MAKE THE CITY GREEN AGAIN - THE USE OF GREY WATER IN URBAN VERTICAL GARDENS

[1]MARTIN VOJÍK, [2]MARTINA KADLECOVÁ, [3]KATEŘINA BERCHOVÁ BÍMOVÁ

[1,2,3]Faculty of Environmental Sciences, Dept. of Applied Ecology, Czech University of Life Sciences Prague, Kamýcká 129, Praha – Suchdol, 165 00, Czech Republic
[1]Nature Conservation Agency of the Czech Republic, Kaplanova 1, CZ-140 00 Praha 4, Czech Republic
E-mail: [1]vojik@fzp.czu.cz, [2]martinakadlecova@fzp.czu.cz, [3]berchova@fzp.czu.cz

Abstract –

In the last decades, there has been an increasing use of vertical gardens and living green walls, especially in the urban environments. Vertical gardens are used in the urban planning primarily to mitigate the impact of the urban heat and dry island phenomena (UHI, UDI) which are typical for the urban environments. When planning a vertical garden, it is therefore necessary to select suitable species of vascular plants that will tolerate such extreme conditions and provide an aesthetic value at the same time. Last but not least, it is important to ensure an efficient water regime, in which recycled water from public buildings on which vertical gardens are usually constructed could be used, combined with a suitable substrate (light and absorbent).

In our experiment, the viability of 7 species of vascular plants was tested (Allium schoenoprasum, Deschampsiacaespitosa, Festucaovina, Hedera helix, Heucheraamericana, Hylotelephium maximum, Vinca minor). Plants were planted in ceramic substrate with 4% biochar content; control plants were planted without biochar. The second experimental treatment consisted of watering the plants with disinfected grey water – the plants were watered in a substrate with and without 4% biochar; the control was watered with tap water. The experiment was designed in randomized blocks and the individual treatments were applied in a factorial design. Plant growth was monitored by regular measurement of the following parameters: number of leaves, length of the aboveground part and number of shoots.

Based on the preliminary results of the study we were able to identify plant species that are completely unsuitable for planting in vertical gardens (e.g. A. schoenoprasum), species that are suitable(e.g. H. americana),and species that thrive in such conditions (graminoids). Furthermore, it was found that none of the treatments tested have any significant negative effect on the viability of the plants and therefore the disinfected grey water regime along with the use of biochar can be applied in vertical plantings. Despite the fact that a positive effect of biochar on substrate properties was not proved, this effect cannot be ruled out when used in higher concentrations.

Due to the ongoing climate change, which exacerbates drought and irrigation issues, especially in the urban environments, it is essential to look for new technologies and practices that will help secure sustainability of the city's water regime – using recycled grey water and biochar seems to be an effective way to make cities greener.