Research Note

HERBICIDE SCREENING IN CILANTRO AND SPINY CORIANDER[1,2]

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Cilantro or coriander (*Coriandrum sativum* L.) and spiny coriander (*Eryngium foetidum* L.) are aromatic crops that have been industrialized in Puerto Rico. During 1992-93, the contribution of cilantro and spiny coriander to the agricultural gross income was $451,000 and $399,000, respectively (Departamento de Agricultura, 1993)[5]. One of the limitations in the production of both crops is the lack of registered herbicides. Therefore, weeds interfering with these crops reduce yields, increase production costs and add foreign material to the processed product. The objective of this study was to evaluate the efficacy and phytotoxicity of preemergence and postemergence herbicides in cilantro and spiny coriander.

Two experiments were established at different planting dates but treatments were the same. The experiments were established at the Gurabo Substation on a Mabi clay soil (Fine, montmorillonitic, isohyperthermic Vertic Eutropepts) with a pH of 6.5. For both experiments, treatments included weed-free (hand weeded), weedy plots (checks), DCPA at 8.9 and 17.9 kg ai/ha, napropamide at 2.24 and 4.48 kg ai/ha, oxyfluorfen at 0.13 and 0.26 kg ai/ha, bentazon at 0.56 and 1.12 kg ai/ha, and sethoxydim at 0.22 and 0.44 kg ai/ha. Bentazon and sethoxydim were the postemergence herbicides. A drip irrigation system was installed to provide irrigation as needed.

In the cilantro experiment, plots were 1.4 m wide by 3.05 m long. Within a bed, three cilantro rows were directly seeded 25 October 1993 following farmers' management practices. Preemergence (PRE) herbicide applications were made immediately after seeding. Postemergence (POE) herbicides were applied 12 days after seeding. Bentazon at the rates of 0.56, 1.12 and 1.68 kg ai/ha was included. Herbicide treatments were applied with a CO_2 pressurized backpack sprayer that delivered 187 L/ha. Visual estimates of weed control and crop injury were made six weeks after PRE herbicide applications. For yield determination, 1.4 m^2 of each plot was harvested 53 days after seeding.

In the spiny coriander experiment, plots were 1 m wide by 2.44 m long. Five-week-old plants were transplanted 14 June 1994 in six rows within a bed. Distance between plants was 15.2 cm (96 plants per plot). Preemergence herbicides were applied a day after transplanting (DAT). Postemergence herbicides were applied eight DAT. Visual estimates of weed control and crop injury were made five weeks after transplanting. The whole plot of spiny coriander was harvested 50 DAT.

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[5]Departamento de Agricultura, 1993. Ingreso Bruto Agrícola de P.R., 1992-93. Estadísticas Agrícolas. Departamento de Agricultura de P.R.

TABLE 1.—*Weed control, herbicide phytotoxicity to cilantro, and yield.*

Treatment	Rate	Weed Control[1]		Crop phytotoxicity	Yield
		Broadleaves[2]	Grasses		
	kg ai/ha	%			g/1.4 m²
Weedy check	—	0	0	0	99.4
Weed-free check	—	100	100	0	519.7
Bentazon	0.56	3	0	0	36.9
Bentazon	1.12	25	0	0	53.9
Bentazon	1.68	30	0	0	31.2
DCPA	8.90	2	10	0	48.3
DCPA	17.90	0	40	0	17.0
Napropamide	2.24	25	52	0	88.0
Napropamide	4.48	37	65	0	147.7
Oxyfluorfen	0.13	17	70	0	71.0
Oxyfluorfen	0.26	25	83	8	65.3
Sethoxydim	0.22	0	40	0	34.1
Sethoxydim	0.44	0	97	0	133.5
LSD (0.05)		37	36	NS	255.0

[1]Weed control and phytotoxicity index are based on: 0 = no effect (no weed control or no crop reduction or injury), 100 = complete effect (complete weed or complete crop destruction).

[2]Wild poinsettia (*Euphorbia heterophylla*) density = 315 plants per square meter; wild poinsettia was more than 90% of broadleaf density.

For both experiments, a randomized complete block design (RCBD) with three replicates was used. Means were separated by least significant differences (LSD) at $P \leq 0.05$.

The highest cilantro yield was obtained from the weed-free check (519.7 g/1.4 m²) (Table 1). *Euphorbia heterophylla* L. (wild poinsettia) was the most abundant weed in the cilantro experiment. Wild poinsettia control was poor with all treatments (Table 1). Bentazon, a broadleaf herbicide, did not control wild poinsettia even at the highest rate (1.68 kg ai/ha). Oxyfluorfen at 0.26 and sethoxydim at 0.44 kg ai/ha gave 80 and 97% control of grasses, respectively. Neither of the herbicides evaluated was phytotoxic to cilantro. There were no significant differences in yield among the herbicide treatments and the weedy-check. These results could be attributed to the fact that wild poinsettia density was high (315 plants per square meter). Even with excellent grass control, the interference by wild poinsettia did not allow cilantro to develop.

The highest spiny coriander yield was obtained from the weed-free check (1029 g/2.44 m²) (Table 2). With DCPA at 8.90 kg ai/ha, napropamide at 4.48 kg ai/ha and bentazon at both rates, spiny coriander yields were lower than with oxyfluorfen at 0.26 kg ai/ha. Wild poinsettia, gale of the wind (*Phyllanthus niruri* L.), wild bean (*Phaseolus adenanthus* G. F. W. Meyer) and junglerice [*Echinochloa colona* (L.) Link] were the most common weeds in the spiny coriander experiment. Oxyfluorfen at 0.26 kg ai/ha gave 82 and 90% control of grasses and broadleaves, respectively (Table 2). Sethoxydim at 0.22 and 0.44 kg ai/ha gave 72 and 80% control of grasses, respectively. Bentazon at 0.56 and

TABLE 2.—*Weed control, herbicide phytotoxicity to spiny coriander, and yield.*

Treatment	Rate	Weed control[1]		Crop phytotoxicity	Yield
		Broadleaves	Grasses		
	kg ai/ha	%			g/2.44 m²
Weed-free check	—	100	100	0	1029
Bentazon	0.56	55	3	77	18
Bentazon	1.12	72	7	78	18
DCPA	8.90	13	58	0	312
DCPA	17.90	37	48	0	549
Napropamide	2.24	13	72	0	455
Napropamide	4.48	7	92	0	331
Oxyfluorfen	0.13	30	20	0	567
Oxyfluorfen	0.26	90	82	0	691
Sethoxydim	0.22	3	72	0	445
Sethoxydim	0.44	3	80	0	606
LSD (0.05)		26	33	3	319

[1]Weed control and phytotoxicity index are based on: 0 = no effect (no weed control or no crop reduction or injury), 100 = complete effect (complete weed destruction or complete crop destruction).

1.12 kg ai/ha gave 55 and 72% control of broadleaves, respectively. Of the herbicides evaluated, only bentazon was phytotoxic to spiny coriander. Oxyfluorfen and sethoxydim are good candidates for weed control in cilantro and spiny coriander, but additional research on efficacy and crop residue is needed.