Postemergence Weed Control in Liners.

Mark A. Czarnota
University of Georgia, Dept. of Horticulture
Griffin, GA 30223

Index Words: Bittercress (*Cardamine hirsuta*), Burford holly (*Ilex cornuta* "Burfordii Nana'), Envoy (clethodim), Fusilade II (fluazifop-P), Garlon (triclopyr), Goal (oxyflourfen), Kinetic (polyalkyleneoxide modified polydimethylsiloxane and polyoxypropylene-polyoxyethylene copolymers), Lontrel (clopyralid), Postemergent Herbicides, Roundup (glyphosate), Shore juniper (*Juniperus conferta*), Spurge (*Euphorbia spp.*), Vantage (sethoxydim), Weedar 64 (2,4-D).

Nature of Work: Few postemergent herbicides are labeled for weed control in liners, and little information exists on weed control during this stage of nursery production. There are several selective postemergent herbicides on the market that are labeled for weed control in established ornamentals, but none are labeled for liners. A study was designed to evaluate several postemergent herbicides on both juniper and holly liners.

Methods: On June 27th, 2007 at the Center for Applied Nursery Research, 44 trays of both Burford holly (*Ilex cornuta* "Burfordii Nana') and Shore juniper (*Juniperus conferta*) were assembled. Each tray contained 72 cells and at the time of treatment each tray had at least half the cells filled with live plants. Each tray was also contaminated with both bittercress (*Cardamine hirsuta*) and spurge (*Euphorbia spp.*). Juniper and holly cutting were taken and stuck in January and February of 2007. Rooting media consisted of 50% perlite : 50% peatmoss. Four trays of each species were placed in a 6 ft. x 6 ft. area. Herbicide applications were then applied to the 8 trays in the 6' x 6' area. All treatments were applied with a CO_2 backpack sprayer calibrated to deliver 20 gallons per acre (GPA). Each treatment contained the surfactant Kinetic (polyalkyleneoxide modified polydimethylsiloxane and polyoxypropylene-polyoxyethylene copolymers) at 0.25% V/V. Trays were then moved to the assigned test area where they were arranged in a randomized complete block (RCB) design. Each treatment contained 4 replications. The process was continued for each herbicide treatment. Watering occurred four times a day for approximately 30 minutes (this represented approximately 2 to 1 inch of water per day). The treatment list was as follows:

#	Treatment	Formulation*	Active ingredient	Rate
1	Fusilade II	2.0 L	fluazifop-P	3.0 oz pr/A (0.047 lb ai/A)
2	Envoy	0.94 L	clethodim	20.0 oz pr/A (0.147 lb ai/A)
3	Vantage	1.0 L	sethoxydim	1.5 pt pr/A (0.187 lb ai/A)
4	Goal	2.0 L	oxyflourfen	2.0 pt pr/A (0.5 lb ai/A)
5	Weedar 64	3.8 L	2,4-D	0.526 qt pr/A (0.5 lb ai/A)
6	Lontrel	3.0 L	clopyralid	0.5 pt/A (0.187 lb ai/A)

7	Garlon	3.0 L	triclopyr	1.0 qt pr/A (0.75 lb ai/A)
8	Roundup Pro	4.0 L	glyphosate	1.0 pt pr/A (1.0 lb ai/A)
9	Envoy	0.94 L	clethodim	20.0 oz pr/A (0.147 lb ai/A)
9	Weedar 64	3.8 L	2,4-D	0.526 qt pr/A (0.5 lb ai/A)
10	Envoy	0.94 L	clethodim	20.0 oz pr/A (0.147 lb ai/A)
10	Lontrel	3.0 L	clopyralid	0.5 pt/A (0.187 lb ai/A)
11	UTC*			

*L=liquid formulation, UTC=Untreated control

Weed control and plant injury was taken at 4 and 8 weeks after treatment (WAT). A problem with the irrigation caused many of the plants and weeds to die shortly after the 8 WAT rating, thus ratings were discontinued. Weed control and plant injury were taken on a (0-100 scale) and numbers represented the following:

Value	Plant Symptoms
0	No visual injury present
10-30	Minimal injury to desirable plant. Less than 10% of the plant leaf service area showing chlorosis and necrosis.
40-70	More noticeable plant injury or stunting. Greater than 50% of the leaf area showing symptoms of chlorosis and/or necrosis.
80-90	Plants severally injured. Most of the leaves and leaf surface showing signs of chlorosis and necrosis.
100	Plant appears dead. No signs of regrowth.

Results and Discussion:

Treatments 5, 6, 7, 9, and 10 caused significant injury to Burford holly at both rating dates (Table 1). Junipers were significantly injured with treatments 5 and 7 at 4 WAT, and treatments 4 thur 10 at 8 WAT (Table 2). As expected, control of bittercress and spurge was significantly better than the untreated control (UTC) at both rating dates with all but treatments 1-3 (the grass herbicides) (Table 3).

