THE EFFECT OF PLANT GROWTH REGULATORS ON PUTTING GREEN SPEED AND QUALITY

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The reputation of a golf course is often centered around its greens. For this reason a tremendous amount of energy is spent each season in the area of putting green maintenance. Recently, putting green speed has unfortunately become a tool for comparison between golf courses and their putting surfaces. This has certainly increased the pressure of the golf course superintendent's job. One well documented way to increase putting speed is to lower cutting height. However, this is often detrimental to the turf plant and begins a vicious cycle of costly and time consuming and often futile maintenance practices. Certainly if putting green speed could be maintained without lowering cutting height and without expensive inputs such as double mowing, everyone would be the benefactor. For these reasons and for reasons concerning environmental regulation of fungicides, plant growth regulators should be investigated to determine if they can increase putting green speed without sacrificing turf quality.

METHODS

A study was conducted at the Hancock Turfgrass Research Center (HTRC) at Michigan State University to determine the effects of plant growth regulators (PGR) on putting green ball speed and subsequent turf quality. The study was conducted on a one year-old stand of *Aqrostis palustius* var 'Pennlinks'. The design was completely randomized 3 x 5 factorial with three cutting heights (0.188, 0.157 and 0.125 inch) and five PGR treatments, 0.25 and 0.175 lb ai/A florprimidol (Dow Elanco Cutless 50 W), 0.25 and 0.175 lb ai/A paclobutrazol (Scotts Turf Enhancer 50 WP), and a control. The plots were 4 foot x 20 foot. PGR application dates were 15 July and 12 August. The plot area was topdressed 20 July and 28 July with 0.2 $yd^3/1000\ ft^2$ of sand and fertilized with 1.0 lbs $N/1000\ ft^2$ over the period of 15 July to 12 August. No topdressing or fertility was applied after 12 August. The area was cut six times weekly with Toro Series 1000 walk behind mowers. Each cutting height treatment had a separate mower.

Data collected included stimpmeter readings and color ratings. Stimpmeter readings were recorded on 18, 23, 26, 30 July; 1, 5, 15, 20, 21, 23, 26, 29 August; and 1, 3 September. These values were an average of six stimpmeter measurements, three in each direction. Color ratings were taken 23, 29 August and 11 September. Color was on a scale of 1-9 with 1=brown and 9=ideal. A score of six or better was considered acceptable color. Results were analyzed using ANOVA procedures. Mean separation was performed using LSD procedures at the 0.05 level.

RESULTS

Stimpmeter Readings

Lowering the cutting height caused an increase in stimpmeter readings for all dates measures. There was a significant stimpmeter reading difference in PGR treatments for four of the 14 data collection periods. The first significant PGR treatment effect (1 August) did not occur until 17 days after application (15 July), a trend consistent with earlier findings concerning the plant growth regulators onset and length of effectiveness. On the dates of significant differences of stimpmeter readings between PGR treatments there was little separation of the PGR treatments themselves, as stimpmeter readings for all the treatments were higher than the control. For the most part differences among the treatments (excluding the control) were of a magnitude such that detection by the golfer would be unlikely.

There was a significant cutting height by PGR treatment interaction on three dates during the study (23 August, 29 August, and 1 September). The 23 August data are shown in Figure 1. The cause of the interaction was the lack of PGR effect (as compared to the control) at the low cutting

height (0.125 inch). There was an increase in stimpmeter readings due to PGR treatments at 0.188 and 0.157 inch cutting heights but not at the 0.125 inch cutting height. The data suggest that the growth regulators have effect in increasing green speed at higher cutting heights. The stimpmeter readings of the PGR treated plots at the 0.157 inch cutting height did not equal the stimpmeter readings of the control plot at the 0.125 inch cutting height, but they were close on several dates (15 August, 20 August, 21 August, and 29 August). This is encouraging since higher cutting heights for putting greens leads to a healthier turf, more able to combat stress, noninfectious disorders, and diseases. This increased disease resistance will lead to a decreased fungicide dependency and a potential favorable response from environmental concerns.

