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CONTROL OF ITALIAN ANNUAL RYEGRASS IN WINTER WHEAT WITH HERBICIDES

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SUMMARY

This study was conducted to determine the efficacy of herbicides for control of annual ryegrass (Lolium multiflorum Lam.) in winter wheat (Triticium aestivum L.). Hoelon (methyl ester of diclofop), Glean (chlorsulfuron), prodiamine, TM TYCOR (BaySmy 1500), and Amber (trisulfuron) were tested. The study was conducted over 3 years at Overton, Texas. Results indicate the Hoelon was effective in annual ryegrass control when applied preemergence at 1/2 lb/ai/ac, however Hoelon did not control broadleaf weeds. Glean also controlled ryegrass but was most effective with a split application (pre- and 60 days postemergence) of 0.25 oz/ai/ac at each application. A combination of Hoelon (1/2 lb/ai/ac) plus Glean (0.1 oz/ai/ac) applied either pre- or postemergence (3-4 leaf stage) was also effective for ryegrass control.

INTRODUCTION

The objectives of this experiment were to 1) evaluate the ability of several herbicides to control annual ryegrass and other weeds in winter wheat and 2) to determine the effect ryegrass control would have on wheat grain yields. Profitability in wheat production is highly dependent on efficient production through various agronomic practices.

PROCEDURE

Field experiments were planted at the Texas A&M University Agricultural Research & Extension Center at Overton in the fall of 1984, 1985, and 1986. 'McNair 1003' wheat was planted each year at a seeding rate of 90 lbs/ac. Gulf ryegrass was overseeded in the entire test at a rate of 25 lbs/ac. Wheat plots were planted in 6 rows with 8 inch row spacing and plots were 4 x 50 ft. Each test was arranged in a randomized complete block with three replications. The soil type was Darco loamy fine sand (Grossarenic paleudults, loamy siliceous thermic) with a pH of 6.2 to 6.5 in years 1 and 3. In year 2, the

soil was a Sacal fine sandy loam (Aquic hapludults, clayey, mixed, thermic) with a pH of 6.5.

Treatments evaluated for each of the 3 years vary for product, rate, and time of application. Treatments are presented in Tables 1, 2 and 3 for 1984-85, 1985-86, and 1986-87, respectively. Data were recorded for percent ryegrass control at either two or three dates each year. Broadleaf weed control was recorded in 1984-85 and 1985-86. Cheat control was recorded in 1984-85 only. Wheat phytotoxicity was recorded in 1984-85. Wheat grain yields were obtained each year of the study.

RESULTS

Good wheat stands and ryegrass stands were obtained in 1984-85. Cheat stands were uniform but sparse and probably did not affect grain yields. Very good ryegrass control was obtained by all herbicide treatments. The two treatments with the least ryegrass control were from prodiamine treatments that were incorporated at 1/8 lb/ac and 1/4 lb/ac). Cheat control by ^{TM}TYCOR and Hoelon was superior to the other herbicide. Glean controlled 63 percent of the cheat while Prodiamine had no effect on cheat. The best broadleaf control occurred with the use of Glean, ^{TM}TYCOR, and Prodiamine (1/8 lb/ac incorporated). Phytotoxicity on wheat was observed for both ^{TM}TYCOR treatments and for Glean. Rainfall in the test site was 9 and 5 inches for November and December, respectively. Since the soil was very sandy, excessive leaching of Glean into the wheat root zone may have occurred in 1984-85. Grain yields were fairly good, and as in other years, the control plots produced the lowest grain yields. Hoelon, Prodiamine, and ^{TM}TYCOR treated wheat all produced high yields. The persistance of Glean may have resulted in lower yields in 1984-85.

In 1985-86, poor stands resulted from heavy rains which occurred shortly after planting and yields were reduced. Drought conditions during head filling in April also reduced grain yields (Table 2). Good ryegrass control was obtained with most of the herbicide treatments. The lowest grain yield of 17 bu/ac was produced on the control indicating the uncontrolled ryegrass did limit yields. The range in yield of wheat in different treatments was from 23 to 27 bu/ac, however differences were nonsignificant. Significant variation

in ryegrass control occurred. The best control was obtained with Hoelon, or Hoelon plus Glean, or Hoelon plus Amber mixtures (Table 2). Glean applied preemergence at 1/3 oz/ai/ac was not as effective as the above treatments. Amber at 16.2 g/ac (0.57 oz/ai/ac) applied either pre- or postemergence was effective for ryegrass control. Tycor at 3/4 lb/ai/ac was also effective for ryegrass control. Hoelon as expected, did not control broadleaf weeds. All other herbicides were effective for broadleaf weed control. The lodging noted on wheat in the untreated control plots was caused by ryegrass lodging and pulling the wheat plants down.

