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RESEARCH AREA

**Systems-based disease control
packages: tactical disease
management**

Tell us a bit about yourself?

I grew up in Nepal, where I earned a Bachelor of Science in Agriculture (BScAg) from Tribhuvan University. Pursuing advanced studies, I completed a Master of Science in Agriculture (MScAg) specialising in Plant Protection at the Hebrew University of Jerusalem, Israel. Later, I obtained a PhD in Ecology from Freie Universität Berlin, Germany, focusing on plant-mediated interactions between herbivores/microbes. My academic journey equipped me with expertise in general agronomy, plant pathology, nematology, and integrated disease management, which I now apply to innovative research supporting the Australian cotton industry.

What research have you previously been involved with?

I have worked across plant-herbivore interactions, plant pathology, nematology, and integrated disease management. In Australia, I contributed to CRDC-funded cotton projects on reniform nematode ecology and priming of cotton defence against soil-borne diseases and reniform nematodes using silicon. My experience includes glasshouse experiments, cotton disease surveys, diagnostics, pathogen identification, and developing sustainable management strategies, establishing me as a key contributor to cotton disease research.



What excites you about working in the Australian cotton industry?

I am passionate about contributing to innovative solutions for managing diseases that threaten crop health and yields. Collaborating with leading researchers, growers, and organisations like the Cotton Research and Development Corporation (CRDC) allows me to make a tangible difference in the industry. The chance to develop cutting-edge tools, such as rapid diagnostics and spore trapping, and to share knowledge with growers, inspires me to drive positive change and ensure the industry's long-term success.

What do you like to do when you're not researching?

I enjoy cycling and hiking, which allow me to explore the outdoors, stay physically active, and connect with nature. I also spend time reading about history and politics while also appreciating movies of various genres.

PROJECT OVERVIEW

A2.1: Diagnostic development, diagnostic support and cotton pathology collection

A2.3: Pathogen inoculum: spore trapping to detect aerial spores of cotton pathogens

Explain your current research project

Project A2.1: This project focuses on diagnostic development, providing diagnostic support, and maintaining the cotton pathology collection. It aims to enhance the industry's capacity to identify and manage cotton diseases effectively.

Project A2.3: This project involves spore trapping to monitor and detect airborne spores of cotton pathogens. It seeks to improve early detection and understanding of pathogen behaviour, enabling timely interventions to protect cotton crops.

Why is it important?

These research projects are vital for addressing the significant challenge of cotton diseases, which reduce yields and threaten the sustainability of Australian cotton production. The projects focus on developing rapid diagnostic tools, providing diagnostic support to the cotton growers, and exploring spore trapping methods to detect and manage key pathogens like leaf spot and *Eutypella* fungus. These innovations enable early intervention, improve disease management strategies, and protect growers' livelihoods. By equipping cotton growers with reliable solutions and knowledge, this research strengthens the industry's resilience, ensuring its long-term profitability and sustainability.

What does your current project aim to do?

These projects focus on developing advanced tools and strategies to improve the diagnosis, detection, monitoring, and management of major cotton diseases in Australia. Project A2.1 is centred on creating rapid molecular diagnostics, including LAMP assays, to speed up and enhance the accuracy of identifying key soil-borne and leaf spot pathogens. Project A2.3 complements this by evaluating spore-trapping tools and techniques to detect airborne spores of pathogens such as leaf spot fungi and *Eutypella*, which causes recurring wilt. Together, these projects also maintain a comprehensive cotton pathology collection, conduct pathogenicity assays, and preserve representative pathogen isolates for future research. By validating and refining these diagnostic and monitoring tools, the work aims to equip growers with reliable, science-based solutions that enable early intervention and more effective disease management.

How will this work benefit Australian cotton growers and industry?

These projects will significantly benefit Australian cotton growers and the industry by providing faster, more reliable tools to detect and manage key diseases. Rapid molecular diagnostics will enable early identification of major pathogens, improve disease management and reduce crop losses. Spore trapping will help monitor and understand the spread of airborne pathogens, allowing for timely interventions. By equipping growers with evidence-based solutions and strengthening local expertise, these projects will enhance crop health, reduce economic losses, and boost confidence in the long-term sustainability and profitability of the Australian cotton industry.



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