

***Travel Fund Report***

***Glasshouse Crop Research Institute Trust***

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**International Society for Molecular Plant-Microbe Interactions XVIII Congress, Glasgow, 2019**

The Molecular Plant-Microbe Interactions Congress XVIII (IS-MPMI) was held in Glasgow in 2019 and brought together researchers with the common goal of understanding and generating disease resistance in plants. The conference covered a broad range of topics including cross-disciplinary research on both pathogens and symbionts alongside molecular developments in plant science.

The IS-MPMI congress was an excellent platform to access the latest high-quality research in plant-microbe interactions. Attendance at this conference allowed me to network with the plant-pathogen community and integrate with researchers working specifically on powdery mildews. Powdery mildew is a huge problem for the strawberry industry, however it is largely understudied due to its comprehensive culturing requirements. Our current work has identified powdery mildew resistance QTL in strawberry and has developed the first draft genome of the causative pathogen *Podosphaera aphanis*. Funding has been won to generate gene models for the pathogen in order to assist the identification of putative virulence factors and resistance genes. Before the main conference began, I was able to attend a satellite meeting on powdery mildew. Here I met Dr. Laurence Bindschedler who has conducted ground-breaking research in model powdery mildew species. She has used novel techniques to look for key virulence genes / susceptibility factors from haustoria focused proteomics and achieved functional validation of candidate genes through RNA silencing. Collaboration will provide an excellent opportunity to further research on the strawberry-powdery mildew pathosystem. Highlights from the symposium included novel work on the powdery mildew species *Blumeria graminis* which causes powdery mildew on barley; Marion Muller presented a pathogen genetic mapping study which allowed the identification of quantitative elements associated with the genetic basis for host adaptation to triticale. Whereas, Shaoli DasGupta presented her novel work on investigating the potential for pH dependent mechanism of effector regulation where the transcription factor Pac-C is upregulated in acidic haustorial environments.

During the main conference, there were many thought-provoking presentations in the “Emerging Topics in Plant Microbe Interactions” session; Roger Innes proposed that extracellular vesicles are important for transportation of proteins, miRNA and siRNA from hosts to pathogens. Furthermore, Erin Braggs gave a very good presentation describing basal plant immunity in water dwelling plants and proposed the use of duck weed as a new plant- pathogen model system. She then went on to describe the loss of NLR genes associated with the transition of plants from terrestrial to aquatic environments.

Attending the congress also supported my research on the soil-borne generalist pathogen *Verticillium dahliae*. My studies to date have identified several major resistance QTL and developed a drone based multispectral imaging platform for field infected strawberries. Whilst Whilst attending the conference, I was able to meet Prof. Bart Thomma and determine his opinion on our most recent findings. I was also able to learn of his current research: Bart described the novel effector, *Tom1*, which is required for *Verticillium dahliae* infection in tomato. Remarkably, the transformation of *Verticillium nubilum* and *Verticillium tricorpus*, to contain *Tom1*, turns these non-pathogenic fungi into plant pathogens. Further results increase our knowledge on the well characterised plant pathogen effector *VdAve1*, which was found to have a dual function beyond that of plant infection. *VdAve1* was found to be ubiquitously expressed, have antimicrobial properties and was associated with microbiome changes, thus indicating that the acquisition of a single effector can change the lifestyle of a microbe. Furthermore, many of the platform presentations were directly relevant to work focused on the use of Host Induced Gene Silencing (HIGS) to study the impact of conidiation suppression on virulence. Indeed, discussions with delegates during the coffee break highlighted issues that multiple labs have faced with implementing RNAi spray applications as a potential method to control plant pathogens.

The IS-MPMI Congress provided a diverse and stimulating platform for researchers to exchange knowledge on the most recent discoveries in plant-microbe research. It is through attending such a congress that the translation of ground-breaking research may be translated into the lesser-studied but economically important protected crops. As part of attending the conference I was able to disseminate my previous work on the identification of the genetic components underlying arbuscular mycorrhizal fungi association, such components are required to improving the association of strawberries and beneficial microbes.

The horticultural industry can benefit in many ways from the information conveyed at the conference. Embracing the improvements in several areas including post translational modification can enhance research strategies alongside enhancing the toolbox of a breeder to combat detrimental plant pathogens. Furthermore, the knowledge assimilated at the IS-MPMI Congress will directly support the research undertaken within NIAB EMR, the primary UK research institute for protected fruit research.

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