

## ***Research - Weed control research – container nursery production***

Weed control is an important management issue for container nursery producers. Nurseries predominantly rely on hand weeding and preemergence herbicide application to manage weeds. Through the assistance of Bennett’s Creek Nursery, we were able to conduct several useful research trials on the use of granular and sprayable herbicides as well as mulches at their site. The primary weed at this site was spotted (prostrate) spurge, with lesser amount of longstalked phyllanthus, common groundsel, and flexuous bittercress. The weather conditions last summer were apparently conducive to spotted spurge germination, as we observed very high populations as the summer progressed.

### Trial 1. Preemergence weed control in containers with sprayable and granular formulations

The objective of this trial was to compare effectiveness of sprayable versus granular herbicides. FreeHand and Gallery plus either Barricade or Tower gave the greatest reduction in weed number at 6 weeks after treatment (6WAT) (Table 1). After the first application, Rout and BroadStar gave the greatest reduction in longstalked phyllanthus count, while after the second application Biathlon, Rout, BroadStar, and FreeHand, and Marengo gave the greatest reduction. Snapshot did not control longstalked phyllanthus, while Gallery plus either Barricade or Tower gave poor to fair longstalked phyllanthus control.

After the first application, FreeHand, Snapshot, and Gallery plus either Barricade or Tower gave the greatest reduction in spotted spurge numbers. At 5 weeks after the second application (5WAT2), these four treatments gave 90% or greater control of spotted spurge, with FreeHand giving the numerically highest control (98%). Biathlon, Rout, BroadStar, and Marengo G gave fair control of spotted spurge (approximately 60 to 70%). Spurge control with all treatments except FreeHand decreased to unacceptable levels by 12 weeks after the second application (12WAT2), while FreeHand gave 88% control at this time. No injury to Burford or Carissa holly was seen in this trial from any treatment.

**Table 1. Preemergence weed control in containers with sprayable and granular formulations**

Treatment	Pounds ai/acre	Longstalked phyllanthus		Spotted surge		
		#/plot 8 WAT	#/plot 5 WAT2	#/plot 8 WAT	% control 5 WAT2	% control 12 WAT2
1 Nontreated		27.3	11.5	98.0	0	15
2 Gallery	75DF 0.75	9.5	6.0	2.8	92	30
2 +Barricade	65WG 0.75					
3 Gallery	75DF 0.75	8.3	4.3	7.0	93	35
3 +Tower	6EC 1.0					
4 Biathlon	2.75G 2.75	5.8	0.5	46.5	64	0
5 Rout	3G 3.0	1.3	0.5	29.8	60	0
6 BroadStar	0.25G 0.38	1.8	0.0	28.5	71	10

7	FreeHand	1.75G	3.5	5.5	1.3	4.5	98	88
8	Snapshot	2.5G	5.0	17.5	16.0	8.5	91	0
9	Marengo	0.0224G	0.045	8.0	0.8	46.0	63	13
LSD P=.05				6.9	5.6	14.3	11	51

#### Trial 2. Evaluation of sprayable herbicides for container weed control

The objective of this trial was to compare sprayable Marengo to other sprayable herbicides. Gallery plus Tower and the highest rate of Marengo gave the numerically highest spotted spurge control at 21 DAT2 (94%) (Table 2). Other treatments gave fair to good spotted spurge control. Marengo FLO at all rates gave the numerically greatest reduction in longstalked phyllanthus stand.

Marengo FLO at 7.5, 9., and 15.5 fl oz/A (0.036, 0.045, and 0.075 lb ai/A) was the only herbicide to cause holly (Helleri, Needlepoint, Burford) injury and injury increased as the Marengo rate increased, with unacceptable injury to all 3 holly species at the highest rate. After 2 applications, injury to Needlepoint holly was 8, 18, and 30% for Marengo FLO at 0.036, 0.045, and 0.075 lb ai/A, with dead Needlepoint holly plants per plot averaging 1, 4, and 16 at those rates at 72 DAT2. Needlepoint holly is more susceptible to Marengo FLO injury than the other holly species tested, as the other species were able to outgrow the injury seen at 28 DAT2.

