

2018 PGR Options for Tall Fescue Management

Tall fescue is a widely adapted species and is a common roadside and other unimproved turf cool-season grass. Frequent mowing is the most common management regime for departments of transportation. Plant Growth Regulators (PGRs) are potential tools to reduce turf growth and aid in keeping our roadways safe for travelers. PGRs are currently classified into six categories, Classes A – F, based on their mechanism of action. This trial includes examples of Class A, C, and D PGRs and was established to evaluate some PGR options for roadside management. Class A are late GA synthesis blockers, Class C are mitotic/cell division inhibitors, and Class D are herbicidal. Seedhead suppression is an effective means to reduce mowing for the first cycle. PGRs for this are normally applied in the early spring. This trial was established to evaluate some PGR options for roadside management.

Materials and Methods

A trial was established in 2018 at Spindletop Research Farm in Lexington KY arranged as a complete block design with 21 PGR treatments and three replications. Plots were 7 ft by 20 ft with running unsprayed checks (3 ft wide) between each of the plots. The treatments were five PGRs applied before the first mowing and one to two weeks after each of the three mowings plus control. Products tested were Embark 2S (mefluidide) [Class C]), Plateau (imazapic) [Class D], Opensight (aminopyralid + metsulfuron methyl) [Class D], Anuew (prohexadione calcium) [Class A], and Perspective (aminocyclopyrachlor + clorsulfuron) [Class D] (Table 1). All applications were at 25 gallons per acre and included a non-ionic surfactant at 0.25% v/v. Application dates were 4/29/2018, 6/14/2018, 8/24/2018, and 10/19/2018 for the 2018 trial. Mowing dates were 5/29/2018, 8/10/2018, and 10/11/2018.

Tall fescue color was assessed every two weeks by comparison to the running check strips. The color rating ranges from 0 (dead) to 9 (full green). The color of the check strips was set at 8. Heading (%) was assessed before the first mowing. Canopy heights were measured every two weeks as well. Data were analyzed using ARM software and treatment means were compared using Fisher's LSD at $p = 0.05$.

Results and Discussion

After the first PGR application all treatments had fescue shorter than control 15 days after treatment (DAT1) and lower heading density (Table 2). At this assessment only Anuew was no less green than control. By 30 DAT1 all treatments were still shorter than control and while all the treatments had lower heading (%) (1-57%) (Figure 1), Plateau had almost no seedheads (Table 2). There would likely not have been any more seedheads emerging based on previous trials (Omielean and Witt, 2012) and the Plateau treatment would have saved at least one mowing. Anuew was the only treatment with the same green color as control. After mowing, all the treatments except Plateau had the same green color at 46 DAT1. Plateau was more green than control. Figure 2 summarizes what happened, as regards green color, to these treated plots over the course of the season. There were no effects on color beyond 46 DAT1. Figure 3 summarizes the effects on turf height over the course of the season. There were no consistent treatment effects beyond 30 DAT1.

After the first mowing and the second application all the PGR treatments had less green color 16 DAT2 as well as shorter turf with the Class D PGR treatments (Plateau, Opensight, and Perspective) (Table 3). The Embark, Plateau, and Perspective treatments had less green color 31 DAT2 but color had recovered in all treatments in subsequent evaluations. All treatments had shorter turf 31 DAT2 while only Plateau, Anuew, and Perspective were shorter 49 DAT2. By the time of the second mowing 57 DAT2 there were no differences in height. Figure 4 summarizes the effects on color with these plots and the effects did not extend beyond 31 DAT2. Figure 5 summarizes the treatment effects on fescue height. Most treatments, except for Embark, reduced turf height beyond the second mowing (Table 4 and Figure 5). Plateau only had shorter turf until 86 DAT2 while Opensight, Anuew, and Perspective had consistently shorter turf until 99 DAT2.

After the second mowing and the third PGR application, all the treatments except Anuew had lower green color 15 DAT3 and all treatments except Embark had lower fescue height (Table 4). Anuew did not have lower green color ratings while the other treatments did 28 DAT3. All the treatments had shorter turf at this assessment. Color recovered with Plateau and Anuew but was still less green for the other treatments 44 DAT3. Turf height was shorter for all the treatments except for Plateau and Opensight at that assessment date. After mowing there were no further treatment effects on color or height (Table 4) (Figures 6 and 7).

After the third mowing and the fourth PGR application, the Plateau, Opensight, and Perspective treatments had less green color at 11 and 30 DAT4 (Table 5) (Figure 8). Plateau and Perspective consistently reduced turf height at both assessments while Anuew did at 11 DAT4 and Opensight did 30 DAT4 (Figure 9).