Good wheat yields were obtained in 1986-87 (Table 3). All herbicide treated wheat had greatly increased grain yields compared to the control (24 bu/ac). The highest yield (49 bu/ac) was from the Hoelon (8 oz/ai/ac) treated wheat, however this yield was not significantly higher than several other treatments. Excellent ryegrass control occurred due to the Hoelon treatment, the Hoelon plus Glean treatments, and the Hoelon plus Amber treatment, or the Glean preemergence plus Glean applied at 66 days. In each of these treatments, ryegrass control was excellent throughout the growing season. Glean as a single preemergence treatment, or Glean split as a pre- and postemergence treatments at 33 days was not as effective in the control of ryegrass, at least in 1986-87. Test weights were all relatively low in 1986-87. However the control wheat was especially low (51 lb/bu), probably due to moisture stress of the wheat because of ryegrass competition. Ryegrass competition apparently also reduced plant height of the wheat in the control.

In general, results from the experiments over the 3 years indicate that ryegrass control in wheat will significantly increase wheat grain yields. Second, ryegrass control can be obtained with several herbicide products. Hoelon will effectly control annual ryegrass at 1/2 lb/ai/ac, however no broadleaf control should be expected with Hoelon. A split application of Glean (pre- and postemergence at 66 days) were excellent in ryegrass control. Glean will also control most broadleaf weeds. A single application of a mixture of Hoelon (1/2 lb/ai/ac) and Glean 0.1 oz/ai/ac) applied postemergence was effective in control of both ryegrass and broadleaf

weeds. This treatment would be relatively inexpensive and cost effective in a weed control program for wheat.

An additional aspect to consider is grazing of treated wheat. Glean treated wheat can be grazed while Hoelon treated wheat cannot. All label directions should be followed with herbicide applications.

Present research will attempt to determine the effect grazing has on Glean effectiveness in the ryegrass weed control.

Table 1. Effect of chemical treatments on grain yield, percent ryegrass, cheat and broadleaf control and wheat phytotoxicity, in 1984-85

Herbicide	Rate	Grain Yield	Percent Control				Phytotoxicity§
			Ryegrass		Cheat	Broadleaf	on wheat
	ai/ac	bu/ac	Dec. 6	Apr. 21	Apr. 29	Apr. 29	Dec. 6
Hoelon	1 lb	55 a*	100 a*	100 a*	90 a*	30 bc*	0 a*
Prodiamine	1 lb‡	51 ab	98 a	73 cd	0 c	20 c	0 a
Prodiamine	1/2 lb‡	49 abc	92 ab	76 bcd	0 c	37 bc	0 a
TM TYCOR	1/4 lb	49 abc	100 a	93 ab	100 a	77 ab	4 b
TM TYCOR#	1 lb	47 abc	100 a	100 a	100 a	80 ab	5 b
Prodiamine	1/4 lb‡	46 bc	83 bc	67 de	7 c	23 c	0 a
Glean	1/3 oz	44 bc	97 ab	90 abc	63 b	100 a	4 b
Prodiamine	1/8 lb‡	42 c	74 c	53 e	0 c	50 abc	0 a
Control		29 d	0 d	0 f	0 c	0 c	0 a
Mean		46	83	72	40	46	1

+Treatment applied 2 days after planting.

‡Treatment incorporated (surface blend) by dragging chain over plot.

#Treatment applied postemergence at two-leaf stage.

§Phytotoxicity rated on a scale of 0 to 9, where 0 equals no phytotoxicity.

*Means followed by the same letter are not significantly different at the 0.05 level, as judged by Duncan's New Multiple Range Test.

Table 2. Effect of chemical treatments on wheat grain yield, % ryegrass and broadleaf control, lodging and plant height at Overton, TX 1985-86.

