DIMENSION COMBINED WITH ACCLAIM EXTRA FOR POSTEMERGENT CRABGRASS CONTROL

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INTRODUCTION

Crabgrass (*Digitaria* spp.) is perhaps the most problematic weed in turf throughout the mid-Atlantic and Northeastern United States. In situations where a healthy stand of turf free from weeds is desired, preemergent and/or postemergent crabgrass control is often necessary to prevent the turf from becoming dominated by the undesirable weed. When crabgrass is not controlled, large swards can be become dominated by the weed during the summer months only to die at the first hard frost. In this situation, dead weeds may leave voids in the lawn which make the area vulnerable to invasion by other weeds or even susceptible to erosion.

One of the most common herbicides used to control crabgrass in the region is Dimension (dithiopyr). Dimension provides both pre and early-post emergent control of crabgrass. In situations where Dimension is applied to more mature crabgrass, control may be reduced. The objective of this study was to assess the season-long control of tillered crabgrass following applications of Dimension and tank-mix combinations of Dimension with the postemergent herbicides Acclaim Extra (fenoxaprop) and Drive (quinclorac).

MATERIALS & METHODS

The study was conducted at the University of Connecticut's Plant Science Research and Education Facility located in Storrs, CT. The site consisted of an established lawn of 'Jasper' creeping red fescue (*Festuca rubra*) maintained as a low maintenance home lawn. The area was mowed approximately once per week and received only natural irrigation. Prior to initiation of the study, the area received 0.5 lb N/1000 ft^2 from urea in the spring.

All treatments and application timings are shown in the treatment table. Briefly, various combinations of Dimension and tank-mixes of Dimension + Acclaim Extra or Drive were applied to crabgrass. Treatments were applied to crabgrass at the 1-3 or 3-5 tiller stage. All treatments including Drive were applied with methylated seed oil (MSO). All treatments were applied with a CO_2 pressurized (40 psi) sprayer equipped with a flat-fan nozzle and calibrated to deliver 1.0 gal water per 1000 ft^2.

Plots measured 3 ft x 6 ft, and were arranged in a randomized complete block with four replications. Various visual ratings were taken throughout the course of the study. Injury to the fine leaf fescue from the herbicide treatments was rated on a 0 to 5 scale where 0 = no turfgrass injury; 3.0 = minimum level of acceptable injury for a fine leaf fescue home lawn; and 5 = turfgrass brown or dead. Turfgrass quality was rated visually on a 1 to 9 scale where 1 = brown or dead turf; 6.0 = minimum acceptable quality for a home lawn; and 9 = optimum color and density. Crabgrass and white clover populations were rated on a 0 to 100% scale where 0 = no crabgrass present and 100 = entire plot area covered with crabgrass.

RESULTS

Percent Clover. During the 2008 season, crabgrass populations were considered low and on the final rating date the untreated plots only had an average of 22 to 43% crabgrass. Additionally, crabgrass populations generally were slow to develop as rain was limited during the period when crabgrass germination was expected. The onset of adequate moisture in late Jul, however, likely brought an additional flush of crabgrass germination and growth. Differences in crabgrass populations among treatments were negligible during the summer months, but clear differences could be seen on the final rating date (8 Sep). On 8 Sep, the greatest suppression of crabgrass was exhibited within plots treated with Dimension + Acclaim (20 fl oz) (Table 1). Although several other treatments had statistically similar crabgrass percentages, the following treatments had acceptable levels (≤5%): Dimension (both rates; 1-3 T timing); Dimension + Acclaim (both rates; 1-3 T timing); Dimension + Drive (0.75 lb/A; 1-3 T timing); Acclaim (3-5 T timing); and Dimension + Acclaim (14 fl oz; 3-5 T

timing). Except for applications made alone and at the 1-3 T timing, Acclaim and its tank-mix combinations provided acceptable control of crabgrass. When Dimension was applied alone, applications made to 1-3 T crabgrass provided acceptable control while applications at the later timing did not provide adequate suppression. In situations where Dimension was applied at a reduced rate (01.25 lb ai/A) and tank-mixed with Drive, acceptable control of crabgrass was only achieved in the early application timing and with the higher rate (0.75 lb/A) of quinclorac. The lower rate of Drive (0.50 lb/A) applied early or either rate applied in the 3-5 T stage of crabgrass did not provide adequate control in this study.

