2015 PGR Trials on Turf

Introduction

Seasonal management of cool season turf can include application of plant growth regulators (PGRs) to suppress growth and reduce the number of time consuming and costly mowings. PGRs may also be a good option on steep slopes where it is difficult to cut the grass safely. However, these products can injure the turf causing discoloration, which is undesirable but in many cases is temporary. Our group has tested PGRs for seedhead suppression and growth reduction in forage type tall fescue (see 2012 Research Report). We established trials in 2015 on turf to test PGR options, including the new product Anuew, for growth suppression .

There are a number of PGR products available for turf and the early classification of these had two groups. Type I PGRs slow cellular division and include some herbicides. Our previous trials only included Type 1 PGRs. Type II PGRs were gibberellic acid (GA) inhibitors and slow cell elongation. The current classification has 6 groups, Classes A – F. This trial included a number of Type 1 PGRs which are now Class C (mitotic inhibitors) (cell division) (foliar absorbed) and Class D (herbicidal mode) PGRs. Mefluidide (in the product Envoy) is in Class C while imazethapyr + imazapyr (Stronghold), imazapic (Plateau), and metsulfuron methyl (Escort) are in Class D. The new product, Anuew (prohexadione calcium), is in Class A (late GA synthesis blocker) (foliar absorbed).

Materials and Methods

The trials were established at the Turfgrass Research Center at Spindletop Research Farm in Lexington KY with 9 treatments and 3 replications arranged in a randomized complete block design on each of two turf types. They were part of a trial conducted by Kenneth Cropper (see reference) from 2013 to 2014. The turf type tall fescue plot was under high maintenance management during that time and the mixed species endemic polystand (endemic) plot was under low maintenance management.

Plots were 5 ft by 20 ft with running unsprayed checks (2 ft) between each of the plots. Application was at 20 gallons per acre on July 10, 2015 and included a non-ionic surfactant at 0.25% v/v. Table 1 lists the herbicide treatments with their active ingredients and application rates. In all treatments a synthetic auxin (2,4-D) was included to increase the weed control spectrum but also as a “safener” to reduce damage to the grasses. The Embark, Plateau, and Stronghold treatments are industry standards for seedhead suppression and growth reduction. The plots were irrigated on a set schedule for the duration of the trial. Due to miscommunication with the Research Center staff, the plots were mowed three days after application. They were left unmowed for the remainder of the trial.

Turf color was assessed by comparison to the running check strips 14 (7/24/2015) days after application (DAT). The color rating ranges from 0 (dead) to 9 (full green). The color of the check strips was set at 8. Canopy heights were measured at 14, 39 (8/18/2015) and 60 (9/8/2015) DAT. Broadleaf weed (% control) ratings were taken on the endemic (low maintenance) turf plots 14 and 39 DAT with % broadleaf cover rating taken 60 DAT. Fresh and

dry clipping weights were measured by collecting the mower output from a mower swath for all plots 60 DAT. Data were analyzed using ARM software and treatment means were compared using Fisher's Protected LSD at p = 0.05. Data columns in Tables 2 and 3 with *ns* have treatment means compared using Fisher's LSD where the overall P was greater than 0.05.

Results and Discussion

The Anuew treatments had the same turf color as the control in the tall fescue turf plots 14 DAT (Table 2). Embark and Escort affected turf color less than the Stronghold and Plateau treatments. All treatments had shorter turf than the control 14 DAT while by 60 DAT only Plateau was shorter than the control. There were no differences in clipping weights between the treatments by 60 DAT.

In the endemic plots, the Escort and the two lower rates of Anuew had the same turf color as the control 14 DAT (Table 3). Embark had the lowest color rating. All treatments had shorter turf than the control with Embark being shorter than the others 14 DAT. At 39 DAT, most treatments were still shorter than the control except for Escort. By 60 DAT, only the Embark and two of the Anuew treatments were still shorter than the control. Broadleaf control ranged from 62 to 78% in the herbicide treatments 39 DAT while broadleaf % cover ranged from 0 to 17 % among the plots 60 DAT. Clipping weights were variable and none of the treatments were different than the control 60 DAT.

There are a number of PGR options for use on cool season turf which temporarily reduce height and turf color rating. The different rates of Anuew did not affect turf color but still temporarily reduced turf height.

