

Evaluation of Wet-Blade and Broadcast Spray Applications for Tall Fescue Seedhead Suppression

Introduction

Tall fescue is a common roadside and other unimproved turf cool season grass in Kentucky. Frequent mowing is the most common management regime for departments of transportation and the Kentucky Transportation Cabinet (KTC) is no exception. On average, the KTC mows their rights-of-way 3 to 5 times a season at a cost ranging from \$25 to \$50 an acre, depending on site characteristics and added services (litter pick-up, etc). Plant growth regulators, or PGRs, have been researched in the past at the University of Kentucky for their ability to inhibit seedhead growth of tall fescue and therefore reduce mowing cycles. Common herbicides for tall fescue seedhead suppression include Stronghold™ and Plateau®. Some of the limitations of seedhead suppression herbicide applications include the timing of the application and the need for a broadcast sprayer in the early spring.

New application technologies have also been researched in the past at University of Kentucky. One of these technologies is the Wet-Blade by Diamond Mowers™. The Wet-Blade is an application system which incorporates a traditional deck mower and herbicide delivery system to perform cut surface applications while performing standard mowing operations. Although marketed mainly for brush control, the technology may be used for unimproved turf management. The use of a Wet-Blade for PGR applications could allow a roadside manager to perform the necessary task of mowing while applying a seedhead suppression product and therefore reducing the need for future mowing cycles.

A trial was installed in the spring of 2007 to examine the efficacy of the Wet Blade versus traditional broadcast applications for tall fescue seedhead suppression.

Methods and Materials

The trial was located in a predominately tall fescue stand at the University of Kentucky Spindletop Research Farm in Fayette County, Kentucky. Two herbicide treatments (Stronghold™ + Arsenal® and Plateau®) were evaluated using 2 different application methods (Wet-Blade and broadcast spray) at 2 different application timings (April and May) in a 3-way factorial design with 4 replications. Plots measured 10' X 50' and were treated at 8' X 50' which left a 4' running check for comparison purposes at evaluation. Broadcast spray plots were mowed prior to the May applications. The first application occurred on April 13 and the second occurred on May 11. Broadcast spray applications were performed at 20 GPA while the Wet-Blade applications were done at 2 GPA. Data was collected on May 21, June 13, July 6, and August 16. Data collected included color ratings and percent control of tall fescue seedheads. Color ratings were taken on a 0 – 9 scale with 0 being dead turf and 9 being fully green turf. Percent control of seedheads were taken using a 0 – 100 % scale. Ratings were taken general broadleaf weed control was taken on August 16. Data were analyzed using ARM software and means were separated using Fisher's LSD at $p = 0.05$.

Results

Due to the factorial design of this trial, results will be presented for each single factor and followed by all 3 factors combined.

Effect of Timing of Application on Turf Color and Seedhead Suppression Regardless of Herbicide or Application Method

A significant treatment effect for timing of application was seen in the May, June, and July evaluations (Table 1). This effect was not present in the August evaluations as color ratings for both timings approached 8. The April application timing had unacceptable color damage in May and the May application followed suit in the June ratings. April applications regained their near normal color appearance in June and July and then began to brown as the drought continued. Color ratings were not significantly different for either application timing at the August evaluations. Control of seedheads followed the same trend as color ratings. April applications resulted in control consistently above 90 % (Table 1). May applications did not reach 90 % until the August evaluation. April applications resulted in significantly higher control of tall fescue seedheads than the May applications for every evaluation except August. Weed control at the August evaluation was unremarkable as to be expected with the herbicides and rates used.

Table 1: Results and statistics for timing of application

Treatment date	Rating Date								
	May 21	June 13	July 6	August 16	May 21	June 13	July 6	August 16	August 16
	Turf color				Percent control of seedheads				Percent broadleaf weed control
April 13	5.5	8.6	8.2	7.8	95	93	94	95	31
May 11	7.6	4.5	6.0	7.6	78	79	83	90	27
<i>LSD</i> _{0.05}	0.6	0.3	0.3	0.3	4.7	5.8	4.7	5.6	8.9
<i>Prob(F)</i> _{0.05}	0.0001	0.0001	0.0001	0.6951	.0001	0.0001	0.0001	0.0562	0.3179

Effect of Method of Application on Turf Color and Seedhead Suppression Regardless of Application Timing or Herbicide

There was no significant treatment effect for application method on turf color at any evaluation interval (Table 2). Color ratings for both application methods ranged from 6.5 to 7.8 throughout the trial.

There was a significant treatment effect noted for the control of seedheads. The broadcast spray resulted in significantly higher levels of control throughout the entire trial. Broadcast spray applications resulted in control consistently above 90 % while the Wet-Blade application ranged from 76 % at the May evaluation to 87 % in August. This

may be due to lack of herbicide dispersal directly under the two gear boxes on the Wet-Blade mower which allowed for some tall fescue flowering. The Wet-Blade applications did result in significantly higher general broadleaf weed control regardless of herbicide or timing of application at the August evaluation; however, these levels of control would be considered operationally unacceptable for either application method.

