CATCHWEED BEDSTRAW CONTROL IN GRASS SEED CROPS

D.A. Ball and D. Singh

Catchweed bedstraw (*Galium aparine* L.) is a persistent annual broadleaf weed problem in grass seed crops throughout much of the grass seed producing region of the Pacific Northwest. Catchweed bedstraw can interfere with crop growth and reduce seed yield. In addition, bedstraw seed is difficult to separate in seed cleaning operations thereby reducing quality of harvested seed. For these reasons, effective herbicides for control of bedstraw in grass seed crops are desired by grass seed producers.

In 2000, several field trials were conducted at various locations in northeastern Oregon to evaluate catchweed bedstraw control effectiveness and grass seed crop tolerance from several herbicide treatments. Field trials were conducted near Echo, Hermiston, and Imbler, Oregon, and Walla Walla, Washington on seedling hard fescue, Kentucky bluegrass, and tall fescue, and on established chewings fescue, creeping red fescue, Kentucky bluegrass, tall fescue, and perennial ryegrass. Table 1 contains a summary of field locations, our experiment number for identification purposes, and the grass seed crop type evaluated. Herbicides evaluated included fluroxypyr (Starane®), prosulfuron (Peak®), tribenuron (Express®), and carfentrazone (Aim®), alone and in combination with an isooctyl ester of 2,4-D (Salvo®). Fluroxypyr is currently registered for use under 24c special local needs (SLN) labels in Oregon and Washington. Carfentrazone is registered for use under a 24c SLN in Oregon. Tribenuron and 2,4-D are currently labeled for use in grass grown for seed in Oregon and Washington. Prosulfuron is not presently labeled for use in grass seed crops. The results of these trials are considered to be of a preliminary nature and should not be considered as a product endorsement or recommendation for commercial use. Several treatments evaluated in these trials are not registered for use. Consult herbicide labels for appropriate application rates and requirements.

Herbicide treatments were applied postemergence with a handheld CO_2 backpack sprayer in 15 gal/acre water at 30 psi spray pressure. A non-ionic surfactant at 0.25% (v/v) was added to all treatments except for fluroxypyr applied alone where no surfactant was used. Plots were generally 10 ft by 30 ft in size, and arranged as randomized complete block designs with 4 replications. Grass seed crops and weeds were actively growing at time of application. Visual estimates of percent bedstraw control of were made on three trials (#00-500, #00-502, #00-520). At time of herbicide application, bedstraw was 5-7 inches in height in the first two trials, and 3 inches in height at the third site. Visual estimates of percent henbit (*Lamium amplexicaule* L.) were made on two trials (#00-502, #00-740). At time of herbicide application, henbit was 5-10 inches in height at the first trial, and 3 inches in height at the second trial. At the time of weed control evaluations, observations of crop injury were recorded. At crop maturity, plots were swathed, combined, and seed cleaned to obtain estimates of clean seed yield. Three of the trials had no weeds present (#00-510, #00742, #00-743), so evaluations were made of crop tolerance to applied herbicides.

A summary of bedstraw control effectiveness is presented in Table 2. In general, treatments containing fluroxypyr provided a moderately high level of bedstraw control. Addition of 2,4-D to the fluroxypyr treatment only slightly improved bedstraw control. Carfentrazone treatment was also effective at two of the three experimental sites. Bedstraw control at one of the three sites (#00-500) was poor due to the large size of bedstraw (5 to 7 inch) at time of treatment (Table 2). Prosulfuron and tribenuron were generally ineffective for control of bedstraw (Table 2).

Henbit is another annual broadleaf weed common in grass seed production fields. An evaluation of henbit control in two studies is summarized in Table 3. Fluroxypyr and tribenuron treatments were the most effective for suppression of henbit.

Grass seed crop injury from herbicide treatments was limited to only a few specific instances. In seedling tall fescue (#00-502), prosulfuron treatments produced slight, visible injury in the form of foliar discoloration and transient slowing of growth (data not shown). This particular trial was not harvested for seed, so effect of prosulfuron on seed yield was not determined. In another trial on established perennial ryegrass (#00-743), treatments containing prosulfuron or tribenuron (sulfonylurea type herbicides) caused moderate crop injury that reduced seed yield compared to other treatments or to the untreated control (Table 4). Other than these specific instances, herbicide treatment had no significant effect on clean seed yield (Tables 4 and 5). Herbicide treatments containing fluroxypyr or carfentrazone were both effective for managing bedstraw. Treatments containing fluroxypyr or tribenuron demonstrated effectiveness for controlling henbit. Because of the minor crop status of grass seed crops, herbicide registrations are limited. It is necessary to fully consult product labels to determine if particular treatments are registered for use in a specific location. Consideration also needs to be given to crop and weed growth stage to obtain maximum effectiveness of applied treatments.

Table 1. Summary of field trial locations, crop evaluated, soil type, and herbicide application dates.

