/l (0.34 oz/gal). A single application was made. No surfactant was used.

Treatments #4 and #5 were designed to assess possible orchid phytotoxicity. Broadcast applications of Turflon (triclopyr) were made at rates of 0.56 kg/ha (0.5 lb/A) and 1.12 kg/ha (1.0 lb/A). Herbicide concentration was identical in spot and broadcast treatments.

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Table 1. *Oxalis corniculata* L. control with post-emergence applications of 2,4-D and triclopyr.

Treatment	Application method	Rate	Evaluation Date							
			May 23	May 30	June 6	June 13	June 20	June 27	July 3	July 11
Control	None		1.7 <sup>z</sup>	1.0	0.7	0.3	0.0	0.0	0.0	0.0
Turflon	Spot	1.3 g/l (0.17 oz/gal)	7.0	7.3	7.7	7.3	7.3	7.3	7.3	7.3
Turflon	Spot	2.6 g/l (0.34 oz/gal)	7.7	9.3	9.7	9.7	9.7	10.0	10.0	10.0
Turflon	Broadcast	0.56 kg/ha (0.5 lb/A)	8.0	8.0	7.7	6.7	7.0	6.3	6.3	6.3
Turflon	Broadcast	1.12 kg/ha (1.0 lb/A)	8.0	9.3	10.0	8.7	9.0	9.0	9.7	10.0
2,4-D	Spot	2.0 g/l (0.2603/gal)	5.3	4.7	4.3	4.0	3.7	3.3	3.3	2.7
2,4-D	Spot	4.0 g/l (0.5203/gal)	7.0	7.0	5.3	5.3	5.0	4.3	4.3	4.3
2,4-D	Broadcast	0.84 kg/ha (0.75 lb/A)	5.0	3.7	2.7	0.7	0.7	0.7	0.0	0.0
2,4-D	Broadcast	1.68 kg/ha (1.5 lb/A)	6.7	6.0	5.0	2.3	2.0	2.0	1.3	0.7
LSD 5%			2.4	3.2	2.9	3.7	3.0	3.1	2.7	2.1

<sup>z</sup>Rating system: 0 = no control; 10 = complete control.

For treatments #6 and #7, spot applications of Weedar-64 (2,4-D dimethylamine salt) were made at rates of 2.0 gm ai/l (0.26 oz/gal) and 4.0 gm ai/l (0.52 oz/gal). A non-ionic surfactant, X-77, was used at the rate of 2.5 ml/l (3.2 oz/10 gal). A single application to runoff was made.

Treatments #8 and #9 were also designed to assess possible phytotoxicity. Weedar-64 (2,4-D) was broadcast applied at 0.84 kg/ha (0.75 lb/A) and 1.68 kg/ha (1.5 lb/A). X-77 surfactant was added at 2.5 ml/l (3.2 oz/10 gal).

All plants were treated on May 16, 1986. Temperature was 29°C (84°F). Weather was sunny, with a slight wind of less than 8 km/hr (5 mph).

All plants were monitored weekly for oxalis control and phytotoxicity. A 300 ppm N, ammonium nitrate solution was applied, using a hose end proportioner, on June 6th.

## Results and Discussion

Turflon (triclopyr) spot applied at 1.3 gm ai/l (0.17 oz/gal) reduced oxalis populations by 70% within 2 weeks, and maintained this level of control throughout the monitoring period. At the 2.6 gm ai/l (0.34 oz/gal) rate, 90% control was achieved within 2 weeks, and complete control was achieved 6 weeks after application. Herbicidal activity was apparent within 1 week of application, at both rates. No phytotoxicity was found at either rate. The 2.6 gm ai/l rate of Turflon applied as a spot treatment, was the most effective treatment in the experiment.

With the broadcast applications of Turflon (triclopyr), the orchid foliage prevented good herbicidal contact with the oxalis. Nevertheless, the weed population was reduced by 60%, after 8 weeks, at the 0.56 kg/ha (0.5 lb/A) rate, and complete control was achieved at the 1.12 kg/ha (1.0 lb/A) rate. Herbicidal activity was apparent within 1 week of application. No phytotoxicity was noted.

Weedar-64 (2,4-D) spot treated at 2.0 gm ai/l (0.26 oz/gal) reduced oxalis populations by 30% 8 weeks after application. The 4.0 gm ai/l (0.52 oz/gal) rate applied as a spot treatment, reduced oxalis populations by 40% after 8 weeks. Initial herbicidal activity was very good at both rates,

but regrowth began approximately 3 weeks after applications. No cymbidium phytotoxicity was noted.

Broadcast applications of Weedar-64 (2,4-D) initially provided good oxalis control, but regrowth occurred only 2 weeks after application. Eight weeks after application, broadcast treatments of Weedar-64 (2,4-D) provided the poorest control in the experiment. At the 0.84 kg/ha (0.75 lb/A) rate, no oxalis control was found after 8 weeks, and the 1.68 kg/ha (1.5 lb/A) rate reduced oxalis populations by only 10%. Orchid foliage again prevented good herbicide contact. No crop phytotoxicity occurred.

## Significance to the Nursery Industry

Cymbidium growers experiencing problems with oxalis infestation will find that either spot or broadcast applications of 'Turflon' (triclopyr) at 2.6 g/l (0.34 oz/gal) or 0.56 kg/ha (0.5 lb/A) applications respectively will effectively control the creeping woodsorrel with no phytotoxicity. Since mechanical methods of control are both expensive and ineffective, this chemical treatment will provide much better control at lower cost. Further experimentation must be done to assess activity on other orchid species.

**(Ed. Note:** This paper reports the results of research only and does not imply registration of a pesticide under amended FIFRA. Before using any of the products mentioned in this research paper, be certain of their registration by appropriate state and/or federal authorities.)

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