

# New Project

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## PE 005

Protected edible crops: biological control of plant diseases using insect pathogenic fungi with dual activity against plant pathogens

**Project Number:** PE 005

**Title:** Protected edible crops: biological control of plant diseases using insect pathogenic fungi with dual activity against plant pathogens

**Start and end dates:** 01 June 2011 to 30 May 2013

**Project Leader:** Dr Dave Chandler and Dr John Clarkson

**Industry Representative:** Phil Pearson

**Location:** Warwick Crop Centre, School of Life Sciences, University of Warwick, Wellesbourne Campus, Wellesbourne, Warwick CV35 9EF

**HDC Cost:** £112,110.00

*SUBJECT TO CONTRACT*

**Project Summary:**

- The development of non-chemical methods for controlling powdery mildew and damping off diseases (caused by *Pythium* and *Rhizoctonia* spp.) on protected edible crops is a high priority. In particular, there is a need for new biological control agents.
- Insect pathogenic fungi are being used by UK growers as “bioinsecticides” against a range of arthropod pests. Six different products are now authorized for UK use or are listed on EU Annex I. However, it has recently been established that some insect pathogenic fungi are also capable of conferring protection against plant diseases. For example:
- Some strains of *Beauveria bassiana* can grow within plant tissue without causing damage to the plant. There is evidence from the USA that these endophytic strains of *B. bassiana* can protect plants against damping off diseases.
- The insect pathogenic fungi *Lecanicillium longisporum* and *Lecanicillium muscarium* can also parasitize powdery mildew.
- This raises the possibility of using these fungi for biological control of plant disease in the UK. Both *B. bassiana* and *L. muscarium* are already authorised for use in the UK as bio-insecticides on protected crops. It would be relatively simple to get approval to use them against plant diseases. This would be an innovative approach to plant disease control.
- In this proposal, a series of glasshouse experiments will be done to quantify the effect of insect pathogenic fungi as biological control agents of three key plant diseases for UK protected edible crops. Tomato will be used as the main host plant for the purposes of experimentation. The experiments include: measuring the effect of selected entomopathogenic fungi against damping off when applied as a seed

treatment to tomato; using entomopathogenic fungi as a spray against powdery mildew; and determining the effect of entomopathogenic fungi to control powdery mildew through induced systemic resistance.

### **Aims & Objectives:**

#### *(i) Project aim(s):*

The aim of this proof-of-concept study is to demonstrate the potential for using insect pathogenic fungi as biological control agents of damping off and powdery mildew diseases affecting UK tomato production.

#### *(ii) Project objective(s):*

- Objective 1. Quantify the effect of foliar sprays of the insect pathogenic fungus *Lecanicillium longisporum* on powdery mildew on tomato.
- Objective 2. Determine the potential of *B. bassiana*, applied as a root drench to tomato plants, to control powdery mildew.
- Objective 3. Quantify the effect of seed applications of the insect pathogenic fungus *Beauveria bassiana* on *Pythium* and *Rhizoctonia* diseases of tomato.

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