Turfgrass Quality and Injury. In general, quality ratings of all treated plots were at or above acceptable levels (≥6.0) during the study and no statistical differences were observed among treatments on any rating date. However, ratings on 1 Aug revealed several treatments that had unacceptable quality. When applied to crabgrass in the 1-3 tiller stage, quality was considered unacceptable in plots treated with Drive (1.0 lb/A), Dimension + Acclaim (both rates), and Dimension + Drive (0.75 lb/A) (Table 2). When applied to crabgrass with 3-5 tillers, plots treated with Acclaim, Drive, or Dimension + Drive (0.5 and 0.75 lb/A) had unacceptable quality. Despite this reduction on 1 Aug, most treatments had acceptable or near acceptable quality throughout the study. No differences in injury were observed among any treatments or the untreated control (Table 3). Slight injury was observed in several plots for 1 to 3 weeks after treatment, but no treatment caused injury that was considered unacceptable on any rating date.

Percent Clover. White clover was present in varying percentages in plots throughout the study and on the final rating date, the untreated control plots had an average of 15 to 26% clover (Table 3). Due to the high variability within plots, few differences were observed among treatments, but in general plots receiving applications of Drive along or in combination with Dimension provided excellent control of clover. Plots treated with Acclaim, Dimension, or combinations of the two generally provided minimal control of clover.

DISCUSSION

Dimension effectively suppressed crabgrass in this study, but timing and/or tank-mix combination was an important factor in improving control. Dimension applied early and alone provided acceptable control of crabgrass, but poor control was observed when applied to more mature crabgrass plants. In either timing, the addition of Acclaim improved or provided similar control as Dimension applied alone. With reduced rates of Dimension (0.125 lb/A), higher rates of Drive may be necessary to provide acceptable season-long control of crabgrass and treatments must be applied crabgrass prior to reaching >3 tillers. Future research may investigate the influence of tank-mix combinations of varying rates and sequential applications in which early applications of Dimension are then followed later by applications of post-emergence crabgrass herbicides. This type of research may provide information on a programmatic approach to managing crabgrass in situations where escapes occur. Based on observations of crabgrass breakthroughs with single applications of Dimension in the Northeast in 2008, conducting future studies of pre and post-emergent combinations involving Dimension on highly maintained turfgrass stands such as creeping bentgrass fairways is warranted.

Table 1. Percent crabgrass of dimension combined with Acclaim Extra for postemergent crabgrass control, 2008.

Treatment and rate in ai/a	App. timing[z] Tillers	Percent crabgrass 1 Aug	15 Aug	8 Sep
Dimension 2EW 0.18 lb	1-3	1 f[x]	2 efg	4 fgh
Dimension 2EW 0.25 lb	1-3	<1 f	2 efg	4 fgh
Acclaim Extra 28 fl oz/a	1-3	3 ef	8 cde	13 c-g
Drive 75DF 1.0 lb/a + MSO 1.5 pt/a	1-3	<1 f	3 efg	7 e-h
Dimension 2EW 0.125 lb + Acclaim Extra 14 fl oz	1-3	<1 f	<1 g	2 gh
Dimension 2EW 0.125 + Acclaim Extra 20 fl oz	1-3	0 f	<1 fg	4 fgh
Dimension 2EW 0.125 lb + Drive 75DF 0.50 lb/a + MSO 1.5 pt/a	1-3	3 ef	6 d-g	11 d-h
Dimension 2EW 0.125 lb + Drive 75DF 0.75 lb/a + MSO 1.5 pt/a	1-3	1 f	3 efg	5 e-h
Dimension 2EW 0.18 lb	3-5	7 cde	10 bcd	19 cd
Dimension 2EW 0.25 lb	3-5	3 ef	7 c-f	11 d-h
Acclaim Extra 28 fl oz/a	3-5	<1 f	1 efg	4 fgh
Drive 75DF 1.0 lb/a + MSO 1.5 pt/a	3-5	4 ef	9 bcd	16 cde
Dimension 2EW 0.125 lb + Acclaim Extra 14 fl oz	3-5	0 f	<1 fg	3 fg
Dimension 2EW 0.125 lb +Acclaim Extra 20 fl oz	3-5	<1 f	<1 g	1 h
Dimension 2EW 0.125 lb + Drive 75DF 0.50 lb/a + MSO 1.5 pt/a	3-5	4 def	9 bcd	14 c-f
Dimension 2EW 0.125 lb + Drive 75DF 0.75 lb/a + MSO 1.5 pt/a	3-5	3 ef	8 cde	13 c-g
Untreated	-	17 a	27 a	43 a
Untreated	-	9 bcd	13 bc	23 bc
Untreated	-	10 bc	15 b	22 c
Untreated	-	14 ab	22 a	33 ab

