



Agriculture & Horticulture
DEVELOPMENT BOARD



New Project

CP 095

Sustainable resource use in horticulture: a systems approach to delivering high quality plants grown in sustainable substrates, with efficient water use, and novel nutrient sources

Project Number:	CP 095
Project Title:	Sustainable resource use in horticulture: a systems approach to delivering high quality plants grown in sustainable substrates, with efficient water use, and novel nutrient sources
Project Leader:	Dr Paul Alexander
Contractor:	Royal Horticultural Society
Start Date:	01 July 2012
End Date:	30 June 2017
Project Cost:	£187,725

Summary and Background

Sustainable use of resources within horticulture impacts upon both professional horticulturists and amateur gardeners. In particular, provision of sustainable growing media, availability of water, and development of novel nutrient sources will become increasingly important over the coming years for both financial and environmental reasons. It is critical that the interactions between these elements are investigated and that their impact on plant performance is understood.

Whilst research into certain aspects of the substrate, water and nutrient matrix has already been done and is underway, there is an urgent need to draw these threads together and ensure that findings are relevant to the complex interactions of the whole soil-plant system. For example, it is highly likely that some of the potential novel nutrient sources will behave quite differently depending upon the substrate being used. This may open up opportunities for some nutrient sources that have previously been disregarded. Also, combinations of mineral and organic materials might deliver a higher and more standardised nutrient value than either material alone. This application of resource complementarity could deliver a novel fertiliser technology that is both practical and cost effective.

It is therefore proposed that this Fellowship adopts a systems approach to examining these issues within a horticultural context with the following three specific research objectives.

- To investigate biological, chemical and hydrological interactions between substrate materials (including soil, peat and peat-free based substrates and mixes of these materials), nutrient sources, and plant performance (across different horticultural sectors).
- To investigate novel nutrient sources including organic sources (e.g. grey waters), inorganic materials (e.g. rock phosphates), and materials from waste streams (e.g. struvite). In addition to plant performance, consideration will be given to political, economic, and logistical implications of horticultural use of such materials.
- To investigate efficient use and re-use of both water and nutrients i.e. matching plant needs to water and nutrients applied.

(i) Vulnerability of the field of study

Career opportunities to enter the field of horticulture and, more specifically, soils and growing media research, are diminishing. Reading University's decision to suspend its Horticulture degree is just one recent development highlighting how serious the situation is becoming.

However, it is not just the provision of a sound academic foundation in horticulture that is lacking. A worrying trend in the biological sciences over recent years, probably driven by the priorities of government R&D funders, has been a shift towards basic science and molecular or genomic approaches. Applied bioscience and whole organism studies have not been regarded as high priorities for R&D funding.

Perhaps as a consequence, there is a dearth of individuals in the early stages of their career with an interest in applied R&D and a strong grasp of the practical realities of the horticultural sector. It is therefore unclear where the pipeline of new talent exists to enable succession planning at research organisations in the UK.

Alongside the dissipation in horticultural science training that has occurred in recent years, there has been well-documented contraction in relevant R&D infrastructure. There is therefore also an urgent need for remaining centres of horticultural science excellence to build effective collaborative networks.

(ii) A brief description of the fellowship and outputs.

The Fellowship aims to mentor a post-doctoral Horticultural Scientist, giving them a firm grounding in both amateur gardening and commercial horticulture via an intensive programme of training and research objectives. In doing so, the Fellowship will develop an individual with the applied science and communication skills that the horticulture sector will need in the future. It is anticipated that satellite projects will be identified to add value to this Fellowship and enable the development of further individuals with relevant horticultural science skills.

Through a programme of robust, high quality experimental science focused on improving sustainable plant production, with results being widely disseminated to amateur gardeners, professional horticulturists and the wider scientific community, the Fellowship will advance our understanding of sustainable growing media, novel nutrient sources and water relations.

An important aspect of this Fellowship is the facilitation of scientific collaboration by bringing together expertise at the RHS, Reading University and East Malling Research. Whilst this proposal includes recruitment of a postdoctoral scientist employed by the RHS, it is anticipated that they would spend a significant proportion of their time at Reading University and East Malling Research as well at RHS Garden Wisley.

Aims

1. To bring a new scientist into horticulture, enable them to gain an in depth insight into the horticulture sector, and provide a robust training in applied horticultural science and knowledge transfer.
2. To undertake an innovative programme of R&D and knowledge transfer to improve the sustainability of the horticultural sector (both amateur and professional).
3. To greatly strengthen the existing collaborative partnership between the RHS, Reading University and East Malling Research for the benefit of the horticultural sector.

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