Location	Experiment number	Grass seed crop type	Variety	Soil type	Herbicide application date
Walla Walla	#00-500	Seedling hard fescue	Oxford	Silt loam	March 21, 2000
Echo	#00-501	Seedling Kentucky bluegrass	-	Sandy loam	March 21, 2000
Echo	#00-502	Seedling tall fescue	-	Loamy sand	March 21, 2000
Imbler	#00-510	Seedling Kentucky bluegrass	-	Sandy loam	April 7, 2000
Imbler	#00-520	Established chewings fescue	-	Loam	April 7, 2000
Hermiston	#00-740	Established fine fescue	Shademark	Loamy sand	March 22, 2000
Hermiston	#00-741	Established Kentucky bluegrass	Gnome	Loamy sand	March 22, 2000
Hermiston	#00-742	Established tall fescue	Bravo	Loamy sand	March 22, 2000
Hermiston	#00-743	Established perennial ryegrass	Top Hat	Loamy sand	March 22, 2000

Table 2. Visual estimates of percent catchweed bedstraw control in several grass seed crop types at various times after postemergence herbicide application.

		Trial no. =	Seedling hard fescue	Seedling tall fescue	Established chewings fescue	
			#00-500	#00-502	#00-520	
			Date of visual control evaluation			
Treatment	Rate		6/16/00	4/12/00	5/2/00	Average
			---------- (% bedstraw control) ----------			
Fluroxypyr	3 oz a.e./a		50	40	90	60
Fluroxypyr + 2,4-D	3 oz a.e./a + 12 oz a.e./a		60	63	94	72
Prosulfuron	0.57 oz a.i./a		60	13	37	37
Prosulfuron + 2,4-D	0.43 oz a.i./a + 12 oz a.e./a		50	15	18	28
Tribenuron	0.25 oz a.i./a		50	36	28	38
Tribenuron + 2,4-D	0.187 oz a.i./a + 12 oz a.e./a		30	37	30	32
Carfentrazone	0.264 oz a.i./a		30	80	72	61
Carfentrazone + 2,4-D	0.132 oz a.i./a + 12 oz a.e./a		50	50	80	60
2,4-D	12 oz a.e./a		-	13	-	13
LSD (0.05)			NS	12	32	--

Table 3. Visual estimates of percent henbit control in several grass seed crop types at various times after postemergence herbicide application.

Treatment	Rate	Trial no. =	Seedling tall fescue #00-502	Established creeping red fescue #00-740	Average
			Date of visual evaluation		
			4/29/00	5/3/00	
			----------(% henbit control)----------		
Fluroxypyr	3 oz a.e./a		86	73	79
Fluroxypyr + 2,4-D	3 oz a.e./a + 12 oz a.e./a		88	65	77
Prosulfuron	0.57 oz a.i./a		43	37	40
Prosulfuron + 2,4-D	0.43 oz a.i./a + 12 oz a.e./a		56	32	44
Tribenuron	0.25 oz a.i./a		84	62	73
Tribenuron + 2,4-D	0.187 oz a.i./a + 12 oz a.e./a		78	65	71
Carfentrazone	0.264 oz a.i./a		58	50	54
Carfentrazone + 2,4-D	0.132 oz a.i./a + 12 oz a.e./a		59	42	50
2,4-D	12 oz a.e./a		54	-	54
LSD (0.05)			18	20	--

Table 4. Influence of herbicide treatment on clean seed yield of established grass crops.

Treatment	Rate	Trial no. =	Established Chewings fescue #00-520	Established creeping red fescue #00-740	Established KBG #00-741	Established tall fescue #00-742	Established perennial ryegrass #00-743
			----------lb/a clean seed----------				
Fluroxypyr	3 oz a.e./a		1570	3060	1080	1930	2140
Fluroxypyr + 2,4-D	3 oz a.e./a + 12 oz a.e./a		1760	3380	1190	2150	2150
Prosulfuron	0.43 oz a.i./a		1780	3340	1150	2260	1750
Prosulfuron + 2,4-D	0.57 oz a.i./a + 12 oz a.e./a		1670	3260	1310	1990	1830
Tribenuron	0.25 oz a.i./a		1890	3150	1250	2110	1830
Tribenuron + 2,4-D	0.187 oz a.i./a + 12 oz a.e./a		1660	3410	1310	2340	1750
Carfentrazone	0.264 oz a.i./a		1860	3530	1040	2170	2260
Carfentrazone + 2,4-D	0.132 oz a.i./a + 12 oz a.e./a		1390	3490	1120	1760	2390
2,4-D	12 oz a.e./a		-	-	-	-	-
Untreated	--		1780	3210	1250	1980	2180
LSD (0.05)			NS	NS	NS	NS	310

Table 5. Influence of herbicide treatment on clean seed yield of first year (seedling) grass crops.

Treatment	Rate	Trial no. =	Seedling hard fescue #00-500	Seedling KBG #00-501	Seedling KBG #00-510
			(lb/a clean seed)		
Fluroxypyr	3 oz a.e./a		350	1020	1390
Fluroxypyr + 2,4-D	3 oz a.e./a + 12 oz a.e./a		350	890	1340
Prosulfuron	0.57 oz a.i./a		430	900	1360
Prosulfuron + 2,4-D	0.43 oz a.i./a + 12 oz a.e./a		410	800	1260
Tribenuron	0.25 oz a.i./a		380	830	1290
Tribenuron + 2,4-D	0.187 oz a.i./a + 12 oz a.e./a		360	850	1280
Carfentrazone	0.264 oz a.i./a		380	840	1410
Carfentrazone + 2,4-D	0.132 oz a.i./a + 12 oz a.e./a		340	750	1300
2,4-D	12 oz a.e./a		-	-	-
Untreated			330	780	1300
LSD (0.05)			NS	NS	NS