Table 2: Results and statistics for method of application

Application Method	Rating Date								
	May 21	June 13	July 6	August 16	May 21	June 13	July 6	August 16	August 16
	Turf color				Percent control of seedheads				Percent broadleaf weed control
Spray	6.5	6.6	7.0	7.8	97	92	93	95	18
Wet-Blade	6.6	6.5	7.2	7.7	76	79	84	87	40
<i>LSD</i> _{0.05}	0.6	0.3	0.3	0.3	4.7	5.8	4.7	5.3	8.9
<i>Prob(F)</i> _{0.05}	0.8203	0.7034	0.2176	0.6951	0.0001	0.0001	0.0008	0.0048	0.0001

Effect of Herbicide on Turf Color and Seedhead Suppression Regardless of Timing or Method of Application

The only significant difference, and subsequent treatment effect, between the 2 herbicide treatments and turf color occurred at the July evaluation (Table 3). This treatment effect was not maintained as there was no difference in turf color at the August evaluation. The only time of significant treatment effect for seedhead suppression occurred at the July evaluation as well and this effect, as with turf color, was not maintained through the August evaluation. Overall, there were no major differences between the 2 herbicides tested and their effect on either turf color or control of seedheads regardless of timing or method of application. General weed control, although not operationally acceptable for either herbicide treatment, was significantly higher at the August evaluation for the Stronghold + Arsenal treatment than the Plateau treatment. This can be attributed to the residual activity of Arsenal versus the low rate of Plateau used.

Table 3: Results and statistics for herbicide

Herbicide (rate per acre)	Rating Date								
	May 21	June 13	July 6	August 16	May 21	June 13	July 6	August 16	August 16
	Turf color				Percent control of seedheads				Percent broadleaf weed control
Stronghold (14 fl oz) + Arsenal (1.5 fl oz)	6.7	6.6	6.9	7.7	84	84	86	90	35
Plateau (4 fl oz)	6.4	6.5	7.3	7.8	88	87	92	92	23
<i>LSD</i> _{0.05}	0.6	0.3	0.3	0.3	4.7	5.8	4.7	5.3	8.9
<i>Prob(F)</i> _{0.05}	0.26	0.70	0.05	0.69	0.06	0.24	0.02	0.28	0.01

Combined Effect of Timing of Application, Method of Application, and Herbicide on Turf Color and Seedhead Suppression

Three of the April applications resulted in significantly lower color ratings than the May applications in the May evaluations (Table 4). This trend reversed itself in the June evaluations as all May applications had significantly lower color ratings than all the April applications. This is directly a function of timing of application; the April applications had recovered from treatment. This pattern continued through the June evaluations. The only statistical difference that occurred in terms of color ratings at the August evaluation was the April spray application of Plateau resulted in higher color ratings than the May spray applications of either Stronghold + Arsenal and Plateau.

May Wet-Blade applications, regardless of herbicide, were significantly lower in control of seedheads than all other applications at the May evaluation (Table 4). The April Wet-Blade application of Stronghold + Arsenal were significantly higher than the May Wet Blade applications of either herbicide but significantly lower than the April and May spray applications of either herbicide and the April Wet-Blade application of Plateau at the May evaluation. The April Wet-Blade application of Stronghold + Arsenal continued this trend through the trial as it resulted in significantly lower control levels in August than all treatments except the May Wet-Blade applications of either herbicide. April spray applications of either herbicide provided consistent control greater than 95 % throughout the study. The April Wet-Blade application of Plateau, along with the May spray applications of either herbicide, resulted in control levels greater than 90 % at the August evaluation.

Overall Efficacy

It appears that the WetBlade system has potential for plant growth regulator applications for seedhead suppression. The results of this trial indicate that applications of Plateau at 4 fl oz / ac through the WetBlade in April result in statistically similar control levels as those provided by broadcast spray applications of Plateau at 4 fl oz / ac or Stronghold at 14 fl oz / ac plus Arsenal at 1.5 fl oz / ac. May applications of either herbicide using the WetBlade were not as operationally effective as the April broadcast spray applications or the April WetBlade Plateau application indicating the importance of application timing for cool season grass seedhead suppression.

Table 4: Results and statistics for timing of application, method of application, and herbicide for tall fescue seedhead suppression

Treatment	Rating Date								
	May 21	June 13	July 6	Aug 16	May 21	June 13	July 6	Aug 16	Aug 16
	Turf color				Percent control of seedheads				% BLWC
April Spray Stronghold (14 fl oz) + Arsenal (1.5 fl oz)	5.0 d	8.8 a	8.0 a	7.8 ab	100 a	100 a	99 a	98 a	20 bc
April Spray Plateau (4 fl oz)	5.5 cd	8.5 a	8.3 a	8.3 a	100 a	98 ab	96 ab	98 a	13 c
April Wet-Blade Stronghold (14 fl oz) + Arsenal (1.5 fl oz)	6.5 bc	8.5 a	8.0 a	7.8 ab	81 b	83 cd	86 c	81 c	48 a
April Wet-Blade Plateau (4 fl oz)	5.0 d	8.5 a	8.5 a	7.5 b	96 a	90 abc	96 ab	95 ab	45 a
May Spray Stronghold (14 fl oz) + Arsenal (1.5 fl oz)	7.8 a	4.5 b	5.8 b	7.5 b	94 a	87 bcd	90 abc	92 ab	31 ab
May Spray Plateau (4 fl oz)	7.8 a	4.5 b	6.0 b	7.5 b	93 a	85 cd	88 bc	92 ab	10 c
May Wet-Blade Stronghold (14 fl oz) + Arsenal (1.5 fl oz)	7.5 ab	4.5 b	6.0 b	7.8 ab	61 c	66 e	69 b	88 abc	43 a
May Wet-Blade Plateau (4 fl oz)	7.3 ab	4.5 b	6.3 b	7.8 ab	65 c	76 de	86 c	85 bc	24 bc