

# Spring Transition of Tifway (419) Bermudagrass as Influenced by Herbicide Treatments

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## Abstract

*The transition from perennial ryegrass back to bermudagrass is often problematic. Prolonged periods of ryegrass persistence and/or loss of complete turf is troublesome and not favorable to the re-establishment of the bermudagrass base. A group of select herbicides were applied in May 2000, to assess their response to enhance the removal of perennial ryegrass, and to enhance recovery of the bermudagrass. CORSAIR (Chlorosulfuron) applied at 1.0 ounce/product/acre resulted in reduced turfgrass quality from three to six weeks after treatment, with a decrease in color at three weeks. This treatment caused moderate suppression of the turf and an enhanced transition from perennial ryegrass to Tifway (419). MANOR (Metsulfuron) applied at 0.4 ounce/product/acre caused a slight growth suppression, acceptable turfgrass color, but a noticeable decrease in turfgrass quality up to six weeks after application. MANOR increased turf density and minimized scalping by seven weeks after treatment (July 24, 2000). SURFLAN when applied at 1.5 lb AI/A, produced acceptable quality turf, no visible growth suppression, acceptable overseed turf quality and color. SURFLAN did not provide any affect as a transition agent in this test. KERB did not greatly enhance transition, and was slightly more effective at 0.5 lb AI/A, than at the 1.0 lb AI/A rate. Both rates of KERB produced acceptable turfgrass color throughout the test. Turfgrass quality diminished to low levels from July 18 to July 24, ranking lowest in quality. KERB treated turf tended to "scalp" more than other treated turfs and thinned the grass at the high rate of 0.50 lb AI/A. FIRST RATE applied at 75 grams AI/hectare caused slight visible suppression for two weeks after treatment, an acceptable quality turf (on six of seven evaluation dates), acceptable turfgrass color and turf density. FIRST RATE did enhance transition, but less so than CORSAIR, possibly less than MANOR, and certainly less than AEF 130630. PROXY was applied on four dates (four, three, two, and zero weeks prior to June 3), selected as a "calendar target" dates observe transition. PROXY when applied on May 13, provided a short transition effect, for a period of about two weeks. Applications made later had little effect whatsoever, on Spring transition back to bermudagrass. From May 19 to June 5, the two "early" applications of PROXY, generally increased turfgrass color and quality scores, most likely by having a PGR response on perennial ryegrass. AEF 130630 readily enhanced Spring transition from perennial ryegrass to Tifway (419) bermudagrass, especially in May and June. All three application rates caused visual suppression of the turf from May 19 until June 5. Turfgrass color and quality were affected by AEF 130630. The maximum expression occurred for the 0.42 ounce/product/M rate by May 25 (which remained until at least June 5). Mean color scores here were 5.3, on both dates. The high rate 0.64 ounce/product/M actually caused less color reductions in the turf (perhaps as a function of the quicker removal of ryegrass). Reduced turf quality resulted three weeks after treatment for both the low and high rates (means = 5.0). The turf was similar to that of the control plots, afterwards, and superior by both middle and late July time periods.*

## Introduction

The current use of heat-tolerant perennial ryegrass, and the lack of scheduling opportunities for standard early Summer maintenance cultivation practices (aerification, vertical mowing) has aggravated Spring transition. Conditions range from long-term stands of perennial ryegrass, to loss of turf upon final collapse of the cool season turf in middle to late Summer. It is imperative to remove the ryegrass in full by mid-Summer in order for the bermudagrass to establish an adequate Summer turf, with enough food storage capacity for the next Fall overseeding event.

One approach to enhance the removal of ryegrass and re-emergence of bermudagrass would be the use of selective herbicide, or plant growth regulators. For a compound to be effective, it would have to (1) slowly remove the ryegrass (2) not be deleterious to the bermudagrass (3) would produce minimal or no injury to the turf and (4) provide a continuous cover with no loss of turf.

With this in mind, several experimental and commercially available herbicides were used to assist in Spring transition.

## Material and Methods

“Vip III” perennial ryegrass was overseeded in the Fall of 1999, at the rate of 18 lbs/1000 square feet on a nine year old stand of Tifway (419) bermudagrass. Both rye and bermudagrass were mowed 3 times weekly at 11/16 of an inch, and fertilized with 0.5 to 0.75 lbs N/M/month from November until June. The turf was irrigated to avoid stress.

