Study of water infiltration in a lightweight green roof substrate

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Green roofs have a positive impact on the environment (e.g. improving microclimate and air quality in cities, reducing solar absorbance and storm water).

A laboratory infiltration experiment was conducted on the narrow flume serving as 2D vertical model of a green roof. The lightweight Optigreen substrate Type M was used (depth of 20 cm). The front wall of the flume was transparent and inspected by digital camera. The experiment was designed to measure pressure head, volumetric water content and calculate water retention in the substrate. Experiment comprised three artificial rainfall intensities with different values of initial water content of the substrate.

The experimental results confirmed that green roofs have the ability to retain rainwater and thus have a beneficial effect on reducing runoff. In the experiment with the artificial 10 minutes rainfall event (total precipitation of 29 mm), the air dry substrate retained 95.9 % of precipitation. On the other hand for moist initial condition 4.2 % of precipitations amount was captured in the substrate. Additionally, the analysis of images taken during the experiment confirmed preferential flow and uneven advancement of the wetting front.

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