Maximising the environmental benefits of gardens through optimal planting choices and understanding of occupants' engagement

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What we plant and how we manage our gardens can have a significant environmental impact. Domestic gardens cover 15-25% of area in most UK towns and cities, and recent research[1,2] links garden plant characteristics with provision of ecosystem services. Using plants with these environmental benefits in gardens would reduce risks posed by extreme weather and pollution while increasing the sustainability of urban spaces. Unfortunately, Royal Horticultural Society research shows a decline in garden vegetative cover, with gardens instead being paved over. New evidence and clear advice to gardeners is needed to reverse the decline in ecosystem service provision by domestic gardens[3].

In this project, the student will study contrasting garden plant communities in controlled experimental conditions to describe the environmental benefits they provide. Plants will be grown as single species monocultures and as mixtures, and their ability to reduce air and soil temperature, reduce rainwater run-off and remove particulate air pollutants will be investigated and compared to non-vegetated areas. Detailed work will focus on assessing how plant traits determine performance and how they interact with planting combinations. Clearly, as all planting decisions in a domestic garden are taken by or at the behest of the owner, this project will research the attitude of homeowners/landlords towards investigated planting strategies. A key element will be understanding how homeowners can be 'nudged' towards making decisions that support social and ecological benefits in their neighbourhood.

Training: The project features close collaboration between academia and the RHS - UK's largest gardening charity. Thus, alongside scientific discovery, one of the main outcomes of the project will be advice to RHS membership on simple and practical solutions which would encourage homeowners to develop their garden space to maximise environmental gains. Alongside development of skills in a range of field and laboratory assessments, the student will have opportunities to engage in media training, science writing for non-scientific audiences, and a 3-month secondment with the RHS.

Student Profile: This PhD would suit a student with a background in environmental science, plant science, horticulture or forestry. Students with knowledge of soil science, botany or plant community ecology would be particularly well placed. The skills required are likely to be broad, and the exact nature of skills which the student may already have could guide the direction in which they take the PhD.

References: [1] Blanuša et al. 2019 (doi.org/10.1016/j.ufug.2019.126391); [2] Vaz Monteiro et al. 2017 (doi.org/10.1016/j.enbuild.2017.02.011); [3] Cameron and Blanuša 2016 (doi.org/10.1093/aob/mcw129)