



Spurge Control in Juniper (*Juniperus horizontalis* 'Blue Rug') Liners

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NATURE OF WORK: To evaluate several pre and postemergence herbicides for the control of spurge (*Euphorbia maculata* and *esula*) in juniper liners. Growers of containerized nursery material primarily deal with 3 major weeds, and they include Woodsorrel (*Oxalis* spp.), Bittercress (*Cardamine* spp.), and Spurge (*Euphorbia* spp.). Other weeds are often encountered, but these 3 weeds encompass the major weed spectrum of most containerized nursery grower.

Euphorbia is difficult weed for several reasons. First, most containerized nursery's apply herbicides in early February, and do not apply a second application until late April / Early May. *Euphorbia* is very tolerant to many of the dinitroaniline (DNA) herbicides (i.e. Surflan, Treflan, Factor), and once these herbicides begin to breakdown, falling below the control threshold, *Euphorbia* is able to germinate and grow. Once germinated, a re-application of a preemergence herbicide is ineffective. Moreover, once *Euphorbia* is up and growing even the application of herbicides containing oxyfluorfen (XL, Rout, Regal OO), a postemergent knockdown herbicide, can fail to control established *Euphorbia* plants.

There are many other herbicide besides DNA herbicides that provide preemergent control of *Euphorbia*. If another post emergent herbicide could be used to control emerged *Euphorbia*, and this herbicide was followed by or combined with a preemergent herbicide, one would not have to be so concerned with getting a herbicide out before *Euphorbia* seed germinate.

MATERIAL AND METHODS: On September 12, 2002 at the Center for Applied Nursery Research, 18, 20" x 20" flats containing 64 rooted cutting of Blue rug junipers (*Juniperus horizontalis* 'Blue Rug') were assembled for the test. These flats were severally infested with spurge. Three flats were placed in a 6 ft. x 6 ft. area. In addition to the spurge plants already present, 5 grams of *Euphorbia maculata* seed was uniformly distributed over these three flats. Herbicide treatments were then applied to the area containing these flats. After the herbicide application was complete, flats were carefully moved to a stone pad, and arranged in a randomized complete block (RCB) design containing three replications. The process was continued for each herbicide treatment. Granular herbicides were uniformly applied with a cheese shaker jar, and sprays were applied with a CO₂ backpack sprayer calibrated to deliver 20 gallons per acer (GPA). Watering occurred on an as needed basis, and this represented approximately ½ to 1 inch of water per day. The treatment list was as follows:

Treatment#	Treatment	Rate
1	Basagran 4.0 SL	2.0 (lb ai/A)
1	Gallery 75 WP	1.0 (lb ai/A)
1	Kenitic 100 SL	0.25 % (V/V)
2	Reward 2.0 SL	0.5 (lb ai/A)
2	Gallery 75 WP	1.0 (lb ai/A)
2	Kenitic 100 SL	0.25 % (V/V)
3	Roundup Pro 4L	2.0 (lb ai/A)
3	Gallery 75 WP	1.0 (lb ai/A)
3	Kenitic 100 SL	0.25 % (V/V)
4	Goal 2 SL	2.0 (lb ai/A)
4	Gallery 75 WP	1.0 (lb ai/A)
4	Kenitic 100 SL	0.25 % (V/V)
5	Lontrel 3.0 SL	0.5 (lb ai/ A)
5	Gallery 75 WP	1.0 (lb ai/A)
5	Kenitic 100 SL	0.25 % (V/V)
6	Check	

Ratings (Juniper injury and *Euphorbia* control) were taken at 2, 3, and 7 weeks after treatment (WAT). Juniper injury ratings were also taken at 14 WAT. Plant injury was 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.

Euphorbia control ratings were taken on a (0-100 scale) and numbers represented the following:

Value	Control
0	No control as compared to the check
10 to 30	Very poor weed control as compared to the check. Only a 10 to 30 % weed biomass reduction. Some chlorosis and necrosis evident in emerged weeds.
40 to 60	Poor weed control as compared to the check. 40 to 60 % weed biomass reduction. More noticeable injury or stunting to emerged weeds. More pronounced chlorosis and/or necrosis to the leaf area of emerged weeds.
70 to 90	Fair to good weed control. 70 to 90 % weed biomass reduction. Emerged weeds severally injured or dead. Greater than 50% of leaf surface showing signs of chlorosis and necrosis.
90 to 99	Excellent weed control. Greater than 90% weed biomass reduction. Emerged weeds mostly dead and/or severally injured (chlorotic and/or necrotic).
100	Emerged weeds dead, and no evidence of weed regrowth.

