# Stop #7b: Evaluation of Plant Growth Regulators (PGRs) on Bermudagrass and Seashore Paspalum Turf

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## Objectives:

This study is conducted to quantify effects of several plant growth regulators (PGRs) on growth regulation, injury and visual turfgrass quality on bermudagrass and seashore paspalum maintained as a golf course fairway or athletic field. The effects of Primo Maxx and Anuew PGRs on bermudagrass quality under deficit irrigation regime were also evaluated.

## Materials and Methods:

The studies were conducted on 'Tifway II' bermudagrass established from sod on 27 April 2017 and on 'Platinum' seashore paspalum established from sod in 2015. Soil was a Hanford fine sandy loam. Turf received 0.5 lb N/1000 $ft^2$ every 6 weeks for a target of 5 lbs N/1000 $ft^2$/yr. Mowing height was 0.5 inches (3 days/wk). Irrigation treatments were initiated on 17 July 2017 and weekly irrigation budgets (55% or 80% $ET_o$) were divided into 3 events (days) per week by hand watering with a hose/nozzle with a known output (gpm).

Plant growth regulators were applied every 3 weeks starting on 21 July 2017. Treatments were applied using a $CO_2$-powered backpack sprayer with TeeJet 8002VS nozzles calibrated to deliver 1 gal/1000 $ft^2$. Experimental design was a randomized block with 3 or 4 replications. Plot size was either 4 ft x 6 ft or 4 ft x 8 ft with alleys. Plots were evaluated for turf quality and injury every week on well-watered bermudagrass and seashore paspalum and every 2 weeks on bermudagrass subjected to deficit irrigation. Volumetric water content, NDVI ratings and photos for DIA were taken every two weeks. Clipping yield samples were harvested the day before treatments were applied.

## Results:

One-week after initial application of PGRs on bermudagrass grown under optimal irrigation conditions, only Primo Maxx significantly decreased turf quality in comparison to the untreated control (Table 4). However, quality of turf treated with Primo Maxx was highest among all other treatments by September 1. On the same date the only treatment causing turf quality significantly lower compared to the untreated control was Trimmit (22 oz/A). In terms of turf injury, both Primo Maxx and Anuew (16 oz/A) caused slight but significant injury after the initial application, but injury was short-lived. No significant differences in growth reduction among treatments have been observed thus far.

No significant differences in bermudagrass quality have been found thus far with either Primo Maxx or Anuew under deficit irrigation (Table 5). Similar to well-watered bermudagrass, both Primo Maxx and the higher rate of Anuew caused slight but short-lived injury at the onset of the experiment.

On seashore paspalum, only Anuew caused a significant decrease in turf quality in comparison to untreated control one week after initial application. However, on September 1, all PGR treatments showed significantly higher turf quality than the untreated control. Still, no significant differences in quality among PGR treatments have been observed on this species so far (Table 6). Primo Maxx, Anuew (16 oz/A), and Cutless MEC (49.2 oz/A) caused significant turf injury on August 9, but no significant differences were observed for turf injury at the most recent rating. Like bermudagrass, no significant differences in growth reduction among treatments have been observed thus far.

**Acknowledgements:**

Thanks to SePro, Syngenta, and NuFarm for supporting this research.

Table 1. Treatment list for bermudagrass trial (80% $ET_0$ replacement). Riverside, CA. 2017.

| No. | Treatment | Rate (oz/A) | Timing |
|---|---|---|---|
| 1 | Untreated Control | - | ABCDE |
| 2 | Cutless MEC (12.3 oz/A) | 12.3 | ABCDE |
| 3 | Cutless MEC (18 oz/A) | 18 | ABCDE |
| 4 | Primo Maxx (11 oz/A) | 11 | ABCDE |
| 5 | Anuew (8 oz/A) | 8 | ABCDE |
| 6 | Anuew (16 oz/A) | 16 | ABCDE |
| 7 | Trimmit (16 oz/A) | 16 | ABCDE |
| 8 | Trimmit (22 oz/A) | 22 | ABCDE |

