USGA
Green Section
RESEARCH YOU SHOULD KNOW
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Applying growth regulators at putting green rates damaged bentgrass turf grown at collar height. Gibberellin inputs, lower mowing heights and increased nitrogen helped mitigate growth suppression.

CAN CERTAIN MANAGEMENT PRACTICES RESCUE BENTGRASS FROM OVERREGULATION?

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- Due to the shape of putting greens, overspray of plant growth regulators onto collars can cause overregulation of the turf.
- Trinexapac-ethyl (5.5 ounces per acre) applied at 200 growing degree days (GDD) and paclobutrazol (8 ounces per acre) applied at 260 GDD – resulted in 80%-95% growth suppression and severe phytotoxicity on 'T1' creeping bentgrass mowed at 0.325 and 0.400 inch.
- Gibberellic acid treatments rescued bentgrass from overregulation.
- Increasing nitrogen fertilization and lowering mowing height also improved turf vigor and quality. Ideally these practices should be employed prior to initiating plant growth regulator treatments.

Plant growth regulators (PGRs) are commonly applied to putting greens with boom-type sprayers. Due to the rounded shape of putting greens and the linear spray pattern, overspray onto the collars and closely mown areas around greens is the reality at most courses. However, superintendents plan the

PGR application rate and timing for greens, not the higher-cut turf. This is problematic because collars and approaches are more sensitive to PGR applications. Consequently, the higher-cut turf becomes overregulated by the overspray, causing phytotoxicity, risk of turf thinning and poor recuperative potential. Given this problem, research was needed to quantify the amount of growth suppression that would occur when PGR applications intended for putting greens were made on collars and to identify methods to rescue the turf from overregulation.

To meet these objectives, a USGA-funded research study at the University of Nebraska was initiated in 2017 using two PGRs on 'T1' creeping bentgrass grown at 0.400 inch in 2017 and 0.325 inch in 2018. This replicated trial included Primo Maxx® (trinexapac-ethyl) applied at 5.5 ounces per acre every 200 growing degree days (GDD), Trimmit 2SC (paclobutrazol) applied at 8 ounces per acre every 260 GDD (both using a base temperature of 10 degrees Celsius) and an untreated control. Nitrogen was applied at 0.2 pounds per 1,000 square feet every two weeks beginning in May and continuing through July in 2017 and 2018.

'T1' creeping bentgrass mown at putting green height and treated with PGRs at these rates and spray intervals exhibited 20% growth suppression with trinexapac-ethyl and 35% suppression while treated with paclobutrazol. In this study, these rates and intervals resulted in 80%-95% growth suppression on the same turf grown at 0.325 and 0.400 inch. The overregulation resulted in damaged, discolored leaf tips and poor turf quality compared to the untreated control.

Recovery treatments included reducing the mowing height from 0.400 to 0.300 inch, application of a commercial gibberellic acid (GA) product (RyZup®) at 0.15, 0.3 and 0.6 ounces per acre, and increasing nitrogen fertility inputs to 0.4 and 0.6 pounds per 1,000 square feet from the maintenance rate of 0.2 pounds per 1,000 square feet every 2 weeks. Additional recovery treatments included iron fertilization and seaweed extract application. Practices that increase GA production are thought to reverse or mitigate Class A (trinexapac-ethyl) and Class B (paclobutrazol) PGR effects. As such, it is not surprising to see that the GA product applied at all rates, reduced mowing height and increased nitrogen inputs came to the rescue of the overregulated creeping bentgrass. Iron fertilization and seaweed extract did not improve turf recovery.

This research demonstrates that PGRs meant for putting greens and sprayed on higher-cut collars or surrounding turf can cause damage from overregulation. Eliminating overspray on turf surrounding greens can be achieved using a GPS-enabled sprayer with individual nozzle control. Where this is not an option, this research supports decreasing mowing height, increasing nitrogen inputs and applying GA products as a last resort to increase gibberellin production and growth rate and mitigate excessive suppression from PGRs.

Source: Dr. Bill Kreuser, University of Nebraska, Lincoln