Color

The effects of cutting height and PGR on turfgrass color are presented in Table 2. Ratings for turf color were only taken after the second application date. Turf color decreased with decreasing cutting height. No treatments received a score under six during the experiment. PGR treated areas had color ratings below the control initially after the second treatment (23 August), but these trends were reversed by the end of the study (11 September) particularly in the paclobutrazol treatments. Phytoxicity to the creeping bentgrass due to PGR treatments was not a problem anytime during the study.

FUTURE STUDIES

This experiment will be repeated in 1992 with application times included for the months of April, May and June. Data collection will include stimpmeter readings, color, quality and turf rooting.

In addition there are two proposed studies for 1992. First, a study to evaluate the effects of the PGRs on putting green speed as cutting heights are raised during the season. The objective would be to attempt to maintain a consistent putting speed and quality throughout the season. A second study would include the 1991 experiment conducted on a annual bluegrass/creeping bentgrass stand, a more typical scenario found in the field.

Table 2. Effects of cutting height and plant growth regulators on 'Pennlinks' creeping bentgrass (Agrostis palustris) color, Michigan State University - 1991.

	Color Ratings		
Cutting Height (in)	23 August	29 August	11 September
0.188	7.6	8.2	7.3
0.157	7.5	7.7	7.7
0.125	7.3	0.4	NS
lsd (0.05)	0.3	0.4	NS
Plant Growth Regulator (lb ai/A)			
Cutless 0.75	7.5	7.6	7.0
Cutless 0.25	7.3	7.4	7.4
Turf Enhancer 0.175	7.3	7.6	8.0
Turf Enhancer 0.25	7.1	7.2	8.4
Control	7.7	7.9	7.0
lsd (0.05)	0.4	NS	0.8

Color Scale: 1-9, 1 = brown, 9 = ideal; 6 = acceptable color.

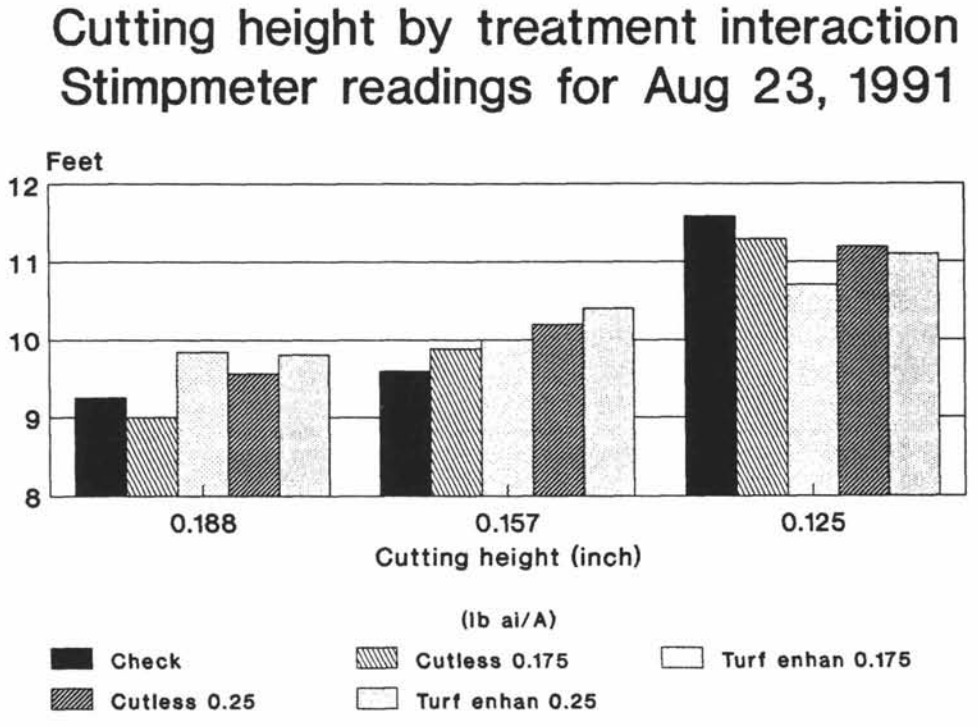
Cutting height by treatment interaction
Stimpmeter readings for Aug 23, 1991
Feet
12
11
10
9
8
0.188
0.157
0.125
Cutting height (inch)
(lb ai/A)
Check
Cutless 0.25
Cutless 0.175
Turf enhan 0.25
Turf enhan 0.175
Michigan State Univ- 1991

Figure 1