

Evaluation of Chipco Proxy and EXP 310309 for Use as a Turf Growth Regulator on Kikuyugrass Fairways

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Summary: In replicated field trials conducted on a kikuyugrass nursery that was mowed at fairway height, the effect of the experimental product ethephon (Proxy) or a combination of ethephon plus cyclanilide (EXP 310309) on turf quality, turf growth regulation and scalping was evaluated. Key results include:

- A single application of Proxy at either 5 oz or 10 oz/1000 square feet had little or no effect on growth regulation of kikuyugrass, with significant clipping reductions observed on only one (5 oz rate) or two (10 oz rate) out of a total of six sampling dates. The addition of cyclanilide to ethephon, in the form of EXP 310309, had a small but positive effect on performance, with significant clipping reductions observed on two sampling dates (2.5 oz rate) or three sampling dates (5.0 oz rate). However, in contrast, Primo L (0.5 oz/1000 square feet) resulted in significantly reduced clipping rates on all six sampling dates.
- Turf quality was not improved through application of Proxy or EXP310309 at any of the rates tested. In contrast, Primo L (0.5 oz/1000 square feet) produced turf with significantly improved quality (when compared to the non-treated check) on all six sampling dates.
- The degree of scalping (appearance of brownish, stubbly, unisghtly areas, as a result of mowing) of kikuyugrass was not consistently reduced through application of either Proxy or EXP310309. In contrast, application of Primo L resulted in significant reductions in scalping on all sampling dates.
- In general, EXP310309 performed slightly better than Proxy in terms of growth regulation, turf quality and reduced scalping,

suggesting that the addition of cyclanilide to ethephon has a beneficial effect. However, the improvement in performance was small, and still did not result in commercially acceptable performance. For these reasons, neither product was judged to demonstrate commercial viability for use as a growth regulator on kikuyugrass fairways.

Materials and Methods:

Location: Research plots were located on a kikuyugrass nursery that was mowed at fairway height (1/2 inch) at La Jolla Country Club, La Jolla, CA.

Experimental design and application: Plots measured 5 feet by 10 feet and treatments were replicated three times, in a randomized design as illustrated below.

Treatments were applied with a CO₂ backpack sprayer equipped with 8004 VS flat fan nozzles and delivering 0.98 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 20 times prior to charging with compressed CO₂. Spray lines were purged with CO₂ and then water prior to changing treatments. All treatments were applied on 6/30/99, at 8:30am.

Treatments: Treatments are listed below in Table 1. All products were applied once, on June 30, 1999.

Evaluations: Turf was evaluated on a weekly basis for clipping reduction, turf quality and the degree of scalping immediately following mowing.

Plot Plan. Kikuyugrass Nursery, La Jolla Country Club.

1	2	3		4	5	6	2	5	1	6	4	3	5	3	6	1	4	2
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Clipping reduction: Clipping reduction was determined by weighing clippings obtained by mowing individual plots. Plots were mowed weekly by making two passes (each 20 inches wide and 10 feet long, for a total of 33.33 sq ft mowed) per plot with a McClane reel mower set at ½ ". Clippings from each plot were collected in a zip-lok plastic bag and were weighed off-site in PACE Consulting's laboratory. The entire plot area was mowed following individual plot mowing to ensure uniform heights throughout the plot area for subsequent mowings.

Turf quality was determined on a visual basis using a 0 – 7 scale, where 0 = poorest turf quality possible and 7 = best quality turf possible. Quality was a function of color, density and evenness.

Percent scalping was rated visually through observation of the plot area before, and then again immediately after mowing. Brownish, stubbly, unsightly areas which were visible only after mowing, and which consisted primarily of thatch, and old and decaying stolons and leaves, were identified as scalped areas.

Data analysis: Data was subjected to analysis of variance, and treatment means were separated using Fisher's LSD, where $p < 0.10$. Percent scalping data was transformed prior to statistical analysis using the arcsine (square root of the proportion).

Table 1. Treatments and application rates. All products were applied on June 30, 1999.

