# Is There a Relationship Between Clipping Weight and Volume on Golf **Course Fairways?**



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# Introduction

- Plant growth regulators (PGRs) are commonly used on turfgrasses to reduce mowing during the peak growing season.
- 'Latitude 36' hybrid bermudagrass (C. dactylon x C. transvaalensis) and 'Trinity' zoysiagrass (Zoysia matrella) are cultivars used on golf course fairways, roughs, and sports fields.
- Trinexapac-ethyl is a commonly used PGR used in turfgrass systems that inhibits gibberellic acid biosynthesis (Pannacci et al. 2004).
- To evaluate PGRs, clipping dry weight data are collected to determine the degree of growth suppression (Wherley and Sinclair 2009; Lyon et al. 2019).
- Recently, golf course superintendents have started evaluating PGR efficacy via assessments of clipping volume (M.S. Woods, personal

# Methods

- Experiments were conducted on stands of 'Latitude 36' hybrid bermudagrass and 'Trinity' zoysiagrass at the East Tennessee AgResearch and Education Center (Knoxville, TN).
- Test sites were maintained as golf course fairways with respect to irrigation, fertilization, and mowing with height of cut of 12.7 mm, except plots were only mowed when clippings were collected.
- Trinexapac-ethyl formulations (TEF) were applied using a CO<sub>2</sub> pressurized sprayer at 374 L ha<sup>-1</sup>. In all TEFs, trinexapac-ethyl was delivered at 97 g ai ha<sup>-1</sup>.
- Treatments were arranged in a randomized complete block design with four replications applied to 1.5 m<sup>2</sup> plots 13 June 2022. Sequential applications were made on 27 June 2022 and 11 July 2022. Approximately 220 growing degree days (base 10°C) accumulated between sequential treatments.

Clippings were harvested twice a week with a single pass through the center of each plot using a reel mower (55.5 cm width). Clipping volume (mL) was measured using a graduate cylinder before being dried in a forced air oven for 48 hours at 105°C. After drying, samples were weighed (g) using a Mettler Toledo

**400**<sub>1</sub>

#### Analytical Balance ME204E. Clipping volume and dry weight data were analyzed in Prism (version 9.4.1).

500-



• TEF 4 ○ Non-treated check ▲ TFF 2 TFF 3 ★ TFF 1

'Latitude 36'

**Objective: Determine the relationship between clipping** weight and clipping volume following PGR treatment.

## Results

- Few differences in clipping volume were detected among TEFs over the course of the study. All TEFs reduced clipping volume compared to non-treated check plots on most dates (Figure 1). **Reductions due to TEF treatment were similar on both turfgrass** species (Figure 1).
- On both grasses clipping weight was correlated with clipping volume (Figure 2). However, a linear regression model fit data collected on Latitude 36 ( $R^2 = 0.81$ ) better than Trinity ( $R^2 = 0.56$ ).

### Conclusions

- All TEFs suppressed growth on both Latitude 36 and Trinity.
- Clipping weight and clipping volume were correlated in this PGR study.
- The relationship between volume and weight varied between turfgrass



**'Latitude 36'** 



○ Non-treated check ▶ 1⊢⊢ 4

Figure 1: 'Trinity' zoysiagrass (Zoysia matrella) and 'Latitude 36' hybrid bermudagrass (C. dactylon C. transvaalensis) clipping volume (mL) data following applications of various formulations of trinexapac-ethyl. Experiments were initiated 13 June 2022 on plots maintained at 12.7 mm.

species, particularly when clipping weight or volume was high. **Clipping volume could be used to evaluate PGR efficacy in research** trials, particularly those conducted on golf course fairways.

## **Future Research**

**Repeat this study in 2023.** 

**Explore the relationship between clipping weight and volume further** on other turfgrass species and cultivars maintained at fairway height. **Explore the relationship between clipping weight and volume** following PGR applications to golf course putting greens.

#### References

Lyons, E. M., Watson, J. R., & Husiny, J. (2019). Comparing effectiveness of plant growth regulators Anuew and Primo Maxx on fairway height turfgrass.

Pannacci, E., Covarelli, G., & Tei, F. (2004). Evaluation of trinexapac-ethyl for growth regulation of five cool-season turfgrass species. Acta Hortic, 661, 349-351.

Wherley, B., & Sinclair, T. R. (2009). Growth and evapotranspiration response of two turfgrass species to nitrogen and trinexapac-ethyl. HortScience, 44(7), 2053-2057.



Figure 2: 'Trinity' zoysiagrass (Zoysia matrella) and 'Latitude 36' hybrid bermudagrass (C. dactylon x C. transvaalensis) clipping volume (mL) vs clipping weight (g) data linear correlations following applications of various formulations of trinexapac-ethyl. Experiments were initiated 13 June 2022 on plots maintained at 12.7 mm.