[z] Treatments were applied as follows: 1-3 tiller treatments applied on 1 Jul and 3-5 tiller treatments applied on 11 Jul.

[y] Percent of the plot area infested by crabgrass was visually rated on a 0 to 100 percent scale where 0 = no crabgrass present or 100 = entire plot covered with crabgrass.

[x] Means in a column followed by the same letter are not significantly different at P≤0.05 level according to the Fisher's protected least significant difference t-test.

Table 2. Turfgrass quality of dimension combined with Acclaim Extra for Postemergent Crabgrass Control.

Treatment and rate in ai/a	App. timing[z] Tillers	Quality[y] 11 Jul	20 Jul	1 Aug	15 Aug
Dimension 2EW 0.18 lb	1-3	8.0 a[x]	7.0 a	6.8 a	6.8 a
Dimension 2EW 0.25 lb	1-3	6.8 a	6.5 a	6.3 a	6.5 a
Acclaim Extra 28 fl oz/a	1-3	7.0 a	7.3 a	7.0 a	7.3 a
Drive 75DF 1.0 lb/a + MSO 1.5 pt/a	1-3	7.0 a	7.0 a	5.3 a	6.0 a
Dimension 2EW 0.125 lb + Acclaim Extra 14 fl oz	1-3	6.3 a	6.8 a	5.8 a	6.5 a
Dimension 2EW 0.125 + Acclaim Extra 20 fl oz	1-3	6.3 a	6.5 a	5.8 a	6.3 a
Dimension 2EW 0.125 lb + Drive 75DF 0.5 lb MSO 1.5 pt/a	1-3	7.5 a	7.0 a	6.3 a	6.3 a
Dimension 2EW 0.125 lb + Drive 75DF 0.75 lb/a MSO 1.5 pt/a	1-3	6.8 a	6.5 a	5.0 a	5.8 a
Dimension 2EW 0.18 lb	3-5	7.5 a	7.0 a	6.0 a	6.0 a
Dimension 2EW 0.25 lb	3-5	7.8 a	7.3 a	6.3 a	6.8 a
Acclaim Extra 28 fl oz/a	3-5	7.3 a	6.8 a	5.8 a	6.5 a
Drive 75DF 1.0 lb/a + MSO 1.5 pt/a	3-5	7.8 a	7.0 a	5.8 a	6.3 a
Dimension 2EW 0.125 lb + Acclaim Extra 14 fl oz	3-5	7.3 a	6.8 a	6.5 a	6.8 a
Dimension 2EW 0.125 lb +Acclaim Extra 20 fl oz	3-5	7.8 a	7.8 a	6.5 a	7.3 a
Dimension 2EW 0.125 lb + Drive 75DF 0.5 lb/a MSO 1.5 pt/a	3-5	6.8 a	7.0 a	5.3 a	6.0 a
Dimension 2EW 0.125 lb + Drive 75DF 0.75 lb/a MSO 1.5 pt/a	3-5	7.5 a	7.0 a	5.5 a	6.3 a
Untreated	-	7.5 a	7.5 a	6.8 a	7.0 a
Untreated	-	6.5 a	7.0 a	6.5 a	6.3 a
Untreated	-	7.0 a	7.3 a	6.3 a	7.0 a
Untreated	-	7.3 a	7.5 a	6.5 a	7.3 a

[z] Treatments were applied as follows: 1-3 tiller treatments applied on 1 Jul and 3-5 tiller treatments applied on 11 Jul.

