



# New Project

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## CP 82

**HDC Studentship:** Discovery and development of new phylloplane biocontrol agents to control insect pests

**Project Number:** CP 82

**Title:** Discovery and development of new phylloplane biocontrol agents to control insect pests

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

**Project Leader:** Dr R. W. Jackson, University of Reading

**Industry Representative(s):** Martin Emmett, Binsted Nursery  
Neal Ward, Cantelo Nurseries Ltd

**Location:** Main site: Reading University (including Shinfield Field Unit)  
Additional sites: Sampling will be conducted at grower sites during the course of the project

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

*SUBJECT TO CONTRACT*

**Project Summary:**

Aphids and related pests cause immense damage to a wide variety of crops. However, the range of pesticides available to control these pests is continually decreasing and there are many circumstances where existing biological controls are not sufficiently effective. Some bacteria found on leaf surfaces can kill aphids and other insects whilst having negligible mammalian toxicity; so the potential exists to either use them as a directly applied biological control agent or to manipulate the crop environment to enhance their development. This project will identify the bacteria found on leaf surfaces (and elsewhere on crops) and then screen them to identify those bacteria that can kill aphids and thrips. Suitable methods of either applying the bacteria or enhancing naturally occurring populations will then be developed. The student will be trained in bacteriology, entomology and horticulture. Regular visits with growers will enhance the students' knowledge of the horticultural industry

**Aims & Objectives:**

- (i) Project aim(s): To identify naturally occurring phylloplane bacteria, or their components, that can control pests of peppers and strawberries.

(ii) Project objective(s):

We know that phylloplane bacteria can be ingested by insects such as aphids. Although some bacteria can kill aphids, the basis of how they do this is unknown. One possibility is that the bacteria kill by infection, whereby they colonise the gut of the aphid and either invade into aphid cells or specifically cause breakdown of the aphid cells. Alternatively, the bacteria may cause death by a product they make, that can kill independent of the bacterium eg. a protein toxin that is taken up by the aphid and kills the aphid. To develop this project, the following objectives will be met.

1. Isolate a range of bacteria from environmental sources including phylloplane, soil and rhizosphere, water and invertebrates.
2. Identify bacterial isolates that kill aphids by toxicity tests.
3. Characterise the bacterial isolates by histological, biochemical and DNA analysis.
4. Determine the interaction dynamics with aphids (toxicity, pathogenicity) and other insects (for host range testing).
5. Determine whether toxic bacteria can be transmitted by aphids between plants.
6. Apply genetic screening technique to identify the genetic causes of toxicity.
7. Determine efficacy of bacterial suspension, or product, in controlling aphid infestations within crop plants.
8. Communicate discoveries to HDC and growers.

## **Further information**

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

HDC  
AHDB  
Stoneleigh Park  
Kenilworth  
Warwickshire  
CV8 2TL

Tel – 0247 669 2051

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