Trt #	Product	Active Ingredient	Rate/1000 sq ft
1	No treatment		
2	Chipco Proxy	21.7% Ethephon	5 oz
3	Chipco Proxy	21.7% Ethephon	10 oz
4	EXP310309	35.1% ethephon, 4.3% cyclanilide	2.5 oz
5	EXP310309	35.1% ethephon, 4.3% cyclanilide	5.0 oz
6	Primo L	12% Trinexapac-ethyl	0.5 oz

Results and Discussion

Growth regulation and clipping reduction (Table 2): Primo L (0.5 oz/1000 sq ft) was the only treatment which consistently reduced kikuyugrass clipping rates, for all seven weeks of the trial. In contrast, when Proxy was tested at either the 5 oz or 10 oz/1000 sq ft rate, clipping weights were reduced on only one (5 oz rate) or two (10 oz rate) of the six sampling dates. There was, however, a strong rate response, with the 10 oz rate frequently (four out of six sampling dates) resulting in significantly

reduced clippings when compared to the 5 oz rate. Although clipping weights were not significantly increased following Proxy treatments, as they were in trials previously performed on *Poa annua*, the performance of Proxy was not impressive on kikuyugrass. The addition of cyclanilide to ethephon (EXP310309) had a small, but significantly positive effect on Proxy performance, with the 2.5 oz rate resulting in significant clipping reductions on two sampling dates, and the 5.0 oz rate on three sampling dates. As for ethephon alone, the ethephon/cyclanilide combination produced a

rate response, with fewer clippings produced at the 5.0 oz rate than at the 2.5 oz rate. However, the dramatic rate response of ethephon alone was somewhat muted here, with a significant difference between the two rates of EXP310309 observed only on one date. This is partly due to the fact that clipping weights were already fairly low in the 2.5 oz treatment, suggesting that the rate response curve may have bottomed out at this rate, leaving little room for improvement when 5.0 oz were applied.

Although ethephon (and ethephon combinations) had a more consistent (and more positive) effect on kikuyugrass than had been seen on annual bluegrass, the performance of Proxy or EXP310309 was still not commercially acceptable as far as clipping reduction was concerned.

Turf quality (Table 3): Both Proxy treatments and the high rate of EXP310309 produced significantly poorer quality turf than the non-treated check during the first week after application. The decrease in quality was due to a combination of scalping and turf discoloration that was not observed in plots treated with the low rate of EXP310309 or Primo.

The low rate of Proxy (5.0 oz/1000 sq ft) caused additional significant reductions in turf quality at two and three weeks after application as well. Interestingly, there was no positive rate response with regards to turf quality; in other words, increased rates of Proxy or EXP310309 did not result in increased turf damage. In fact, on three out of six rating dates, the 10 oz rate of Proxy resulted in significantly higher turf quality than the 5 oz rate. However, the turf quality in plots treated with either rate of Proxy was either lower quality or the same quality as the non-treated check.

On no date did Proxy or EXP310309 result in significant improvements to turf quality when compared to the untreated check. We did observe, however, some interesting effects on kikuyugrass, including some suppression of stamens at the 1 WAT sampling date. However, this was not observed on subsequent sampling dates. At the 2 WAT sampling date, kikuyugrass treated with Proxy or EXP310309 displayed a darker, green-gray appearance, making it similar in appearance to bermudagrass. This effect was sustained for only one week, however.

In contrast, a single Primo application resulted in turf with significantly improved quality (when compared to the non-treated check) on all 6 sampling dates. The turf in these plots was finer, darker and more dense than in any of the other plots in this trial.

Percent scalping (Table 4): Because of its tendency towards thatchiness, kikuyugrass is particularly prone to scalping. For example, the non-treated check demonstrated levels of scalping up to 50%. Treatment with Proxy had either no effect on this unacceptable level of scalping, or at times even increased the level of scalping observed immediately after mowing. Treatment with EXP 310309 resulted in a significant reduction in scalping on one sampling date (5.0 oz rate) or two sampling dates (2.5 oz rate), but on all other sampling dates, the level of scalping was similar to that in the non-treated check.

In contrast, we observed no scalping in plots treated with Primo for the duration of the trial.

The performance of Proxy and EXP310309 in this trial did not result in positive improvements in growth regulation (clipping reduction), turf quality and scalping levels. On the basis of this data, neither product demonstrated commercial viability for this particular use.

Table 2. Kikuyugrass growth regulation, La Jolla Country Club. Clipping weights (grams per 33.33 square feet) of turf following growth regulator application on June 30, 1999. Treatments with significantly ($p < 0.10$) lower clippings than the control are in green type. WAT = weeks after treatment.

