

Cotton Research Roundup...



An update on the Cotton Research and Development Corporation's latest investments, innovations and impact from Executive Director, Dr Ian Taylor.

2020: The International Year of Plant Health

Welcome to 2020: the UN's International Year of Plant Health. Plant health encompasses a broad range of practices, including on-farm biosecurity, to help protect plants and crops from the negative impacts of pests, weeds and disease. Through CRDC, the Australian cotton industry is investing in research, development and extension (RD&E) to ensure the continued health of our cotton plants and the wider industry, and we're



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IT'S NOT AN ORDINARY CONVEYOR... IT'S A WESTFIELD

working collaboratively with our fellow plant-based research and development corporations (RDCs) to ensure efforts are coordinated across Australia's plant industries.

In recognition of this important year, in this edition of *The Australian Cottongrower* column we bring you a snapshot of our latest activities in the area of plant health.

Plant industries join forces to strengthen biosecurity

Biosecurity is a key issue for all Australian industries involved in producing crops of any kind. Incursions of exotic pests – diseases, vertebrates and invertebrates – are often detrimental to several industries and history tells us it's not a case of 'if' they will arrive, but 'when.'

By pooling knowledge and resources, Australia's plant industries can better prepare for common threats and learn from each other's biosecurity strategies and preparedness techniques.

The Plant Biosecurity Research Initiative (PBRI) held a two-day symposium in Brisbane in August showcasing current plant biosecurity research, supported by members including CRDC. It was the first meeting of its kind in Australia to address biosecurity in this way.

Research teams from across the country presented findings around pests, diseases and weeds. The program included keynote speakers and panel discussions on future priorities for RD&E.

Importantly the event provided a forum for plant biosecurity networking and collaboration across industries as well as borders. Under a recently signed MOU between PBRI and Better Border Biosecurity NZ, teams are looking to work together on common biosecurity issues; presenting their research with the intention of future collaboration.

The symposium also aimed to help avoid duplication of research on common biosecurity themes. It was the first time biosecurity research, supported by seven plant RDCs and Better Border Biosecurity (B3) New Zealand, had been discussed in one forum.

Several cotton industry researchers, including virologist Dr Murray Sharman, entomologist Dr Dean Brookes and pathologist Dr John Webster presented on issues such as cotton blue disease, new biosecurity pest techniques and disease diagnostics. Cotton Australia's Sally Ceeney reported on the success of the industry biosecurity preparedness activity Exercise Blueprint.

Exercise Blueprint: Ensuring we're prepared to respond

Exercise Blueprint has shown the cotton industry has a clear understanding of the roles and responsibilities of individuals and organisations in the event of a biosecurity incident.

Run by Plant Health Australia (PHA) with support from CRDC, Exercise Blueprint was held in August in Toowoomba. It simulated an incursion of cotton blue disease, caused by cotton leafroll dwarf virus (CLRDV).

The main aims of the exercise were to raise awareness of biosecurity issues and roles within the industry; test industry-wide response structures and processes; and investigate the ability to develop appropriate response strategies for the industry's priority pests.

Cotton blue disease was chosen as the target for the scenario as it is a priority pest for Australia and could have significant impacts should it arrive here. CRDC-supported research undertaken by QDAF virologist Dr Murray Sharman has already confirmed its presence in Timor Leste, north of Australia. It has



Exercise Blueprint gave us the opportunity to test our industry's preparedness for a biosecurity emergency.

led to severe damage in cotton in other countries, most recently USA. Transmission is via a vector endemic to Australia – the cotton aphid (*Aphis gossypii*) – a major pest of cotton with a host range that includes other commonly grown crops.

Exercise Blueprint involved farmers, agronomists, ginners, CottonInfo, Cotton Australia, the Department of Agriculture, NSW DPI, QDAF and CSD.

The exercise highlighted that our industry is in a really good position for communication in the case of an incursion, thanks to our strong collaborative networks such as CottonInfo and CSD, which have extensive databases and reach to support Cotton Australia, who represent the industry under the terms of the Emergency Plant Pest Response Deed (EPPRD).

We also have a strong advocate in Cotton Australia and robust R&D ongoing into priority pests.

The scenario helped clarify how our organisations would work together and interact with the relevant state departments, who under the deed, lead the incursion responses.

Key lessons from the exercise were:

- The importance of early detection;
- The isolation of an exotic threat;
- The importance of on-farm management biosecurity measures such as Come Clean Go Clean;
- Managing weeds (hosts) between seasons; and.
- On-farm day-to-day farm cleanliness measures.

Having these measures already in place can have a huge impact on isolating – and hopefully eradicating – a pest.

Tackling pests, plant health and biosecurity through RD&E

Australia is no stranger to incursions of exotic pests and diseases. Silverleaf whitefly, mealybug and cotton aphid are all imports. CRDC's investment in biosecurity preparedness is ongoing and is a key part of our current (2018–2023) strategic plan. Exercise Blueprint is a result of this investment and builds on from a similar CRDC-supported exercise held July 2017, that focused on boll weevil and highlighted the need for industry communication roles and responsibilities to be better defined.

CRDC RD&E looks to develop tools to support an incursion response as well as capacity. Investment has included travel exchanges, modelling and research to assess potential impact, pest ecology, diagnostics and surveillance research, as well

as investigating potential controls for critical threats where eradication is less likely.