The plant growth regulator PROXY was applied at 5 ounces/product/M as separate treatments applied on a schedule as 4, 3, 2, and 0 weeks before a “normal” transition by calendar date would be expected. These dates were thus May 13, May 19, May 26, and June 3, being the “calendar target” date representing an early June date for observing any Spring transition.

All other treatments were applied on May 13. These included AEF 130360 at 0.21, 0.42, and 0.64 ounces/product/M; KERB at 0.5 and 1.0 lb AI/A; CORSAIR at 1.0 ounce/product/acre; MANOR at 0.4 ounce/product/acre; and FIRST RATE at 75 grams AI/hectare. Note that the active ingredients in these products are as follows: PROXY (Ethephon), AEF 130360 (Proprietary), KERB (Pronamide), SURFLAN (Oryzalin), MANOR (Metsulfuron), CORSAIR (Chlorosulfuron), FIRST RATE (Cloransulam).

Plot size was 5' x 12'. Each plot had its own check half plot as an untreated background control plot (5' x 6'). Each treatment appeared three times in a randomized complete block design. Plots were scored with visual estimates of percent bermudagrass on four dates (May 29, June 5, July 7, and July 24). Turfgrass color, quality, degree of scalping, density, and visual suppression estimates were assigned as symptoms developed from May 29, to July 24.

All data were subjected to the analysis of variance technique, using SAS software. LSD values were calculated as the mean separation statistic, applied only when the F ratio in the anova for the treatment main effect was significant at P = 0.10, or less.

## Results and Discussion

### Transition

On all four evaluation dates, the treatment main effect was significant. Percent bermudagrass was assigned on all plots on June 5, by rating two 1' x 2' squares within each plot which was sprayed ten days earlier with a corn herbicide which bleaches bermudagrass. On May 29, bermudagrass could be easily spotted within the plots. On July 7 and July 24, percent ryegrass was easily observed, and used to calculate the percent bermudagrass (as 100% total plot cover - % ryegrass).

The average percent plot bermudagrass among non-treated turf was 27%, 29%, 72%. and 82% on May 29, June 5, July 7, and July 24, respectively. (Table 1).

On May 29, the PROXY application scheduled at two weeks before “calendar” transition was applied on the same date as the first evaluation for all other treatments (being May 29). Both PROXY treatments which were applied four and three weeks before “calendar transition” were rated after respective treatment applications. These two treatments had similar transition responses (43% and 32% respectively).

Both AEF treatments applied at 0.42 and 0.64 ounces, respectively, had the greatest percent bermudagrass (85%, 90%). Note that these estimates were derived from viewing the turf with magenta field lense glasses, which differentiates reflective properties due to plant stress. The percent non-stressed turf (0 - 100%) was scored as percent bermudagrass. (Table 1).

Both KERB treatments had minimal transitional effects, as they produced percent plot bermudagrass mean values similar to that of the control (28% - 32%). SURFLAN was slow to act as well, producing 35% bermudagrass cover by May 29 (15 days after treatment). CORSAIR, MANOR, and FIRST RATE had 70%, 68%, and 62% mean bermudagrass, respectively.

On June 5, percent plot bermudagrass was assigned to plots by visually estimating the percent of the sub-sample plot areas sprayed with the bleaching herbicide. Visual estimates of percent bermudagrass were lower than the previous rating were, especially for all the AEF and MANOR treated turfs. This may be a function of evaluator/technique bias, due to different assessment estimates (filter reflections versus leaf bleaching) between the two dates. Note, however, that relative treatment rankings were similar between dates (with the exception of MANOR). By June 5, PROXY applied “two weeks before the calendar transition” of June 1 had just one week to respond for transition effect. The “0” target application was made on June 2, just three days prior to this particular evaluation date. (Table 1).

PROXY applied four weeks before the calendar target had twice as much bermudagrass (40%) than when applied at three weeks (20%) prior to the calendar target. At this time (June 5), those treatments which had 65% or more ryegrass included CORSAIR at 1.0 ounce/product/acre, and both AEF treatments applied at either the 0.42 or 0.64 ounce/product/M rates.

SURFLAN produced minimal results, while KERB treated plots had (27% - 47%) plot cover of bermudagrass. (Table 1).

