

P004 Novel proteomic and biosensor based strategies for detection of downy mildew infection.

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Downy mildew is the most common foliar disease of the pea crop (*Pisum sativum*) in the UK, with up to 55% losses in yield observed where plant resistance is ineffective. Control of the pathogen *Peronospora viciae* is achieved through the use of resistant plants and treatment with fungicides such as the phenylamides, which have systemic and curative activity. Resistance to these fungicides has been observed, so optimal application is required to prolong their effectiveness in controlling downy mildew outbreaks. The aim of this DEFRA-funded work is to identify novel protein biomarkers that are indicative of early stage pea downy mildew infection. This will use two-dimensional gel electrophoresis, and in particular difference gel electrophoresis (DIGE) technology and mass spectrometry to isolate and identify proteins that are under or over-expressed in pea plants infected by *P. viciae*. Antibodies for proteins that are specific for downy mildew infection will be generated and utilised in prototype detection devices for the early diagnosis of potential disease problems, allowing fungicides to be applied more efficiently and effectively. A secondary aim of the project is to generate fundamental information on proteins specifically involved in this plant-pathogen interaction, which may be employed in novel control strategies for downy mildew diseases.