

Cotton Research Roundup...



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

Cotton research during coronavirus

The Covid-19 pandemic is a dynamic situation for us all, and given the exceptional circumstances, we are committed to protecting the health and safety of our team, our families, our cotton community, and the community at large.

CRDC has a proactive plan in place to help minimise the risk to our team. Our office is closed and our team are working from home, actively monitoring our health and practicing social distancing. Given many of our team already operate remotely,



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and due to the nature of our work and excellent systems, we are well placed to work fully remotely. All of our existing meetings and events are now being conducted via video or teleconference, or postponed until it is once again safe to meet face to face.

Rest assured, we are still fully engaged with our growers, research partners and industry stakeholders during this period. Nevertheless, as we all adjust to this new way of working, we may need more time than usual to reply. Thank you in advance for your patience and understanding as we all work through these challenging circumstances together.

For our research community – we recognise the potential for disruption to research projects and the concerns of researchers during these difficult times. Our R&D Managers are in the process of connecting with our research partners to understand any potential impacts of the Covid-19 restrictions, and to arrange any resulting variations to research agreements. Should you have any concerns regarding your research project, please contact your CRDC R&D Manager, or our General Manager R&D Investment, Allan Williams (allan.williams@crdc.com.au).

Fall armyworm identification for cotton growers

Most growers will now be aware that fall armyworm (*Spodoptera frugiperda*) has been detected in numerous locations across north Queensland and it is likely with increased surveillance that over the coming months this pest will be detected at other locations further south. For information and correct reporting procedures specific to your state, please ensure you visit your relevant department website (see links below) for the correct information.

This species of armyworm is most at home in tropical regions and the common name is derived from its pattern of seasonal occurrence in the US. It resides throughout the year in the lower reaches of Texas and Florida, and as summer ends, populations that have built up in these regions spill out into more northern cooler temperate cropping areas during the early US 'fall' (autumn).

Modelling for occurrence of this pest in Australia suggests it will be highly active in our tropical regions and less abundant in southern temperate regions, particularly those areas well away from warmer coastal zones.

The impact of this pest for cotton is at this stage is unknown. Reports from overseas suggest that the proteins contained in Bollgard 3 (particularly Cry 2Ab and Vip3A) will provide control for this species and it is therefore likely that this pest will not be abundant within Bollgard 3-based cotton production systems. But Bollgard 3 is not currently registered for control of FAW and field studies may be required to enable an APVMA registration for this use. Potential unknowns at this stage revolve around whether individuals within the current incursions are carrying resistance alleles for Bt based toxins or other insecticide products. Similarly, FAW might have unforeseen impacts on refuges (and therefore the deployment of the Bollgard RMP program in its current format). Any impacts on recently sown cotton in northern Australia where FAW have been detected will provide some insights for how this pest might interact with cotton and what targeted R&D might be required going forward.

In the interim the impact of our endemic species of armyworm – *Spodoptera litura* (also known as cluster caterpillar) – which is common in northern Australia may provide some insights. This pest regularly occurred in Bollgard II crops in the Burdekin and the Ord, but due to the addition of Vip3A is less frequently

encountered in Bollgard 3. A weakness of Bollgard 3 in northern Australia can occur when bouts of poor weather (cloudiness or extreme heat) or moisture stress cause a drop off in Bt expression, allowing larvae to survive and potentially persist. The damage observed by larvae in these instances has often been minor and primarily limited to leaf feeding. Larger larvae have been observed to feed on flowers, squares and bolls. Damage to flowers would often appear to be superficial and limited to the petals and stamens whilst boll damage often entails surface grazing as opposed to tunnelling, particularly compared to the intensity with which *Helicoverpa* target fruiting structures.

In terms of abundance, *Spodoptera litura* is a routine pest of crops in tropical regions each year and is commonly encountered along the coastal fringe of eastern Australia. It is occasionally observed in sub-tropical regions in southern Queensland and northern NSW but is not a routine pest. Time will tell if FAW follows a similar pattern.

For more information on FAW identification and reporting, please visit: The QLD DAF webpage: www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/crop-growing/fall-armyworm
The NSW DPI webpage: www.dpi.nsw.gov.au/biosecurity/plant/insect-pests-and-plant-diseases/fall-armyworm
Our CottonInfo FAW ID video: www.youtube.com/cottoninfoaust.

Water benchmarking study

CRDC has been investing in water benchmarking for the Australian cotton industry for over a decade, and the latest benchmarking study, conducted by NSW DPI for the 2017–18 season, shows significant increases in irrigated cotton's water productivity.