Trt #	Product	Rate/1000 sq ft	7/8/99 1 WAT	7/13/99 2 WAT	7/20/99 3 WAT	7/27/99 4 WAT	8/2//99 5 WAT	8/16/99 7 WAT
1	No treatment		75.7bc	187.3c	269.7b	281.0bc	99.3bc	102.7b
2	Chipco Proxy	5 oz	95.0c	103.3b	293.0b	392.0c	109.0c	95.3b
3	Chipco Proxy	10 oz	40.3ab	58.0a	196.7ab	148.0ab	67.3abc	47.7a
4	EXP310309	2.5 oz	32.3a	76.3a	254.7b	246.3abc	111.3c	83.7ab
5	EXP310309	5.0 oz	29.3a	62.0a	160.7ab	182.3ab	61.7ab	48.0a
6	Primo L	0.5 oz	38.0a	56.0a	71.3a	81.3a	43.3a	42.0a

Table 3. Kikuyugrass Quality Ratings. Turf was rated on a 0 – 7 scale, with 0 = dead turf and 7 = best possible quality fairway turf. Treatments significantly better than the check are noted in green type ($p < 0.10$). Treatments significantly worse than the check ($p > 0.10$) are noted in red type

Trt #	Product	Rate/1000 sq ft	7/8/99 1 WAT	7/13/99 2 WAT	7/20/99 3 WAT	7/27/99 4 WAT	8/2//99 5 WAT	8/16/99 7 WAT
1	No treatment		6.7c	6.3b	5.3b	4.2ab	4.0a	4.7ab
2	Chipco Proxy	5 oz	5.7a	5.7a	4.2a	3.2a	3.7a	4.2a
3	Chipco Proxy	10 oz	6.0ab	6.3b	5.2b	5.5bc	4.8a	5.3ab
4	EXP310309	2.5 oz	6.5bc	6.8bc	5.0b	5.7cd	4.7a	5.0ab
5	EXP310309	5.0 oz	6.0ab	7.0c	5.5b	5.0bc	5.0a	5.5b
6	Primo L	0.5 oz	7.0c	7.0c	6.3c	7.0d	7.0b	7.0c

Table 4. Percent scalping observed immediately following mowing. Treatments significantly better than the check (reduced scalping, $p < 0.10$) are noted in green type. Treatments significantly worse than the check (increased scalping, $p < 0.10$) are noted in red type. For analysis of variance, percent scalping data was transformed to the arcsine (square root of the proportion). Values shown in the table are non-transformed.

Trt #	Product	Rate/1000 sq ft	7/13/99 2 WAT	7/20/99 3 WAT	7/27/99 4 WAT	8/2/99 5 WAT	8/16/99 7 WAT
1	No treatment		6.7b	17.3bc	50.7cd	41.7b	34.0bc
2	Chipco Proxy	5 oz	13.3c	28.3c	60.0d	46.7b	41.7c
3	Chipco Proxy	10 oz	4.0b	16.7bc	19.3bc	26.7b	15.0b
4	EXP310309	2.5 oz	0a	21.7bc	10.0ab	25.0b	19.2bc
5	EXP310309	5.0 oz	0a	8.3b	17.3bc	11.7ab	10.0b
6	Primo L	0.5 oz	0a	0a	0a	0.0a	0.0a

Figure 1. EXP310309 @2.5 oz/1000 sq ft (Treatment 4, left) vs. Non-treated check (Treatment 1, right). 7/13/99 (2 WAT). Note the improved turf quality and minimal scalping in the EXP310309 treatment.



Figure 4. Primo L @ 0.5 oz/1000 sq ft (Treatment 6, left) vs. Non-treated check (Treatment 1, right). 7/27/99. Note the significant scalping (mean of 50.7%) in the non-treated plot.

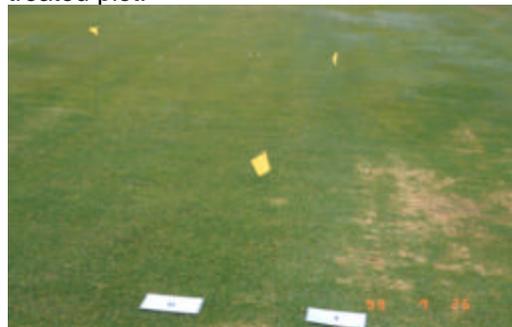


Figure 2. EXP310309 @ 5.0 oz/1000 sq ft (Treatment 5, left) vs. Chipco Proxy @ 10 oz/1000 sq ft (Treatment 3, right). 7/27/99. These treatments produced roughly the same level of turf quality and scalping.



Figure 5. EXP310309 @ 2.5 oz/1000 sq ft (Treatment 4, left) vs. Chipco Proxy @ 5 oz/1000 sq ft (Treatment 2, right). 7/27/99. Note the higher quality turf and lower percentage of scalped turf in treatment 4.



Figure 3. Proxy @10 oz/1000 sq ft (Treatment 3, left) vs. Primo L @0.5 oz/1000 sq ft (Treatment 6, right). 7/27/99. Note the lack of scalping in the Primo treated plot.