Significance to Industry:

Results of this study have shown that no postemergent herbicide tested in this study can provide safety and control of weeds in two selected woody plant liners. More emphasis should be placed on the use of preemergent herbicides during this stage of nursery production.

Table 1. Injury to Burford Holly (*Ilex cornuta* "Burfordii Nana') at 4 and 8 WAT.

Treatment#	Treatment	Rate	Holly Injury	
			4 WAT	8 WAT
1	Fusilade II	3.0 oz pr/A (0.047 lb ai/A)	0 d	0 d
2	Envoy	20.0 oz pr/A (0.147 lb ai/A)	0 d	0 d
3	Vantage	1.5 pt pr/A (0.187 lb ai/A)	0 d	0 d
4	Goal	2.0 pt pr/A (0.5 lb ai/A)	1 d	0 d
5	Weedar 64	0.526 qt pr/A (0.5 lb ai/A)	73 ab	64 b
6	Lontrel	0.5 pt/A (0.187 lb ai/A)	23 c	35 c
7	Garlon	1.0 qt pr/A (0.75 lb ai/A)	85 a	91 a
8	Roundup Pro	1.0 pt pr/A (1.0 lb ai/A)	15 cd	10d
9	Envoy	20.0 oz pr/A (0.147 lb ai/A)	60 b	53 bc
	Weedar 64	0.526 qt pr/A (0.5 lb ai/A)		
10	Envoy	20.0 oz pr/A (0.147 lb ai/A)	18 c	55 bc
	Lontrel	0.5 pt/A (0.187 lb ai/A)		
11	UTC*		0 d	0 d
LSD			16.2	22.3

*Means followed by same letter do not significantly differ (P=0.05, LSD)

Table 2. Injury to Shore juniper (*Juniperus conferta*) at 4 and 8 WAT.

Treatment#	Treatment	Rate	Juniper Injury	
			4 WAT	8 WAT
1	Fusilade II	3.0 oz pr/A (0.047 lb ai/A)	3 d	0 b
2	Envoy	20.0 oz pr/A (0.147 lb ai/A)	3 d	0 b
3	Vantage	1.5 pt pr/A (0.187 lb ai/A)	0 d	0 b
4	Goal	2.0 pt pr/A (0.5 lb ai/A)	0 d	0 b
5	Weedar 64	0.526 qt pr/A (0.5 lb ai/A)	13 b	25 a
6	Lontrel	0.5 pt/A (0.187 lb ai/A)	5 cd	10 b
7	Garlon	1.0 qt pr/A (0.75 lb ai/A)	43 a	25 a
8	Roundup Pro	1.0 pt pr/A (1.0 lb ai/A)	4 d	8 b
9	Envoy	20.0 oz pr/A (0.147 lb ai/A)	10 bc	8 b
	Weedar 64	0.526 qt pr/A (0.5 lb ai/A)		
10	Envoy	20.0 oz pr/A (0.147 lb ai/A)	0 d	13 ab
	Lontrel	0.5 pt/A (0.187 lb ai/A)		
11	UTC*		0 d	0 b
LSD			5.4	13.4

*Means followed by same letter do not significantly differ (P=0.05, LSD)

Table 3. Control of Bittercress (*Cardamine hirsuta*) and Spurge (*Euphorbia spp.*) at 4 and 8 WAT.

Treatment#	Treatment	Rate	Bittercress Control		Spurge Control	
			4 WAT	8 WAT	4 WAT	8 WAT
1	Fusilade II	3.0 oz pr/A (0.047 lb ai/A)	0 d	33 bc	0 d	5 c
2	Envoy	20.0 oz pr/A (0.147 lb ai/A)	0 d	0 c	0 d	5 c
3	Vantage	1.5 pt pr/A (0.187 lb ai/A)	0 d	0 c	0 d	0 c
4	Goal	2.0 pt pr/A (0.5 lb ai/A)	78 bc	75 a	83 ab	50 a
5	Weedar 64	0.526 qt pr/A (0.5 lb ai/A)	94 ab	35 bc	90 a	35 ab
6	Lontrel	0.5 pt/A (0.187 lb ai/A)	70 c	55 ab	68 bc	40 a
7	Garlon	1.0 qt pr/A (0.75 lb ai/A)	98 a	43 ab	95 a	53 a
8	Roundup Pro	1.0 pt pr/A (1.0 lb ai/A)	65 c	55 ab	65 bc	35 ab
9	Envoy	20.0 oz pr/A (0.147 lb ai/A)	83 abc	55 ab	83 ab	38 ab
	Weedar 64	0.526 qt pr/A (0.5 lb ai/A)				
10	Envoy	20.0 oz pr/A (0.147 lb ai/A)	65 c	45 ab	58 c	15 bc
	Lontrel	0.5 pt/A (0.187 lb ai/A)				
11	UTC*		0 d	0 c	0 d	0 c
LSD			19.1	35.4	18.5	24.1

*Means followed by same letter do not significantly differ (P=0.05, LSD)