Developing Management Practices and Prediction Models for Controlling Seedheads on Warm Season Turfgrasses

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Start Date: 2013
Project Duration: 3 years
Total Funding: $30,000

Turfgrass and Environmental Research Online
Volume 14, Number 2 | March—April 2015

Objectives:

The objective of the proposed research is to develop prediction models and management recommendations for suppressing seedheads of bermudagrass, seashore paspalum, and zoysiagrass at various mowing heights.

Improved varieties of warm-season grasses are becoming popular selections for golf course turf throughout southern regions and the U.S. transition zone. Many new cultivars of bermudagrass, seashore paspalum, and zoysiagrass offer desirable color, quality, and leaf textures for greens, tees, fairways, and roughs. However, a significant problem with these new warm-season varieties is seedhead production. The presence of seedheads reduces turf aesthetics, quality, and ball roll distances. Additionally, seedheads wear on reels and bedknives and may increase maintenance requirements on turf equipment.

Seedhead production on warm-season turfgrasses is influenced by seasonal growth, temperature, and management practices but emergence patterns differ among species. For example, bermudagrass seedhead production is most prevalent during spring months and is often exacerbated by cool, wet weather or if nitrogen is limited. Zoysiagrass produces seedheads in spring but may also have a second flush of inflorescence in late summer or fall. Seashore paspalum is a prolific seedhead producer during active growth in spring, summer, and fall regardless of environment or fertility levels. Managing seedheads of these species is a major limitation to these improved varieties and are a significant challenge to producing high quality golf course turf.

Limitations of PGR safety and efficacy for managing seedheads of warm-season turfgrasses have lead to superintendents relying on herbicide applications and cultural practices for control. For example, sulfonylurea herbicides have been used for low maintenance turfgrass seedhead production, such as bermudagrass roadsides, but new chemistries have potential for use in golf course turfgrass. Herbicides such as flazasulfuron (Katana), flucarbazone (Everest), and fenoxaprop (Acclaim Extra)

Plant growth regulator treatments to reduce seedheads on seashore Paspalum.

have shown to control seedheads of bermudagrass and seashore paspalum. (Brosnan et al. 2011; McCullough et al. 2011) Despite promising efficacy, multiple applications may be required to control seedheads after the initiation of production.

Timing herbicide treatments before seedhead emergence has shown to be more effective than postemergence applications, especially in managing zoysiagrass. However, the emergence of warm-season turfgrass seedheads is often erratic and unpredictable. Improved varieties of these species, such as 'TifGrand' bermudagrass, 'Diamond' zoysiagrass, and 'Sea Isle 1' seashore paspalum, are currently being planted for golf course greens, tees, fairways, and roughs. The influence of cultural practices, such as mowing regimens, may influence emergence and herbicide efficacy for seedhead control especially if treatments are initiated after emergence. The development of growing degree models

and management recommendations for seedhead control for these three turf species grown under various maintenance levels would be beneficial for superintendents and could enhance potential for long-term successful culture.

Experiments

A three-year experiment is being conducted at the University of Georgia Griffin Campus to evaluate effects of mowing regimens on seedhead emergence of 'TifGrand' bermudagrass, 'Sea Isle 1' seashore paspalum, and 'Diamond' zoysiagrass. These three grasses were chosen because of use in the golf industry and prolific seedhead emergence issues reported by superintendents. Experiments are also being conducted to evaluate five application timings of Embark and Proxy + Primo for controlling seedheads on these grasses in spring. For mowing experiments, bermudagrass, seashore paspalum, and zoysiagrass maintenance was modified in fall 2012 in one of four regimens including mowing at 0.25" 2 d wk-1, 0.5" 2 d wk-1, 1.5" weekly, or no mowing. All three species were mowed under these four programs until dormancy, and mowing resumed upon active growth in spring 2013. Beginning on January 14, seedhead cover of plots was visually measured weekly. For each rating date, growing-degree days (heating units) were determined at each evaluation to help provide a relative emergence timing for seedheads on the three grasses, rather than calendar dates.

For PGR experiments, five application timings of Embark or Proxy + Primo were made based on growing degree-days from a base temperature of 50° F on January 1. Applications were made at 250, 500, 1000, 1500, 2000, or 2500 GDD on all three fields, and control, injury, and turf quality were rated weekly. The PGR timing experiments are being conducted on all three species maintained at a 0.5" height with a reel-mower.

Summary Points

- Greenup of the grasses was significantly influenced by mowing height. Generally, the lower mowed plots greened up quickest compared to higher mowed plots and seedheads emerged earlier.
- 'TifGrand' bermudagrass and 'Sea Isle' seashore paspalum produced seedheads from ≈900 to 4200 growing degree-days (GDD). 'Diamond' zoysiagrass produced seedheads from ≈300 to 1200 GDD, and again starting at ≈3500 GDD in fall (with a base of 50° F starting January 1st).
- Data will continue to be collected this year and throughout 2015.
- We are currently evaluating the seasonal patterns of photoperiod and growing degree days to make comparisons of environmental factors on seedhead emergence.