



Agriculture & Horticulture
DEVELOPMENT BOARD



New Project

CP 81

HDC Studentship: Detection and amelioration of rootzone ethylene production in protected crops

Project Number: CP 81

Title: Detection and amelioration of rootzone ethylene production in protected crops

Start and end dates: 1st October 2011 to 31st December 2014

Project Leader: Dr Ian Dodd, Lancaster University

Industry Representative: Sarah Fairhurst

Location: Main site: Lancaster Environment Centre, Lancaster University, LA1 4YQ
Additional sites Myerscough College, Bilsborrow, Preston, PR3 0RY

HDC Cost: £66,150 (plus up to £2,000 p.a. available for expenses)

SUBJECT TO CONTRACT

Project Summary:

To avoid crop losses associated with under-watering, growers may routinely overwater. This not only represents a system inefficiency (which is difficult to justify if irrigation supplies are limiting) but can decrease crop growth/quality since inadequate substrate aeration stimulates root production of the plant hormone ethylene. Ethylene limits vegetative growth, stimulates leaf senescence and causes flower/fruit abscission. Reasonably porous growing substrates may overcome this problem, but the lack of a technique to measure rootzone ethylene production prevents identification of suboptimal growing conditions. Recent technological advances now permit on-line rootzone ethylene measurement to quantify ethylene fluctuations in response to soil moisture dynamics. Thus the success (or otherwise) of management techniques (eg. automatic irrigation scheduling, rhizobacterial treatments) to limit ethylene production can be assessed. By engaging with new technologies that can be applied in a range of industries, this project provides a unique training opportunity for a potential career in horticulture.

Aims & Objectives:

(i) Project aim(s):

To assess the impact of standard cultural conditions used in protected cropping on rootzone ethylene production, thus indentifying suitable management techniques (refinement of substrate, substrate moisture management, chemical and biological interventions) to minimise deleterious impacts of ethylene on crop growth and quality.

(ii) Project objective(s):

1. Quantify crop growth limitations imposed by inadequate substrate aeration in diverse horticultural substrates (rockwool, organic composts)
2. Continuously monitor rootzone ethylene production and substrate moisture content under realistic irrigation regimes
3. Evaluate the impacts of automatic irrigation scheduling at different soil moisture thresholds (using off-the-shelf soil moisture sensors) on crop growth and quality
4. Determine whether rootzone treatments with newly available ethylene antagonists (1-MCP) or plant growth promoting rhizobacteria (that degrade the ethylene precursor) can overcome limitations to crop growth and quality caused by inadequate soil aeration
5. To transfer appropriate technology to the industry through grower information days and publication through HDC and in international plant science/horticulture journals

Further information

Email the HDC office (hdc@hdc.ahdb.org.uk), quoting your HDC number, alternatively contact the HDC at the address below:

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