



The  
University  
Of  
Sheffield.

Research &  
Innovation  
Services.

## KTA Collaborative R&D Case Study

### Developing novel, green roof substrates

#### **Project Partners**

Department of Animal and Plant  
Sciences, University of Sheffield  
Dr Duncan Cameron, Royal Society  
University Research Fellow & Dr Gareth  
Phoenix, Senior Lecturer

Boningale Ltd  
[www.boningale.co.uk](http://www.boningale.co.uk)

#### **Overview**

Green roofs help mitigate the effects of climate change in urban habitats. They improve air quality, contribute to water and energy management, increase

biodiversity, provide effective sound insulation, and protect against electro-smog. Included in the roof's construction is a layer of substrate for the plants to grow in and its composition is crucial for success.

Although the use of green roofs in the UK is increasing, available substrates tend to be based on standard mixes that are not designed for particular requirements or locations; very little scientific research has been done on green roof substrate composition.

This Collaborative R&D funding has enabled the team to partner with leading supplier Boningale Ltd to create a new range of scientifically engineered bespoke green roof substrates, optimised for specific climatic zones.



## Activities

Applying the key criteria of water loss, biodiversity and aesthetics, the researchers identified the different functional types of green roof. Together with an analysis of the UK's climatic zones, this enabled them to classify the specific properties that are required from a substrate to achieve the desired type of green roof in a given location. A fully factorial experiment then explored the effects of the composition of the inorganic and organic fractions on plant growth and water holding capacity. Novel chemical amendments were used to aid water and nutrient retention and the testing identified which substrate recipes were most suitable.

## Outcomes

Findings from the project's pioneering integrated approach will significantly contribute to the development of green roof technology. Products tailored for regional climate and roof type will make substrate selection and specification more straightforward for customers, commercial specifiers and architects.

## Next steps

After further testing, research into manufacturing solutions and identification of market opportunities, the product range of green roof substrates will be made commercially available.

Work on the project has strengthened the partnership with Boningale: further collaboration has led to a co-funded PhD studentship via the University's EPSRC E-futures Doctoral Training Centre for Interdisciplinary Energy Research, which is investigating low-carbon green roofs.

**Maggie Fennell, Green Roof Project Manager at Boningale, said: "This project is exciting for Boningale because it will provide reliable, scientific answers to questions that are very important to green roof designers and clients. It will enable us to establish our reputation as a leader by guiding the industry towards green roofs with much higher environmental performance, putting the expertise at the University into the hands of practitioners."**

## Contact us

---

T: 0114 2221331

---

E: [KTAenquiries@sheffield.ac.uk](mailto:KTAenquiries@sheffield.ac.uk)

---

KTA website: [www.sheffield.ac.uk/ris/cta](http://www.sheffield.ac.uk/ris/cta)

---

EPSRC website: [www.epsrc.ac.uk](http://www.epsrc.ac.uk)

---

Twitter: [www.twitter.com/ResearchatSheff](https://www.twitter.com/ResearchatSheff)

---

Films: [www.researchatsheffield.co.uk](http://www.researchatsheffield.co.uk)

---

**EPSRC**

Engineering and Physical Sciences  
Research Council