

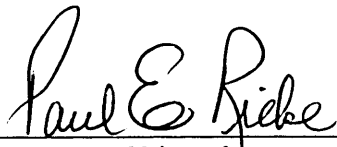
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INVESTIGATIONS ON STATISTICAL ANALYSIS OF TURFGRASS RATING
DATA, LOCALIZED DRY SPOTS OF GREENS, AND NITROGEN
APPLICATION TECHNIQUES FOR TURF

By

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ABSTRACT

INVESTIGATIONS ON STATISTICAL ANALYSIS OF TURFGRASS RATING DATA, LOCALIZED DRY SPOTS OF GREENS, AND NITROGEN APPLICATION TECHNIQUES FOR TURF

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Three separate turfgrass research topics were addressed: 1) statistical analysis of visual rating data, 2) localized dry spots (LDS) on putting greens, and 3) nitrogen fertilization using high pressure water injection cultivation (WIC) on putting green turf. 1) Visual ratings are often used by researchers to assess turfgrass quality. The resultant data are ordinal and often violate assumptions necessary for analysis using ANOVA. Valid analysis of ordinal data is possible with the proportional odds model (POM) and gives the researcher nearly the same amount of information on treatment effects as ANOVA. A Rating Data Analysis File Package was developed that allows researchers to analyze rating data with the POM, without needing to program statistical software. 2) Consistent control of LDS is difficult. The effects of flutolanil (a fungicide), a soil wetting agent, and WIC on LDS control, and the cause of LDS were investigated. All treatments showed some control of LDS in 1998 or 1999, but results were variable. Where characteristic LDS occurred, soil at the center of the dry spot, and at a 1 cm depth, was most non-wettable. Slides buried into the soil (1 cm beneath thatch) at the edges of the dry spots had the greatest amount

of fungal hyphae, consistent with the hypothesis that fungi may be involved in development of LDS. 3) Subsurface nitrogen fertilization has increased nitrogen use efficiency by crops in the food and forage industries. However, the equipment needed for subsurface fertilization in turf was unavailable until the recent development of WIC. Studies were conducted to compare putting green turf responses between surface applications nitrogen and nitrogen injected via WIC to 7.5 and 15 cm. An additional study was conducted to evaluate the effects of several WIC nitrogen application methods on surface uniformity, since nitrogen injection with traditional nozzles sometimes causes unacceptable striping of putting green turf. Subsurface placement of nitrogen increased clipping yields and nitrogen content in leaf tissues in 1997, and improved visual color and general turf quality in 1997 and 1998 compared to surface applications. An application of WIC on turf receiving surface applications of nitrogen did not significantly affect any turf evaluation. Injecting nitrogen with a Toro HydroJect 3000® at a 7.5 cm by 2.5 cm spacing and with the roller washers turned on significantly reduced turf striping following application compared to other nitrogen injection techniques.

To all of the wonderful people at Michigan State University who enriched my
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