## Effect of Nitrogen Type and Rate on the Quality of Hybrid Bermudagrass Turf in Central Arkansas

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**Additional index words:** fertilizer, golf course, urea, sulfur-coated urea

**Summary. The effect of nitrogen type and rate was evaluated on the quality of hybrid bermudagrass grown under golf course conditions. Nitrogen sources included ammonium sulfate and the slow-release nitrogen sources polymer-coated/sulfur-coated urea and polymer-coated urea. Nitrogen sources were applied individually, and in 1:1:1 ratios with each other, at rates of 0, 1, 1.5 and 2 lb N/1,000 ft² on 22 April. Both the nitrogen source type and rate had a significant effect on turf quality ratings relative to unfertilized turf. Ammonium sulfate or polymer-coated/sulfur-coated urea applied at any rate resulted in the fastest response to a nitrogen source as assessed by a change in turf quality. Although turf fertilized with polymer coated urea at any nitrogen rate was slow to respond initially, the turf responded with a steady rise in favorable quality ratings from 5 to 11 weeks after treatment.**

A great deal of research has been conducted on cool- and warm-season turf to evaluate the effect of nitrogen sources and rates on turf color and growth (Carrow, 1997; Waddington and Duich, 1976; Zhang et al., 1998). Of the plant nutrients, nitrogen is often the most limiting. The extent and degree of response by turf to nitrogen depends on the turf species, the environment, and the type and rate of nitrogen applied. This study was conducted to assist Central Arkansas golf course superintendents in the proper selection of a nitrogen source and rate for quality bermudagrass turf .

### Materials and methods

Research was conducted on a fairway at Pleasant Valley Country Club in Little Rock, Ark. The 'Tifway' bermudagrass was mowed at 0.5 inches and clippings were not collected. Nitrogen sources included ammonium sulfate (AS; 21% N), polymer coated sulfur-coated urea (SCU; 42% N), and polymer coated urea (PCU; 42% N). Nitrogen sources were applied individually and in ratios of 1/3 (e.g. 1/3 ammonium sulfate: 2/3 SCU) at rates of 0, 1, 1.5 and 2 lb N/1,000 ft² on 15 April, 2002. Plots were 3'x 6'. Air temperatures on 15 April were 85-90ºF. Turf quality ratings were made weekly by a single evaluator. Quality ratings considered turf growth and color. A rating of 6 was considered the minimum acceptable turf; a rating of 9 was not considered favorable from a management standpoint since growth was excessive and required frequent mowing. Ratings were terminated when the nitrogen treated plots could not be visually separated from the control. Treatments consisted of four single plot replications. The experimental design was a completely randomized design.

### Results and discussion

Only results for the individual nitrogen sources will be discussed. Ammonium sulfate or SCU applied at any rate resulted in the fastest response to a nitrogen source as assessed by a change in turf quality (Figs. 1, 2, and 3). At the 1 lb N rate, turf quality ratings 3 weeks after treatment for the AS, SCU, and PCU were 8.3, 8.0, and 6.6, respectively. The overall shape of the response curve for AS or SCU was similar over the course of the experiment. Both nitrogen sources resulted in an increase in turf quality peaking about 4 weeks after application. The highest turf quality was followed by a slow decline in ratings over the next 10 weeks.

The polymer-coated urea applied at the 1 and 1.5 lb N rate did not result in a significant increase in turf quality until 4 weeks after application (Figs. 1 and 2). At the 2 lb N rate the PCU resulted in a significant increase in turf quality after 2 weeks (Fig. 3). In contrast to the SCU and AS, turf quality ratings for plots fertilized with PCU tended to increase until eleven weeks after treatment and then declined.

Unfertilized plots were rated as having acceptable quality over the entire experimental period (Fig. 1). The quality of unfertilized turf plots increased gradually from mid-April to mid-July. This increase in quality likely reflects the response of a warm season turf species to warmer weather. Differences in the effect of nitrogen source and rate on bermudagrass turf quality were observed.

