



Agriculture & Horticulture
DEVELOPMENT BOARD



New Project

CP 60a

Combined thermal and visual image analysis for crop scanning and crop disease monitoring (HDC Studentship)

Project Number: CP 60a

Project Title: Combined thermal and visual image analysis for crop scanning and crop disease monitoring (HDC Studentship)

Project Leader: Dr Nasir Rajpoot,

Contractor: The University of Warwick,

Industry Representative: Alan Davis, Protected Ornamentals Panel Chairman

Start Date: 14th March 2011

End Date: 31st March 2014

Project Cost: £ 64,650.00 (Plus up to £2,000 p.a. for each year of the project to cover additional expenses associated with industry liaison)

Project Summary:

HDC studentship CP 60 on Thermal Imaging for Glasshouse Crops was commenced in summer 2008 under the supervision of Rodney Edmondson and Professor Roland Wilson (succeeded by Dr Nasir Rajpoot). A well qualified student was appointed in March 2009 but unfortunately left without warning during the first year of the project. Consequently, the studentship was terminated in early 2010.

The proposed new studentship is intended to build-on and complete the program of work started in CP60. Models will be developed for detecting temperature differences in commercial crops, especially glasshouse pot and ornamental crops, with the aim of providing early warning of crop disease or crop stress. Any physiological mechanism that affects plant transpiration will affect plant temperature and this response can be used as an early indicator of plant stress or disease before the appearance of visual symptoms. However, the temperature of a crop is highly dependent on position and aspect and may be affected by factors such as shade, position, tissue type and trends over the crop area. The early appearance of anomalously high temperature effects in individual plants can be very difficult to detect against the variable temperature background of a crop. CP 60 developed methods for detecting thermal effects in stressed plants and the proposed new studentship will develop new software that will allow improved detection of thermal anomalies relative to the normal temperature variability of a crop.

Benefits to industry

The benefit of this work for the industry is to provide an integrated crop scanning system with the potential for detecting plants with early symptoms of disease. The system would have the potential for monitoring thermal response to disease or stress or possibly nutritional deficits at the same time that the 3-dimensional growth and development of the crop was monitored. The system could be highly automated to scan the thermal profile of a crop with minimum human supervision. Project CP60 was discussed and approved by industry representatives at a meeting of the Pot and Bedding Image Analysis Steering Group (Alan Davis, Wayne Brough, Mike Holmes, Chris Need and Ruth Finlay) on Wednesday 18th Dec 2007.

Following an HDC meeting on Crop Imaging held at WHRI on 17th Feb 2010, discussions were held with Alan Davis, Jason Pole and Neill Bragg and it was agreed that Thermal Imaging was a worthwhile area of research and that a new studentship to complete the thermal imaging work started by CP60 should be considered.

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