By July 7, percent plot bermudagrass increased drastically among all turfs. Percent plot bermudagrass among treated turfs ranged from mean values of 65% to 95%. AEF 130360 applied previously at 0.42 and 0.64 ounces/product/M produced turfs with 92% and 95% bermudagrass, respectively. CORSAIR and FIRST RATE were similar (94% bermudagrass) followed closely by MANOR and (89%). The mean of all check plots was 72% bermudagrass on July 7. Note, that at this time, all PROXY treated turfs had between 72% - 80% plot bermudagrass, regardless of application timings.

At the close of the test on July 24, percent plot bermudagrass for Tifway (419) treated 45 days previously, ranged from 78% - 98%. All three AEF 130360 plots had 97% - 98% bermudagrass present. All PROXY treated turfs had 81% - 90% bermudagrass cover, with the latest season application timing having the least (81%). (Table 1).

KERB applied at the higher rate of 1.0 lb AI/A, had the lowest amount (78%) which was less than that of the mean of the untreated control. PROXY treated turf showed that all three treatments applied before the “calendar target date” had greater effect on transition, as opposed to the latest seasonal timing. The difference was 10% more bermudagrass for PROXY applied at either four, three, two weeks before the early June target date. (Table 1).

On a seasonal basis, AEF 130360 applied at either 0.42 or 0.64 ounces/product/M, dramatically increased the rate of Spring transition. CORSAIR, MANOR, and FIRST RATE did also, but was initially slower to do so until early July. SURFLAN when applied at 1.5 lb AI/A, was similar to that of the untreated control. KERB provided at best, an intermediate response at 0.50 lb AI/A, and an even slower response at 1.0 lb AI/A.

### Turfgrass Appearance

Certain treatments showed visual suppression of the foliage which was highly noticeable in May and early June. Plots were assigned visual suppression scores (on five dates) relative to each of the check plots within 48 hours after a mowing event. A 1-6 scale was used where 1 = no suppression (similar to the check), 4 = moderate, and 6 = severe suppression. (Table 2).

The greatest amounts of growth suppression occurred within the first three weeks after the May 13 application. AEF 130630 caused noticeable suppression, scoring mean values of 4.0, or greater at the 0.42 and 0.64 ounce/product/M rates. The low rate of 0.21 ounce/product /M caused slightly less, but still noticeable stunting. Stunting was still realized by the end of June. KERB and SURFLAN had minimal suppression throughout the test. FIRST RATE caused initial stunting, for about two weeks only. CORSAIR treated plots were moderately stunted at one week after treatments and then slightly so up to early June. (Table 2).

By the end of June, the AEF treated turf still exhibited a small amount of suppression (2.0 - 2.3 mean scores). All other treatments had trace or no effects at this time. At the third week of July, there was essentially no suppression evident on any treatments, remaining. (Table 2).

### Turfgrass Color

Color responses were assigned to plots on seven dates, from May 19 to July 24. PROXY treated turf provided acceptable turfgrass color, especially at three weeks after application. On June 5, PROXY plots which were applied on May 13 and May 20, had dark green color turf (8.3 and 8.1, respectively). After that, there was no timing response which affected turfgrass color for any PROXY timing treatments. (Table 3).

AEF treated turf had produced lighter color plots, from May 26 to June 5 (2 and 3, three weeks after treatment, respectively). Interestingly enough, the low rate produced a light green color turf (by one week after treatment) which lasted until late June. The middle (0.42 ounce/product/M) rate was slower to produce the lighter green turf. At two weeks after treatment, this treatment produced a light green turf (mean = 5.3). This lasted until late June as well. In step-wise fashion, the high rate of AEF 130630 produced a light green turf three weeks after treatment (5.0). All three AEF treatments recovered by June 27. After that date, these same turfs produced mean color scores which were greater than that of the control (check) plots. (Table 3).

KERB treated turf had acceptable color scores, noting, however, that at the high rate (1.0 lb AI/A) on July 7, the turf was slightly lighter in color (mean = 5.7). This demonstrates an affect on bermudagrass, which KERB seems to express at this rate, randomly.

SURFLAN treated turf had adequate turf color throughout the test, peaking at three and six weeks after treatment. SURFLAN treated turf had mean color scores of 8.0 and 7.7 on June 5, and June 27, respectively. (Table 3).