Several industry researchers have studied exotic threats overseas and in laboratories in Australia.

Dr Murray Sharman of QDAF has been investigating blue disease in Timor since 2013 with support from CRDC. Earlier this year, CRDC support enabled Murray and QDAF pathologist Dr Linda Smith to travel to the US to participate in meetings with US counterparts, to share their research and see first-hand how the virus rolled out.

Dr Dean Brookes of the University of Queensland (the 2019 CRDC-supported winner of the ABARES Science and Innovation Award) is also looking at boll weevil and pheromone trapping as part of the *iMapPESTS: Sentinel Surveillance for Agriculture* project (see story below). He's also using a technique which examines gut content to determine hosts of exotic invertebrate pests. A recently announced Rural R&D for Profit Program project CRDC is involved in will boost diagnostic capacity for plant production industries.

Sentinel on duty soon

A national multi-agricultural industry surveillance initiative, *iMapPESTS*, is developing novel airborne surveillance and diagnostics technologies to speed up detection and reporting of important pests and diseases in cotton growing regions and beyond.

The *iMapPESTS: Sentinel Surveillance for Agriculture* program aims to rapidly monitor and report the presence of airborne pests and diseases for multiple agricultural sectors, including cotton, sugar, grains, viticulture, horticulture and forestry.

The five-year program is being led by Horticulture Innovation, with funding from the Australian Government's Rural R&D for Profit Program, along with 16 partner organisations including CRDC.

A key feature of the program is the Sentinel, a mobile surveillance unit that offers optimal sampling of airborne fungal spores and insects. The Sentinel is a specialised trailer equipped with several airborne samplers, a climate sensor, telemetry and an industrial computer to remotely control and monitor the unit, including automated robotics to change pots on the samplers according to the day or capture criteria.

A prototype Sentinel was recently launched at a field trial site for grains in Hart, South Australia. In February 2020 a second



The Sentinel, a mobile surveillance unit offers optimal sampling of airborne fungal spores and insects.

Sentinel will be commissioned during north Queensland's wet season before making its way down through Queensland and northern NSW, where it will target airborne pests of cotton such as green mirid and Helicoverpa.

The iMapPESTS research and industry network will work with growers and industry representatives to determine the best way to communicate the dynamic pest information data it gathers to end users, potentially via mobile devices. This includes which pests or diseases the Sentinel is detecting in an area at a particular time.

The iMapPESTS team will be hosting a show and tell of the Sentinel for cotton growers during autumn. Event details will be shared through CottonInfo and the Autumn 2020 edition of CRDC's Spotlight magazine.

Cotton growers and their consultants are encouraged to visit the iMapPESTS website for more information, including where and when the sentinels will be in your region and how to be involved: www.imapests.com.au

New resistance testing regime

NSW DPI's Dr Lisa Bird is starting a new project on insecticide resistance to focus on pests where and when needed. Resistance surveillance will continue to provide the industry with evidence-based resistance frequency data and testing will be prioritised for pests and insecticides identified as emerging issues for the industry and/or at heightened risk of resistance development.

CRDC has a long history of working with NSW DPI in resistance monitoring programs, previously undertaken by Dr Grant Herron. Grant has made an enormous contribution to our knowledge and success in managing resistance.

While insecticide resistance remains a serious threat, in this new project we have consolidated our efforts for insecticide

resistance monitoring. Lisa will continue her work monitoring Helicoverpa, while adding a range of pests to her project including mites, mirids and aphids. Dr Jamie Hopkinson of QDAF is still monitoring and testing resistance in silverleaf whitefly.

It is hoped the change to a risk assessment-based approach delivers efficiencies in our testing and monitoring, allowing a focus on where the need is greatest – as opposed to testing every pest and every insecticide every year.

Lisa will also continue working with CRDC, GRDC and the grains industry to address growing resistance levels in Helicoverpa in pulses. Results from the industry-wide resistance surveillance program have shown levels of resistance to indoxacarb in *H. armigera* have increased in areas of central and northern Queensland. Resistance surveillance monitoring and detection of early-stage resistance in grains will increase preparedness in the cotton and horticulture industries.

Growers and consultants with any concerns about resistance should contact Lisa: lisa.bird@dpi.nsw.gov.au.

Biosecurity: it's everybody's business

Importantly, we all have a critical role to play in biosecurity. Here's CottonInfo's 12 top tips for managing your plant health in 2020:

- Regularly monitor all crops and call the Exotic Pest Plant Hotline if you find something suspicious: 1800 084 881.
- Participate in your regional cotton communication network: sign up to communication from your CottonInfo Regional Extension Officer.
- Use precision spray technologies to optimise weed control.
- Ensure all vehicles, machinery and equipment arriving onto your property are mud and trash free.
- Control volunteer and ratoon cotton plants.
- Develop a farm biosecurity plan.
- Select disease resistant varieties where possible.
- Undertake pre-season planning to consider strategies on pests and beneficial species.
- Implement an integrated disease management strategy.
- Control weeds in cotton crops using two non-glyphosate tactics.
- Communicate your biosecurity requirements to all people entering your farm.
- Conserve and increase the beneficial insect populations on your farm.

These 12 top tips can be found in the 2020 CottonInfo cotton industry calendar, themed 50 shades of green. You can request a copy by emailing comms@crdc.com.au



Lisa Bird of NSW DPI.



The 2020 CottonInfo cotton calendar: 50 shades of green.