Table 2. Treatment list for bermudagrass trial (55% ET0 replacement). Riverside, CA. 2017.

| No. | Treatment | Rate (oz/A) | Timing |
|---|---|---|---|
| 1 | Untreated Control | - | ABCDE |
| 2 | Anuew (8 oz/A) | 8 | ABCDE |
| 3 | Anuew (16 oz/A) | 16 | ABCDE |
| 4 | Primo Maxx (11 oz/A) | 11 | ABCDE |

Table 3. Treatment list for seashore paspalum trial (80% $ET_0$ replacement). Riverside, CA. 2017.

| No. | Treatment | Rate (oz/A) | Timing |
|---|---|---|---|
| 1 | Untreated Control | - | ABCDE |
| 2 | Cutless MEC (12.3 oz/A) | 12.3 | ABCDE |
| 3 | Cutless MEC (18 oz/A) | 18 | ABCDE |
| 4 | Cutless MEC (49.2 oz/A) | 49.2 | ACE |
| 5 | Primo Maxx (11 oz/A) | 11 | ABCDE |
| 6 | Trimmit (16 oz/A) | 16 | ABCDE |
| 7 | Anuew (16 oz/A) | 16 | ABCDE |

Application code / timing:
A – 07/21/2017
B – 08/11/2017
C – 09/01/2017
D – 09/22/2017
E – 10/13/2017

**Plot plan:**

↑**N** **Bermudagrass (80% $ET_0$ replacement) Trial** Plot Plan

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 101 | Trt 1 | 201 | Trt 2 | 301 | Trt 6 | 401 | Trt 3 |
| 102 | Trt 2 | 202 | Trt 5 | 302 | Trt 8 | 402 | Trt 6 |
| 103 | Trt 3 | 203 | Trt 3 | 303 | Trt 4 | 403 | Trt 4 |
| 104 | Trt 4 | 204 | Trt 1 | 304 | Trt 7 | 404 | Trt 7 |
| 105 | Trt 5 | 205 | Trt 8 | 305 | Trt 5 | 405 | Trt 2 |
| 106 | Trt 6 | 206 | Trt 7 | 306 | Trt 1 | 406 | Trt 8 |

↑**N** **Bermudagrass (55% $ET_0$ replacement) Trial** Plot Plan

| | | | |
|---|---|---|---|
| 101<br>Trt 4 | 102<br>Trt 3 | 103<br>Trt 2 | 104<br>Trt 1 |
| 201<br>Trt 3 | 202<br>Trt 1 | 203<br>Trt 4 | 204<br>Trt 2 |
| 301<br>Trt 2 | 302<br>Trt 4 | 303<br>Trt 1 | 304<br>Trt 3 |
| 401<br>Trt 1 | 402<br>Trt 2 | 403<br>Trt 3 | 404<br>Trt 4 |

↑**N** **Seashore Paspalum Trial** Plot Plan

| | | | |
|---|---|---|---|
| 101 | Trt 1 | 301 | Trt 4 |
| 102 | Trt 2 | 302 | Trt 7 |
| 103 | Trt 3 | 303 | Trt 5 |
| 104 | Trt 4 | 304 | Trt 1 |
| 105 | Trt 5 | 305 | Trt 2 |
| 106 | Trt 6 | 306 | Trt 6 |
| 107 | Trt 7 | 307 | Trt 3 |
| 201 | Trt 4 | 401 | Trt 3 |
| 202 | Trt 5 | 402 | Trt 2 |
| 203 | Trt 7 | 403 | Trt 7 |
| 204 | Trt 3 | 404 | Trt 4 |
| 205 | Trt 1 | 405 | Trt 6 |
| 206 | Trt 2 | 406 | Trt 1 |
| 207 | Trt 6 | 407 | Trt 5 |

Table 4. Effect of PGRs on bermudagrass under optimal irrigation (80% ET0 replacement). Riverside, CA. 2017.