CORSAIR produced a light green color turf within one week after treatment (5.3 on May 19). and remained lighter in color than the untreated control plots until June 27.

MANOR was slower to cause a loss of color. It took three weeks for maximum herbicide response, as the mean color for this treatment was 5.0 on June 5. After that, the turf returned to a dark color (similar to the checks).

FIRST RATE basically produced turf with acceptable color, noting that it was generally slightly less than that of the control plots. The immediate response (at one week after treatment) was a slightly lighter color, with a mean color score of 5.7. After that time, all color was fully acceptable on all remaining dates.

The overseeded Tifway (419) was fertilized with 3/4 to 7/8 lb N each month, except for July, which received one spray application of Ferron Iron supplement, which added only 0.07 lbs /N/M. Therefore, at the close of the test on July 24, there were no deleterious color responses, and eight of the thirteen treatments were numerically darker than the control plots. This is typical in turfgrass, where latent release responses occur after treatment with a herbicide or plant growth regulator. The result is a darker green turf several weeks after treatment. (Table 3).

### Turfgrass Quality

The “treatment” main effect was significant for all seven evaluation dates, from May 19 to July 24. On each date, there were treatments which scored above or below the quality mean values of the untreated control plots. (Table 4).

The PROXY treated turf plots, which were treated earlier in May, produced better quality turf than those treated closer to June (calendar target date). This was the general trend from May 19 to June 27. After June 27, there was no general trend.

AEF 130630 treated turf plots did show definite seasonal trends. The first four evaluation dates, May 19 through June 27, demonstrated some decrease in quality, which would be nominally noticeable to the lay person. On the first three evaluation dates, turfgrass quality among AEF treated plots was less than that of the untreated control plots. On the fourth evaluation (June 27), quality was identical to that of the control plots (mean quality = 5.7). (Table 4).

A similar trend occurred with turfgrass color (as for quality) among AEF treated turf. The low rate produced the lowest desirable turf responses closest to the application date (of May 13). In time (by June 27) all AEF turfs had similar ranks for color and quality. By July 7, all AEF turfs had recovered fully, producing better quality turf than that of the controls. (Table 4). This is often a typical latent response among herbicide treated turfs. The identical 5.0 mean quality scores at the lowest and highest rate, on June 5, may be from the herbicide affecting the perennial ryegrass more so at the low rate (50% bermuda : 50% ryegrass), while perhaps exhibiting a bermudagrass affect at the high rate (70% bermuda : 30% ryegrass). (Tables 1,4).

KERB treated turf produced acceptable quality turf up until mid-July. At the close of the test on July 24, both the 0.50 and 1.0 lb AI/A treatments had low mean quality scores of 5.0. The bermudagrass appeared uneven in color and composition across the plot. As mentioned previously, no nitrogen fertilizer was added in July.

SURFLAN treated turf had acceptable quality throughout the entire test period.

CORSAIR showed decreased turfgrass quality at three and six weeks after treatment. CORSAIR produced mean quality scores of 5.0 and 5.3, on June 5 and June 27 respectively. Ratings following on July 7, 18, and 24 show a strong positive latent regrowth period, with mean quality scores ranging from 7.7 to 8.3. (Table 4).

MANOR treated turf was similar in response to that of CORSAIR, but the decrease in quality after treatment was more pronounced from MANOR. Marginal turf quality scores occurred on the first three evaluation dates, with poor quality turf recorded on June 27 (six weeks after treatment). After that, the turf rebounded strongly.

FIRST RATE produced, in general, acceptable quality turf, exhibiting a very slight negative response at one week after treatment (May 19, mean = 5.7) and again at six weeks after treatment (June 27, mean = 5.0). (Table 4).

### Density and Scalping Performance

By mid-July, visible differences were evident in plot density. With values based on a 1 - 9 scale (1 = no turf, 9 = best possible turf), the plots were assigned scores on July 18, and July 24. (Table 5).

On July 18, plot scores ranged from 5.7 to 8.0. AEF treated turf generally increased in density as the rate increased. CORSAIR plots also produced a visually dense turf at this time. At the close of the test on July 24, most treatments had denser looking plots than the controls. AEF 130630 at 0.42 and 0.64 ounce/product/M, and both CORSAIR and MANOR had density values of 8.0, or greater. (Table 5). These turfs exhibited plots with a high shoot density and/or shorter leaf internodes.

