Constructing Soil Moisture Spatial Variability Maps of Golf Course Fairways

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Excessive soil salinity can decrease plant available water resulting in poor turfgrass growth conditions. The purpose of this project is to determine if time domain reflectometry (TDR) instruments can effectively measure spatial variability of soil salinity on golf fairways in relation to the position of in-ground irrigation heads. A variety of par 4 and par 5 fairways on 18-hole golf courses were measured across Lubbock Texas from August to October. The number of TDR readings per fairway varied from 100 to 200 depending on the size of the fairway. Soil samples were taken every 10th measurement and sent to the lab to measure the accuracy of salinity readings recorded by the TDR 350. Then every sprinkler head was marked for each fairway and a spatial variability map was created. Bulk EC from the TDR 350 did not correlate to lab EC measurements from soil samples; however, it was highly correlated with volumetric water content. The hypothesis was not supported in this experiment. Soil moisture variability maps were developed versus bulk EC due to the lack of correlation to lab-based EC determination. Using this information, golf superintendents can use the data to apply irrigation to improve consistency within and across fairways. On average, American golf courses use 104,683 gallons of water per day to water their fairways and greens. Using excessive amounts of water in a world with a small percent of freshwater can result in water scarcity. By discovering and implementing tools to discover salinity levels in the soil we can help lower the amount of water used daily on golf courses and improve the quality of the turfgrass.

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