

MANAGING CREEPING BENTGRASS IN THE SHADE

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Introduction

Shade is a major problem for many turfgrass managers. Home lawns, athletic stadia, golf courses and parklands often face problems associated with shade. The reduced light level environment produces a spindly sward with higher disease pressure, reduced density and decreased quality. The current practices for increasing the quality of turf under reduced light conditions include increasing fungicide applications, decreasing water inputs, decreasing nitrogen fertilization, decreasing wear/traffic and increasing mowing height. The high level of play and demand by the golfing public will not allow for reduced traffic or higher mowing heights. The objectives of the study were: *(1) to determine the best rate and timing of application of the plant growth regulator Primo (trinexapac-ethyl) for the improvement of turf quality, (2) to determine any effects on nitrogen on shaded turfgrass with the application of Primo and (3) to establish the physiological rationale behind the improvement of turfgrass quality under reduced light conditions with Primo.* Two studies were conducted to look at slightly different aspects of the effects of Primo on shaded turf.

Primo and Nitrogen study (PN)

The first study, initiated in 1998, compared two different rates of Primo and two different nitrogen levels. Applications were made at 0.075 and 0.125 oz/1000ft² Primo and two rates of nitrogen (3.0 and 5.0 oz/1000ft²/yr) applied biweekly. Plots were maintained under 20% artificial shade cloth (blocked 80% of photosynthetically active radiation). The Primo and Nitrogen Study (PN) indicated Primo could improve the overall turf quality by increasing density, by decreasing excessive growth and by giving a darker appearance to the turf stand. Since the first application was made one month after shade treatment in 1998, it appeared Primo improved the quality over time, not by just maintaining existing quality. The study was continued through 1999 with the first application made at the time of shading. Both rates of Primo showed great promise in improving the overall quality and density of the turf stand (Figures 1 and 3). However, in 1999, the higher rate of application did have a slightly lower quality compared to the lower rate. Increased nitrogen decreased quality and density in 1999, but showed little influence in 1998 (Figures 2 and 4).

Rate and timing study (RT)

The second study initiated in 1999 attempted to pinpoint the best rate and application timing for improvement of shaded turfgrass greens. Applications of 0.05 and 0.10 oz/1000ft² were made either once or twice a month from May through October. In addition, an application was initiated in late August at the high rate to simulate recovery treatments. Because the previously built shade structures provided a highly stressful environment, the RT study was performed under less strict environmental conditions. Only 60% of the available light was blocked and the cloth was green to better simulate the light quality of natural tree shade.

The shade produced by the second study did not produce major differences between treatments (data not shown). The plants received enough photosynthetically active radiation to grow and develop normally. Most of the improvements due to color, density and clipping reduction have been documented in swards found in full sun. The higher rate of Primo resulted in fewer clippings, followed by the lower rate of the PGR in most instances. However, there were times when clippings were increased possibly due to the "rebound effect." Primo increased turf quality mostly because it produced a darker colored turf.

Future research (PN and RT)

Both PN and RT studies have data to be collected and analyzed from the previous years' experiments. The completed studies will include the following information:

- Analysis of any carbohydrate differences between Primo treatments.
- Measurements of starch content differences between treatments.
- Comparison of tiller number and of root mass to treatment differences.

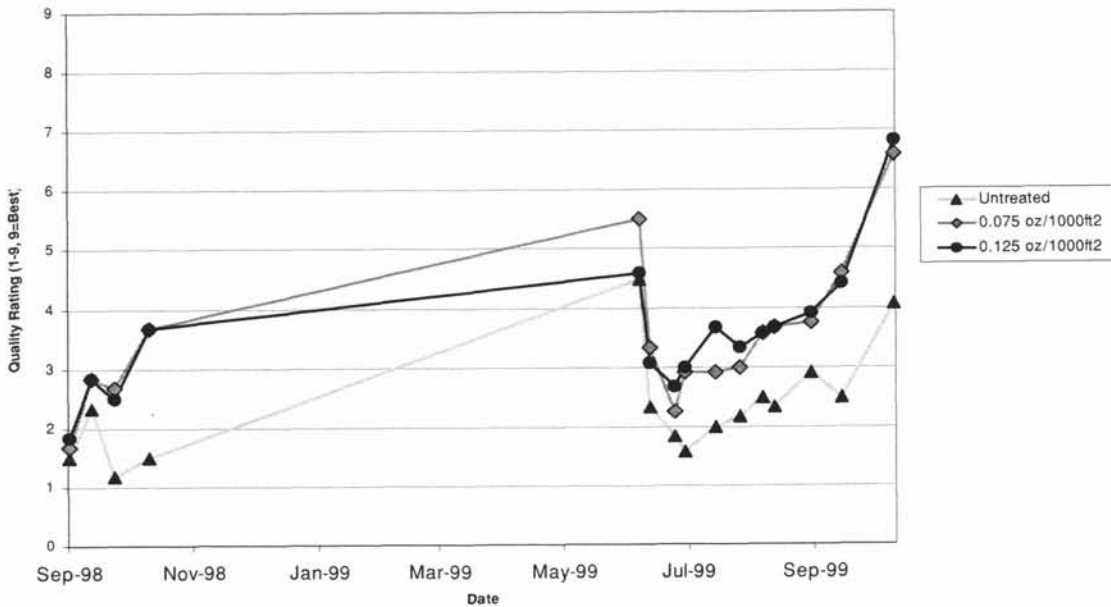
- Determination of the physiological/morphological response of creeping bentgrass to Primo under reduced light conditions.

