

Kikuyugrass Control with Quinclorac

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Summary: In a replicated field trial on a kikuyugrass rough at Mesa Verde Country Club (Costa Mesa, CA), the efficacy of various mixtures and application frequencies of quinclorac (Drive) for control of kikuyugrass control was evaluated. Key results include:

- Two to three monthly applications of quinclorac (0.37 oz/1000 sq ft or 0.25 oz/1000 sq ft, respectively) provided good to excellent control of kikuyugrass, but one application (0.37 oz/1000 sq ft) did not provide acceptable levels of control.
- When two or three monthly applications of quinclorac were made, control occurred gradually, with only a minimal effect observed in the first 5 weeks after application; by 9 weeks after application, however, significant levels of control were achieved. This type of gradual control may be especially beneficial in situations where kikuyugrass infestations are heavy, because it allows the maintenance of green turf (assuming the area can be re-seeded or re-colonized by a desirable turf species) as the kikuyugrass slowly dies.
- The use of MSMA (monosodium acid methanearsonate) also produced good to excellent control of kikuyugrass. This product is the current commercial standard for kikuyugrass control. However, due to the rapid burn down observed with this product, its use may be undesirable, especially if there are heavy infestations of kikuyugrass present.
- The addition of MSMA to quinclorac increased the level of kikuyugrass control, as well as the speed of kill of the kikuyugrass. This was most apparent when a single application of quinclorac (which resulted in only minimal kikuyugrass control) is compared to a single application of MSMA plus quinclorac (which resulted in over 90% control on all rating dates).
- With one or two monthly applications, neither MSMA nor Drive caused damage to common

bermudagrass. However, when three monthly applications of Drive (either alone or in combination with MSMA) were made, common bermudagrass exhibited reddish colored foliage—an effect that was not observed for other treatments.

Materials and Methods:

Location: Research plots were located on a kikuyugrass rough at Mesa Verde Country Club, Costa Mesa, CA. Small patches of common bermudagrass (approximately 5-10% of turf cover per plot) were present in the test area at the time of trial initiation.

Experimental design and application: Plots measured 5 feet by 10 feet and treatments were replicated three times, in a randomized design. Treatments were applied with a CO₂ backpack sprayer equipped with 8008 VS flat fan nozzles and delivering 1.73 gallons of water per 1000 square feet, with 28 psi at the boom. Calibration of each nozzle was confirmed prior to application to be within 5% of the desired nozzle flow rate. Boom height was 17 inches above the ground. The spray swath was 5 feet. Speed was 3 mph. Spray bottles were agitated by shaking 10 times prior to charging with compressed CO₂. Spray lines were purged with CO₂ and then water prior to changing treatments.

Treatments: Treatments and application timings are listed below. Applications were initiated on 8/3/98. All products were applied in a solution containing 1% crop oil concentrate (Herbicide Helper)

Evaluations: Evaluations were made 4 weeks after each application. An additional evaluation was made on 9/1/98. Product efficacy was assessed on the basis of a visual rating of percent kikuyugrass control as well as injury levels to any bermudagrass present in the test plots. Data was subjected to analysis of variance, and treatment means separated using Fisher's LSD, where $P < 0.05$. For analysis of variance, percent kikuyugrass control data was transformed to the arcsine (square root of the proportion).

Treatments Tested

Trt	Product	Active Ingredient	Rate/ 1000 sq ft)	Date of Application
1	Non-treated check			
2	Drive 75 DF	Quinclorac (75%)	0.37 oz	8/3
3	Drive 75 DF	Quinclorac (75%)	0.37 oz	8/3, 9/9
4	Drive 75 DF	Quinclorac (75%)	0.25 oz	8/3, 9/9, 10/7
5	Drive 75 DF + MSMA 6SC	Quinclorac (75%) + monosodium acid methanearsonate (47.6%)	0.37 + 2.0 oz	8/3
6	Drive 75 DF + MSMA 6SC	Quinclorac (75%) + monosodium acid methanearsonate (47.6%)	0.37 + 2.0 oz	8/3, 9/9
7	Drive 75 DF + MSMA 6SC	Quinclorac (75%) + monosodium acid methanearsonate (47.6%)	0.25 + 2.0 oz	8/3, 9/9, 10/7
8	MSMA 6 SC	monosodium acid methanearsonate (47.6%)	2.0 oz	9/9, 10/7

All products were applied in a solution containing 1% crop oil concentrate (Herbicide Helper)

Results

Phytotoxicity: On most dates, none of the products tested caused damage to common bermudagrass. However, on the last rating date (10/30/98), treatments 4 (3 monthly applications of Drive) and 7 (3 applications of Drive plus MSMA) showed some signs

of damage to common bermudagrass, with reddish colored foliage appearing in each of the three replicates for these treatments (Figures 1 and 2). It is possible that the effects of three applications, in combination with approaching dormancy of the bermudagrass (due to decreased air and soil temperatures) were responsible for this effect.