In mid-Summer, during the high relative humidity conditions of the monsoon, Tifway (419) tends to scalp, even when mowed three times weekly. “Scalping” severity scores were assigned to plots on July 18.

Two values were assigned to plots; the first being the severity of scalping (1 = none, 3 = slight/moderate, 4 = moderate, 6 = severe), the second being the percent of the entire plot which demonstrated scalping.

It is noteworthy that those treatments which were the most dense on July 18 and July 24, were also those with the lesser severity of the scalping condition, as well as also having less plot area scalped. These treatments included CORSAIR, MANOR, and the middle and upper rates of AEF 130630. PROXY plots tended to scalp most (in severity and percent plot of scalped turf). KERB treated turf had the “thinnest” turf (at the 1.0 lb AI./A) rate, and slight scalping. (Table 5).

## Conclusions

1. Thirteen individual treatments of herbicide or plant growth regulators were applied on May 13, 2000 on overseeded Tifway (419) bermudagrass, mowed three times weekly at 11/16 inch.

2. CORSAIR (Chlorosulfuron) applied at 1.0 ounce/product/acre resulted in reduced turfgrass quality from three to six weeks after treatment, with a decrease in color at three weeks.

This treatment caused moderate suppression of the turf and an enhanced transition from perennial ryegrass to Tifway (419).

3. MANOR (Metsulfuron) applied at 0.4 ounce/product/acre caused a slight growth suppression, acceptable turfgrass color, but a noticeable decrease in turfgrass quality up to six weeks after application. It is unsure as to the extent as how effective MANOR was as a transition agent (due to use of different estimating techniques used). Bermudagrass plot content was high initially when rated on a whole plot basis, but low when estimated with a bleaching agent.

MANOR increased turf density and minimized scalping by seven weeks after treatment (July 24, 2000).

4. SURFLAN when applied at 1.5 lb AI/A, produced acceptable quality turf, no visible growth suppression, acceptable overseed turf quality and color.

SURFLAN did not provide any affect as a transition agent in this test.

5. KERB did not greatly enhance transition, and was slightly more effective at 0.5 lb AI/A, than at the 1.0 lb AI/A rate.

Both rates of KERB produced acceptable turfgrass color throughout the test. Turfgrass quality diminished to low levels from July 18 to July 24, ranking last in quality (mean = 5.0).

KERB treated turf tended to “scalp” more than other treated turfs and thinned the grass at the high rate of 1.0 lb AI/A.

6. FIRST RATE applied at 75 grams AI/hectare caused slight visible suppression for two weeks after treatment, an acceptable quality turf (on six of seven evaluation dates), acceptable turfgrass color and turf density.

FIRST RATE did enhance transition, but less so than CORSAIR, possibly less than MANOR, and certainly less than AEF 130630.

7. PROXY was applied on four dates (four, three, two, and zero weeks prior to early June, which was selected as “calendar target” dates to initiate transition).

PROXY when applied on May 13, provided a short transition effect, for a period of about two weeks.

Applications made later had little effect whatsoever, on Spring transition back to bermudagrass.

From May 19 to June 5, the two “early” applications of PROXY, generally increased turfgrass color and quality scores, most likely by having a PGR response on perennial ryegrass.

8. AEF 130630 readily enhanced Spring transition from perennial ryegrass to Tifway (419) bermudagrass, especially in May and June.

All three application rates caused visual suppression of the turf from May 19 until June 5.

Turfgrass color and quality were affected by AEF 130630. The maximum expression occurred for the 0.42 ounce/product/M rate by May 25 (which remained until at least June 5). Mean color scores here were 5.3, on both dates.

The high rate 0.64 ounce/product/M actually caused less color reductions in the turf (perhaps as a function of the quicker removal of ryegrass).

Reduced turf quality resulted three weeks after treatment for both the low and high rates (means = 5.0). The turf was similar to that of the control plots, afterwards, and superior by both middle and late July time periods.

9. AEF 130630 should be evaluated further to investigate:
  - (1) response on common bermudagrass
  - (2) effects water stress and fertility
  - (3) repeat application effects
10. The Spring of 2000 was abnormally hot, and characteristically dry.
11. At no time was there "bare ground" or dead turf present, although the KERB treatments seemed to be somewhat deleterious to the bermudagrass, more so at the 1.0 lb AI/A rate.

