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Application of Synchrotron XFM and IRM to Study Plant–Pathogen Interactions

Plants, particularly agricultural crops require a number of different elemental macro and micro-nutrients, such as K, Ca, Fe, Mn, Cu, and Zn, to name a few, for health and sustained crop yields. While these nutrients are essential for plant development and growth, they also facilitate pathogen development and progression. Plant pathogens have evolved numerous mechanisms to source essential nutrients from host plants, which have in turn developed pathogen –response pathways aimed at starving the pathogen of essential nutrients. As an example, this interplay and “battle for nutrients” is observed in plant fungal diseases (such as yellow spot, powdery mildew and leaf rust). These fungal diseases are major biotic threats affecting wheat production and resulting in yield losses of up to 50%. Understanding how plant physiology changes in response to the fungal infections, may reveal important information on disease pathology.

IRM and XFM at the Australian Synchrotron provide unique opportunities to study how biochemical and elemental distributions change in leaves, particularly crop leaves, during infection. We report in this presentation an overview of our recent studies using IRM to study changes to leaf waxes during infection, and using XFM to study changes in trace metal ions during infection.

Presenter Gender

Man

Do you wish to take part in the Student Poster Slam

Condition of submission

Yes

Students Only - Are you interested in AINSE student funding

Level of Expertise

Experienced Researcher

Pronouns

He/Him

Which facility did you use for your research

Primary authors: KHAMBATTA, Karina (Curtin University); NAIM, Fatima (Curtin University); DE JONGE, Martin (ANSTO); HOWARD, Daryl; PATERSON, David (Australian Synchrotron); HACKETT, Mark John (Curtin University); Prof. GIBBERD, Mark (Curtin University, CCDM); Dr ZERIHUN, Ayalew (Curtin University, CCDM); Dr SANGLARD, Lilian (Curtin University, CCDM)

Presenter: HACKETT, Mark John (Curtin University)

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