Figure 1. Changes in common bermudagrass coloration (note reddish foliage) after three monthly applications of Drive (0.25 oz/1000 sq ft). The effect was observed only on the last sampling date (October 30, 1998).



Figure 2. Close-up of discolored common bermudagrass illustrated in Figure 1.



Efficacy (Drive): Two or more monthly applications of quinclorac (made during the summer months) provided good to excellent control of kikuyugrass (Table 1). This control occurred gradually, with significant results achieved 9 weeks after the first applications were made. Before that time, control levels were below 20%. This type of gradual control may be especially beneficial in situations where kikuyugrass infestations are heavy, because it allows

the maintenance of green turf (assuming the area can be re-seeded or re-colonized by a desirable turf species) as the kikuyugrass slowly dies. On the last rating date, two monthly applications (0.37 oz/1000 sq ft) provided less control of kikuyugrass than three monthly applications (0.25 oz/1000 square feet). However, the two application strategy was perfectly safe for common bermudagrass, while the three application strategy produced some changes in the turf physiology (see above). To avoid damage to bermudagrass, it is possible that Drive applications should be avoided when air temperatures begin to dip below 60 F. The onset of bermudagrass dormancy may make the turf more sensitive to injury by herbicides. This theory needs to be more fully tested, however.

One application of Drive (0.37 oz/1000 sq ft) did not provide acceptable results (Figure 3 and 4), with 15% control the highest level observed during the course of the trial. However, the addition of MSMA to Drive resulted in excellent season long kikuyugrass control, even when only one application was made.

Figure 3. Kikuyugrass control with one application of Drive vs. 2 monthly applications of Drive. Photograph was taken on 10/7/98.

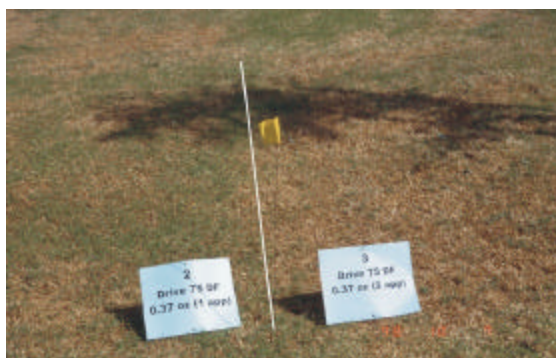


Figure 4. Kikuyugrass control with one application of Drive vs. 3 monthly applications of Drive. Photograph was taken on 10/30/98.



Efficacy (MSMA): The use of MSMA (monosodium acid methanearsonate) also produced good to excellent control of kikuyugrass. This product is the current commercial standard for kikuyugrass control. However, due to the rapid burn down observed with this product, its use may be undesirable, especially if there are heavy infestations of kikuyugrass present.

Figure 5. Kikuyugrass control with two monthly applications of MSMA. Photograph was taken on 10/7/98.



The addition of MSMA (monosodium acid methanearsonate) to quinclorac increased the level of kikuyugrass control, as well as the speed of kill of the kikuyugrass. This was most apparent when a single application of quinclorac (which resulted in only minimal kikuyugrass control) is compared to a single application of MSMA plus quinclorac (which resulted in over 90% control on all rating dates).

Table 1. Mean percent kikuyugrass control. Values followed by the same letter are not significantly different (Fisher's LSD, $P < 0.05$). The best treatments on each rating date are highlighted in green shaded boxes. Percent data was transformed prior to statistical analysis using the arcsine (square root of the proportion). WAFT = weeks after first treatment).

Trt	Product	# Applic.	9/1/98 (4 WAFT)	9/9/98 (5 WAFT)	10/7/98 (9 WAFT)	10/30/98 (12 WAFT)
1	Non-treated check	0	0.0 a	0.0 a	0.0 a	0.0a
2	Drive 75 DF	1	10.0 b	15.0 b	13.3 b	6.7b
3	Drive 75 DF	2	10.0 b	18.3 b	93.3 c	85.0c
4	Drive 75 DF	3	8.3 b	11.7 b	93.3 c	99.3ef
5	Drive 75 DF + MSMA 6SC	1	98.0 c	99.0 c	96.3 c	94.7d
6	Drive 75 DF + MSMA 6SC	2	98.0 c	99.0 c	99.0 c	99.7f
7	Drive 75 DF + MSMA 6SC	3	98.0 c	99.0 c	99.0 c	99.3ef
8	MSMA 6 SC*	2	N/T	N/T	93.3 c	96.0de

* because these treatment were initiated on 9/9/98 (5 weeks after all other treatments), the 10/7 rating represents 4 WAFT and the 10/30 rating represents 7 WAFT).

N/T: data not taken on this date due to late initial application date