Herbicide Rate (ai/ac)	Yield bu/ac	Percent Control			% lodging
		Ryegrass Feb. 17	Ryegrass Mar. 19	Broadleaf Mar. 19	
Hoelon 3/4 lb/ac Preemergence	24 ab [1/]	100 a [1/]	95 a [1/]	0 c [1/]	2 a [1/]
Hoelon 1/2 lb + .01 oz Glean + 1 pt crop oil/ac Postemergence (3-4 leaf stage)	23 ab	95 ab	96 a	98 a	0 a
Hoelon 1/2 lb + .01 oz Glean/ac Postemergence (3-4 leaf stage)	23 ab	95 ab	95 a	100 a	0 a
Glean 1/3 oz/ac Preemergence	27 a	70 cd	87 ab	95 a	0 a
Amber 8.1 g/ac + X77 at .25% Postemergence (3-4 leaf stage)	27 a	67 cd	67 bc	97 a	0 a
Amber 16.2 g/ac + X77 at .25% Postemergence (3-4 leaf stage)	25 ab	90 ab	93 a	100 a	0 a
Amber 16.2 g/ac Preemergence	27 a	87 abc	92 a	97 a	0 a
Tycor 1 lb/ac Preemergence	25 ab	63 d	58 c	87 b	3 a
Tycor 1/2 lb/ac Postemergence (3-4 leaf stage)	23 ab	78 bcd	70 bc	97 a	0 a
Tycor 3/4 lb/ac Postemergence (3-4 leaf stage)	25 ab	93 ab	92 a	93 ab	0 a
Control	17 b	0 e	0 d	0 c	38 b
Mean	24	76	77	78	4

Planted on November 22, 1985. Harvest May 27, 1986. Variety planted was McNair 1003.
Fertilizer application rate: Preplant 60 lb/ac N, 60 lbs/ac P_2O_5 and 80 lbs/ac K_2O
Topdressed 25 lbs N/ac as urea on January 23, 1986
35 lbs N/ac as urea on February 20, 1986
Yields were limited by a fairly low stand, caused by heavy rainfall after planting. Also, yields were reduced by very dry conditions in February and March and finally by a leaf rust epidemic in April and May.

[1/] Means followed by the same letter are not significantly different at the 0.05 level, as judged by Duncan's New Multiple Range Test.

Table 3. Effect of herbicidal treatments on wheat grain yields, test weight, % ryegrass control, and plant height at Overton, Texas in 1986-87.

Treatment	Application Time	Yield bu/ac	Test wt/lb	Plant ht. inches	% Ryegrass Control 1/28/87	3/27/87	5/7/87
Untreated control		24 a [1/]	51	25	0 a [1/]	0 a [1/]	0 a [1/]
Glean 0.375 oz ai/ac	Pre	41 bcd	56	29	57 b	37 b	38 b
Glean 0.187 + 0.25 oz ai/ac	Pre + 33 days	34 ab	56	30	62 bc	53 c	50 bc
Glean 0.25 + 0.25 oz ai/ac	Pre + 33 days	40 bc	56	30	67 bc	63 c	60 cd
Glean 0.30 + 0.20 oz ai/ac	Pre + 33 days	40 bc	55	29	75 cd	60 c	63 d
Glean 0.187 + 0.25 oz ai/ac	Pre + 66 days	43 bc	56	29	90 e	95 d	96 e
Glean 0.25 + 0.25 oz ai/ac	Pre + 66 days	40 bc	57	30	88 de	93 d	97 e
Glean 0.30 + 0.20 oz ai/ac	Pre + 66 days	44 bc	56	30	93 e	96 d	99 e
Hoelon 8 oz AI/a + Glean 0.01 oz ai/ac	Pre	48 c	55	33	98 e	92 d	91 e
Hoelon 8 oz AI/a + Glean 0.1 oz ai/ac	3-4 leaf stage	39 bc	57	29	98 e	100 d	99 e
Hoelon 8 oz AI/a + Amber 0.1 oz ai/ac	3-4 leaf stage	47 c	56	30	99 e	98 d	98 e
Hoelon 8 oz AI/ac	3-4 leaf stage	49 c	56	30	99 e	99 d	98 e
CV		15.9	--	8.4	11.0	8.7	9.9

Planted on October 31, 1986. Harvested on June 5, 1987. Variety planted was McNair 1003.
Fertilizer application rate: Preplant 400 lbs/ac of 6-24-24
Topdressed with 25 lbs N/ac as ammonium nitrate on January 5, 1987
and 40 lbs N/ac as ammonium nitrate on February 19, 1987

[1/] Means followed by the same letter are not significantly different at the 0.05 level, as judged by Duncan's New Multiple Range Test.