**TABLE 1: PERCENT PLOT BERMUDAGRASS OF TIFWAY AFTER TREATMENTS WITH HERBICIDES TO ENHANCE SPRING TRANSITION UNIVERSITY OF ARIZONA, 2000**

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<u>TREATMENT</u>	<u>RATE</u>	<u>DOA</u>	<u>% BERMUDAGRASS</u>			
			<u>29-May</u>	<u>5-Jun</u>	<u>7-Jul</u>	<u>24-Jul</u>
PROXY	0.5 ounce/prod/M	5/13	43	40	77	90
PROXY	0.5 ounce/prod/M	5/19	32	20	80	90
PROXY	0.5 ounce/prod/M	5/26	18	17	79	89
PROXY	0.5 ounce/prod/M	6/2	25	17	72	81
AEF	0.21 ounce/prod/M	5/13	63	50	72	97
AEF	0.42 ounce/prod/M	5/13	85	76	92	97
AEF	0.64 ounce/prod/M	5/13	90	70	95	98
KERB	0.5 lb. AI/A	5/13	32	42	74	85
KERB	1.0 lb. AI/A	5/13	28	27	69	78
SURFLAN	1.5 lb. AI/A	5/13	35	23	65	88
CORSAIR	1.0 ounce/prod/M	5/13	70	68	94	98
MANOR	0.4 ounce/prod/M	5/13	68	27	89	98
FIRST RATE	75 gm. AI/hectare	5/13	62	45	94	93
CONTROL			27	29	72	82
TEST MEAN	<sup>3</sup>		50	40	79	81
LSD VALUE	<sup>4</sup>		17	21	19	14

<sup>1</sup> DOA = Date of treatment application.

<sup>2</sup> % BERMUDAGRASS = (0 - 100%). Values are the mean of 3 replications.

<sup>3</sup> TEST MEAN = Mean of all treatments on each date.

<sup>4</sup> LSD VALUE = Mean separation statistic. Absolute value between two treatments must be larger than the LSD value for treatment differences to occur.



**TABLE 2: MEAN VISUAL SUPPRESSION SCORES OF OVERSEEDED TIFWAY BERMUDAGRASS AFTER TREATMENTS WITH SELECT HERBICIDES UNIVERSITY OF ARIZONA, 2000**

<u>TREATMENT</u>	<u>RATE</u>	<u>1</u> <u>DOA</u>	<u>SUPPRESSION</u> <sup>2</sup>				
			<u>19-May</u>	<u>26-May</u>	<u>5-Jun</u>	<u>27-Jun</u>	<u>24-Jul</u>
PROXY	0.5 ounce/prod/M	5/13	1.0	1.3	1.3	1.0	1.0
PROXY	0.5 ounce/prod/M	5/19	1.3	1.7	1.7	1.3	1.7
PROXY	0.5 ounce/prod/M	5/26	1	1.3	1.3	2.0	1.3
PROXY	0.5 ounce/prod/M	6/2	1.3	1.3	1.0	1.0	1.3
AEF	0.21 ounce/prod/M	5/13	4	3.3	3.7	2.0	1.0
AEF	0.42 ounce/prod/M	5/13	4.3	4.0	4.3	2.3	1.3
AEF	0.64 ounce/prod/M	5/13	4.3	4.0	4.3	2.3	1.3
KERB	0.5 lb. AI/A	5/13	1.0	1.7	1.3	1.0	1.7
KERB	1.0 lb. AI/A	5/13	1.3	1.7	2.3	1.3	1.7
SURFLAN	1.5 lb. AI/A	5/13	1.0	1.5	1.3	1.3	1.3
CORSAIR	1.0 ounce/prod/M	5/13	3.7	2.3	2.3	1.0	1.0
MANOR	0.4 ounce/prod/M	5/13	2.7	3.3	2.3	1.3	1.0
FIRST RATE	75 gm. AI/hectare	5/13	3.0	2.7	1.7	1.7	1.0
CONTROL			1.0	1.3	1.0	1.0	1.0
TEST MEAN	3		2.2	2.2	2.1	1.5	1.3
LSD VALUE	4		1.0	1.2	0.9	0.9	NA

1 DOA = Date of treatment application.

2 SUPPRESSION = 1 - 6; 1 = none, 4 = moderate, 6 = severe. Values are the mean of 3 replications.

3 TEST MEAN = Mean of all treatments on each date.

4 LSD VALUE = Mean separation statistic. Absolute value between two treatments must be larger than the LSD value for treatment differences to occur.