| No. | Treatment | Turf quality [1-9] 07/27/2017 | Turf quality [1-9] 09/01/2017 | Injury [%] 07/27/2017 | Injury [%] 08/24/2017 | Clipping yield [g] 08/10/2017 | Clipping yield [g] 08/31/2017 |
|---|---|---|---|---|---|---|---|
| 1 | Untreated Control | 5.7 AB | 6.0 BC | 0 C | 0 B | 26.31 A | 8.99 AB |
| 2 | Cutless MEC (12.3 oz/A) | 6.3 A | 5.3 CD | 0 C | 0 B | 27.74 A | 17.27 A |
| 3 | Cutless MEC (18 oz/A) | 5.7 AB | 6.7 B | 0 C | 0 B | 24.79 A | 10.30 AB |
| 4 | Primo Maxx (11 oz/A) | 4.0 C | 7.7 A | 16 A | 6.7 A | 12.89 A | 8.82 AB |
| 5 | Anuew (8 oz/A) | 5.3 AB | 6.3 B | 5 BC | 6.7 A | 10.86 A | 5.95 B |
| 6 | Anuew (16 oz/A) | 5.0 BC | 6.0 BCD | 11 AB | 0 B | 25.01 A | 9.88 AB |
| 7 | Trimmit (16 oz/A) | 5.3 AB | 6.3 BC | 1 C | 0 B | 18.25 A | 7.16 AB |
| 8 | Trimmit (22 oz/A) | 5.3 AB | 5.3 D | 1 C | 3 B | 10.99 A | 16.19 AB |

Means followed by the same letter in a column are not significantly different ($P \leq 0.05$).

Table 5. Effect of PGRs on bermudagrass under deficit irrigation (55% ET0 replacement). Riverside, CA. 2017.

| No. | Treatment | Turf quality [1-9] 07/27/2017 | Turf quality [1-9] 08/24/2017 | Injury [%] 07/27/2017 | Injury [%] 08/24/2017 |
|---|---|---|---|---|---|
| 1 | Untreated Control | 6.5 A | 5.5 A | 0 C | 0 B |
| 2 | Anuew (8 oz/A) | 6.0 A | 6.0 A | 4 BC | 0 B |
| 3 | Anuew (16 oz/A) | 5.2 A | 5.5 A | 10 AB | 1 AB |
| 4 | Primo Maxx (11 oz/A) | 5.0 A | 6.0 A | 13 A | 4 A |

Means followed by the same letter in a column are not significantly different ($P \leq 0.05$).

Table 6. Effect of PGRs on seashore paspalum. Riverside, CA. 2017.

| No. | Treatment | Turf quality [1-9] 07/27/2017 | Turf quality [1-9] 09/01/2017 | Injury [%] 08/09/2017 | Injury [%] 09/01/2017 | Clipping yield 08/10/2017 | Clipping yield 08/31/2017 |
|---|---|---|---|---|---|---|---|
| 1 | Untreated Control | 6.2 AB | 3.8 B | 0 C | 2 AB | 26.74 A | 9.14 ABC |
| 2 | Cutless MEC (12.3 oz/A) | 6.8 A | 6.2 A | 0 C | 4 A | 21.76 A | 10.63 AB |
| 3 | Cutless MEC (18 oz/A) | 6.5 AB | 6.0 A | 1 C | 2 AB | 17.52 A | 9.68 AB |
| 4 | Cutless MEC (49.2 oz/A) | 6.2 AB | 6.5 A | 8 B | 1 AB | 17.22 A | 12.21 A |
| 5 | Primo Maxx (11 oz/A) | 5.5 BC | 6.8 A | 14 A | 2 AB | 17.86 A | 2.89 C |
| 6 | Trimmit (16 oz/A) | 7.0 A | 6.2 A | 0 C | 2 AB | 19.31 A | 6.47 ABC |
| 7 | Anuew (16 oz/A) | 5.0 C | 6.8 A | 16 A | 1 B | 13.83 A | 4.31 BC |

Means followed by the same letter in a column are not significantly different ($P \leq 0.05$).