

再生水对园林升降式喷头水力性能的影响 Hydraulic Performance of Pop-up Sprinklers with Reclaimed Sewage Effluent

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摘要: 选取园林喷灌中常用的3种升降式旋转喷头: DPX-HP型喷头、具有记忆功能的DPX-TS型喷头和托罗V-1550型喷头, 分别在地下水和再生水条件下运行447 h, 测定运行前、后的流量-压力关系、喷头水量分布和转动均匀性, 并利用单喷头水量分布资料模拟计算组合喷灌均匀系数, 以评价再生水对升降式喷头水力性能的影响。结果表明, 再生水运行447 h后喷头流量降低3.4%~4.7%、射程降低2.7%~9.0%, 而地下水分别降低了0.03%~0.09%和2.5%~3.9%, 再生水降幅明显大于地下水。再生水运行使喷头各象限转动时间的最大偏差率增加4.2%~4.4%, 水质变化对喷头转动均匀性影响不明显。再生水运行不会对喷头的均匀系数产生明显影响, 能够满足高灌水均匀度的要求。 Water distribution, discharge-pressure relation and rotation nonuniformity of pop-up sprinklers during application of reclaimed sewage effluent and groundwater were tested to investigate the effects of water quality on sprinkler performance. The overlapped sprinkler uniformity coefficients were also determined from the radial water distribution of an individual sprinkler. Three types of pop-up sprinklers, DPX-HP sprinkler, DPX-TS sprinkler (recordable angle adjusting) and Toro V-1550 sprinkler, were used and sprinkler performance were measured after the operation of 447 h for both sewage effluent and groundwater application. A significant influence of water quality on sprinkler performance was found. Sewage effluent application resulted in 3.4%~4.7% and 2.7%~9.0% reduction in sprinkler discharge and coverage radius, respectively; while sprinklers applying groundwater produced a 0.03%~0.09% reduction in discharge and a 2.5%~3.9% reduction in radius. Sprinkler rotation nonuniformity, represented by a maximum rotation deviation, increased after a continuously operation of 447 h, but no significant influence of water quality on the rotation nonuniformity was observed. The influence of water quality on Christiansen uniformity coefficient (CU) was also insignificant.

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