# FUNCTIONAL CHARACTERIZATION OF EFFECTOR PROTEINS THAT MODULATE PLANT-INSECT INTERACTIONS

Saskia A. Hogenhout

*Department of Disease and Stress Biology, The John Innes Centre, Norwich Research Park, Norwich, NR4 7UH, United Kingdom. saskia.hogenhout@bbsrc.ac.uk*

Hemipteran insects use their piercing mouthparts to feed on various plant tissues and transmit a number of plant diseases, including viruses and bacterial pathogens such as phytoplasmas. In my lab we have generated evidence that the Pathogen-Associated Molecular Pattern (PAMP) Triggered Immunity (PTI) pathway plays a role in plant defence response to aphid attack and that a specific aphid effector suppresses PTI. Furthermore, silencing of a number of candidate effector genes in aphids by plant-mediated RNAi reduces the performance of aphids on plants, while expression of these effectors in plants increases progeny production. Only effectors from the aphid species tested showed the progeny-increase phenotype but not the effector homologs from another species. Phytoplasmas have effectors that modulate plant-insect interactions as well. Leafhoppers that vector aster yellows phytoplasma (AYP) produce more progeny on AYP-infected plants. We found that one phytoplasma effector destabilizes specific plant transcription factors that positively regulate genes involved in jasmonate production leading to an increase in leafhopper progeny. Phytoplasma effectors modulate plant development inducing flowers that become leafy, increased production of stems (witch's broom phenotype) and changes in leaf shapes that are also observed in symptomatic AYP-infected plants. Investigations of how these effectors may affect plant-insect interactions are ongoing. In conclusion, we generated evidence that various effectors can modulate plant-insects interactions providing new avenues for research that can lead to better control of hemipteran insect pests and the diseases they transmit.

Financial support: Biotechnology and Biological Sciences Research Council (BBSRC) and The John Innes Centre (JIC)