The effects of the PGR treatments in most cases did not extend beyond the next mowing this year. All the PGR treatments reduced seedhead density and height after the first application timing with the greatest reduction with Plateau. In general, many of the treatments reduced grass height along with turf color but color recovered. Anuew had less effect on color than the other treatments at most of the ratings.

The differences in rainfall between 2017 (see 2017 Research Report) and 2018 should help put the results and responses in perspective. Lexington had a record amount of precipitation in the 2018 calendar year. Other areas of the state had near “normal” rainfall. In 2017 total precipitation was 10% above “normal” (30 year average) for the whole year but 6.4 inches or 23% above normal for the growing season (April to October). In 2018 total precipitation was 62% above normal for the whole year and 15.9 inches or 58% above normal for the growing season. We need to take this into consideration when using this information in making management decisions.

We also had an earlier killing freeze than in 2017. Plots that were treated late in the season (October 19) will be evaluated in 2019 for spring seedhead suppression.

Literature Cited:

Omielan, J and Witt, W. 2011/2012 Fall Spring Tall Fescue Seedhead Suppression Trial (IVM 2012 Annual Research Report)

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Table 1. Herbicide Treatments, Active Ingredients and Application Rates.

Product (s)	Rate (per Acre)	Active Ingredient(s)	ai Rate (per Acre)
Embark 2S	24 fl oz	mefluidide	6 oz ae
Plateau	2 fl oz	imazapic	0.5 oz ae
Opensight	2.5 oz	aminopyralid + metsulfuron methyl	1.3 oz ae + 0.24 oz
Anuew	1 lb	prohexadione calcium	4.4 oz
Perspective	4.75 oz	aminocyclopyrachlor + chlorsulfuron	1.9 oz + 0.75 oz
Unsprayed Control			

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

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Table 2. Herbicide Treatments, Turf Color, Fescue Heights and % Heading after First PGR Application

Product (s)	Rate (per Acre)	Timing	May 14, 2018			May 29, 2018			June 14, 2018	
			Color (0-9)	Ht (in)	Heading (%)	Color (0-9)	Ht (in)	Heading (%)	Color (0-9)	Ht (in)
			15 DAT1 ¹			30 DAT1			46 DAT1	
Embark 2S	24 fl oz	before first mowing	6.5 bc ²	14 b	8 bc	6.8 b	17 c	28 c	8.0 b	12
		after first mowing								
		after second mowing								
		after third mowing								
Plateau	2 fl oz	before first mowing	5.5 cd	11 b	2 c	5.7 c	11 d	0.3 d	8.1 a	12
		after first mowing								
		after second mowing								
		after third mowing								
Opensight	2.5 oz	before first mowing	4.0 e	10 b	2 c	6.7 b	14 cd	25 cd	8.0 b	12
		after first mowing								
		after second mowing								
		after third mowing								
Anuew	1 lb	before first mowing	7.2 ab	14 b	17 b	8.0 a	35 b	57 b	8.0 b	13
		after first mowing								
		after second mowing								
		after third mowing								
Perspective	4.75 oz	before first mowing	5.2 d	10 b	0 c	6.0 c	17 b	13 cd	8.0 b	12
		after first mowing								
		after second mowing								
		after third mowing								
Unsprayed Control			8.0 a	26 a	77 a	8.0 a	44 a	100 a	8.0 b	12

¹ DAT1 = Days after treatment before first mowing

² Means within a column followed by the same letter are not different according to Fisher's LSD at $P < 0.05$.

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Table 3. Herbicide Treatments, Turf Color, and Fescue Heights after Second PGR Application