**TABLE 3: MEAN TURFGRASS COLOR RESPONSE OF OVERSEEDED TIFWAY BERMUDAGRASS AFTER TREATMENTS WITH SELECT HERBICIDES UNIVERSITY OF ARIZONA, 2000**

<u>TREATMENT</u>	<u>RATE</u>	<u>DOA</u> <sup>1</sup>	<u>COLOR</u> <sup>2</sup>						
			<u>19-May</u>	<u>26-May</u>	<u>5-Jun</u>	<u>27-Jun</u>	<u>7-Jul</u>	<u>18-Jul</u>	<u>24-Jul</u>
PROXY	0.5 ounce/prod/M	5/13	6.7	6.7	8.3	6.3	6.3	6.0	7.0
PROXY	0.5 ounce/prod/M	5/19	6.7	7.7	8.1	6.7	6.3	5.3	6.3
PROXY	0.5 ounce/prod/M	5/26	7.0	7.0	7.7	6.3	6.3	5.7	6.0
PROXY	0.5 ounce/prod/M	6/2	7.0	6.7	7.7	6.3	5.7	6.3	6.7
AEF	0.21 ounce/prod/M	5/13	5.7	5.3	5.0	7.0	6.3	6.0	7.3
AEF	0.42 ounce/prod/M	5/13	6.0	5.3	5.3	7.0	7.0	7.3	7.7
AEF	0.64 ounce/prod/M	5/13	6.3	6.7	5.0	6.7	8.0	7.3	7.7
KERB	0.5 lb. AI/A	5/13	7.0	7.7	7.7	6.3	6.3	5.7	6.3
KERB	1.0 lb. AI/A	5/13	7.3	6.0	7.0	7.3	5.7	5.7	6.3
SURFLAN	1.5 lb. AI/A	5/13	7.3	6.3	8.0	7.7	6.3	6.7	7.0
CORSAIR	1.0 ounce/prod/M	5/13	5.3	6.0	5.7	7.3	7.0	7.7	7.7
MANOR	0.4 ounce/prod/M	5/13	6.0	6.0	5.0	7.3	6.3	7.7	7.3
FIRST RATE	75 gm. AI/hectare	5/13	5.7	6.3	7.0	6.7	6.0	7.0	7.0
CONTROL			7.0	7.3	7.3	7.0	6.0	6.3	6.3
TEST MEAN			6.5	6.5	6.8	6.9	6.4	6.5	6.9
LSD VALUE			0.9	0.9	1.1	NA	1.2	1.1	1.0

<sup>1</sup> DOA = Date of treatment application.

<sup>2</sup> COLOR = 1 - 9; 1 = dead, 6 = acceptable, 9 = best

<sup>3</sup> TEST MEAN = Mean of all treatments on each date.

<sup>4</sup> LSD VALUE = Mean separation statistic. Absolute value between two treatments must be larger than the LSD value for treatment differences to occur.

**TABLE 4: MEAN TURFGRASS QUALITY SCORES OF OVERSEEDED TIFWAY BERMUDAGRASS  
AFTER TREATMENT WITH SELECT HERBICIDES UNIVERSITY OF ARIZONA, 2000**

