



## What is it with Plant Growth Regulators?

By Dr. Frank S. Rossi  
Department of Horticulture  
University of Wisconsin-Madison

In the first part of this series I attempted to describe in general terms the mechanics of regulating the growth of plants. We learned about classification of PGRs as Type I or Type II, differences in activity between grass species and affects on plant morphology (wider leaves, enhanced rooting, etc.). It is critical to understand the nature of plant growth regulation before you embark (no pun intended) on a management strategy that includes intensive use of PGRs. In this article I will focus on specific use aspects of PGRs with research based information so you can decide for yourself if you can accomplish the goals you set (and tell the golfers to expect).

### Clipping Reduction

The most obvious benefit from plant growth regulation is the reduced elongation of turf leaf blades, which results in extended mowing frequencies. For example, instead of mowing 5 times per week now you can maintain the same height and playing conditions with only 3 mowings per week. This would reduce wear and tear on your mowers, reduce energy consumption, and minimize clipping handling problems.

Many annual research reports include evaluations of PGRs for clipping reduction and mowing management. The level of growth reduction depends on many factors: timing of application (the earlier in the season the PGR is applied the greater the reduction), turf species being treated (generally ryegrass and tall fescue require higher rates than Kentucky bluegrass), and rate and frequency of application. There appears to be significant trade-offs between increased regulation and reduction in turf quality, but many optimal rate strategies have been determined. As mentioned in the first article, an important consideration should be made for the level of soil activity: Cutless and TGR are persistent in the soil while Embark and Primo are primarily foliarly active. This could have a significant effect on the intensity and duration of turf injury. To this point, no significant growth regulation is without at least small compromises in turf quality, just by the very nature of the

process. Our research at the Noer Facility is investigating clipping reduction and any disease incidence that might result from reduced leaf growth.

Currently, we are evaluating the clipping reduction potential of several PGRs applied at different rates and frequencies (every 2 weeks or every 4 weeks) on a Penncross creeping bentgrass fairway maintained at 10mm (0.40"). Our objective is to determine if PGRs can reduce the number of mowings and maintain the high quality turf the golfer expects. Additionally, the cost effectiveness of PGR use for clipping reduction will be evaluated. By the time you read this you will have viewed our plots at Field Day and it might make more sense.

### Putting Green Speed

This area of PGR use has received increased attention in the last few years as our industry continues to strive for faster greens. Clearly, the increased use and acceptance of greens rolling indicates the incredible pressures on course superintendents to have fast greens. Theoretically, if we can regulate growth on the putting surface, we can slightly increase our mowing heights because the grass is not growing as rapidly, thereby maintaining acceptable green speed without sacrificing quality. An important benefit to this practice would be the improved plant health that results from raising the mower height: deeper rooting and enhanced resistance to certain diseases that are more severe as heights drop closer to 3mm (0.125").

To this point there are no peer-reviewed publications that address this research. However, Trey Roger's group at Michigan State University have some preliminary results published in the Proceedings of the Michigan Turfgrass Conference (Vol. 21). Cutless and Scott's Turf Enhancer were applied twice during the summer of 1991 at 2 rates on a *Pennlinks* creeping bentgrass green maintained at 4.7mm (0.188"), 4mm (0.157"), and 3mm (0.125"). Topdressing was applied during the treatment intervals and terminated following the last PGR treatment.

Based on stimpmeter measurements, the most significant effect on green speed was a result of lower mowing height. As mowing height was increased the PGR treated plots did provide slightly higher stimpmeter readings, however, based on these differences it is not likely that the aver-




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age golfer would notice. There was between .33 meters (1') and .82 meters (2.5') difference in stimpmeter readings from the 4.7mm height and 3mm height regardless of PGR treatment. Additionally, turf color was slightly reduced at lower mowing heights and by the higher PGR application rates.

Based on these preliminary results it is too early to recommend initiating this type of management program on your greens. It might be worth an experiment of your own on a practice green or a nursery. Remember, the aforementioned research was conducted on a predominantly bentgrass green; I would expect much different results on an annual bluegrass/creeping bentgrass polystand. Any option which allows for increased mowing heights on the green is worth keeping an open mind to.

#### **Annual Bluegrass Conversion**

The thought of slowly eliminating annual bluegrass from our golf courses while enhancing the competitiveness of creeping bentgrass (or other desirable species) without any significant disruption of play (as with renovation) or reduction in turf quality (as with selective herbicides) quickly attracts attention. It would be kind of like reducing taxes and paying off the national debt! Think of the benefits of

less annual bluegrass; reduced winterkill, no unsightly seedheads, reduced N requirement and reduced severe disease spectrum. You may have some personal favorites. No matter how near and dear annual bluegrass might be to you, one cannot deny the attractiveness of this offer. This has been the challenge for PGRs following the report of selective regulation of annual bluegrass with reduced regulation to creeping bentgrass.

One of the definitive experiments conducted concerning this issue looked at several management factors including PGRs. Roch Gaussoin (pronounced Gah-Swah) from the University of Nebraska and Bruce Branham at Michigan State investigated N fertility, irrigation, leaving vs. removing clippings, overseeding vs. non-overseeding, and PGR application on the species dominance of a annual bluegrass (AB)/creeping bentgrass (CB) polystand. The significant conclusion from the study was that the persistence of AB can not be easily attributed to any one management practice but depends on the overall cultural program.

Specifically, practices which favored AB included, light frequent irrigation for existing AB plants as well as new germinants, leaving clippings that acted as a passive AB overseeding program (significantly more viable annual bluegrass seed was found in plots where

clippings were returned), and mefluidide (PGR) applications alone. Conversely, plots that were treated with PGRs, had clippings removed and were overseeded with creeping bentgrass had significantly less AB than control plots and plots that were not overseeded. Still, new PGRs have been released and many new bentgrass cultivars are available since this study was conducted. Therefore, our program will expand on the Gaussoin and Branham work to include the new PGRs and overseed new bentgrass cultivars. One result I expect in support of the previous research is that PGRs alone will not reduce annual bluegrass populations.

In conclusion, organizing this series of articles on PGRs has increased my awareness of the facts and fallacies we all operate under regarding this management tool. During my first year here in Wisconsin and through my travels across the country, I know of no other golf course management practice employed to the extent to which PGRs are used. That is void of a clear and attainable goal. I hope that reading these articles moves you to question your use of PGRs—call the Turfgrass Information File, read the trade journals, talk to fellow superintendents and look for our work to be reported. Get the facts and be clear on what PGRs are able to provide. ♣

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