Product (s)	Rate (per Acre)	Timing	June 30, 2018		July 15, 2018		Aug 2, 2018		Aug 10, 2018		Aug 24, 2018	
			Color (0-9)	Ht (in)	Color (0-9)	Ht (in)	Color (0-9)	Ht (in)	Color (0-9)	Ht (in)	Color (0-9)	Ht (in)
			62 DAT1 ¹ (16 DAT2 ²)		77 DAT1 (31 DAT2)		95 DAT1 (49 DAT2)		103 DAT1 (57 DAT2)		117 DAT1 (71 DAT2)	
Embark 2S	24 fl oz	before first mowing	8.1 a ³	15 ab	8.0 a	15 ab	8.0	17 a	8.0	18	8.0	14 abc
		after first mowing	6.8 b	14 ab	6.2 c	12 def	8.0	16 ab	8.0	19	8.0	15 ab
		after second mowing										
		after third mowing										
Plateau	2 fl oz	before first mowing	8.3 a	14 abc	8.0 a	15 ab	8.0	16 ab	8.0	20	8.0	14 abc
		after first mowing	5.5 cd	12 c	7.0 b	12 efg	8.0	14 b	8.0	19	8.0	14 bc
		after second mowing										
		after third mowing										
Opensight	2.5 oz	before first mowing	8.1 a	13 bc	8.0 a	13 cde	8.0	15 ab	8.0	16	8.0	14 abc
		after first mowing	6.2 bc	12 c	7.3 ab	13 def	8.0	15 ab	8.0	17	8.0	14 bc
		after second mowing										
		after third mowing										
Anuew	1 lb	before first mowing	8.1 a	15 a	8.0 a	15 a	8.0	16 ab	8.0	18	8.0	15 abc
		after first mowing	6.8 b	13 bc	7.7 ab	11 fg	8.0	14 b	8.0	16	8.0	13 c
		after second mowing										
		after third mowing										
Perspective	4.75 oz	before first mowing	8.0 a	14 abc	8.0 a	14 bcd	8.0	16 ab	8.0	18	8.0	14 bc
		after first mowing	5.2 d	12 c	7.2 b	11 g	8.0	14 b	8.0	17	8.0	14 bc
		after second mowing										
		after third mowing										
Unsprayed Control			8.0 a	14 ab	8.0 a	15 abc	8.0	17 a	8.0	19	8.0	16 a

¹ DAT1 = Days after treatment before first mowing

² DAT2 = Days after treatment after first mowing

³ Means within a column followed by the same letter are not different according to Fisher's LSD at $P < 0.05$.

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Table 4. Herbicide Treatments, Turf Color, and Fescue Heights after Third PGR Application

Product (s)	Rate (per Acre)	Timing	Sept 8, 2018		Sept 21, 2018		Oct 7, 2018	
			Color (0-9)	Ht (in)	Color (0-9)	Ht (in)	Color (0-9)	Ht (in)
			132 DAT1 ¹ (86 DAT2 ²) (15 DAT3 ³)		145 DAT1 (99 DAT2) (28 DAT3)		161 DAT1 (115 DAT2) (44 DAT3)	
Embark 2S	24 fl oz	before first mowing	8.0 a ⁴	19 ab	8.3 a	21 a	8.0 a	27 a
		after first mowing	8.0 a	19 abc	8.0 a	21 a	8.0 a	26 a
		after second mowing	7.2 b	18 abcd	5.8 b	15 bcd	7.3 bc	19 d
		after third mowing						
Plateau	2 fl oz	before first mowing	8.0 a	19 abc	8.0 a	20 a	8.0 a	25 ab
		after first mowing	8.0 a	18 abcd	8.0 a	17 ab	8.0 a	23 abcd
		after second mowing	6.3 c	17 bcd	6.0 b	15 cd	7.7 ab	21 bcd
		after third mowing						
Opensight	2.5 oz	before first mowing	8.0 a	16 cd	8.0 a	18 abc	7.5 bc	23 abcd
		after first mowing	8.0 a	17 bcd	8.0 a	19 ab	8.0 a	23 abcd
		after second mowing	6.7 bc	16 d	6.3 b	16 bcd	7.6 b	22 bcd
		after third mowing						
Anew	1 lb	before first mowing	8.0 a	18 abcd	8.0 a	18 abc	8.0 a	23 abcd
		after first mowing	8.0 a	17 bcd	8.0 a	18 abc	8.0 a	24 abc
		after second mowing	7.8 a	15 d	6.7 a	14 d	8.0 a	19 d
		after third mowing						
Perspective	4.75 oz	before first mowing	8.0 a	18 abcd	8.0 a	18 abc	8.0 a	23 abcd
		after first mowing	8.0 a	17 ncd	8.0 a	18 abc	8.0 a	22 abcd
		after second mowing	6.3 c	15 d	6.3 b	16 bcd	7.2 c	20 cd
		after third mowing						
Unsprayed Control			8.0 a	20 a	8.0 a	20 a	8.0 a	25 ab

¹ DAT1 = Days after treatment before first mowing ² DAT2 = Days after treatment after first mowing

³ DAT3 = Days after treatment after second mowing

⁴ Means within a column followed by the same letter are not different according to Fisher's LSD at P < 0.05.

