

## PLANT GROWTH REGULATOR USE ON CREEPING BENTGRASS FAIRWAYS

Ronald N. Calhoun and Bruce E. Branham  
Dept. of Crop and Soil Science, M.S.U.

Plant growth regulators (PGRs) have been increasingly used on golf course turf since the mid-80's. PGR research has concentrated on single applications in a season. The primary benefit from PGR treatments is growth reduction. As PGR use has increased, so have the questions regarding possible secondary effects on turfgrass growth.

Research was initiated in 1994 to study the interaction of nitrogen fertilization and PGRs on creeping bentgrass (*Agrostis palustris* H.) performance, clipping production, and recovery from injury. Plots were established on a three-year-old Penncross fairway maintained at 0.625 in. Nitrogen regimes of 2.5 and 5.0 lb. per 1000 ft<sup>2</sup> per year and three PGRs at three rates were applied in a randomized complete block design. PGR treatments were made in June, July, and August of 1994; and in May, June, July, and August of 1995. The PGRs chosen were Cutless® (flurprimidol), Scott's TGR® (paclobutrazol), and Primo® (trinexapac-ethyl) each applied at 0.25, 0.5, and 1.0 times the label rate. The high nitrogen regime doubled clipping production in both years and enhanced creeping bentgrass recovery from injury.

All three PGRs elicited similar levels of growth reduction. PGRs provided growth reduction of up to 60% after the first application. However, growth reduction following the second set of PGR applications was minimal. A growth surge following the growth reduction period was observed in both years. During the growth surge, the growth rate of the PGR treated turf exceeded that of the control plots. Creeping bentgrass plots that displayed the greatest growth reduction also had the greatest growth surge. Turfgrass treated with Cutless and Scott's TGR tended to have a longer growth reduction period than turfgrass treated with Primo.

Turfgrass quality was rated in both years. Primo and Cutless enhanced turfgrass quality compared to Scott's TGR in 1994, whereas all PGRs enhanced turfgrass quality in 1995. Temporary quality losses from PGR applications are commonly reported but were not observed in this study.

Simulated divots were made after the first PGR application in 1994 and the first and second PGR applications in 1995. Divot closure was observed in order to evaluate treatment effect on divot closure rate. Nitrogen fertility was the dominant factor affecting divot closure rate. The high nitrogen regime reduced the days needed for divot closure by 10 days. The effect of PGRs on divot closure rate was subtle, especially in 1994. However, Primo treated creeping bentgrass experienced slightly accelerated divot closure compared to Cutless and Scott's TGR treated turfgrass in 1995.

The wear tolerance of creeping bentgrass was evaluated in 1995 (Table 1). A drag sled was used to apply the wear to the turf. Quality ratings were taken to determine the effect of PGRs and nitrogen on turfgrass wear tolerance. Nitrogen applied at 5.0 lb. per 1000 ft<sup>2</sup> per year increased turfgrass wear tolerance with or without PGR treatment. Acceptable turf quality was observed in all Primo treated plots. Primo treated turfgrass expressed greater wear tolerance than the control plots and turf treated with Cutless and Scott's TGR at the 2.5 lb. N per 1000 ft<sup>2</sup> per year fertility regime. Primo treatments had no effect on the wear tolerance of turfgrass at the high nitrogen regime.

In 1995 casual observations of dollar spot incidence were made (Table 2). The number of centers of infection of dollar spot was dramatically reduced for plots in the high nitrogen regime. PGR treatment also reduced the severity of dollar spot infestation as compared to the control plots. The greatest reduction of number of dollar spot lesions was observed on turfgrass treated with Scott's TGR.

**Table 1.** Wear tolerance of a creeping bentgrass fairway as affected by plant growth regulator treatment and nitrogen regime. 1995

PGR	Rate	Low N	High N
	oz/1000 ft <sup>2</sup>	Quality Index <sup>1</sup>	
Control		4.3	5.0
Cutless 50 WP	0.2	3.1	4.2
Cutless 50 WP	0.3	1.4	5.1
Cutless 50 WP	0.4	1.8	4.0
Scott's TGR 50 WP	0.05	3.3	4.7
Scott's TGR 50 WP	0.1	4.4	5.3
Scott's TGR 50 WP	0.2	3.1	4.7
Primo 1EC	0.13	5.1	5.7
Primo 1EC	0.25	6.3	5.7
Primo 1EC	0.5	5.5	5.5
LSD (p=0.05)		1.5	

<sup>1</sup> Quality rating taken on 1-9 scale where 1=dead, 9=excellent, and 5=acceptable.

**Table 2.** Number of centers of dollar spot infection on a creeping bentgrass fairway as affected by plant growth regulator treatment and nitrogen regime. 1995

PGR	Rate oz/1000 ft <sup>2</sup>	Season Average	
		Low N	High N
		number per plot	
Control		75	24
Cutless 50 WP	0.2	53	20
Cutless 50 WP	0.3	37	20
Cutless 50 WP	0.4	29	13
Scott's TGR 50 WP	0.05	48	27
Scott's TGR 50 WP	0.1	41	21
Scott's TGR 50 WP	0.2	13	8
Primo 1EC	0.13	50	35
Primo 1EC	0.25	55	28
Primo 1EC	0.5	51	23
LSD (p=0.05)		17	