Evaluation of Developed Ancillary Drip Irrigation Lines for Experimental Modular Sloping Green Roof in Urban Environment

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Abstract
Accelerating worldwide population and speedy urbanization are significant contributors to the rapidly deteriorating natural green vegetation. Green roofs have been employed as a sustainable resolution that can perform as a strategy to reinstate the endangered green infrastructure in urban city resilient programs. Roofing is a vital component of a building construction that can be utilized to incorporate green space and it successively generates a natural environment on a man-made structure. Green roofing can be considered as nature based creation that has several benefits such as economic, ecological and societal levels. This research aimed to a) appraise the *Centella asiatica* leafy vegetable succession on the roof module and b) assess the gap distance between the drip irrigation lines connected at the upper section and the succeeding neighbouring irrigation line on the sloping green roof to efficiently nourish the entire vegetated cover. Appropriately designed roof covering tiles which are having dimensions of 500mm × 1000mm ×25mm have been utilized to formulate vegetative green roof tile system. Entire vegetated tiles cover a space of $5m^2$ on 28^0 inclined roof. Single drip irrigation line installed at the top of the roof was used to water the plants. Chlorophyll content, leaf area and number of leaves per area as plant growth and development parameters were measured once in a two weeks. In addition, growth media moisture contents were investigated by taking soil samples at 30cm intervals along the length of the vegetated area, after irrigating known amount of water from the top. It revealed that plant growth analysis justified that nurturing entire sloping green roof area with a single drip line was not effective and it stimulates to apply succeeding next watering line to augment plant growth up to their optimum level. Experimental results revealed that the next adjacent irrigation line is 3m away from top irrigation line. It can be concluded that a single drip irrigation line on this sloping green roof only can irrigate a length of 3m effectively.

Keywords: *Centella asiatica*, Drip irrigation, Green roof
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