



Broadening knowledge on downy mildew for Australian sugar industry

Left: Dr Nicole Thompson in the lab in Frankfurt, Germany.

SRA Researcher Dr Nicole Thompson has learnt valuable information for the Australian sugarcane industry on downy mildew as part of a scientific visit to Frankfurt, Germany, recently.

Downy mildew of sugarcane is a biosecurity pathogen of high risk to the Australian sugarcane industry. SRA research has shown that downy mildew in Papua New Guinea is likely to be caused by more than one species of *Peronosclerospora*, and that at least two species are likely to be new to science.

Professor Marco Thines of the Senckenberg Biodiversity and Climate Research Centre, in Frankfurt, Germany has published a DNA-based diagnostic and taxonomic tool for downy mildews, however this does not seem to be effective for characterisation of sugarcane-infecting downy mildews.

I recently undertook a Sugar Travel and Learning Award (STLA) to visit Prof Thines' laboratory to learn more about their methodology, to discuss the recent findings in PNG, examine the sugarcane downy mildew diagnostic test I have developed, and to produce a way forward for the taxonomic study of downy mildews.

The visit coincided with one by Dr Yu Pei Tan, of the Queensland Plant Pathology Herbarium (QDAF), who has been classifying downy mildews from the herbarium collection.

I took with me some samples from Papua New Guinea for analysis. Dr Sebastian Ploch taught me the Thines laboratory method of downy mildew extraction and PCR, and the samples were also used for DNA sequence analysis by Yu Pei.

In discussion with Prof Thines we discovered that the methods we use are similar and target adjacent gene regions. This has led to the apparent difference in our results. Professor Thines' method was developed for genus-level discrimination, but the method I developed is better at species and sub-species-level discrimination of the sugarcane-infecting downy mildews.

We concluded that a more robust approach would be to sequence the whole of the Cox2/1 genomic region for complete taxonomic breakdown: the downy mildews of grasses could be a species complex, which would imply that the host range of these pathogens is broader than we thought.

The diagnostic test I developed is robust for the sugarcane downy mildew diagnostics, and is currently being prepared for publication.

The whole Cox2/1 genomic region is going to be used to study the taxonomy of downy mildews of sugarcane and related grasses into the future.

Thanks to Professor Marco Thines and Dr Sebastian Ploch of the Senckenberg Biodiversity and Climate Research Centre for their assistance, to Dr Yu Pei Tan of Queensland Plant Pathology Herbarium for sequence analysis and specimens. *Nicole's trip was funded by an SRA Travel and Learning Award.*



Above: Sugarcane downy mildew, leaf striping with down on R570.