### Literature cited

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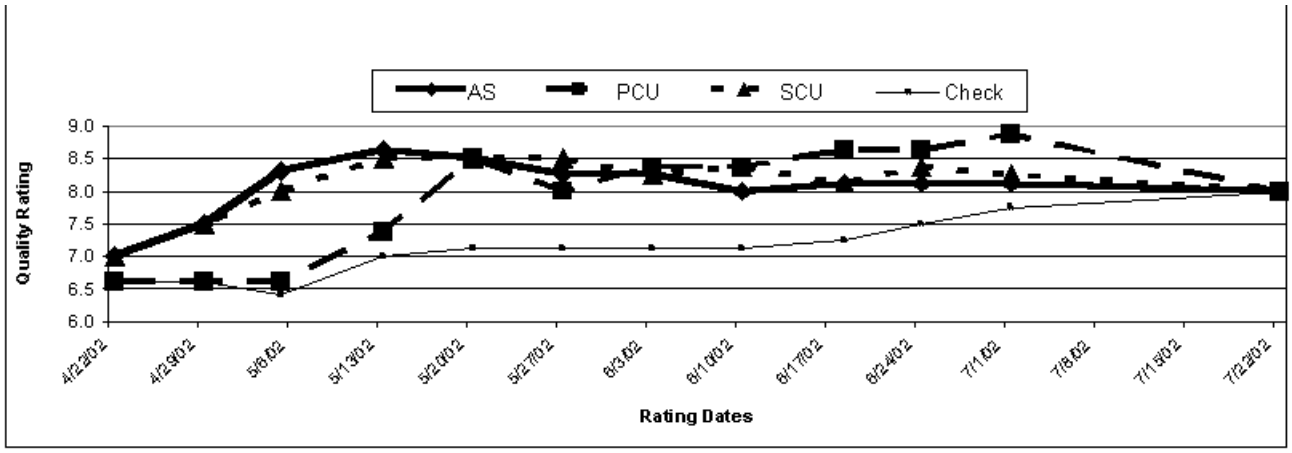


**Fig. 1. Effect of nitrogen fertilizers on the quality of bermudagrass. Nitrogen sources were applied on 15 April 2002 at the rate of 1 lb N/1,000 ft². A rating of 6 is considered the minimum for acceptable turf.**

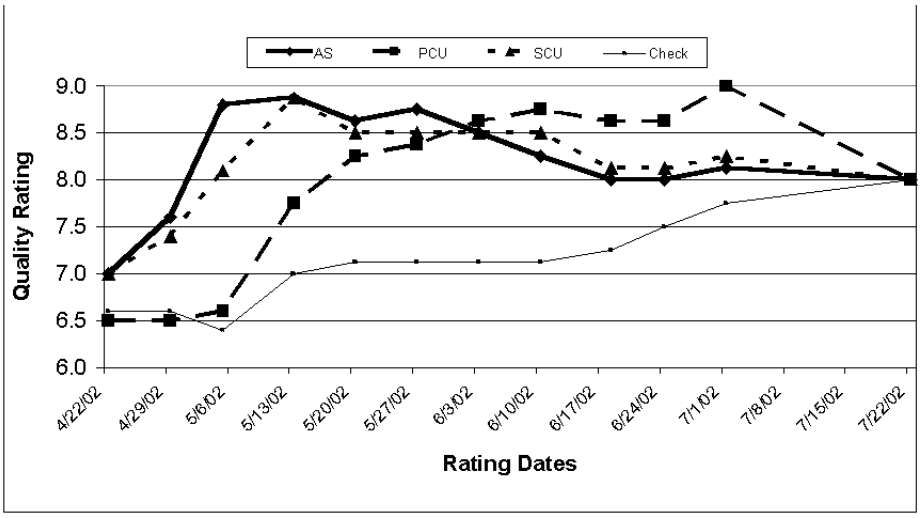


**Fig. 2. Effect of nitrogen fertilizers on the quality of bermudagrass. Nitrogen sources were applied on 15 April 2002 at the rate of 1.5 lb N/1,000 ft². A rating of 6 is considered the minimum for acceptable turf.**

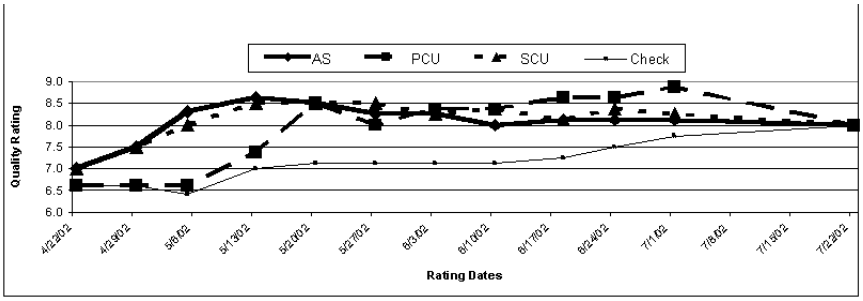


**Fig. 3. Effect of nitrogen fertilizers on the quality of bermudagrass. Nitrogen sources were applied on 15 April 2002 at the rate of 2 lb N/1,000 ft². A rating of 6 is considered the minimum for acceptable turf.**