[y] Quality was rated visually on 0-9 scale where 0 = entire plot brown or dead, 6 = minimul acceptable quality for a fine leaf fescue lawn, and 9 = optimum greenness and density.

[x] Means in a column followed by the same letter are not significantly different at P≤0.05 level according to the Fisher's protected least significant difference t-test.

Table 3. Turfgrass injury and percent clover of dimension combined with Acclaim Extra for postemergent crabgrass control, 2008.

	App. timing[z]	Injury[y]		Percent Clover[x]		
Treatment and rate in ai/a	Tillers	11 Jul	20 Jul	1 Aug	15 Aug	8 Sep
Dimension 2EW 0.18 lb	1-3	0.5 a[w]	1.0 a	28 a	28 a	36 a
Dimension 2EW 0.25 lb	1-3	1.3 a	1.5 a	12 a	12 a	15 abc
Acclaim Extra 28 fl oz/a	1-3	1.0 a	0.3 a	31 a	31 a	37 a
Drive 75DF 1.0 lb/a + MSO 1.5 pt/a	1-3	1.3 a	1.5 a	0 a	0 a	0 c
Dimension 2EW 0.125 lb + Acclaim Extra 14 fl oz	1-3	1.8 a	1.3 a	11 a	11 a	15 abc
Dimension 2EW 0.125 + Acclaim Extra 20 fl oz	1-3	1.8 a	1.8 a	10 a	10 a	21 abc
Dimension 2EW 0.125 lb + Drive 75DF 0.5 lb MSO 1.5 pt/a	1-3	0.5 a	1.0 a	0 a	0 a	1 bc
Dimension 2EW 0.125 lb + Drive 75DF 0.75 lb/a MSO 1.5 pt/a	1-3	1.3 a	1.8 a	<1 a	<1 a	2 bc
Dimension 2EW 0.18 lb	3-5	0.8 a	1.3 a	2 a	2 a	4 bc
Dimension 2EW 0.25 lb	3-5	0.3 a	0.8 a	17 a	17 a	14 abc
Acclaim Extra 28 fl oz/a	3-5	0.5 a	1.3 a	8 a	8 a	10 bc
Drive 75DF 1.0 lb/a + MSO 1.5 pt/a	3-5	0.5 a	1.3 a	0 a	0 a	0 c
Dimension 2EW 0.125 lb + Acclaim Extra 14 fl oz	3-5	1.3 a	1.3 a	7 a	7 a	8 bc
Dimension 2EW 0.125 lb +Acclaim Extra 20 fl oz	3-5	0.5 a	0.5 a	33 a	33 a	38 a
Dimension 2EW 0.125 lb + Drive 75DF 0.5 lb/a MSO 1.5 pt/a	3-5	1.0 a	1.3 a	2 a	2 a	1 bc
Dimension 2EW 0.125 lb + Drive 75DF 0.75 lb/a MSO 1.5 pt/a	3-5	0.5 a	1.0 a	2 a	2 a	0 c
Untreated	-	0.8 a	0.5 a	22 a	22 a	15 abc
Untreated	-	1.5 a	1.0 a	13 a	13 a	18 abc
Untreated	-	0.8 a	0.8 a	19 a	19 a	26 ab
Untreated	-	0.8 a	0.5 a	20 a	20 a	15 abc

[z] Treatments were applied as follows: 1-3 tiller treatments applied on 1 Jul and 3-5 tiller treatments applied on 11 Jul.

[y] Turfgrass injury was rated on a 0 to 5 scale where 0 = no injury visible and 5 = entire plot brown or dead.

[x] Percent of the plot area infested by white clover was visually rated on a 0 to 100 percent scale where 0 = no clover present or 100 = entire plot covered with clover.

[w] Means in a column followed by the same letter are not significantly different at P≤0.05 level according to the Fisher's protected least significant difference t-test.