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Table 5. Herbicide Treatments, Turf Color, and Fescue Heights after Fourth PGR Application

Product (s)	Rate (per Acre)	Timing	Oct 30		Nov 18	
			Color (0-9)	Ht (in)	Color (0-9)	Ht (in)
			184 DAT1 ¹ (138 DAT2 ²) (67 DAT3 ³) (11 DAT4 ⁴)		203 DAT1 (157 DAT2) (86 DAT3) (30 DAT4)	
Embark 2S	24 fl oz	before first mowing	8.0 a ⁵	12 ab	8.0 a	14 a
		after first mowing	8.0 a	13 a	8.0 a	13 ab
		after second mowing	8.0 a	11 abcde	8.0 a	12 cdef
		after third mowing	8.0 a	11 abcde	7.8 a	13 ab
Plateau	2 fl oz	before first mowing	8.0 a	11 abcde	8.0 a	14 a
		after first mowing	8.0 a	11 bcde	8.0 a	12 abcd
		after second mowing	8.1 a	11 cde	8.1 a	13 abc
		after third mowing	7.3 b	10 de	6.7 b	11 ef
Opensight	2.5 oz	before first mowing	7.8 a	10 e	7.9 a	13 abc
		after first mowing	8.0 a	10 de	8.0 a	12 abcd
		after second mowing	8.2 a	11 bcde	8.1 a	12 bcde
		after third mowing	7.0 b	12 abcd	6.5 b	11 def
Anuew	1 lb	before first mowing	8.0 a	11 bcde	8.0 a	13 abc
		after first mowing	8.0 a	11 abcde	8.0 a	12 abcd
		after second mowing	8.1 a	11 cde	8.1 a	12 cdef
		after third mowing	7.8 a	10 de	7.9 a	12 cdef
Perspective	4.75 oz	before first mowing	8.0 a	11 abcde	8.0 a	13 abc
		after first mowing	8.0 a	11 cde	8.0 a	13 abc
		after second mowing	8.1 a	11 cde	8.0 a	12 bcde
		after third mowing	7.2 b	10 de	6.7 b	10 f
Unsprayed Control			8.0 a	12 abc	8.0 a	13 abc

¹ DAT1 = Days after treatment before first mowing ² DAT2 = Days after treatment after first mowing

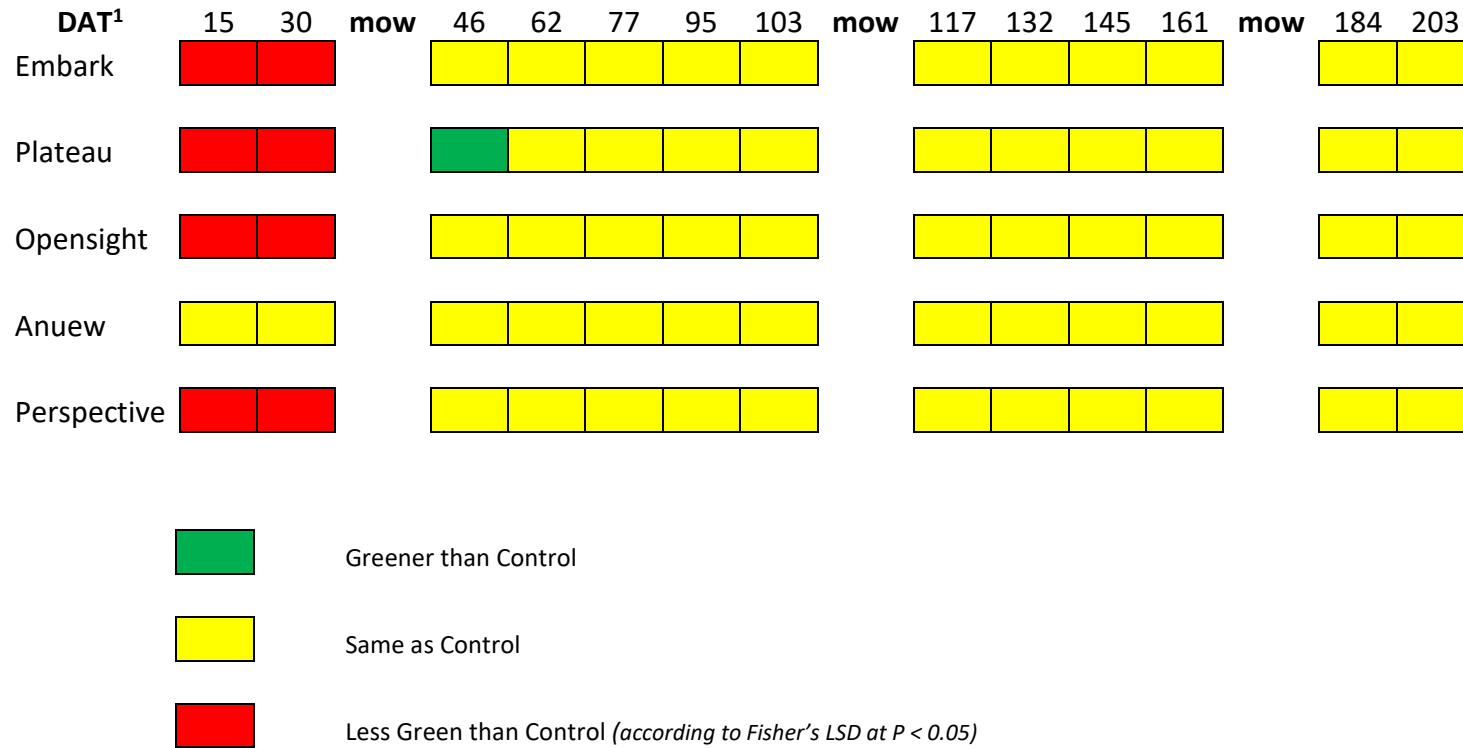
³ DAT3 = Days after treatment after second mowing ⁴ DAT4 = Days after treatment after third mowing

