

Tolerance of Carbon-Seeded Meadow Barley and Blue Wildrye to Diuron

B.J. Hinds-Cook¹, D.W. Curtis¹, C.A Mallory-Smith¹, A.G Hulting¹, K.W. Robb, D.C. Darris and J.J. Williams

¹Department of Crop and Soil Science, Oregon State University, Corvallis, OR

Introduction

Several species of grasses native to the Pacific Northwest are being grown for seed on small acreages in the Willamette Valley. There are currently no herbicides registered for the control of grass weeds during stand establishment of these native species. The application of diuron prior to crop emergence where the seed row has been protected with a band of carbon is a standard practice for some of the conventional grass species grown for seed in the Willamette Valley. Although annual bluegrass (*Poa annua*) has developed resistance to diuron on much of the valley grass seed acreage, many other grass and broadleaf weed species are controlled with this decades old practice. Two of the native species that are being tested for tolerance to diuron in carbon seedings are meadow barley (*Hordeum brachyantherum*) and blue wildrye (*Elymus glaucus*). The data being collected from this series of trials will be used in support of potential additions to a diuron label.

Methods

Two trials were initiated in the fall of 2006 at the OSU Hyslop Research Farm and two trials were initiated in 2007 at the nearby OSU Schmidt Research Farm. All trials were a collaborative effort with the USDA NRCS Plant Materials Center. The soil at the Hyslop site was a Woodburn silt loam with a pH of 5.6 and an organic matter content of 2.5%, while the Schmidt Farm soil was a Willamette silt loam with a pH of 5.2 and an organic matter content of 3.9%. The soil was dry when the diuron treatments were applied in 2006 and wet when they were applied in 2007.

The experimental design in both years was a randomized complete block with four replications. Individual plot dimensions were 6.5 ft by 25 ft in 2006 and 8 ft by 25 ft in 2007. Diuron treatments were applied with water at 20 gallons per acre at 20 psi on October 13, 2006, and October 12, 2007—the day after carbon seeding each year. Diuron rates ranged from the lowest recommended rate of 0.8 lb active ingredient per acre to 4.8 lb active ingredient per acre which is twice the maximum rate for any soil type. Activated carbon was applied at a rate of 300 lb per treated acre in a 1-inch-wide band over the seed row at planting. Visual evaluations of crop injury were conducted periodically following diuron application, and the grasses were swathed, threshed and the seed was cleaned.

Results

The final crop injury ratings are presented in Tables 1 and 2. Although visual ratings of both species were zero in 2007, blue wildrye seed yield was reduced by the highest rate of diuron (Table 1). Stunting of both species was recorded at the highest rate of diuron in 2008, but seed yields of neither species were reduced by any of the diuron treatments in that year. Meadow barley and blue wildrye tolerance to diuron in carbon seedings appears comparable to that of other grass species that are currently established with this technique. These data may allow the addition of these and several other native grass species to a diuron label.

Table 1. Visual injury ratings and seed yield of blue wild rye following applications of diuron to carbon seedings.

Treatment ¹	Rate (lb ai/A)	Injury ²		Seed yield ³	
		2007	2008	2007	2008
		------(%)-----		------(lb/a)-----	
Diuron	0.8	0	0	86	427
Diuron	1.2	0	1	82	441
Diuron	2.4	0	8	91	441
Diuron	4.8	0	38	66	440
Check	0	0	0	72	296
LSD(0.10)				18	62

¹2007 treatments applied on October 13, 2006; 2008 treatments applied on October 12, 2008

²2007 treatments evaluated March 7, 2007; 2008 treatments evaluated April 9, 2008

³Harvested in July both years

Table 2. Visual injury ratings and seed yield of meadow barley following applications of diuron to carbon seedings.

Treatment ¹	Rate (lb ai/A)	Injury ²		Seed yield ³	
		2007	2008	2007	2008
		------%-----		-----lb/a-----	
Diuron	0.8	0	0	60	481
Diuron	1.2	0	1	76	519
Diuron	2.4	0	4	80	532
Diuron	4.8	0	30	86	545
Check	0	0	0	41	380
LSD(0.10)				15	69

¹2007 treatments applied on October 13, 2006; 2008 treatments applied on October 12, 2008

²2007 treatments evaluated March 7, 2007; 2008 treatments evaluated April 9, 2008

³Harvested in July both years