

Assessment of Alternative Water Resources and Growing Media in Green Roofs

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Abstract : Grey infrastructure is an unavoidable part of urbanisation that is threatening the local microclimates. Sustainable urbanisation requires more green infrastructure in cities such as green roofs to minimise urbanisation impacts. The environmental, social and economic benefits of green roofs are widely deliberated. However, there is still a lack of assessment of the water management for green roofs. This paper aimed to assess the irrigation management of green roofs in a semi-arid region where blue water scarcity is one of the primary challenges in urban water management. To determine the appropriate water source and growing media for green roofs, an experiment was established at the University of South Australia, Australia. This study compared the performance of two growing media and three water sources on the drainage quality, medium weight and survival rate of potted Tussock grass (*Poa labillardieri*), an endemic plant to Australia and recommended for green roofs. Three irrigation sources were tap water, mixed of wastewater-stormwater, and rainwater. The growing media were natural sandy loam soil and Scoria - one of the most used commercial growing media for green roofs. The drainage quality of these media was tested by analysing leachate samples. Medium weight was measured before and after watering, and all pots were monitored for their survival rates. Results showed that although plant growing development was significantly higher in Scoria, the survival rate was lower. For all three water sources, EC and pH of the leachate were significantly lower from Scoria than the sandy loam soil. However, the mixed of wastewater-stormwater had the highest EC, and rainwater had the lowest EC. Results did not present a significant difference between pH of different water resources in the same media. Our experimental results found the scoria and rainwater as the best sources of medium and water for green roofs.

Keywords : green smart cities, urban water, green roofs, green walls, wastewater, stormwater

Conference Title : ICWSUDUE 2018 : International Conference on Water Sensitive Urban Design in Urban Engineering

Conference Location : London, United Kingdom

Conference Dates : July 26-27, 2018