

HERBICIDES FOR ALFALFA SETBACK AND PREHARVEST DESICCATION IN ALFALFA SEED PRODUCTION

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Introduction

Growers intensively delay early alfalfa development so that plant flowering coincides with warm weather, which is conducive for pollination by alfalfa leafcutting bees. In addition to herbicides being used for weed control, contact herbicides like paraquat sometimes are used to delay early season plant development by burning back alfalfa plants. "Setback" herbicides may be used instead of cultivation, therefore eliminating reduced stand and the spread of diseases that may occur during cultivation. With the introduction of several new contact herbicides, it is likely that some of these herbicides may be useful for delaying crop development to synchronize the onset of bloom with the optimum time of alfalfa leafcutting bee emergence and pollination activity.

Improved methods of desiccation continue to be of interest. Different herbicides will be compared to Gramoxone Extra that may give growers other options for preharvest desiccation.

Methods

General Procedures

Setback and desiccation trials were conducted on a cooperator's field near Ontario, Oregon. Alfalfa seed management practices were carried out by the grower. Treatments were applied with a CO₂-pressurized backpack sprayer delivering 20 gal/acre at 30 psi. Data were analyzed using ANOVA, and treatment means were separated using a protected least significant difference at the 5 percent level, LSD (0.05). Neither trial was harvested.

Alfalfa Setback

Treatments were applied on May 3 to alfalfa that was 6 - 14 inches tall. Plots were 10 ft wide and 30 ft long and replicated four times in a randomized complete block design. Treatments included three rates of Desiccant A at 2.0, 4.0, and 6.0 percent v/v and Gramoxone Extra plus a non-ionic surfactant (NIS) at 0.31 and 0.47 lb ai/acre. Desiccant A is a botanical-based herbicide developed privately in Michigan. Visual evaluations were taken for alfalfa setback on May 11, 8 days after treatment (DAT).

Preharvest Desiccation

Plots were 10 ft wide by 25 ft long. Treatments were replicated three times and arranged in a randomized complete block design. Applications were made on August 29. Treatments included Reglone (Diquat) alone at 0.25 ai/acre and Gramoxone Extra (0.625 lb ai/acre) alone and with Reglone at 0.25 lb ai/acre. Et 751 at the 0.012 lb ai/acre rate was tested alone and at the 0.006 lb ai/acre rate was tested with Reglone at the 0.25 and 0.5 lb ai/acre rate. Desiccant A was entered at the 8 and 10 percent v/v rate. Desiccant A at the 8 percent v/v rate was combined with Reglone at 0.25 lb ai/acre. All treatments included a crop oil concentrate (COC) at 1.0 qt/acre. Visual evaluations of foliage desiccation were recorded 3 and 7 DAT. Plant moisture content was determined 7 DAT by harvesting a sample from each plot, recording the fresh weight, drying for 48 hours, recording the dry weight, and using the fresh and dry weights to calculate percent moisture.

Results

Alfalfa Setback

Gramoxone Extra at 0.47 lb ai/acre provided crop setback significantly greater than all other treatments at 65 percent (Table 1). Gramoxone Extra at 0.31 lb ai/acre provided 51 percent defoliation. Desiccant A at the 2.0, 4.0, and 6.0 percent v/v rates provided only 4, 18, and 34 percent desiccation, respectively. Ratings were similar on May 7 and May 11.

Preharvest Desiccation

Seven days after applications were made, Gramoxone Extra plus Reglone and Gramoxone (0.625 lb ai/acre) desiccated alfalfa significantly greater than all other treatments (89 and 85 percent) (Table 2). Et 751 (0.006 lb ai/acre) plus Reglone and Desiccant A plus Reglone provided similar results at 60 and 53 percent. Et 751 (0.006 lb ai/acre) plus Reglone, Desiccant A at the 8 and 10 percent v/v rates, and Reglone alone at the 0.25 lb ai/acre rate were similar in activity (28-40 percent). Et 751 (0.012 lb ai/acre) alone did not differ from the untreated check. Biomass samples indicated that treatments containing Gramoxone Extra plus Reglone reduced percent alfalfa moisture content greater than all treatments except Gramoxone Extra alone. Biomass samples may have underestimated differences among treatments since more effective treatments caused desiccated leaves to fall to the ground. At the rates tested, Et 751 or Desiccant A applied alone were less effective than currently available desiccants.

Table 1. Alfalfa setback in response to chemical setback treatments, Malheur Experiment Station, Oregon State University, Ontario, OR, 2001.

Treatment*	Rate	Alfalfa setback	
		5-7	5-11
		-----%-----	
Desiccant A	2.0% v/v	4	4
Desiccant A	4.0% v/v	18	11
Desiccant A	6.0% v/v	34	26
Gramoxone Extra + NIS	0.31 lb ai/acre	51	51
Gramoxone Extra + NIS	0.47 lb ai/acre	65	63
No setback	--	0	1
LSD (0.05)		7	3

*NIS was applied at 0.25 percent v/v.

Table 2. Alfalfa desiccation and moisture content from herbicide treatments, Malheur Experiment Station, Oregon State University, Ontario, OR, 2001.

Treatment*	Rate	Alfalfa desiccation		Moisture content †
		9-1	9-5	9-5
		-----%-----		
	lb ai/acre			
Gramoxone Extra + Reglone	0.625 + 0.25	82	89	42
Et 751	0.012	12	8	54
Et 751 + Reglone	0.006 + 0.25	38	32	57
Et 751 + Reglone	0.006 + 0.5	63	60	49
Desiccant A	8% v/v	41	34	57
Desiccant A	10% v/v	43	28	58
Desiccant A + Reglone	8% v/v + 0.25	62	53	54
Reglone	0.25	38	40	58
Gramoxone Extra	0.625	71	85	44
Untreated	--	0	0	56
LSD (0.05)		13	17	10

*COC was added to all treatments at 1.0 qt/acre.

†Moisture content was calculated by weighing alfalfa before and after drying.