⁵ Means within a column followed by the same letter are not different according to Fisher's LSD at $P < 0.05$.

Figure 1. Example of plot with reduced tall fescue color, height, and seedhead density 30 days after the April 29 application. This happens to be an Embark 2S plot.

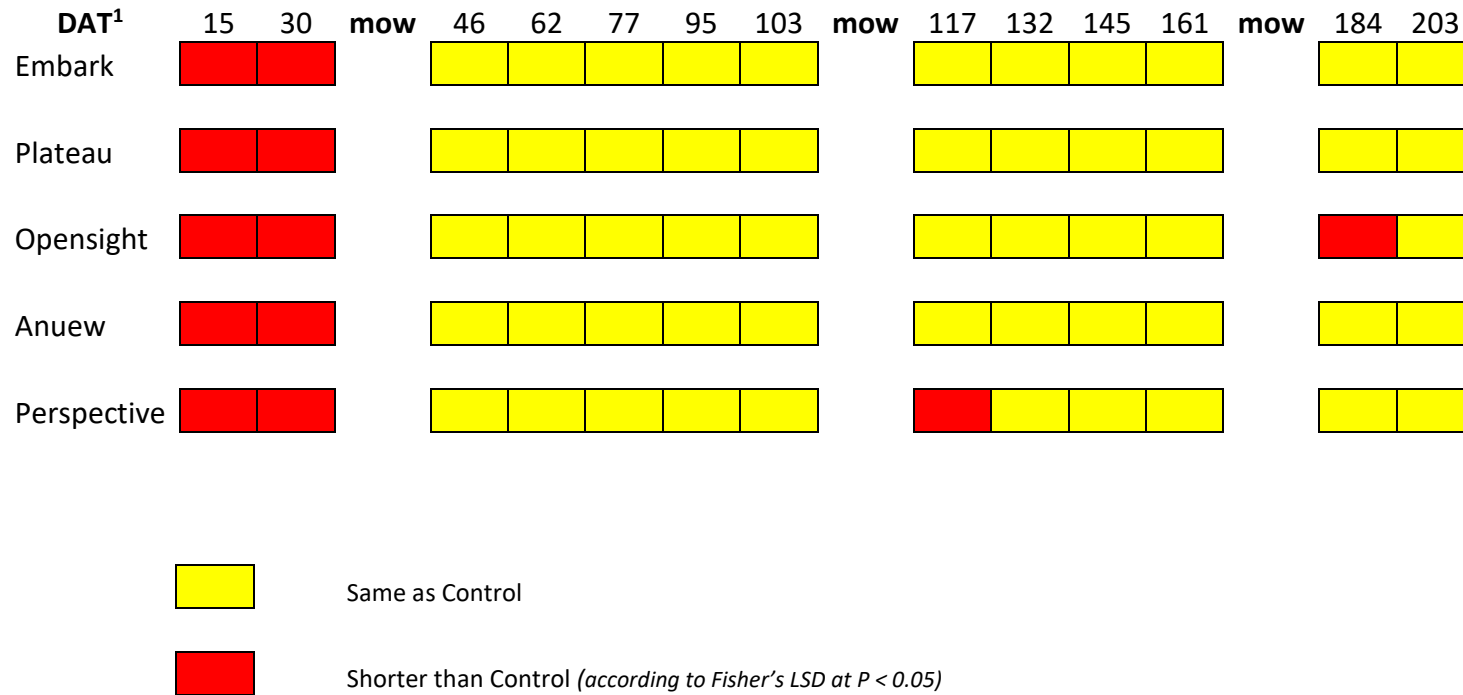