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<u>TREATMENT</u>	<u>RATE</u>	<u>DOA</u> <sup>1</sup>	<u>QUALITY</u>						
			<u>19-May</u>	<u>26-May</u>	<u>5-Jun</u>	<u>27-Jun</u>	<u>7-Jul</u>	<u>18-Jul</u>	<u>24-Jul</u>
PROXY	0.5 ounce/prod/M	5/13	7.0	8.0	7.3	6.3	6.7	6.0	6.3
PROXY	0.5 ounce/prod/M	5/19	6.7	7.7	8.0	7.0	5.7	5.7	5.7
PROXY	0.5 ounce/prod/M	5/26	7.3	8.0	7.7	4.7	5.3	5.3	6.7
PROXY	0.5 ounce/prod/M	6/2	6.0	6.7	6.3	5.7	6.3	6.0	5.3
AEF	0.21 ounce/prod/M	5/13	5.6	5.7	5.0	5.7	6.3	6.7	6.7
AEF	0.42 ounce/prod/M	5/13	6.3	6.3	5.7	5.7	7.3	7.3	8
AEF	0.64 ounce/prod/M	5/13	5.7	6.3	5.0	5.7	7.7	8.0	8
KERB	0.5 lb. AI/A	5/13	7.0	7.7	7.3	7.0	6.3	5.7	5
KERB	1.0 lb. AI/A	5/13	6.7	7.0	7.3	6.3	6.7	5.3	5
SURFLAN	1.5 lb. AI/A	5/13	7.3	7.3	8.0	5.3	6.0	6.3	6
CORSAIR	1.0 ounce/prod/M	5/13	6.0	5.7	5.0	5.3	7.7	8.3	8
MANOR	0.4 ounce/prod/M	5/13	5.0	5.3	5.0	4.7	8.0	7.0	7.3
FIRST RATE	75 gm. AI/hectare	5/13	5.7	6.3	6.3	5.0	6.0	6.3	7.7
CONTROL			7.0	7.7	7.0	5.7	5.6	5.6	5.7
TEST MEAN			<sup>3</sup> 6.4	6.8	6.5	5.7	6.5	6.4	6.5
LSD VALUE			<sup>4</sup> 1.1	1.1	1.4	1.3	1.3	2.0	1.7

DOA = Date of treatment application.

QUALITY = 1 - 9; 1 = dead, 6 = acceptable, 9 = best. Values are the mean of 3 replications.

TEST MEAN = Mean of all treatments on each date.

LSD VALUE = Mean separation statistic. Absolute value between two treatments must be larger than the LSD value for treatment differences to occur.

TABLE 5:

**MEAN DENSITY, SCALPING DEGREE, AND PERCENT PLOT SCALPING OF OVERSEEDED TIFWAY BERMUDAGRASS AFTER TREATMENTS WITH SELECT HERBICIDE -UNIVERSITY OF ARIZONA, 2000**

<u>TREATMENT</u>	<u>RATE</u>	<u>DOA</u> <sup>1</sup>	<u>DENSITY</u> <sup>2</sup>		<u>SEVERITY</u> <sup>3</sup>	<u>% SCALP</u> <sup>4</sup>
			<u>18-Jul</u>	<u>24-Jul</u>	<u>18-Jul</u>	<u>18-Jul</u>
PROXY	0.5 ounce/prod/M	5/13	6.7	7.3	2.7	13
PROXY	0.5 ounce/prod/M	5/19	5.7	7.0	2.3	10
PROXY	0.5 ounce/prod/M	5/26	6.7	5.6	2.3	12
PROXY	0.5 ounce/prod/M	6/2	7.0	6.0	2.7	13
AEF 130360	0.21 ounce/prod/M	5/13	6.3	7.3	1.7	5
AEF 130360	0.42 ounce/prod/M	5/13	8.0	8.0	1.3	3
AEF 130360	0.64 ounce/prod/M	5/13	7.7	8.3	1.3	2
KERB	0.5 lb. AI/A	5/13	6.3	7.0	3.7	13
KERB	1.0 lb. AI/A	5/13	6.0	5.3	2.7	10
SURFLAN	1.5 lb. AI/A	5/13	7.3	5.7	2.3	5
CORSAIR	1.0 ounce/prod/M	5/13	8.0	8.0	1.3	2
MANOR	0.4 ounce/prod/M	5/13	7.0	8.0	1.0	0
FIRST RATE	75 gm. AI/hectare	5/13	7.3	7.7	2.0	7
CONTROL			6.7	6.0	2.3	12
TEST MEAN			6.9	7.0	2.1	8
LSD VALUE			NA	1.7	2.0	10

DOA = Date of treatment application.

DENSITY = 1 - 9; 1 = dead, 9 = best possible. Values are the mean of 3 replications

SEVERITY OF SCALPING = 1 - 6; 1 = none, 4 = moderate, 6 = severe. Values are the mean of 3 replications.

% SCALP = Percent of plot scalped (0-100%). Values are the mean of 3 replications.

TEST MEAN = Mean of all treatments on each date.

LSD VALUE = Mean separation statistic. Absolute value between two treatments must be larger than the LSD value for treatment differences to occur.