



Effect of Pre and Post Emergence Herbicide Application Timing on Hydroseeded *Fimbristylis cymosa* R. Br.

Orville Baldos¹, Joseph DeFrank¹ and Glenn Sakamoto²

¹ Department of Tropical Plant and Soil Sciences, University of Hawai'i at Manoa, United States

² USDA-Natural Resources Conservation Service Hoolehua Plant Materials Center, United States

Introduction

Fimbristylis cymosa R. Br. (mau'u 'aki'aki) is a salt and moderately drought tolerant native sedge with potential use for roadside re-vegetation and landscaping. Easily propagated by seeds, this species can be planted on a large scale through hydroseeding.

Successful establishment of hydroseeded *F. cymosa* requires safe and effective weed control tools. Providing a weed-free environment from the time of planting to canopy closing is important for strengthening the native groundcover's competitive ability against weed invasions.

Research was conducted to determine the response of newly hydroseeded *Fimbristylis cymosa* pre- and post-emergence herbicides applied at varying times after planting.

In this study, oxadiazon and oryzalin were used to control germinating weed seeds while aminopyralid and fluzafop-p-butyl were used to control some emerged broadleaf and grassy weeds, respectively. These herbicides have been previously tested safe on well established plants.

Materials and Methods

The experiment was conducted at the University of Hawaii Waimanalo Research Station in 2008. Prior to herbicide application, the field plots were hydroseeded at a rate of 1980 kg/ha paper mulch, 1020 kg/ha straw mulch, 2.2 kg/ha tackifier and 25.6 kg/ha crushed seedhead (Figure 1). Based on a germination test of four 0.2 gram samples of crushed seedhead, actual seeding rate was calculated at 705 viable seeds/m².

The 10 treatments, consisting of different herbicides and timing combinations (Table 1 and 2), were laid out in a randomized complete block design with 4 replicates (Figure 2). The pre-emergence herbicides, oxadiazon and oryzalin were applied at 7 and 14 days after hydroseeding (DAH). The post-emergence herbicides, aminopyralid and fluzafop-p-butyl were mixed and applied with or without pre-emergence herbicides (oxadiazon) at 28, 42 and 56 DAH. Plant counts were collected at 92 DAH after weeding the plots (Figure 3). Due to significant non-additivity, data was log transformed before it was analyzed using Statistix 9 statistical analysis software.



Figure 1. Hydroseeding the treatment plots.



Figure 2. Application of herbicides at different time periods after hydroseeding.



Figure 3. Treatment plots at 92 DAH. Plots were weeded to facilitate collection of plant count data.

Table 1. Breakdown of the herbicide treatments

Herbicide Treatment	Rate (kg a.i./ha)	Symbol
Oxadiazon (Ronstar® 50 WSP)	2.24	Pre 1
Oryzalin (Surflan® 4 AS)	2.24	Pre 2
Oxadiazon (Ronstar® 50 WSP)	2.24	Pre 1 + Post
Aminopyralid (Milestone® VM)	0.1	
Fluzafop-p-butyl (Fusilade® DX)	0.28	
Aminopyralid (Milestone® VM)	0.1	Post only
Fluzafop-p-butyl (Fusilade® DX)	0.28	
Oxadiazon (Ronstar® G)	2.24	Pre 3 + Post
Aminopyralid (Milestone® VM)	0.1	
Fluzafop-p-butyl (Fusilade® DX)	0.28	
Untreated	n/a	

Table 2. Herbicide treatments as distributed across time.

Treatment	Herbicide application, days after hydroseeding (DAH)				
	7	14	28	42	56
1	Pre 1				
2	Pre 2				
3		Pre 1			
4		Pre 2			
5			Pre 1 + Post		
6			Post only		
7				Pre 3 + Post	
8				Post only	
9					Post only
10 (untreated)					

Results

Spray applications of oxadiazon and oryzalin at 7 and 14 DAH resulted in low plant counts. Plots treated with oxadiazon during the first 2 weeks had densities ranging from 1.0 to 1.2 plants/m². Oryzalin treated plots exhibited higher plant counts compared to those treated with oxadiazon. However, plants were severely stunted compared to those recorded in untreated control plots.

