Mowing height impacts establishment rate of zoysiagrass cultivars

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Objective

The objective of our research is to identify if mowing height impacts zoysiagrass establishment by plugs and if there are any mowing height by cultivar interactions.

Rationale

The main roadblock to widespread zoysiagrass use is its slow establishment and growth rate. In a previous study we looked at differences in establishment rate among 35 cultivars of zoysiagrass in unmown plots. We decided not to mow plots in a previous study because of the differences in preferred mowing height between *Z. matrella* and *Z. japonica*, and because of the use of sod staples to aid in the accurate determination of plot coverage. However, newly established zoysiagrass will be mown during establishment on golf courses and home lawns. Therefore, we decide to look at the impact of mowing height to determine how it influences establishment and to verify the results of our earlier work.

How it was done

Plant material of 5 commercially available zoysiagrass cultivars was collected in the fall of 2003 and propagated in the greenhouse until the initiation of the experiment. Field plots were prepared by fumigating soil with methyl bromide prior to establishment to minimize weed competition. One zoysiagrass plug (8 by 8 by 8 cm) was transplanted into the center of each plot on 8 June 2006 and irrigated four times daily for the first month to encourage establishment and then irrigated as needed. Plots received 49 kg ha^{-1} N from urea (46-0-0) on 15 July. Three mowing heights were looked at in this study. Unmown, 2.5 inches (6.4 cm) and 1.25 inches (3.2 cm). All plugs were mown at 1.25 inches prior to the start of the experiment. Mowing was conducted with a hand-held trimmer using a jig designed for each separate mowing height.

Digital pictures were taken monthly with a camera mounted on a monopod to insure shooting from a consistent height. Coverage of zoysiagrass was determined using digital image analysis (DIA) (SigmaScan Pro). To selectively identify green leaves in the images, hue range was set from 47 to 107 and the saturation was set from 10 to 100. Images were calibrated and the data was transformed from selected green pixels to zoysiagrass coverage (cm^2).

Results

- There were no mowing height × cultivar interactions on any of the three dates we measured (Table 1).
- El Toro and Palisades had the highest coverage with Diamond having the lowest coverage.
- Unmown plots had the highest coverage 28 and 92 DAP and were similar to 2.5 inch mown plots 56 DAP. The low mowing height of 1.25 inches was similar to the 2.5 inch mowing height 28 and 92 DAP, but was less than the 2.5 inch cut 56 DAP.

Conclusions

- The differences in the establishment of cultivars is consistent with our previous reports.
- The impact of mowing height is consistent with our hypothesis and with anecdotal observations were mowing at 0.75 inches favored zoysiagrass sprig establishment on a golf course compared to a 0.5 inch mowing height.
- Our earlier work on the establishment rate of unmown zoysiagrass plugs is substantiated, since there were no mowing height × cultivar interactions. Although mowing impacts mowing height, this work shows that the relative rankings of the

cultivars is unchanged. This is similar to work in Texas (Hall et al., 1998) illustrating sprigged plots establish more quickly than plugged plots, but that the relative establishment rate of zoysiagrass cultivars is similar among planting method.

References

Hall, M.H., R.H. White, J.E. Gaudreau, W.G. Menn, and G.R. Taylor. 1998. Zoysiagrass cultivar study. Texas Turfgrass Research Report. TURF-97-33.

Patton, A.J., and Z.J. Reicher. 2005. Establishment rate of zoysiagrass cultivars. 2004 Annual Report - Purdue University Turfgrass Science Program.

Table 1. Mowing height and cultivar influence zoysiagrass establishment in West Lafayette, IN.

Cultivar/mowing height (cm)	28 DAP†				56 DAP				92 DAP			
	3.2	6.4	Unmown	Mean	3.2	6.4	Unmown	Mean	3.2	6.4	Unmown	Mean
	----------cm^2----------											
El Toro (*Z. japonica*)	159	162	178	166 a	299	364	433	365 a	1054	998	2227	1426 a
Palisades (*Z. japonica*)	139	167	172	159 a	209	334	388	311 ab	1126	1814	2389	1776 ab
Meyer (*Z. japonica*)	104	128	164	132 b	152	168	268	196 cd	355	591	1185	710 bc
Cavalier (*Z. matrella*)	107	120	131	119 bc	214	270	294	259 bc	730	1060	974	921 cd
Diamond (*Z.matrella*)	102	100	104	102 c	126	160	123	137 d	306	368	402	359 d
Mean	122 b	135 b	150 a		200 b	259 a	301 a		714 b	966 b	1435 a	
					ANOVA							
Source of variation												
Cultivar		***				***				***		
Mowing		**				**				**		
Cultivar × Mowing		NS				NS				NS		

*,**,*** Significant at the 0.05, 0.01, and 0.001 probability levels, respectively.

† Days after plugging (DAP), which was June 7, 2006.