Evaluation of Alachlor for Weed Control in Container Grown Ornamentals

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WEED CONTROL is a major labor requirement of most container grown nursery operations. Several studies have shown alachlor [2-chloro-2'-6'-diethyl-N (methoxymethyl)-acetanilide] 15 G to be an effective herbicide for container grown nursery stock[2,3,4,5].

The research reported here was conducted by the Alabama Agricultural Experiment Station in cooperation with the IR-4 program, a project designed to improve registration of pesticides for minor use crops such as ornamentals. Evaluations were made of (1) the efficacy of alachlor for weed control in selected container grown ornamentals, (2) phytotoxicity of alachlor, and (3) effects of alachlor on the growth of container grown plants.

Plant species used were *Aucuba japonica, Cleyera japonica, Gardenia jasminoides, Liriope muscari, Photinia fraseri,* and *Pittosporum tobira.* Rooted cuttings were potted into 1-gallon plastic containers in a pine bark-sand medium (4:1 ratio, volume basis). Medium amendments included gypsum, 2 pounds per cubic yard; triple superphosphate, 2 pounds per cubic yard; dolomitic limestone, 6 pounds per cubic yard; Aqua gro, 1 pound per cubic yard; and Esmagran minor elements, 4 pounds per cubic yard.

Treatments of 15 G alachlor were surface applied at the rates of 4, 8, and 16 pounds active ingredient per acre 14 days after potting (May 14). A second application was made 60 days later. All treatments were replicated four times with four containers per replication in a randomized block design.

The major weeds in the containers were common ragweed *(Ambrosia atremisiifolia),* bermudagrass *(Cynodon dactylon),* pigweed *(Amaranthus* sp.), and crabgrass *(Digitaria sanguinalis).* These four weed species were sown prior to herbicide application.

Aucuba and *Pittosporum* species were grown in a shade house with 41 percent

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[3]RYAN, G.F. 1976. Control of Bittercress, Common Groundsel and Barnyardgrass in Two Nursery Container Media. Proc. West. Soc. Weed Sci. 29:156-168.

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[5]WEATHERSPOON, D.M. AND W.L. CURREY. 1978. Herbicide Phytotoxicity Evaluations for Woody Ornamentals. HortScience 13:357.

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TABLE 1. EFFECTS OF ALACHLOR ON PERCENT WEED CONTROL IN SIX CONTAINER GROWN ORNAMENTAL PLANTS, 1980[1]

Treatment	Weed control on three dates																	
	Aucuba			Cleyera			Gardenia			Liriope			Photinia			Pittosporum		
	6/20	8/6	10/23	6/20	8/6	10/23	6/20	8/6	10/23	6/20	8/6	10/23	6/20	8/6	10/23	6/20	8/6	10/23
	Pct.	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*
Alachlor[2]																		
4 lb.	100a	94a	99a	98a	88a	97a	100a	95a	99a	99a	83a	92a	82b	83b	93b	100a	93b	100a
8 lb.	100a	96a	99a	99a	89a	98a	100a	100a	100a	99a	88a	96a	93a	84b	96ab	100a	98a	99a
16 lb.	100a	99a	100a	98a	88a	100a	99a	100a	100a	99a	90a	100a	97a	94a	99a	100a	100a	100a
Hand weed	20b	45b	90b	0b	75b	86b	6b	74c	97b	0b	68b	77b	0c	69c	93b	53b	65c	93b
No weeding	20b	0c	0c	0b	0c	0d	0b	0d	0c	0b	0c	0c	0c	0c	0d	30b	0d	0c

[1]Mean separation within columns by Duncan's Multiple Range Test, 5 percent level.
[2]Active ingredient per acre.

TABLE 2. EFFECTS OF ALACHLOR ON GROWTH OF SIX CONTAINER GROWN ORNAMENTAL PLANTS[1]

Treatment	Aucuba		Cleyera		Gardenia		Liriope		Photinia		Pittosporum	
	Height	Width	Height	Width	Height	Width	Height	Width	Height	Width	Height	Width
	In.	*In.*	*In.*	*In.*	*In.*	*In.*	*In.*	*In.*	*In.*	*In.*	*In.*	*In.*
Alachlor[2]												
4 lb.	7b[3]	8a	15a	10bc	24a	19ab	9b	17ab	25a	14a	9a	11a
8 lb.	9a	9a	14a	11b	22a	18ab	10a	19a	21a	14a	9a	10ab
16 lb.	8ab	8a	16a	13a	26a	20a	10a	19a	26a	13a	9a	9b
Hand weed	7ab	8a	15a	11b	24a	20a	9b	16b	25a	13a	8ab	9b
No weeding	5c	5b	11b	8c	20b	17b	5c	10c	15b	7b	7b	9b

[1]Data collected November 1, 1980.
[2]Active ingredient per acre.
[3]Mean separation within columns by Duncan's Multiple Range Test, 5 percent level.

saran shading. Germination of the sown weed species was slowed under shade compared to full sun treatments. All other species were grown in full sun conditions. Plants were fertilized weekly with 150 p.p.m. N, 125 p.p.m. K, and 65 p.p.m. P in the form of Peters 20-20-20 commercial fertilizer (Peters Fertilizer Company, Fogelsville, Pennsylvania).

All rates of alachlor equaled or increased the percent weed control in comparison to the hand weeded check treatments, table 1. No difference in percent weed control was observed when the three rates of alachlor were compared. All rates of alachlor provided 80-100 percent weed control. The final evaluation of percent weed control was conducted 90 days after the last application of alachlor.

Shoot growth (height and width) was not suppressed with alachlor at any rate, table 2. Hand weeded liriope and unweeded check treatments exhibited reduced shoot growth as compared to the alachlor treatments. No phytotoxicity was observed with any rate of alachlor on any tested species. However, both *Photinia* and *Cleyera* exhibited foliar chlorosis within 4 weeks of alachlor application. Evaluation of the data indicated no phytotoxicity occurred as a result of alachlor treatments. This is in contrast to earlier research in which *Photinia* exhibited phytotoxicity when treated with alachlor. In this study, treatment of both species with sesquestrene Fe corrected the foliar chlorosis symptoms.

In summary, these data show alachlor to be an effective herbicide on the six container grown, ornamental species tested. Excellent weed control and no phytotoxicity were observed with any rate of alachlor applied.