Figure 2. Summary of Turf Color with PGR Application before First Mowing



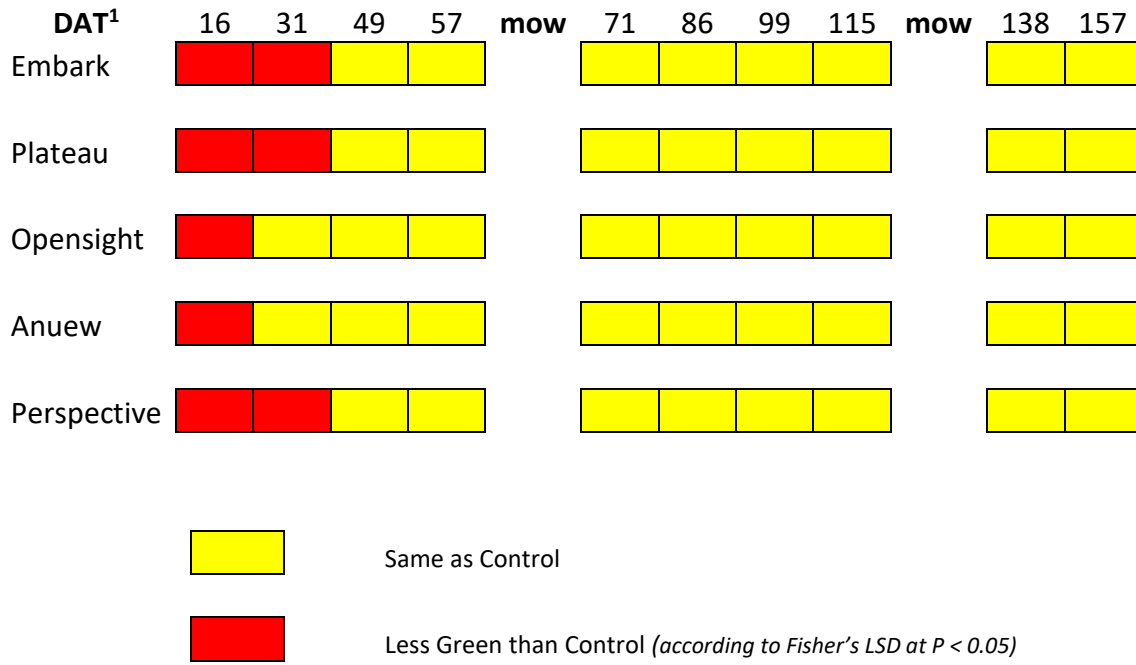
¹ DAT = Days after treatment

Figure 3. Summary of Fescue Height with PGR Application before First Mowing



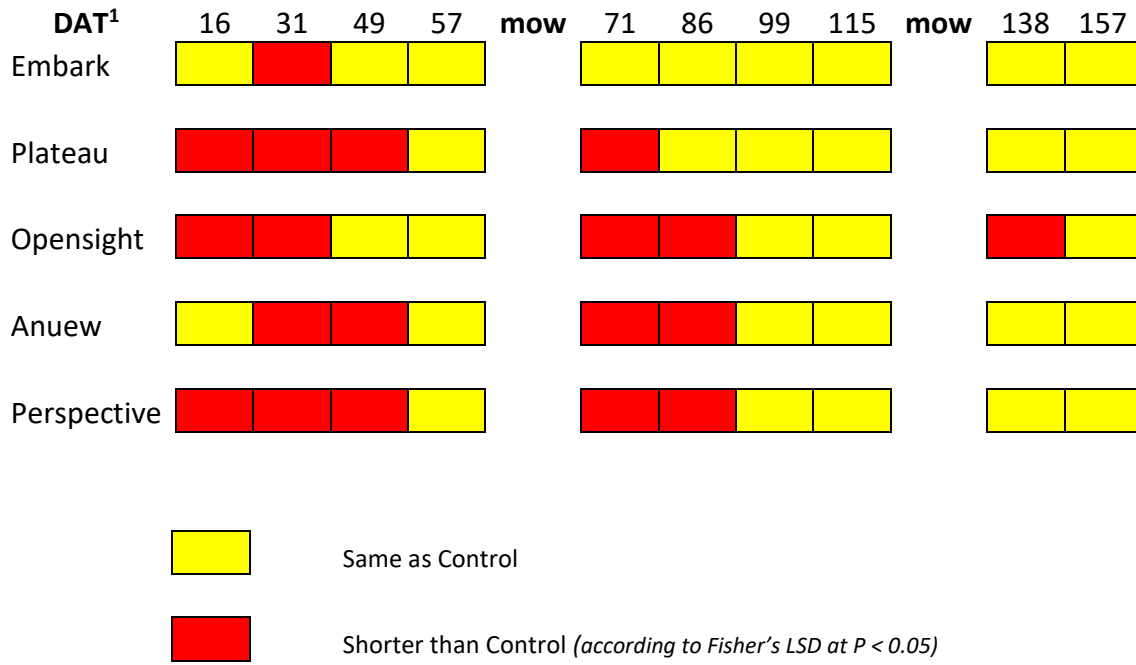
¹ DAT = Days after treatment

Figure 4. Summary of Turf Color with PGR Application after First Mowing



