Evaluation of oxadiargyl herbicide in various Australian horticultural crops

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Introduction

Oxadiargyl was screened for weed efficacy and crop safety in a range of horticultural crops in Australia. Globally, oxadiargyl was developed for rice and sugar cane, however the product is also being evaluated in sunflower, transplanted vegetables and perennial crops. This work was funded by Horticulture Australia Ltd, through levies provided by Australian vegetable growers.

Product Characteristics

- Belongs to oxadiazole chemical group – acts by inhibition of protoporphyrinogen oxidase.
- Pre-emergent and early post emergent weed activity.
- Activity on both grass and broadleaf weeds.
- Activity not affected by soil type as strongly as other herbicides.

Assessments were conducted as whole plot subjective ratings using the European Weed Research System (EWRS) scales for weed control efficacy (1 = total control, 9 = no effect on weeds) and crop tolerance (1 = healthy plant, 9 = crop killed).

Results

Table 1. Average EWRS weed control ratings for different weeds species for oxadiargyl applied pre weed emergence at 400 g a.i./ha

Weed	No Sites	Average EWRS Rating	Standard Error
Amaranthus powellii	3	2.7	0.2
Chenopodium album	6	2.1	0.5
Eleusine indica	3	1.3	0.1
Nicandra physaloides	4	1.9	0.9
Polygonum aviculare	1	6.3	-
Raphanus raphanistrum	4	4.7	1.3
Solanum nigrum	9	2.4	0.5

Table 2. Average EWRS crop tolerance ratings for various crops with oxadiargyl applied pre transplant (PT) or post plant pre crop emergence (PE).

Crop	Application Timing	Rate (g a.i./ha)	No Sites	Average EWRS Rating	Standard Error
Broccoli	PT	400	4	1.9	0.3
Cabbage	PT	400	3	1.4	0.4
Capsicum	PT	400	3	1.6	0.5
Cauliflower	PT	400	1	1.0	-
Lettuce	PT	200	2	2.2	1.2
Carrots	PE	200	2	4.1	1.3
Carrots	PE	400	1	7.8	-
Potato	PE	400	3	2.0	0.6
Pumpkin	PE	400	1	4.0	-
Squash	PE	400	1	6.0	-

Capsicums – Oxadiargyl 400 g ai/ha (left) and Untreated Control (right)

Broccoli - Oxadiargyl 600 g ai/ha (left) and Untreated Control (right)

Discussion

Oxadiargyl potentially offers a new class of herbicide chemistry for management of weeds in a range of horticultural crops. Characteristics which make it particularly suitable to annual horticultural crops include:

- Short residual activity
- Broad weed spectrum
- High crop safety on wide range of soils

Oxadiargyl has potential for use in lettuce, capsicums, potatoes, and transplanted brassicas, for which few herbicides are registered.

Oxadiargyl provides effective of Solanaceae weeds, such as *Solanum nigrum*, in crops such as potatoes and capsicums, which are from the same family