

Evaluation of Herbicides for the Control of Littleseed Canarygrass in Wheat

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Abstract

There are currently three herbicides registered for the control of littleseed canarygrass in the desert southwest. Hoelon was used with marginal success from 1982 to 1999. In 1999, Achieve was registered in Arizona and Puma was registered in California for the control of this weed in wheat and barley. Both have produced good to excellent levels of control (75 to 95 percent) in our tests and under commercial conditions. Two newer herbicides, Olympus (formerly Bayer MKH6561) and F130060 (Aventis) are being developed and have produced excellent levels of canarygrass control in our tests with less crop safety.

Introduction

Littleseed canarygrass (*phalaris minor*) became increasingly widespread in the low deserts during the 1980s and 1990s due to the lack of an effective herbicide to control it. Hoelon (diclofop) was the only herbicide registered to control this weed during that period and produced inconsistent and marginal levels (60 to 90 percent) of control. In 1999, Achieve (tralkoydim) was registered in Arizona and Puma (fenoxaprop) was registered in California. Both have produced superior and more consistent levels of control (75 to 95 percent) than Hoelon. All three of these herbicides have the same mode of action. They inhibit lipid biosynthesis which is required for cell growth. Leaf burn to wheat and barley are typical with Hoelon and Puma but is temporary and does not effect yield or crop maturity. Puma and Achieve have produced commercially acceptable but incomplete levels of canarygrass control and the search has continued for more consistent and highly effective herbicides.

Two newer herbicides which use a different mode of action are being tested and developed for canarygrass control in small grains. Olympus (formerly Bayer MKH6561) and Aventis F130060 work by inhibiting protein synthesis. Specifically they are sulfonylurea herbicides that inhibit acetolactate synthase (ALS). Both have produced excellent and consistent levels of canarygrass control (85-100 percent) in our previous tests. Crop safety has occasionally been unacceptable however. Crop phytotoxicity (stunting and chlorosis) has ranged from 5 to 45 percent. Tests have continued to evaluate crop safety and weed control.

Method

This test was conducted at the University of Arizona Yuma Valley Agriculture Center between January 22, 2001 and June 4, 2001. The soil type is a silty clay loam and the crop was flood irrigated with Colorado River water. Plot size as 14 x 25 feet set in a randomized complete block with four replications. The variety of wheat was Kofa durum planted at 120 lb./a.

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Treatments consisted of standard rates of Puma, Hoelon, Achieve and Olympus and three rates of F130060 sprayed at two timing and untreated check for a total of 16 treatments. The first application was made on 1-22-01 when the canarygrass was at the 1 to 3 leaf stage and the wheat had 5 to 7 leaves and beginning to tiller. The second application was made on 2-9-01 when the canarygrass was 1 leaf to tillering and the wheat had tillered and was beginning to elongate. A uniform and heavy infestation of canarygrass (20 - 50 ft.²) was present. Visual evaluations of percent weed control and phytotoxicity were made on 4-4-01, 54 and 71 days after treatment.

Results

The results of this test appear on Table 1. These results indicate that all treatments except Hoelon were effective at the later application when most of the canarygrass had emerged. This demonstrates that these herbicides are effective on canarygrass that is at advanced stages (tillering) of growth. Canarygrass continues to emerge until late in the season and the later the application, before coverage is compromised, the more effective it is likely to be. Some treatments were less effective when made early (1 to 3 leaf), probably because much of the canarygrass had not yet emerged. Hoelon and the lower rates of F130060 were 10 to 15 percent less effective from these early applications.

Crop phytotoxicity was lower in this test from the Olympus and F130060 than it has been in previous tests. Phytotoxicity from Olympus was 10 percent from the early application and 16 percent from the later application. Phytotoxicity from F130060 ranged from 5 to 10 percent at both the early and late applications. Yields were variable and the competition from the canarygrass appears to have had more effect on yield than the phytotoxicity from the herbicides. The effect of these sulfonyleurea herbicides on crop yield remains a question, however, due to the severity of injury in some past tests.

Table 1. Weed Control, Phytotoxicity and Yields from 16 Herbicide Treatments

No	Herbicide	Rate(A)	Adjuvant	Rate	App Time (C.grass)	Control (%) Avg ¹	Phyto (%) Avg ¹	Yield (g/plot) Avg ¹
1	Hoelon	1.0 lb.ai	-	-	1 leaf to tillering	80 d	4 efg	166 ef
2	Puma	0.11 lb.ai	-	-	"	98 a	8 bcde	298 abc
3	Achieve	0.25 lb.ai.	Supercharge	0.5%	"	95 ab	0 g	336 a
4	MKH6561	0.057 lb.	Activator 90	0.25%	"	99 a	16 a	288 abcd
5	F130060	9 G/HA	107892	18 G/HA	"	98 a	3 fg	237 cd
6	F130060	12 G/HA	107892	24 G/HA	"	99 a	6 cdef	269 bcd
7	F130060	15 G/HA	107892	30 G/HA	"	99 a	9 bcd	240 cd
8	UTC	-	-	-	-	0 f	0 g	109 gf
9	Hoelon	1.0 lb.ai.	-	-	1-3 leaf	70 e	4 efg	114 gf
10	Puma	0.11 lb.ai	-	-	"	93 ab	11 b	228 de
11	Achieve	0.25 lb.ai.	Supercharge	0.5%	"	92 ab	0 g	333 ab
12	MKH6561	0.057 lb.	Activator 90	0.25%	"	97 a	10 bc	232 d
13	F130060	9 G/HA	107892	18 G/HA	"	84 cd	5 def	286 abcd
14	F130060	12 G/HA	107892	24 G/HA	"	89 bc	6 cdef	228 de
15	F130060	15 G/HA	107892	30 G/HA	"	99 a	9 bcd	295 abcd
16	UTC	-	-	-	-	0 f	0 g	98 g
Yields = grams per plot Plot size = 0.0001 acre						LSD (0.5)=2.01	LSD=3.93	LSD=65.49
¹ Average of four replications								