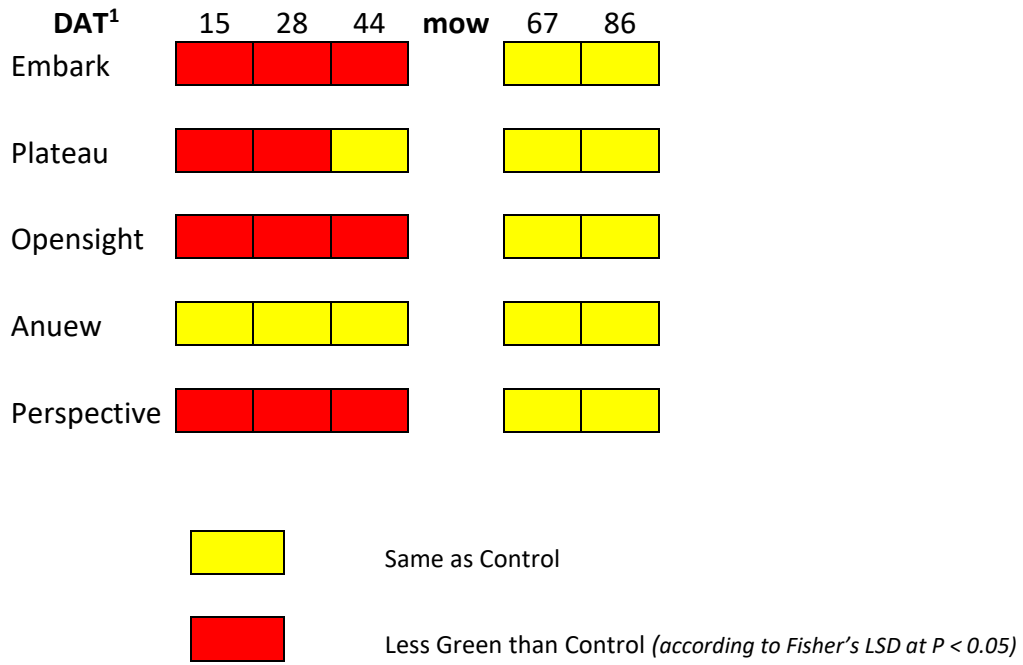
¹ DAT = Days after treatment

Figure 5. Summary of Fescue Height with PGR Application after First Mowing



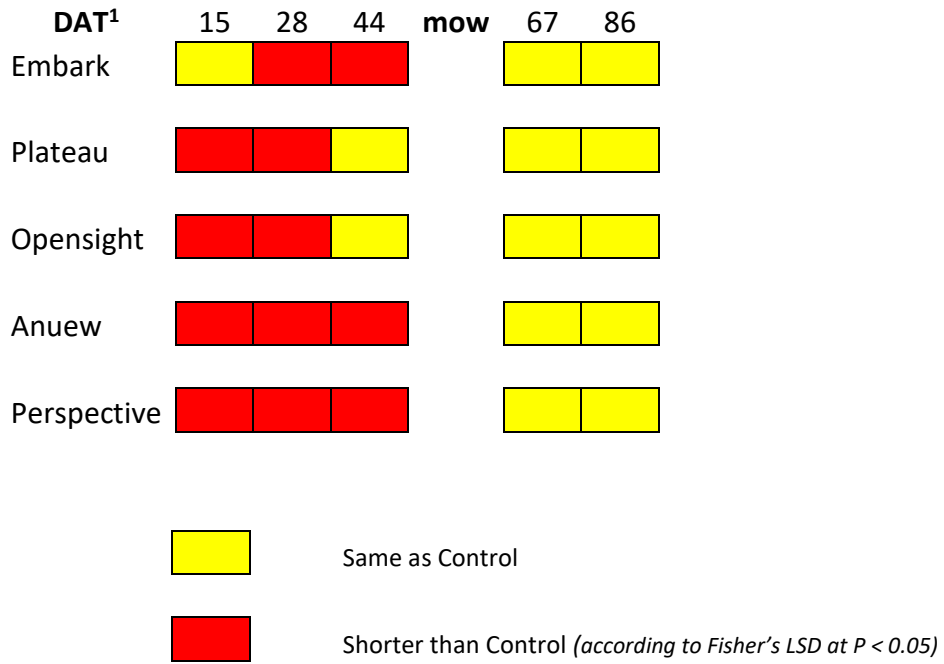
¹ DAT = Days after treatment

Figure 6. Summary of Turf Color with PGR Application after Second Mowing



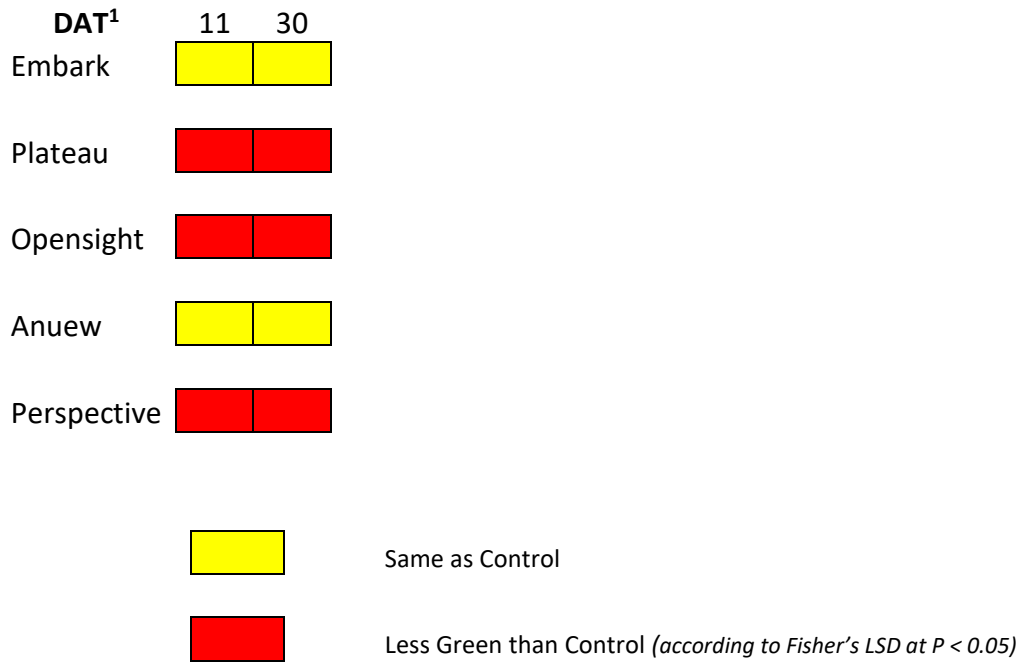
¹ DAT = Days after treatment

