Application Timing Affects the Efficacy of Herbicides Used for Control of Bermudagrass in Zoysiagrass Fairways

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Objective:

1. Determine the effects of application timing on the level of bermudagrass suppression achieved following applications of Fusilade II + Turflon Ester.

Start Date: 2009
Project Duration: 2 years
Total Funding: $6,000

One of the most troublesome weeds to control in zoysiagrass is common bermudagrass (*Cynodon dactylon*), as physiological similarities between these species often render them susceptible to similar herbicide chemistries. Although research has shown that applications of fluazifop (Fusilade II) mixed with triclopyr (Turflon Ester) can provide bermudagrass suppression with minimal zoysiagrass injury, superintendents still struggle to control bermudagrass infestations in zoysiagrass fairways. The objective of this research was to determine points in the growing season in which bermudagrass was most susceptible to applications of fluazifop and triclopyr.

Research was initiated in 2009 at the East Tennessee Research and Education Center in Knoxville, TN on a stand of 'Zenith' zoysiagrass infested with common bermudagrass. Plots measuring 1 m X 1 m were arranged in a 4 X 6 factorial design replicated three times. Herbicide treatment and application timing served as factors in this study. The four herbicide treatments evaluated were: (1) fluazifop at 6 fl oz/A + triclopyr at 32 fl oz/A; (2) fluazifop at 12 fl oz/A + triclopyr at 32 fl oz/A; (3) fluazifop at 18 fl oz/A + triclopyr at 32 fl oz/A; and (4) untreated check.

These treatments were applied at six timings: 200 growing degree days (GDD), 450 GDD, 825 GDD, 1,275 GDD, 1,775 GDD, and 2,250 GDD. Yearly accumulated GDD were calculated beginning on January 1st using a Celsius scale according to the equation,

$$GDD = [(T_{max} - T_{min})/2] - T_{base}$$

where T_{max} represents the daily maximum air temperature, T_{min} represents the daily minimum air temperature, and T_{base} equals 10° C. Bermudagrass suppression and zoysiagrass injury were assessed weekly using a visual scale from 0 (no injury; vigorously growing, green turf) to 100% (severely injured, necrotic, brown turf) until suppression/injury subsided. Bermudagrass suppression and zoysiagrass injury were also assessed quantitatively by collecting relative chlorophyll index data with a hand-held chlorophyll meter.

Although this experiment is still ongoing, current results indicate that bermudagrass is most susceptible to applications of fluazifop and triclopyr surrounding periods of dormancy. The greatest degree of suppression was observed for applications made to bermudagrass transitioning out of winter dormancy in spring and entering winter dormancy in fall in both 2009 and 2010. This response was observed for all fluazifop + triclopyr treatments evaluated. At these timings, increasing the rate of fluazifop from 6 to 18 fl oz/A did not improve efficacy. Increased fluazifop rates resulted in greater efficacy when applied at other summer timings.

Although the maximum labeled use rate of fluazifop for bermudagrass suppression is 6 fl oz/A, 'Zenith' zoysiagrass exhibited tolerance to higher application rates. With the exception of treatments applied in spring (200 GDD), zoysiagrass injury measured less than 13% for all fluazifop rates evaluated. Regardless of fluazifop rate, spring (200 GDD) applications induced greater zoysiagrass injury at 7 days after treatment than any other timing each year.

Relative chlorophyll index data collected on bermudagrass and zoysiagrass were significantly correlated ($P < 0.0001$) with visual assessments of bermudagrass suppression and zoysiagrass injury each year.

Preliminary results suggest that bermudagrass is most susceptible to applications of fluazifop and triclopyr when this species is transitioning into or out of winter dormancy. This study will conclude in spring 2011 once all data have been collected for treatments applied at the 2,250 GDD timing in 2010.

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Summary Points

- Preliminary results suggest that bermudagrass is most susceptible to applications of fluazifop and triclopyr when transitioning out of winter dormancy in spring or transitioning into winter dormancy in fall.
- Increasing the rate of fluazifop above 6 fl oz/A did not improve efficacy for treatments applied to bermudagrass transitioning out of winter dormancy in spring or transitioning into winter dormancy in fall. When applied during the summer, increased rates of fluazifop resulted in greater bermudagrass suppression.
- Regardless of application rate, 'Zenith' zoysiagrass injury measured less than 13% for treatments applied after 200 GDD each year