

Optimising Ivy Management for Domestic Façade Greening

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Introduction

Climbing plants such as *Hedera* species (common ivy), when used for façade greening around buildings, can act to insulate the buildings against weather extremes thus reducing the need for winter heating and summer cooling. Their use around houses however, is anecdotally associated with potential damage to house walls and difficulty controlling ivy's aerial roots, which deters many homeowners from using ivy.

The project aims to overcome some of the reticence to structural greening by developing lower maintenance façade greening options.

Benefits of façade greening

Greening buildings significantly reduces energy losses and requirements. Ivy cladding provides a significant benefit to thermal insulation of a building (Figure 1), decreasing the U value of the walls by 10-33% (Perini *et al.* 2011) and can soften the lines of structures.

Vegetation reduces the rain flow to the ground, thus intercepting the ground water speeds and easing the issues of peak rain water events. It can intercept rain and protect the outer layer of old buildings from moisture and exposure damage (Viles *et al.* 2010).

Façade greening can also provide a useful habitat for biodiversity (Figures 2 & 3), thus increasing the level of biodiversity in the urban environment. Over 70 species of insect use the ivy flowers and 16 species of bird feed on the berries (Metcalf 2005).

Finally, greening areas significantly increases mental well being and is a worthwhile investment of time and money (Kuo & Sullivan 2011).

Barriers to façade greening

Façade greening requires maintenance, whether it is a self supporting plant or one that runs up trellises or cables. If left unchecked, green façades can be seen as a sign of dilapidation, or disuse as happened with this house after ten years (Figure 4).

In the case of ivy, the plant needs to be annually pruned to prevent damage to gutters and windows. The brickwork can be damaged when the aerial rootlets secrete a glue-like substance to enable the plant to self support while climbing. Once removed, the residue often remains and may require extensive scrubbing to remove. If the exterior is painted, the ivy may remove patches of paint on removal and can dislodge exterior cladding if there is a gap underneath (Viles *et al.* 2010).

When mortar used in the brickwork is lime based the ivy is able to develop "true" roots in the brickwork, which may crack and damage the building structure (Viles *et al.* 2010). Buildings built before 1930 typically used lime based mortars so may not be suitable for ivy cladding.

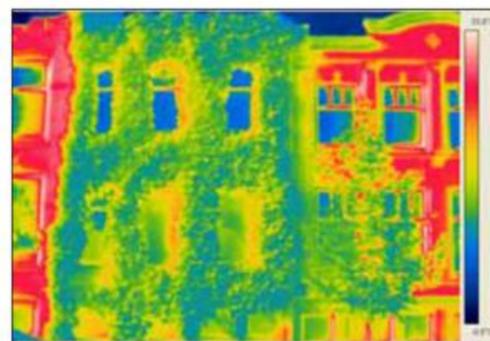


Figure 1. Photo of a façade covered by Boston ivy (*Parthenocissus*) rooted in the soil and applied directly against the façade taken with infrared camera (Delft, The Netherlands, summer 2009, 12 p.m., air temperature 21°C) from (Ottele 2011)

Green façades provide habitats for species that may be considered pests, including rodents, gastropods and insects. To manage these, traps could be used round the building. All parts of ivy are toxic, so care should be taken to prevent it being eaten by children or pets. Gloves should be worn when handling ivy, as ivy can cause sensitisation leading to dermatitis and ulceration (Ozdemir *et al.* 2003).

Project Aims

The main aim of the project is to develop a management system for ivy to increase its use as a form of domestic exterior cladding, by creating inhibitory mechanisms to prevent adhesion of aerial roots and/or vegetative growth of ivy.

There will be three areas of investigation:

- 1. Physical properties** of ivy will be measured; understanding the distances ivy can climb without adhesion and the height it grows to before converting to its mature form are important for implementing design and building material specifications.
- Differences between **building materials** in resistance to ivy adhesion will be established. Ivy is unable to adhere to several materials such as glass, ceramics and steel (Melzher *et al.* 2009) so the cost of using these materials around sensitive areas such as guttering and whether the ivy could adhere underneath panels of these materials would be considered.
- 3. Horticultural techniques** to control ivy growth and root proliferation such as chemical and mechanical root restriction, pruning and trellising will be investigated.

Finally, a section of the project will investigate possible alternatives to ivy.

Ultimately, the aim is to provide building practitioners and home owners with successful solutions for façade greening.



Figure 2. Blackbird on ivy (BWI-BLWS202479) © F.Hecker



Figure 3. Holly blue on ivy (ukbutterflies.co.uk Photo © Wurzel)



Figure 4. Ivy covered house (Express and Star, 2012).

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