Table 1. Treatments and Active Ingredients for PGR Trials on Turf

Treatment	Product Names	Rate (per Acre)	Rate Unit	Active Ingredient(s)	ai Rate (per acre)
1	Embark	24	fl oz/a	mefluidide	6 oz ae
	Formula 40	2	qt/a	2,4-D amine	1.84 lb ae
2	Stronghold	12	fl oz/a	mefluidide + imazethapyr + imazapyr	2.20 oz ae + 0.53 oz ae + 0.01 oz ae
	Hi-Dep IVM	2	qt/a	2,4-D amine	1.90 lb ae
3	Plateau	4	fl oz/a	imazapic	1.00 oz ae
	Formula 40	2	qt/a	2,4-D amine	1.84 lb ae
4	Escort	0.4	oz/a	metsulfuron methyl	0.24 oz
	Formula 40	2	qt/a	2,4-D amine	1.84 lb ae
5	Aneuw	1	lb/a	prohexadione calcium	4.4 oz
	Formula 40	2	qt/a	2,4-D amine	1.84 lb ae
6	Aneuw	1.5	lb/a	prohexadione calcium	6.6 oz
	Formula 40	2	qt/a	2,4-D amine	1.84 lb ae
7	Aneuw	2	lb/a	prohexadione calcium	8.8 oz
	Formula 40	2	qt/a	2,4-D amine	1.84 lb ae
8	Untreated Check				

All herbicide treatments contained the adjuvant, Activator 90 at 0.25% v/v.

Table 2. Results for PGR Trial on Tall Fescue Turf

Treatment	Product	Rate (per Acre)	Turf Color (0-9)	Height (in)	Height (in)	Height (in)	Fresh Clipping Weight (g)	Dry Clipping Weight (g)
			14 DAT		39 DAT	60 DAT		
1	Embark Formula 40	24 fl oz 2 qt	6.7 b	3.8 bc	6.0 b	5.7 ab	647	247
2	Stronghold Hi-Dep IVM	12 fl oz 2 qt	4.7 c	2.8 d	6.2 b	5.8 ab	950	340
3	Plateau Formula 40	4 fl oz 2 qt	4.3 c	3.2 cd	5.8 b	5.2 b	793	315
4	Escort Formula 40	0.4 oz 2 qt	6.3 b	3.0 d	6.0 b	5.8 ab	987	378
5	Aneuw Formula 40	1 lb 2 qt	8.0 a	4.3 b	6.5 ab	6.0 a	727	290
6	Aneuw Formula 40	1.5 lb 2 qt	8.0 a	4.2 b	6.3 ab	6.0 a	793	310
7	Aneuw Formula 40	2 lb 2 qt	8.0 a	4.3 b	6.3 ab	6.2 a	667	261
8	Untreated Check		8.0 a	6.0 a	7.0 a	6.2 a	873	369
					ns	*ns*	*ns*	*ns*

All herbicide treatments contained the adjuvant, Activator 90 at 0.25% v/v.

[1]Means followed by the same letter are not different according to Fisher's LSD at P < 0.05. Data columns with ns have treatment means compared using Fisher's LSD where the overall P was greater than 0.05

Table 3. Results for PGR Trial on Endemic Turf

Treatment	Product	Rate (per Acre)	Turf Color (0-9)	Height (in)	Broadleave Control (%)	Height (in)	Broadleave Control (%)	Height (in)	Broadleave Cover (%)	Fresh Clipping Weight (g)	Dry Clipping Weight (g)
			14 DAT			39 DAT		60 DAT			
1	Embark Formula 40	24 fl oz 2 qt	5.0 e	4.2 c	47 ab	7.3 bc	70 ab	6.3 b	12 ab	703 ab	269 ab
2	Stronghold Hi-Dep IVM	12 fl oz 2 qt	6.7 d	5.5 b	37 abc	6.3 c	72 ab	7.3 ab	6 bc	803 ab	314 ab
3	Plateau Formula 40	4 fl oz 2 qt	6.8 cd	5.3 b	33 abc	6.7 c	78 a	6.7 ab	8 abc	747 ab	307 ab
4	Escort Formula 40	0.4 oz 2 qt	8.0 a	5.3 b	40 ab	8.0 ab	78 a	7.8 ab	0 c	1070 a	411 a
5	Aneuw Formula 40	1 lb 2 qt	8.0 a	5.7 b	10 bc	6.8 c	63 ab	6.2 b	17 a	567 b	219 b
6	Aneuw Formula 40	1.5 lb 2 qt	7.8 ab	5.7 b	43 ab	7.2 bc	68 ab	7.7 ab	5 bc	1033 a	374 ab
7	Aneuw Formula 40	2 lb 2 qt	7.3 bc	5.3 b	60 a	6.5 c	62 b	6.3 b	12 ab	600 b	241 b
8	Untreated Check		8.0 a	7.3 a	0 c	8.5 a	0 c	8.5 a	8 abc	913 ab	373 ab
					ns			*ns*		*ns*	*ns*

All herbicide treatments contained the adjuvant, Activator 90 at 0.25% v/v.

[1]*Means followed by the same letter are not different according to Fisher's LSD at P < 0.05. Data columns with ns have treatment means compared using Fisher's LSD where the overall P was greater than 0.05*