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Green facades flourish with greywater

Using alternative water sources to green our cities

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Background

Green facades use climbing plants such as vines to cover building walls and provide cooling¹. To effectively cool cities and buildings, green facade plants need to have good leaf coverage and/or high rates of evapotranspiration² and these traits are influenced by water availability¹. Greywater has been increasingly used as an alternative water source in urban areas to reduce potable water demand and alleviate pressure on sewerage systems³. Greywater has the potential to increase the applicability and sustainability of green facades but has not yet been widely used to support climbing plant growth and survival. This is in part due to concerns that greywater irrigation can adversely affect plant growth by causing salt accumulation in the growing media⁴.

Aims

This PhD research project investigated whether greywater irrigation affects plant growth, and how greywater might

be used as an alternative water supply to reduce the volume of potable (drinking) water needed to irrigate green facade (climbing) plants.

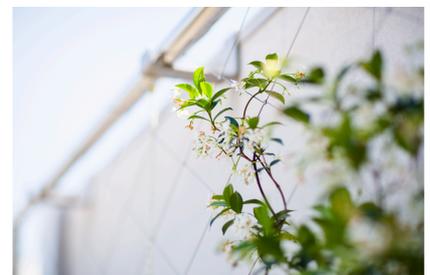
Approach

Six climbing species were studied in glasshouses over 18 weeks: *Akebia quinata*, *Gelsemium sepervirens*, *Jasminum azoricum*, *Trachelospermum jasminoides*, *Pandorea pandorana*, and *Vitis* 'Ganzin Glory'. Plants were subjected to one of three irrigation treatments: (1) potable water irrigation; (2) greywater irrigation; and (3) greywater irrigation with a potable water 'flushing' once every three weeks. Synthetic greywater used in the study was formulated to match office building and household bathroom wastewater⁵.

Plants in all treatments were harvested at the end of experiment (18 weeks), and plants were separated into leaves, stems and roots. Measurements were made of leaf area, water use and evapotranspiration.

Findings

- Greywater did not significantly reduce the growth (biomass, leaf area and shoot root allocation) of the six climbing plant species.
- *Vitis* 'Ganzin Glory' developed the greatest leaf area with alternating irrigation compared to the other plant species and irrigation treatments.
- Plant water use (total water use and water use per leaf area) did not differ among three irrigation treatments.



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Research impact

As urbanisation increases, urban planners are looking to maximise the use of buildings for functional purposes. This study reinforces the potential of greywater from domestic and commercial buildings as an alternative irrigation source for green facade plants. Greywater reuse for green facade irrigation could reduce the demand on potable (drinking) water, which also is considered as an effective means to improve the sustainability of horticulture. This study provides further support for the expansion of green facades in urban areas as a climate, energy and water sensitive strategy.

References

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Climbing species were tested in controlled glasshouse experiments to determine their response to greywater irrigation.



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