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Wild Grass Types as Green Roofing Materials for Urban Landscapes in a Tropical Climate

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Abstract

Urban cities, especially in tropical context emphasis on alternative green covers namely green roofs in order to mitigate Urban Heat Island Effect. Grass is a widespread green roofing material, predominantly for extensive green roofs. This study was aimed (a) to explore the growth performance of selected wild grass types under different irrigation conditions and (b) to select the most suitable wild grass type for green roofs under minimum irrigation in tropics. Five wild grass types (belongs to Genus *Digitaria*, Genus *Chrysopogon*, Genus *Cynodon*, Genus *Panicum* and Genus *Isachene*) were selected and they were tested with *Bouteloua dactyloides* (Buffalo grass) as the control on reinforced concrete slab models. Performances of the grasses were evaluated under two irrigation schedules; irrigation once in five days (I1) and irrigation once in 10 days (I2). Tested parameters were vertical growth, horizontal growth, plant survival percentage, Leaf Area Index (LAI), root density, leaf density, grass density and ranking procedure for visual appearance. Results of this study indicated that under both irrigation schedules, *Digitaria* spp. showed the highest performances (After six weeks of treatments, for I1 and I2; vertical growth: 6.2 cm and 6.0 cm, horizontal growth: 17.6 cm and 16.1 cm, plant survival percentage: 99.1% and 97.8%, LAI: 0.64 and 0.58, root density: 0.0017 g/cm³ and 0.0014 g/cm³, leaf density: 0.0013 g/cm³ and 0.0012 g/cm³, grass density: 0.0043 g/cm³ and 0.0042 g/cm³, respectively) and *Panicum* spp. showed the lowest performances (After six weeks of treatments, for I1 and I2; vertical growth: 15.11 cm and 14.8 cm, horizontal growth: 7.2 cm and 6.5 cm, plant survival percentage: 96% and 92.5%, LAI: 0.47 and 0.43, root density: 0.0013 g/cm³ and 0.0012 g/cm³, leaf density: 0.0011 g/cm³ and 0.0009 g/cm³, grass density: 0.003 g/cm³ and 0.0025 g/cm³, respectively) compared to *Bouteloua dactyloides* while *Chrysopogon* spp. showed better growth performances next to *Digitaria* spp. Though *Isachene* spp. showed better ground coverage compared with *Digitaria* spp., it showed less plant survival percentage. Therefore, *Isachene* spp. is not suitable as a green roofing material in tropical context. *Digitaria* spp. is the best wild grass spp. from the selected wild grasses which gave high tolerance for water scarcity in tropical context under tested irrigation schedules. Further researches should be carried out beyond three months for further evaluation of growth performances of the selected grass spp.

Keywords: Green roofing materials, Tropical context, Wild grasses