

HERBICIDE USE IN PROPAGATION¹

M. THETFORD, C. H. GILLIAM AND W. J. FOSTER

Department of Horticulture
Alabama Agricultural Experiment Station
Auburn University, Alabama 36849

INTRODUCTION

Weed control has become increasingly important during propagation, with many growers direct sticking cuttings in outdoor beds or greenhouses. Limited work has been done in propagation research evaluating herbicidal activity on stock plants and subsequent root initiation (1,2). Recent research has shown that some herbicides suppress root growth on woody plants (3). Johnson (4) evaluated the effects of herbicides on rooting percentages and root quality of four ornamental species in New Jersey and reported a significant reduction in the root quality of *Cotoneaster horizontalis* in all herbicide treatments. Rooting percentages of *C. horizontalis* were reduced by Dual, Devrinol and Ronstar treatments, while rooting percentages of *Rhododendron* were reduced only in the Surflan treatment.

The object of this study was to evaluate the effects of selected preemergence applied herbicides on the rooting of certain ornamental species grown in the southern United States.

METHODS AND MATERIALS

Experiment 1 (Auburn): On 4 September 1987, 3-in. rose pots were filled with the medium and watered to field capacity. The medium consisted of equal parts of ¼-in. screened amendment-grade pine bark and coarse sand, amended with 7 lb. of 18-6-12 Osmocote per cu. yd. Herbicides were then applied at the recommended rates and watered in. Treatments included: (1) Ronstar 2G, 4 lb/ai/A; (2) OH-2 3G, 3 lb/ai/A; (3) Rout 3G, 3 lb/ai/A; (4) Prowl 60DF, 3 lb/ai/A; (5) Prowl 2.45G, 3 lb/ai/A; and (6) non-treated control. Herbicides were applied to the medium prior to sticking the cuttings.

Plant species evaluated included *Lagerstroemia indica* 'Catawba', *Ilex crenata* 'Compacta', *Berberis* × *mentorensis* 'Rose Glow', *Ilex* × *attenuata* 'Foster No. 2', *Spiraea cantoniensis*, and *Euonymus japonica*. Data collected after 10 weeks included: rooting percentage, root length (mean of 3 longest roots), primary root number, and root rating. The root rating scale was 1 to 5 where 1 = no roots, 2 = few short, clubby, distorted roots, 3 = light rooting, 4 = medium rooting, 5 = heavy rooting.

¹ Student paper by Mack Thetford, Graduate Research Assistant

Experiment 2 (Mobile, Ala.): Experiment 2 was conducted under conditions similar to standard nursery practices of the Mobile area. On 11 September 1987, 3¼-in. square liner pots were filled with 100% milled pinebark amended with 6 lb dolomitic limestone, 2 lb gypsum, and 1.5 lb Micromax per cu. yd.

Treatments for Experiment 2 were similar to Experiment 1. Plant species included *Gardenia jasminoides* 'Radicans' dwarf gardenia, *Rhododendron* Glenn Dale Hybrid 'Trouper', and *Rhododendron indicum* 'Formosa'. Data will be presented for five species: barberry, Foster holly, euonymus, 'Trouper' azalea, and dwarf gardenia.

RESULTS AND DISCUSSION

Herbicides ranked according to safety—from least injury to greatest injury—were: Ronstar, Prowl 2.45G, OH-2, Prowl 60DF, and Rout (Table 1). Prowl 2.45G and OH-2 suppressed rooting or root formation of 2 species: euonymus and 'Trouper' azalea. These 2 species were also affected by Prowl 60DF; other species sensitive to application of Prowl 60DF included 'Catawba' crapemyrtle, dwarf gardenia, and Foster holly. Rout suppressed rooting of six of the ornamental species tested: Foster holly, 'Rose Glow' barberry, 'Compacta' Japanese holly, euonymus, 'Trouper' azalea, and dwarf gardenia. Root ratings and root length of dwarf gardenia were also suppressed with Rout; Prowl 2.45G resulted in lower root ratings for gardenia compared to nontreated control.

Species affected by Ronstar were dwarf gardenia and 'Trouper' azalea. Dwarf gardenia had suppressed root length and primary root numbers when compared to the nontreated cuttings. Ronstar also suppressed 'Trouper' azalea rooting percentages (75% vs 91.7%) and root length compared to the nontreated cuttings. Results from Ronstar suppression concur with those of Johnson (4), which also demonstrated a reduction in the root density of *Cotoneaster*. These two species (gardenia and 'Trouper' azalea) were adversely affected by all herbicides in at least one of the four root parameters measured.

