



Weed Management in Arizona Nurseries

Kelly Murray Young and Worku Burayu, University of Arizona, Phoenix, AZ

Abstract

Studies were conducted in 2014 to determine if the preemergence herbicides and coarse wood topmulch could provide extended efficacy to manage spurges (*Chamaesyce spp.*) in container-grown landscape plants at two nursery sites in Phoenix, Arizona. Granular formulations of indaziflam at a rate of 0.0377 & 0.0502 kg ai ha⁻¹; oxyfluorfen + proflamifen at 2.241 & 0.840 kg ai ha⁻¹, respectively; dimethenamid + pendimethalin at 1.260 & 1.680 kg ai ha⁻¹, respectively were compared to 5.08 cm coarse wood mulch top dress and an untreated control. Herbicide applications were made using a hand-cranked, broadcast spreader to the *Prosopis velutina* (mesquite) 0.02 cubic meter (19 liters) containers that were filled with a 7:1 pine bark: sand substrate (v/v) laid over 1 m wide by 15 m long in the first site. The second experiment was initiated in three ornamental tree plantings that included *Leucophyllum langmaniae* (Texas sage), *Simmondsia chinensis* (Jojoba bush), *Leucophyllum frutescens 'compacta'* (Compact Sage) and treatments were applied on June 10 over a meter wide by 4 m length. A randomized complete block design (RCBD) with four replications was used. Data were analyzed using analysis of variance with transformed rank (JMP® 11 software) and means separated using Tukey-Kramer HSD, all pairs test (P = 0.05). The combination of dimethenamid + pendimethalin resulted in a weed free plots until eight weeks after treatment at both locations. Mulches had similar control ability (>96% control) for seven weeks after treatment. Twelve weeks after treatment, indaziflam resulted in the greatest control (>91) of prostrate spurge.

Introduction

Ornamental plant nurseries struggle with weed management in containers, despite an arsenal of available pre-emergence herbicides. In Arizona, various spurges of the genus *Chamaesyce* are among the most difficult to manage for a number of reasons, including high fecundity, small seed size, and fast lifecycle in hot weather. Additionally, inadequate calibration and uneven application practices allow herbicide applications below labeled rates, yielding poor weed control. This study investigates the efficacy of some commercially available preemergence, granular herbicides labeled for container-grown ornamental plants in Arizona and compares them to a 5 cm coarse mulch topdress and an untreated control in the management of *Chamaesyce*.



Small, abundant seeds of *Chamaesyce* are easily spread.



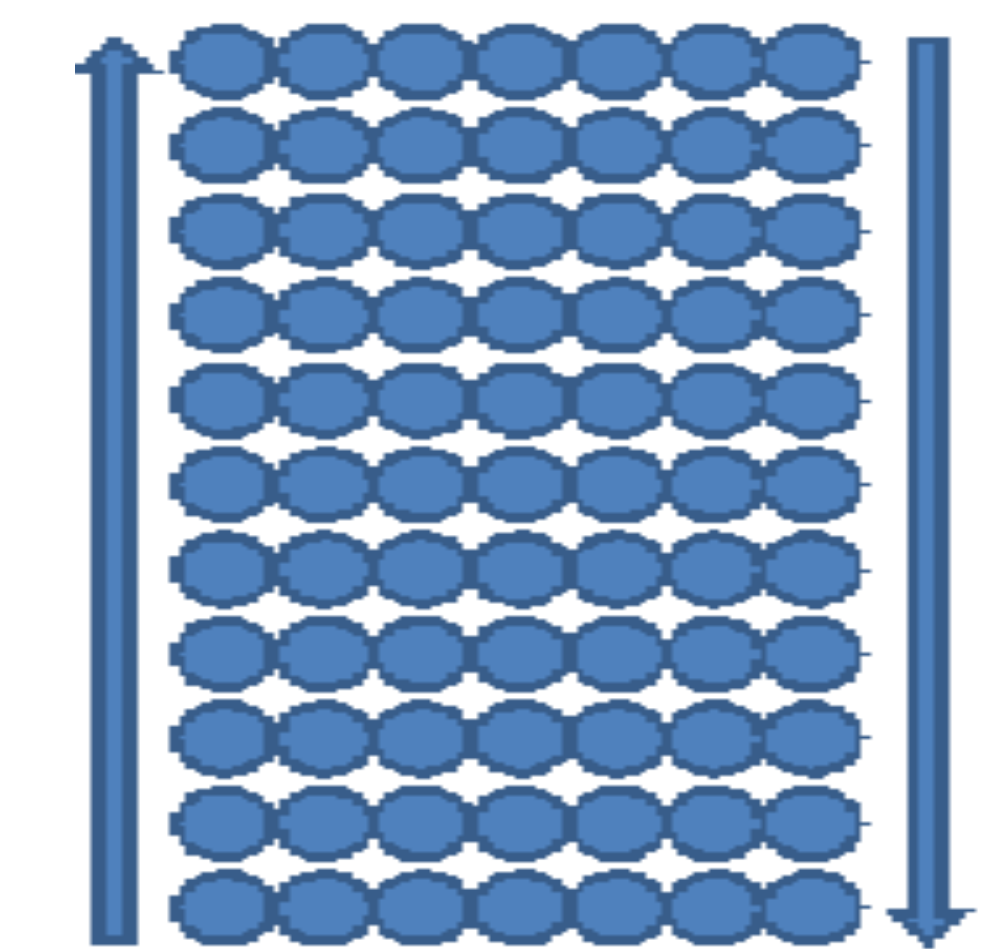
Chamaesyce mat in 1 gallon container with *Prosopis velutina*.