Post-emergence applications of aminopyralid + fluazifop-p-butyl with oxadiazon resulted in densities below 10 plants/m².

Plots treated with post-emergence only herbicides (aminopyralid + fluazifop-p-butyl) at 28, 42 and 56 DAH had plant counts that are not significantly different from untreated plots (Figure 4). Numerically, the highest mean plant count was recorded in plots sprayed with post only herbicides at 56 DAH (86.2 plants/m²).

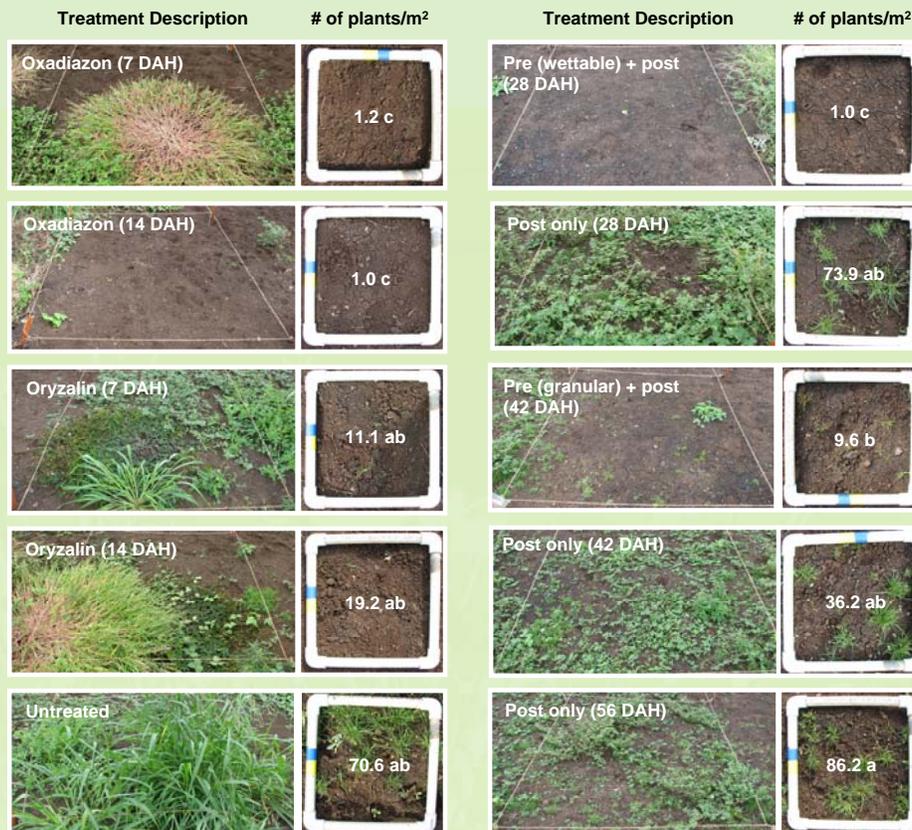


Figure 4. Visual comparison of weed control (left) and mean plant density per square meter (right, superimposed on a 0.3 x 0.3 m square frame) of plots treated with herbicides at 7, 14, 28, 42 and 56 days after hydroseeding (DAH). Means followed by the same letters are not significantly different as determined by Tukey HSD at $P < 0.01$. Means presented are based on the antilog of the transformed mean.

Discussion and Conclusion

Application of oxadiazon and oryzalin at 7 and 14 DAH reduced *Fimbristylis cymosa* seedlings and is not recommended. Spray and granular forms of oxadiazon, when applied together with aminopyralid and fluazifop-p-butyl, also lowered plant counts as it severely injured *Fimbristylis* seedlings of up to 42 days old.

Aminopyralid and fluazifop-p-butyl can be used to selectively control some broadleaf and grassy weeds in hydroseeded *Fimbristylis cymosa* as early as 28 days after hydroseeding.

Aminopyralid provided little to no control of spurges (*Chamaesyce* spp.) (Figure 5).



Figure 5. *Chamaesyce hirta* (hairy spurge) invading the post-emergence only plots.

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