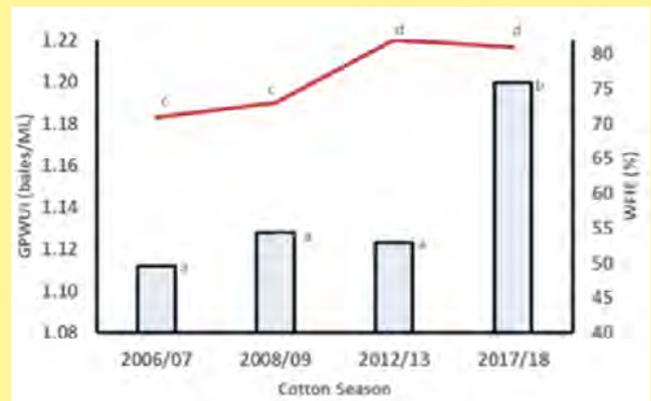
This project monitors water productivity in irrigated cotton to help facilitate continuous improvement in water use efficiency (WUE) and establish a benchmark for you to compare your performance.

To get to the 2017–18 results, the team calculated the water productivity of 57 farms consisting of 240 fields, 18,673 hectares and 232,194 bales of cotton – or approximately eight per cent of the industry. They used surveys and interviews with 45 growers to calculate a farm water balance using WaterTrack software to calculate a gross production water use index (GPWUI) and whole farm irrigation efficiency (WFIE), which is measure of how efficient water is being used.

The 2017–18 results:

- Gross production water use index (GPWUI): Compared with last time benchmarking was undertaken in 2012–13, cotton growers have improved water productivity to 1.20 bales per ML, up 0.06 of a bale per ML on previous studies, where efficiency was 1.12–1.14 bales per ML. That is a significant improvement in water productivity compared to previous benchmarks from five, 10 and 12 years ago.
- Whole farm irrigation efficiency (WFIE) has also increased significantly from around 70 per cent in 2006–07 and 2008–09, to more than 80 per cent in both 2012–13 and 2017–18.
- It took 0.9 ML of total water (irrigation, rainfall and soil moisture) to grow a bale of lint in 2007–08, 2008–09 and 2012–13, and 0.8 ML in 2017–18.
- The irrigation water component of this total water accounted for 0.6–0.8 ML per bale in 2007–08, 2008–09 and 2012–13, and 0.5 ML in 2017–18.

FIGURE 1: Comparison of the Gross Product Water Use Index (GPWUI), blue columns, and Whole Farm Irrigation Efficiency (WFIE), red line, over previous water productivity benchmarking surveys.



Different letters represent significant differences in analysis of variance.

The project team is now undertaking benchmarking for the 2018–19 season – including both irrigated cotton, and for the first time, the WUE of dryland cotton – and you are invited to

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Dinesh Kafle presented with his ABARES Science and Innovation Award by the Minister for Agriculture, the Hon. David Littleproud MP. (PHOTO: Steve Keough Photography)

participate. The team can send the survey to you via email, fax or mail, or you can meet face-to-face or over the phone to complete the survey.

Participants in the benchmarking survey will get a breakdown of how their performance compares to the wider industry and of their own region, and identification of the components of their system where opportunities exist to improve.

To participate, contact your CottonInfo REO or the CottonInfo Irrigation Technical Lead Ben Crawley (ben.crawley@dpi.nsw.gov.au).



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Northern Territory high value crops research program

CRDC is supporting a \$1.4 million research program to trial high-value crops such as cotton in the Northern Territory, with potential crop rotations with sorghum, maize, rice, pulses or pasture. This two-year research project – co-funded by the Cooperative Research Centre for Developing Northern Australia, CRDC, the Grains Research and Development Corporation and 14 industry partners – will investigate new farming systems and crop management strategies to help broadacre cropping in the NT.

Science and Innovation Award recipient

Dr Dinesh Kafle, an agricultural scientist at Queensland's Department of Agriculture and Fisheries, has received the CRDC-supported ABARES Science and Innovation Award for 2020.

Dinesh's innovative research project will investigate whether cotton plants can be primed with silicon to boost their defences against fusarium wilt and reniform nematode. His project will germinate cotton seeds in soil with added silicon, before infecting them with the diseases. The study will trial cotton seeds grown in both seedling trays and pots, to test whether transplanting silicon-primed seedlings provides better defence than direct sowing. On behalf of CRDC, our congratulations to Dinesh!

evokeAG: CRDC supports 15 cotton growers to attend

Some 35 representatives of the cotton industry attended evokeAG in Melbourne in February, including a cohort of cotton growers who were supported to attend by CRDC. evokeAG is the largest agrifood tech event in the Asia Pacific, attracting over 1300 delegates in 2020. It shines a spotlight on the rapidly evolving world of agricultural innovation and is hosted by CRDC's fellow research and development corporation, AgriFutures Australia. CRDC supported growers to attend to provide an opportunity to learn, explore and experience the technological developments firsthand – and we'll be bringing you some of their key learnings in our next edition of the CRDC magazine, Spotlight.

Until next time, Ian.



CRDC's Ian Taylor with one of 15 cotton growers supported to attend evokeAG by CRDC, Daniel Kahl of Wee Waa.