Figure 7. Summary of Fescue Height with PGR Application after Second Mowing



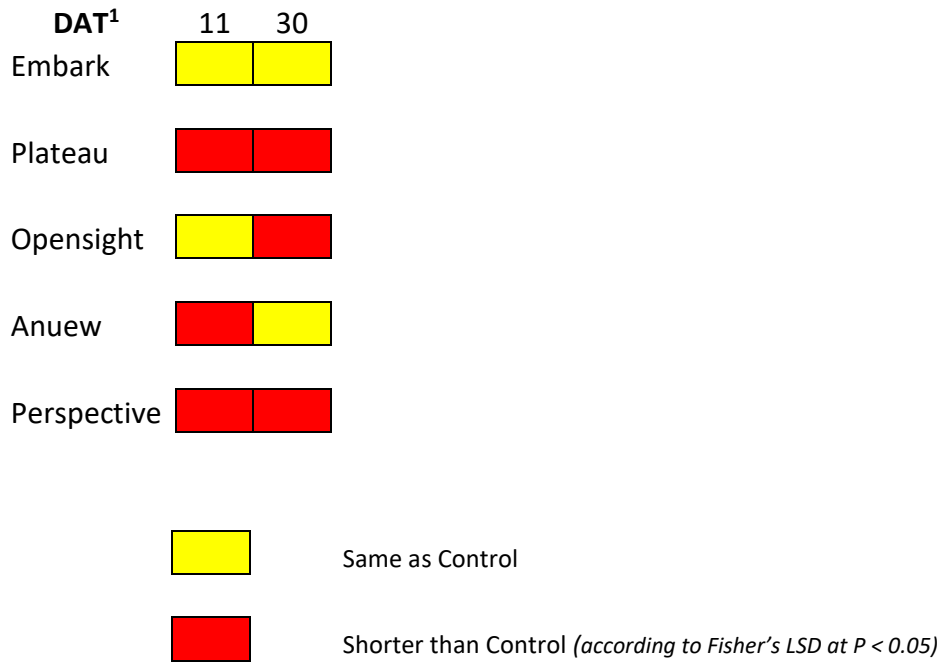
¹ DAT = Days after treatment

Figure 8. Summary of Turf Color with PGR Application after Third Mowing



¹ DAT = Days after treatment

Figure 9. Summary of Fescue Height with PGR Application after Third Mowing



¹ DAT = Days after treatment