Influence of Nitrogen Fertility and Mowing Height on Zoysiagrass Management

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Objectives:

1. Characterize a general response (color, density, turf quality, thatch accumulation, and disease incidence) to nitrogen fertilization, mowing, and their interactions among zoysiagrass cultivars.
2. Determine how nitrogen source affects the turf quality, density, and color of zoysiagrass cultivars.
3. Establish appropriate mowing height and fertility recommendations for each of the cultivars studied.

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Project Duration: 3 years
Total Funding: $24,000

Zoysiagrass (*Zoysia japonica* or *Z. matrella*) is increasing in popularity and availability with over 30 cultivars now commercially available. Zoysiagrass has historically been more widely utilized on golf courses in the upper transition zone. However, due to better performance of newer cultivars, there has been a recent trend to plant zoysiagrass on golf courses in the lower transition zone and further south. Knowledge regarding the management of these new cultivars is critical as they are marketed and recommended for use.

Nitrogen source influences growth of creeping bentgrass (*Agrostis stolonifera*) and annual bluegrass *(Poa annua*), but no one has examined the effect of nitrogen source on zoysiagrass growth. Fertilizing zoysiagrass with the appropriate N source could lead to improved growth with reduced N inputs.

Experimental areas were sprigged in 2001 at the Arkansas Agricultural Research and Extension Center, Fayetteville, AR with 'El Toro', 'Meyer', and 'Cavalier' zoysiagrass. Plots were maintained from 2002 to 2007 using 1-2 lb N/1000ft^2/year. Fertilization treatments were initiated in May, 2008 using sulfur-coated urea at 0, 2, 4, and 6 lb N/1000 ft^2/year applied on May 1, June 1, July 1, August 1, and September 1. Response was evaluated as turf quality, density, green-up, and scalping.

Three nitrogen sources (urea, ammonium nitrate, and calcium nitrate) were applied as 2 and 4 lb N/1000ft^2/year with each source. Application timings were the same as previously stated. Response was evaluated as turf color, quality, density, green-up, and scalping.

Results of these studies indicate that there is no advantage to using more than 2 lb N/1000 ft^2/year for zoysiagrass, and spring green-up was fastest for 0.5-inch mown plots. In addition, spring green-up of zoysiagrass was delayed by N rates of 4 lb/1000 ft^2/year.

Results after three years indicate that turf density is improved through cultivar selection and N fertility. 'Cavalier' consistently had greater turf density than 'Meyer' and 'El Toro'. Increasing annual nitrogen applications ≥2 lb N/1000 ft^2 also improved turf density. In the spring of 2009 (after 1 year of fertility treatments), N rates ≥4 lb N/1000 ft^2/year were observed to cause a delay in spring green-up and a decline in turf quality at the 1.5-inch mowing height. In 2010, this delay in spring green-up was more pronounced in 'El Toro' than in 'Meyer' or 'Cavalier'.

Large patch (*Rhizoctonia solani*) was present in some plots, but there was no clear relationship to cultivar, mowing height, or nitrogen rate. Dollar spot (*Sclerotinia homoeocarpa)* was present in 'Cavalier' plots but not in 'El Toro' or 'Meyer'. There was little scalping in our study, but on two collection dates, mowing at 0.5-inch and fertilizing with 6 lb N/1000 ft^2/year resulted in increased scalping. Turf quality was generally highest for 'Meyer' and 'Cavalier'. Turf quality was highest in the summer for plots receiving ≥2 lb N/1000 ft^2/year, but turf quality was never unacceptable (<6) for the unfertilized check plots. Nitrogen source did not impact turf quality, turf density, or turf color in the field trial.

These results are in agreement with previous results that zoysiagrass requires little N fertility to produce an acceptable quality turf. One exception might be when growing zoysiagrass on sandy soils with a longer growing season, such as Florida. In Arkansas, this study has helped to influence nitrogen fertilization practices among golf course superintendents maintaining zoysiagrass.

Results for this study indicate that there is no advantage to using more than 2 lb N/1000 ft^2/year. Hopefully, these results along with similar research in other states will provide necessary information to help fine tune zoysiagrass management programs and reduce N inputs.

Summary Points

- Turf density was greatest for 'Meyer' and 'Cavalier' compared to 'El Toro'. Turf density was improved when fertilizing ≥2 lb N/1000 ft^2/year.
- Spring green-up was fastest for 0.5-inch mown plots. Among 1.5-inch mown plots, higher nitrogen rates (≥4 lb N/1000 ft^2/year) decreased spring green-up.
- Scalping was greatest when mowing at 0.5-inch and fertilizing with 6 lb N/1000 ft^2/year.
- Turf quality was generally highest for 'Meyer' and 'Cavalier'. Turf quality was highest in the spring among 1.5-inch mown plots, when receiving less than 4 lb N/1000 ft^2/year.
- There was no advantage to fertilizing more than 2 lb N/1000 ft^2/year. Turf quality was never unacceptable for the unfertilized check plots.
- Nitrogen source did not affect turf quality in the field.