RESULTS: *Euphorbia* was treated when a plant stems were at least 4 inches long. At this stage

spurge (*Euphorbia* spp.) is difficult to control. Other than minor discoloration of the foliage, the treatments containing Basagran, Goal, and Lontrel provided no control of spurge by 7 WAT (Table 2). The treatments containing Reward and Roundup provided complete postemergent control of spurge by 7 WAT (Table 2). During the rating period, no evidence of spurge germination was evident in the herbicide treatments. Gallery is known to provide excellent control of spurge, but some of the postemergent herbicides in the treatments may have remained in the growing medium, and helped to provide preemergent control of spurge (i.e. Lontrel and Goal).

Juniper injury was significant during the entire rating period with the Reward treatments, and varied between 20 and 37 percent (Table 1). Roundup injury was evident at 7 WAT, but not significant until 14 WAT. None of the other treatments provided injury during the rating period (Table 1).

SIGNIFICANCE TO INDUSTRY: This test shows the importance of controlling spurge with preemergent herbicides. There are many preemergent herbicides that will control spurge when applied at the correct rate and in a timely manor. Not living in a perfect world, most growers want to know what can be done once the spurge is up and growing? Goal can provide control of spurge if it is applied before the plant stems are greater than 2 inches, however, spurge plants more mature than this are very difficult to control. Reward provides excellent control of spurge, but injury to junipers would not be tolerated by growers. Roundup looks very promising for weed control in junipers species, and when carefully applied could provide a rescue treatment for growers with no other options but hand removal.

Many weed scientist have noted that Roundup over the top can be tolerated by many ornamentals (Junipers, Liriope, Yews, etc.), and could be a useful tool for cleaning up poorly maintained ornamentals. 1% solutions of Roundup Pro (4 lb/gal) can provide excellent control of many herbaceous plants while being safe over the top many woody ornamentals. It must be noted that this application could probably only be used one time as multiple applications (sub-lethal doses) could provide growth stunting and mutations (particularly to newly emerging shoots). As of now, Roundup is not labeled for such uses.

Table 1. Injury to *Juniperus horizontalis* 'Blue Rug' 2002.

Treatment	Rate	Juniper Injury (0-100)			
		2 WAT	3 WAT	7 WAT	14 WAT
Basagran 4.0 SL Gallery 75 WP Kenitic 100 SL	2.0 (lb ai/A) 1.0 (lb ai/A) 0.25 % (V/V)	0.0	0.0	0.0	10.0
Reward 2.0 SL Gallery 75 WP Kenitic 100 SL	0.5 (lb ai/A) 1.0 (lb ai/A) 0.25 % (V/V)	30.0	20.0	26.7	36.7
Roundup Pro 4L Gallery 75 WP Kenitic 100 SL	2.0 (lb ai/A) 1.0 (lb ai/A) 0.25 % (V/V)	0.0	0.0	10.0	23.3
Goal 2 SL Gallery 75 WP Kenitic 100 SL	2.0 (lb ai/A) 1.0 (lb ai/A) 0.25 % (V/V)	0.0	0.0	0.0	6.7
Lontrel 3.0 SL Gallery 75 WP Kenitic 100 SL	0.5 (lb ai/ A) 1.0 (lb ai/A) 0.25 % (V/V)	0.0	0.0	0.0	0.0
Check		0.0	0.0	0.0	0.0
	LSD	21.02	18.87	17.07	20.92

Table 2. Spurge control 2002.

Treatment	Rate	Spurge Control (0-100)		
		2 WAT	3 WAT	7 WAT
Basagran 4.0 SL Gallery 75 WP Kenitic 100 SL	2.0 (lb ai/A) 1.0 (lb ai/A) 0.25 % (V/V)	0.0	0.0	0.0
Reward 2.0 SL Gallery 75 WP Kenitic 100 SL	0.5 (lb ai/A) 1.0 (lb ai/A) 0.25 % (V/V)	100.0	100.0	100.0
Roundup Pro 4L Gallery 75 WP Kenitic 100 SL	2.0 (lb ai/A) 1.0 (lb ai/A) 0.25 % (V/V)	50.0	100.0	100.0
Goal 2 SL Gallery 75 WP Kenitic 100 SL	2.0 (lb ai/A) 1.0 (lb ai/A) 0.25 % (V/V)	0.0	0.0	0.0
Lontrel 3.0 SL Gallery 75 WP Kenitic 100 SL	0.5 (lb ai/ A) 1.0 (lb ai/A) 0.25 % (V/V)	0.0	0.0	0.0
Check		0.0	0.0	0.0
	LSD	21.01	38.07	39.02