Several key factors are evident when using preemergence-applied herbicides in the propagation process. No one herbicide is safe on all woody plants. Ronstar, generally thought to be one of the safer herbicides, affected rooting or root growth of 'Trouper' azalea. Secondly, herbicide use may not affect the rooting percentage, but can still negatively affect subsequent development of the root system.

These data show that several herbicides were non-injurious to the rooting and subsequent root development of the majority of the ornamentals tested. This suggests that a potential exists for safe use of herbicides in propagation of direct stuck cuttings. Growers

should experiment on a small scale with a given herbicide before using any herbicide on their cuttings.

Table 1. Effects of selected herbicides on rooting of woody ornamentals.

	Herbicides					Nontreated
	Ronstar (2G) 4 lbs	OH-2 (3G) 3 lbs	Rout (3G) 3 lbs	Prowl (60DF) 3 lbs	Prowl (2.45G) 3 lbs	
<i>'Rose Glow' barberry^z</i>						
Rooted, %	95.2a ^y	95.9a	73.3b	100.0a	94.7a	90.0a
Root length (cm)	9.3a	9.3a	4.9b	6.8ab	7.3ab	7.4ab
No. primary roots	15.1a	17.2a	11.2a	14.8a	14.3a	18.6a
Root rating ^x	3.7a	3.7a	2.6b	3.3a	3.3a	3.4a
<i>Foster holly</i>						
Rooted, %	77.3a	83.3a	50.0b	83.3a	79.2a	86.4a
Root length (cm)	5.4a	6.5a	1.9bc	1.4c	3.9ab	5.3a
No. primary roots	6.4a	6.4a	2.2b	4.9a	5.9a	6.0a
Root rating	3.0a	3.2a	1.9b	1.9b	2.5ab	3.0a
<i>Euonymus</i>						
Rooted, %	100.0a	100.0a	100.0a	100.0a	100.0a	100.0a
Root length (cm)	10.1a	9.7ab	9.1ab	8.6b	9.3ab	8.8b
No. primary roots	26.5ab	21.1c	21.0c	24.8bc	24.1bc	30.3a
Root rating	4.0a	3.7b	3.4b	3.6b	3.6b	4.0a
<i>'Trouper' azalea^w</i>						
Rooted, %	75.0b	87.5a	91.7a	91.7a	87.5a	91.7a
Root length (cm)	1.5c	2.6bc	2.7bc	3.0b	3.1b	4.4a
Root rating	2.1c	2.5bc	3.0b	3.0ab	2.9b	3.6a
<i>Dwarf gardenia</i>						
Rooted, %	100.0a	100.0a	98.5b	100.0a	100.0a	100.0a
Root length (cm)	8.4a	7.9a	1.1b	7.9a	7.7a	8.1a
No. primary roots	14.1a	15.7a	9.7b	14.5a	13.5ab	12.4ab
Root rating	3.6a	3.6a	2.0c	3.3b	3.2b	3.6a

^zAuburn, Ala.—Expt. 1, 'Rosey Glow' barberry, Foster holly, and euonymus.

^yMean separation within rows by Duncan's multiple range test (5% level).

^xRoot rating scale: 1 = no roots, 2 = few short, clubby, distorted roots, 3 = light rooting, 4 = medium rooting, 5 = heavy rooting.

^wMobile, Ala.—Expt. 2, 'Trouper' azalea and dwarf gardenia.

LITERATURE CITED

- Ahrens, J. F. 1972. Rooting of rhododendron cuttings from container-grown plants treated with trifluralin and simazine. *The Plant Propagator*. 18(3):12-18.
- Fretz, T. A. 1973. Evaluation of several herbicides on subsequent rooting response of two container-grown azalea cuttings. *The Plant Propagator*. 29(4):23-26.
- Gilliam, C. H. and D. C. Fare. 1988. Effects of Surflan on root growth of Japanese holly. *HortScience*: (In press).
- Johnson, J. R. 1987. Some herbicides can control weeds among cuttings during propagation. *Amer. Nurs.* 166(4):157-160.