

## Tolerance of Four Ornamental Grass Genera to Selected Preemergence Herbicides

Glenn B. Fain, Peter M. Hudson, and Keri L. Paridon  
Mississippi State University  
Truck Crops Branch Experiment Station  
Crystal Springs, MS 39059

**Index words:** container production, weed control

**Nature of Work:** Weed control is a top priority in the production of container landscape plants. Ornamental grasses are becoming an increasingly significant portion of many container nurseries' product lines. Information is limited, if available at all, on herbicide safety on many of the grass species in production today. Previous research has shown that ornamental grasses differ in their tolerance to preemergent herbicides (1,2,5).

This experiment was conducted to determine tolerance of five ornamental grass genera to eight commonly used preemergence herbicides. None of the herbicides used in this study were labeled for four of the five genera tested. This experiment was conducted at the Mississippi State University Truck Crops Branch Experiment Station in Crystal Springs, MS. The ornamental grasses (Emerald Coast Growers, Pensacola, FL 32524) tested were 'Karl Foerster' feather reed grass (*Calamagrostis acutiflora* 'Karl Foerster'), northern sea oats (*Chasmanthium latifolium*), pink pampass grass (*Cortaderia sellowana* 'Rosea'), 'Heavy Metal' switch grass (*Panicum virgatum* 'Heavy Metal'), and 'Indian Steel' Indian grass (*Sorghastrum nutans* 'Indian Steel'). Herbicides and rates tested were Gallery 75DF at 1.1, 2.2, and 4.4 kg ai/ha (1.0, 2.0, and 4.0 lb ai/A), Snapshot 2.5G at 2.8, 5.6, and 11.2 kg ai/ha (2.5, 5.0, and 10.0 lb ai/A), Ronstar G at 4.5, 9.0, and 18.0 kg ai/ha (4.0, 8.0, and 16.0 lb ai/A), RegalStar G at 2.7, 5.4, and 10.8 kg ai/ha (2.4, 4.8, and 9.6 lb ai/A), Corral 2.68G at 2.2, 4.4, and 8.8 kg ai/ha (2.0, 4.0, and 8.0 lb ai/A), Rout 3G, Regal O-O, and OH II at 3.4, 6.8, and 13.6 kg ai/ha (3.0, 6.0, and 12.0 lb ai/A). On April 1, 2002, all grasses were planted into #1 containers from 2-1/4" liners using an 8:1 (v:v) pinebark:sand substrate amended per m<sup>3</sup> (yd<sup>3</sup>) with 0.9 kg (1.5lb) micromax, 2.97 kg (5.0 lb) dolomitic limestone and 8.3 kg (14 lb) Osmocote 17-7-12. Plants were placed in full sun under overhead irrigation and watered as needed. Herbicides were applied on April 9, 2002, and reapplied on July 11, 2002. Granular herbicides were applied with a hand-held shaker and spray herbicides were applied using a CO<sub>2</sub> sprayer with a single 8004 flat fan nozzle calibrated to deliver 187 liters/ha (20 gal/A) at 235 kPa (34 psi). Plants received 1.2 cm (0.5 in) of water by overhead irrigation one hour after herbicide applications. Experimental design was a randomized complete block with 6 single plant replications. Data collected was plant injury at 14 days after first application (DAF) and 21 days after second application (DAS) on a scale of 0 to 10, where 0 = no injury and 10 = plant death. Plant height was measured at 51 DAF and shoot fresh weight (SFW) was determined at the conclusion of the study on August 28, 2002.

**Results and Discussion:** All herbicides at all rates provided acceptable weed control throughout the study: however, weed pressure was extremely low and few weeds were present even in the controls. There were no significant differences in injury, height or SFW with any herbicide at any rate for northern sea oats, 'Karl Foerster' feather reed grass, or 'Heavy Metal' switch grass (data not shown).

Rout 3G at 13.6 kg ai/ha (12.0 lb ai/A) caused significant injury to pampass grass and Indian grass at 14 DAF and 21 DAS (Table 1). At 51 DAF pampass grass were significantly shorter than controls among all rates of Rout 3G. Rout 3G also caused plant lodging and poor root development in the top portions of the container substrate on pampass grass (data not shown). This is supported by previous research that reports similar injuries to pampass grass from spray-applied oryzalin (3,4,5), which is one of the active ingredients in Rout 3G. Rout 3G at four times the labeled rate (12.0 lb ai/A (13.6 kg ai/ha)) also reduced the height of Indian grass 51 DAF. At the termination of the study SFW was significantly lower for pampass grass at all rates of Rout 3G and for Indian grass at the 13.6 kg ai/ha (12.0 lb ai/A) rate (data not shown). At 21 DAS plant injury was significant on Indian grass for the 5.6 (5.0 lb ai/A), and 11.2 kg ai/ha (10.0 lb ai/A) rates of Snapshot 2.5G.