Granular product calibration tray.



Hand-crank spreader used to apply granular herbicide.



Application should be made in at least two passes to improve uniformity.

Results

There was no significant difference in herbicide efficacy at either location. Likewise, there was no significant difference between herbicides and the mulch topdress 8 WAT. All herbicides and the mulch managed spurge for eight weeks effectively. Indaziflam at both rates was effective for 12 weeks without repeated application (Table 1).

Table 1. *Chamaesyce prostrata* emergence in nursery containers under various weed management systems at two locations in Phoenix, AZ

Treatment	Rate	% Nursery Containers With Spurge Present									
		Weeks After Treatment (WAT)									
		4		6		8		10		12	
		Loc I	Loc II	Loc I	Loc II	Loc I	Loc II	Loc I	Loc II	Loc I	Loc II
Indaziflam	0.0377 kg ai ha ⁻¹	0.63 ^z b	3.79 ^x a	1.25 ^y	3.79ab ^y	1.25b	3.79ab	5.63c	5.11b	7.81c	5.68b
Indaziflam	0.0502 kg ai ha ⁻¹	0.25b	3.60a	0.94b	3.60ab	0.94b	3.60ab	4.69c	4.17b	5.94c	4.73b
Dimethenamid + pendimethalin	2.241 + 0.840 kg ai ha ⁻¹	0.00b	0.00a	0.00b	0.00b	0.00b	0.00b	9.06bc	5.11b	16.25c	30.11b
Oxyfluorfen + proflamifen	1.260 + 1.680 kg ai ha ⁻¹	0.00b	3.98a	0.31b	5.11ab	1.88b	7.39ab	5.63c	9.47b	9.38c	17.41b
Coarse mulch topdress	5.08 cm in depth	0.25b	3.22a	0.94b	5.49ab	19.06b	9.85ab	49.69a	13.45b	57.19b	19.88b
Untreated Control	-	6.75a	13.64a	25.31a	18.75a	44.38a	19.51a	82.81a	41.48a	97.81a	77.27a

^z Transformed data used for analysis, but actual means are reported; ^y column followed by the same letter are not significantly different according to Tukey-Kramer HSD, all pairs test (P < 0.05), ^x locations were analyzed separately.

Discussion

Available preemergence, granular herbicides are effective at managing *Chamaesyce* in nursery containers when applied at the labeled rates. Indaziflam is effective at the lower rate. Integrated weed management in nursery crops should involve a combination of management options such as sound sanitary practices, appropriate cultural practices, the use of mulches combined with a strong preemergence herbicide program. Applicator training is needed for calibration and efficient walking patterns to improve product application accuracy.

References

- Amoroso G, Frangi P, Piatti R, Fini A (2009) Mulching as alternative to chemical weed control in nursery-containerized crops. *Adv Hort Sci* 23:276–279.
Case LT, Mathers HM, Senesac AF (2005) A review of weed control practices in container nurseries. *Hort Technology* 15:535–545.
Mathers, H (2003) Novel methods of weed control in containers. *Hort Technology* 13:28–31.
Young KM (2012) Managing Spurge in the Landscape, Garden and Turf. www.cals.arizona.edu/pubs/garden/az1572.pdf.

Acknowledgments

The authors would like to thank the Desert Tree Farm and All Seasons Wholesale Growers for providing us experimental sites to conduct our present study. The Arizona Department of Agriculture, Agricultural Consultation and Training has funded all or a portion of this Project using Specialty Crop Block Grant funds provided by the USDA, Agricultural Marketing Service. The views or findings presented are the Grantee's and do not necessarily represent those of the Arizona Department of Agriculture, the State of Arizona or the USDA.