**Table 2. Evaluation of sprayable herbicides for container weed control**

Treatment	Pounds lb ai/A		Spotted spurge		Longstalked phyllanthus	
			#/plot 59 DAT	%control 21 DAT2	#/plot 43 DAT	#/plot 28 DAT2
1	Nontreated		247.0	0	31.3	5.0
2	4.16L	0.75	43.8	85	16.0	5.0
2	+ Barricade	4L 0.75				
3	4.16L	0.75	2.3	94	9.8	4.3
3	+ Tower	6EC 1.0				
4	6EC	1.0	28.3	76	17.5	10.3
5	4L	0.75	15.5	86	24.8	9.8
6	3.3EC	3.0	67.0	85	9.5	1.0
7	0.622L	0.036	57.5	63	5.0	0.3
8	0.622L	0045	12.5	86	1.8	0.0
9	0.622L	0.075	10.0	94	1.3	0.0
LSD P=.05			83.6	13	8.3	6.7

### Trial 3. Evaluation of mulches and herbicides for container weed control

The objective of this trial was to compare rice hulls and an herbicide-treated mulch to preemergence herbicides. Rice hulls gave excellent spurge control and fair control of longstalked phyllanthus. Penn Mulch Plus (isoxaben + trifluralin) gave poor to fair spurge control but no control of longstalked phyllanthus. Gallery plus either Tower, Barricade, or Dimension gave fair control of longstalked phyllanthus and fair to good spurge control. Dimension applied alone gave fair spurge control but did not control longstalked phyllanthus.

### Trial 4. Hand weeding trial

The objective of this trial was to compare a 2-week to an 8-week handweeding cycle. The theory was that hand weeding every 2 weeks should prevent weeds from reaching the flowering stage while weeds would be able to produce seed if handweeding only occurred every 8 weeks. Pots were handweeded and Snapshot applied at 200 pounds per acre prior to the start of each 8-week period.

For the second and third 8-week periods, and the total across 24 weeks, hand-weeding time was numerically but not statistically greater for the 8-week compared to the 2-week handweeding cycle (Table 3). Weed count was numerically higher at the second 8-week period and at the 24 week summary for the 8-week compared to the 2-week handweeding cycle but the opposite was seen at the third 8-week period. The major significant difference seen in this study was the much higher weed weight for the 8-week compared to the 2-week handweeding cycle in the 24 week summary. Weed weight was also numerically higher in the 8-week hand weeding treatment in each of the three 8-week periods. The higher weed weight seen in the 8-week handweeding treatment should result in much higher weed seed production compared to the 2-week cycle. Besides increasing weed density in those pots in the future, it probably will result in increased weed seed reaching the gravel areas of the nursery, increasing weed density at the nursery the following year.

Table 3. Results from the handweeding interval trial.

#### First 8 week period

Treatment	Weed time	Weed count		Weed weight
	Total seconds	Total #	Total g	
1	Weed every 2 weeks	427.8	54.8	74.8
2	Weed every 8 weeks	286.8	47.3	344.8
LSD P=.05	142.1	25.0	206.0	

#### Second 8 week period

Treatment	Weed time	Weed count		Weed weight
	Total seconds	Total #	Total g	
1	Weed every 2 weeks	2,265.8	1069.8	446.7
2	Weed every 8 weeks	2,613.3	2357.8	2,934.1
LSD P=.05	924.6	2053.1	2,734.7	

Third 8 week period

	Weed time	Weed count	Weed weight
Treatment	Total seconds	Total #	Total g

**Weed Table 3. Results from the handweeding interval trial.**

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Treatment		Total seconds	Total #	Total g
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2	Weed every 8 weeks	2,613.3	2357.8	2,934.1
LSD P=.05		924.6	2053.1	2,734.7

		Third 8 week period		
		Weed time	Weed count	Weed weight
Treatment		Total seconds	Total #	Total g
1	Weed every 2 weeks	1,373	415.3	258.4
2	Weed every 8 weeks	1,624	234.5	1,275.5
LSD P=.05		1,103	365.3	1,044.6

Summary 24 weeks		
Weed time	Weed count	Weed weight

Treatment	Total seconds	Total #	Total g
1 Weed every 2 weeks	4,066	1,539.8	779.9
2 Weed every 8 weeks	4,524	2,639.5	4,554.4
LSD P=.05	859	1,815.7	3,449.7

every 2 weeks	1,373	415.3	258.4
2 Weed every 8 weeks	1,624	234.5	1,275.5
LSD P=.05	1,103	365.3	1,044.6

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#### Conclusions

The best treatment for spotted (prostrate) spurge control is FreeHand. Gallery combined with Tower or Barricade also provides effective spotted spurge control. The Gallery combinations, including Gallery plus Dimension, though, are less effective on longstalked phyllanthus. The granular products Marengo G, BroadStar, and the oxyfluofen-containing herbicides Rout and Biathlon are more effective on longstalked phyllanthus but provide less spotted spurge control than FreeHand. The sprayable form of Marengo effectively controls longstalked phyllanthus but is too injurious to use in container production. Herbicide selection therefore must be based on the primary weed species at the site and the nursery crops being grown. Rice hulls have a place for weed control, especially in container-grown species that are sensitive to herbicide applications. Handweeding every 2 weeks dramatically reduced total weed weight but did not result in a significant reduction of total handweeding time over the growing season. The greater weed weight observed in the 8-week handweeding schedule should result in much greater weed seed production, potentially resulting in much greater weed numbers in container production areas the following year compared to a 2-week handweeding cycle.

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