Assessment of the Plant Growth Performances of Vertical Green Walls Developed with Different Plant Types in a Tropical Climate

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Planting on roofs and walls seems to be a modern and swiftly developing strategy towards sustainable environmental constructions. Covering building with vegetation enhance the city environment in terms of contributing to urban biodiversity, growing thermal comfort by buffering building temperature and mitigation of the Urban Heat Island (UHI). The study observed the significance of urban vegetation cover with the objectives of selecting suitable plant types for selected medium on vertical green wall panel by investigating the different plant physiological parameters. Fabrications of green wall panels were done in the premises of Department of Civil Engineering, University of Moratuwa by using timber frames (60 x 30cm) filled with coir dust growing medium for 2.5 cm thickness and fixed with wire mesh. Few holes at the bottom of the panel was prepared to facilitate water drainage. Each panel was irrigated three times per week with 0.5 liter of water per each panel. Nutrient solution prepared by dissolving 0.5 g of Albert's mixture in 500 ml of water for each panel and applied two times per week. Experimental design was Completely Randomized Design (CRD) with 3 replicates from each plant species. The nine plant species (treatments) were placed in green wall panel. Each panel (replicates) held eight plants of each species. *Desmodium triflorum, Roheo spathacea, Centella asiatica, Axonopus fissifoliu, Axonopus compressus, Elusine indica, Dieffenbachiae spp, Tectaria spp, Bigonia spp* were the selected plant species for the study. Plant health was rated for all plants using a 3 point scale. 1 = thriving, 2 = alive, but with signs of pest, disease or other stresses, 3 = dead. Plant height and leaf area were measured along with visual assessments of plant development stages and pest/disease incidence. *Roheo spathacea, Elusine indica, Axonopus fissifolius* displayed the greatest survival (100%) and coverage on an extensive green wall. Increment of Leaf Area Index of nine species over the eight weeks was significantly different ($P < 0.05$) among each species. Highest LAI obtained from *Roheo spathacea* (3.99) followed by *Axonopus compressus* (0.99), *Elusine indica* (0.76), *Axonopus fissifolius* (0.44),) over the trial period. In terms of actual performance, *Roheo spathacea, Elusine indica, Axonopus fissifolius* displayed the greatest survival and coverage on an extensive green wall.

Keywords: LAI, Mean temperature difference, Plant physiological parameters, UHI, Vertical green wall