Summary

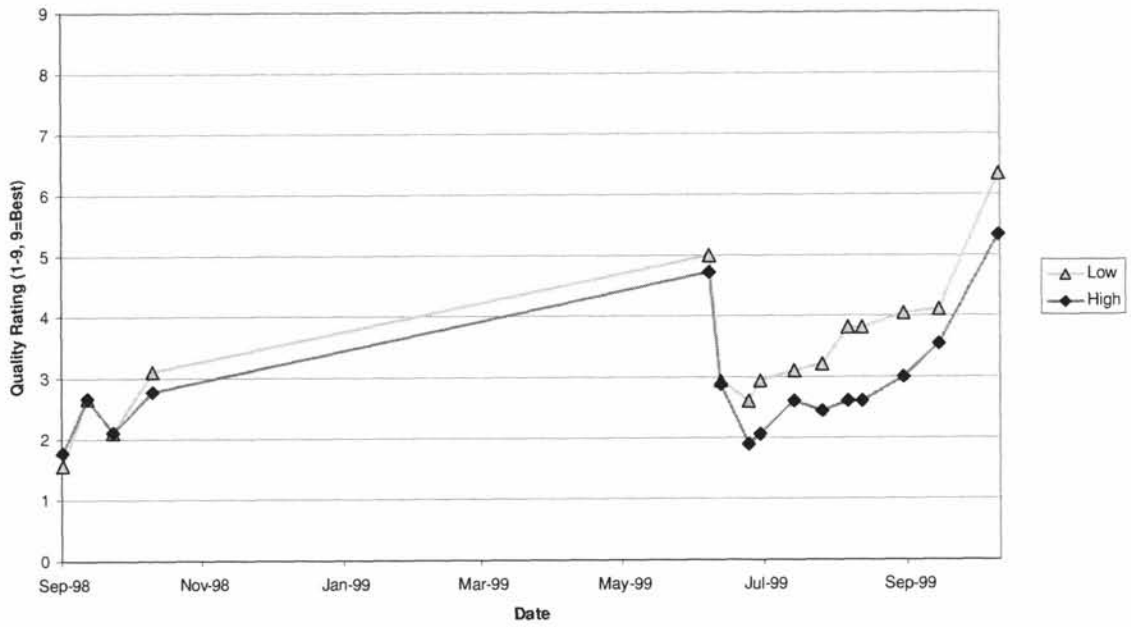
To increase turfgrass quality on putting greens under low light levels, turf managers should:

- Apply Primo according to labeled rates.
- Apply lower levels of nitrogen compared to full sun.
- Employ integrated pest management, especially for disease control.
- Increase mowing heights as high as possible.
- Decrease wear and traffic on shaded turf.
- Prune tree roots and limbs when necessary.
- Apply irrigation judiciously.
- Work with course architects to locate greens in less shaded areas.

**Figure 1: Quality Ratings of PN Shade Study 1998-1999
A Comparison of Primo Rates**



**Figure 2: Quality Ratings of PN Shade Study 1998-1999
A Comparison of Nitrogen Rates**



**Figure 3: Percent Cover of PN Shade Study 1998-1999
A Comparison of Primo Rates**

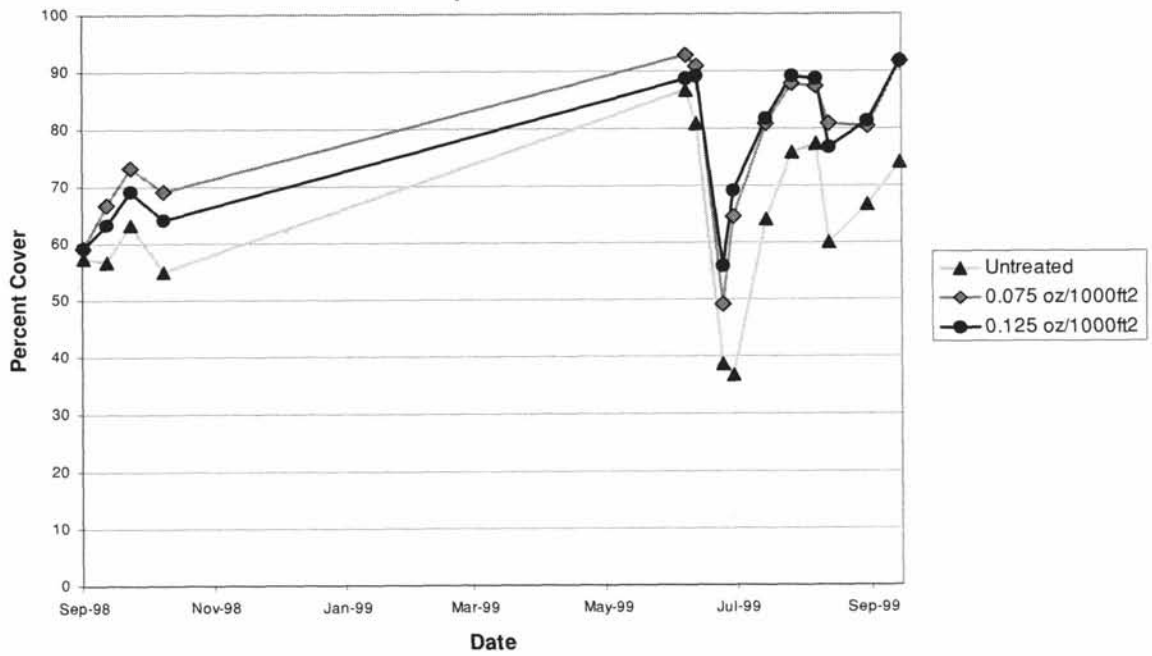


Figure 4: Percent Cover of PN Shade Study 1998-1999
A Comparison of Nitrogen Rates