**Significance to the Nursery Industry:** Little information exists about crop tolerances of many of the ornamental grasses now in production at container nurseries, as is evident by the lack of grass species on herbicide labels. This study was conducted in an effort to expand herbicide labels to include more grass species. Most ornamental grasses tested exhibited good tolerance to many, if not all, herbicides tested even at significantly higher than labeled rates. The only grass to exhibit a lack of tolerance at a label recommended rate was pampass grass treated with Rout 3G. The lack of tolerance of some species and not others is not surprising since previous studies have shown that grass species vary in their tolerance to herbicides (1,2,3). This study, as well as these previous studies, suggest that ornamental grasses exhibit tolerance to many herbicides and further testing of new species of grasses may aid growers in management of these increasingly important crops.

**Literature Cited:**

1. Catanzaro, C.J., W.A. Skroch, and J.D. Burton. 1993. Resistance of selected ornamental grasses to graminicides. *Weed Technol.* 7:326-330.
2. Derr, J.F. 2002. Tolerance of ornamental grasses to preemergent herbicides. *J. Environ. Hort.* 20:161-165.
3. Green, J.C., G.J. Keever, C.H. Gilliam, C.K. Palmer, J.W. Olive, and J.D. Eakes. 1997. Effects of preemergence-applied herbicides on pampass grass in containers. *J. Environ. Hort.* 15:77-80.
4. Hayes, C.K., C.H. Gilliam, G.J. Keever, and D.J. Eakes. 1999. Effects of herbicide and time of application on pampass grass grown in containers. *J. Environ. Hort.* 17:185-189.
5. Neal, J.C. and A.F. Senesac. 1991. Preemergent herbicide safety in container-grown ornamental grasses. *HortScience* 26:157-159.

**Table 1.** Effects of selected herbicides on injury and growth of ornamental grasses.

Herbicide	Rate (kg ai/ha)	<i>Sorghastrum nutans</i> 'Indian Steel'			<i>Cortaderia sellowana</i> 'Roses'		
		Injury <sup>z</sup>		Height (cm)	Injury		Height (cm)
		14DAF	21DAS	51DAF	14DAF	21DAS	51DAF
Gallery 75DF	1.1	1.8	0.3	41.3	0.8	0.5	29.9
Gallery 75DF	2.2	2.8	2.2	31.0	1.2	0.8	32.8
Gallery 75DF	4.4	0.8	0.2	36.8	1.5	1.2	28.2
Snapshot 2.5G	2.8	2.5	2.3	29.5	1.5	1.3	35.3
Snapshot 2.5G	5.6	4.2	4.3*	24.4*	2.5	2.3	29.6
Snapshot 2.5G	11.2	4.5	4.2*	30.6	1.3	1.2	32.2
Ronstar G	4.5	1.5	0.5	38.6	1.3	1.3	36.8
Ronstar G	9.0	0.8	0.5	42.4	1.0	0.8	35.1
Ronstar G	18.0	2.7	2.5	37.2	1.5	1.5	34.0
RegalStar G	2.7	1.0	1.0	44.8	1.3	1.2	27.0
RegalStar G	5.4	2.7	2.2	35.3	1.0	1.0	31.3
RegalStar G	10.8	0.7	0.3	41.9	1.3	1.3	25.6
Rout 3G	3.4	1.7	0.5	37.7	2.3	1.8	20.7*
Rout 3G	6.8	1.7	0.5	36.9	3.2	3.7*	20.8*
Rout 3G	13.6	6.0*	5.6*	20.6*	4.7*	4.5*	11.7*
Regal O-O	3.4	0.8	0.3	44.8	1.0	1.0	29.6
Regal O-O	6.8	4.5	4.2*	29.9	1.2	0.8	35.0
Regal O-O	13.6	3.7	2.0	35.7	1.2	1.2	33.9
OH-II	3.4	2.0	2.0	35.0	1.0	1.0	33.9
OH-II	6.8	1.0	1.2	40.9	1.5	1.2	33.0
OH-II	13.6	1.5	1.0	36.3	1.5	1.8	28.7
Corral 2.68G	2.2	0.5	0.3	42.5	1.3	1.3	33.7
Corral 2.68G	4.4	1.2	0.2	42.7	1.0	1.0	35.1
Corral 2.68G	8.8	2.3	1.3	35.2	0.8	1.2	36.7
Control		1.0	0.2	43.6	1.3	0.8	28.7

<sup>z</sup>Injury rated on a scale from 0-10, where 0 = no injury and 10 = plant death.

\*Significantly different from controls (Dunnett's:  $\alpha = 0.05$ ).