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Water Reuse for Turfgrass Irrigation

Greg Evanylo, Erik Ervin, Xunzhong Zhang, and Beshr Sukkariyah

Abstract Text:

Irrigating turfgrass grown on coarse-textured, permeable soils with reclaimed water must ensure that application rates do not result in groundwater enrichment of nitrogen and phosphorus. The purpose of this study was 1) to investigate the effects of irrigating with reclaimed water containing high concentrations of soluble salts on turfgrass growth and quality and 2) to compare the effects of reclaimed and potable water irrigation on N and P uptake by turfgrass and leaching. A sand-based medium meeting United States Golf Association standards plumbed to supply Norfolk city potable water and reclaimed water to hybrid bermudagrass (Cynodon dactylon x Cynodon transvaalensis var. Tifsport) and creeping bentgrass (Agrostis stolonifera var L-93) was instrumented with lysimeters to collect N and P in leachate that percolated through the sand medium. The experimental design was a 2x2 factorial, completely randomized block consisting of two water (potable and reclaimed) and two turfgrass (bermudagrass and bentgrass) treatments. The bentgrass and bermudagrass both produced high quality turfgrass with the reclaimed water; however, the bermudagrass growth and quality appeared to be reduced by the high salt-containing reclaimed water upon breaking dormancy, and its N use during this period was also reduced. The bentgrass responded positively to the reclaimed water except during the initial establishment of the turfgrass, when the extra N favored shoot over root growth. Continuous use of reclaimed water of the quality used in the study appears to pose a long-term soil Na accumulation problem. Both turfgrasses demonstrated the capability to assimilate high amounts of N and P with minimal potential losses to groundwater. Routine irrigation with the HRSD VIP reclaimed water should not result in N and P impairment of ground or connecting surface water, but we recommend additional soluble salt removal for long-term unrestricted use.

Impact Statement:

The project resulted in the development of an agronomically and environmentally sound new regulation for water reuse in Virginia. The promotion of water reuse via this research/demonstration project, educational materials, and the regulation will conserve potable water for human consumption while increasing the amount of reclaimed water to be used for irrigation.