



Nitrogen Fertilization of Turfgrass Using High Pressure Water Injection

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Fertilization of turfgrass has traditionally been accomplished through surface applications. Recent research has shown subsurface placement of fertilizer provides beneficial turfgrass responses. Chris Miller discovered in his M.S. research that creeping bentgrass plots receiving subsurface applications of liquid nitrogen via HydroJect had greater growth rates than plots receiving equal rates of nitrogen from surface applications. If similar results can be reproduced, the HydroJect may prove to be a valuable means of fertilization on golf course turf. The objective of this study is to determine the effects of HydroJect injection of nitrogen on a creeping bentgrass (*Agrostis palustris*) putting green and an annual bluegrass (*Poa annua*) fairway.

This study commenced in June, 1994, at the Hancock Turfgrass Research Center at Michigan State University. The fairway study is conducted on a 12-year-old annual bluegrass turf established on a sandy loam soil and the putting green study on a nine-year-old 'Pennncross' creeping bentgrass green growing on a modified loamy sand.

Treatments consist of low, medium and high nitrogen rates (*fairway study--2, 4, & 6 lbs N/1000 ft²/yr; putting green study--2, 5, & 8 lbs N/1000 ft²/yr*), both surface applied and injected with the HydroJect. The nitrogen source used in 1994 was urea and in 1995 ammonium nitrate. No supplemental fertilization has been applied. Subsurface fertilizer applications are made with a HydroJect 3000 provided by the Toro Co. A nitrogen solution is pumped from a holding tank to the intake line of the HydroJect and subsequently injected into the soil. Surface applications are made using a CO₂ powered sprayer designed for treating small plots. Irrigation is applied to plots receiving surface applications immediately following treatment.

Data from 1994 show a significant difference in turfgrass response between plots receiving surface applications of nitrogen and plots receiving subsurface injection. Plots injected with nitrogen yielded greater amounts of clippings throughout the growing season and contained a higher percentage of nitrogen in the plant tissue. Significantly less wilt was observed on plots receiving subsurface injection of nitrogen than plots receiving surface applications during periods of drought stress. Plots injected with nitrogen had better color and less dry spot, but had a striped appearance due to the injection pattern of the HydroJect resulting in no overall difference in turfgrass quality between treatments.