

farm program

chapter one

Tropical Northern Australia

– The Burdekin Region

Building on from the work undertaken by the Australian Cotton CRC investigating opportunities for cotton production in the Ord WA, this CRC focussed on developing a cotton farming system for the dry tropics in Queensland. At the start of this CRC, the potential to expand into Western Australia was limited due to the State Government's moratorium on GM crops and the lack of suitable cotton infrastructure in the region. By contrast, the Burdekin area in North Queensland offered greater possibilities since transgenic cotton was already grown in the state, it was closer to cotton processing infrastructure and cotton had the potential to be easily included in the sugar cane farming system as a highly profitable rotation.

The Burdekin however is climatically different to the

Ord and consequently much of the work undertaken in the previous CRC was not directly transferable to this region. Unlike the Ord, the Burdekin (tropical Australia's largest irrigation area) has a climate and cropping system which is unique for cotton production in Australia due to the seasonal constraints that necessitate cotton to be grown in the wet season. In others regions, cotton is typically grown in hot dry summers where ideally crop water can be regulated via irrigation. Growing cotton during the wet season requires a completely different regime of crop management and brings with it many different challenges which were unknown at the time. Grower interest in this region was driven by both local sugar growers wishing to diversify and include a high value rotation into their sugar system as well as southern cotton growers looking to drought-proof their businesses.

A major output of the CRC in 2007 was 'NORpak-Ord River' which synthesised 10 years of rigorous scientific research involving the CRC and its partners into a rational blue print for sustainable cotton production in the region. NORpak-Ord River also confronted the GM debate by demonstrating the merits of GM as part of a production system, with reduced environmental footprint compared with the old non-GM system. Recent commercial scale validations proved that farmers, with little cotton experience, could produce high yielding cotton using NORpak. This experience combined with a more favourable political environment and cotton prices is the basis for significant planned commercial plantings in the Ord.



Former CEO Guy Roth CRC Chair, David Anthony, Western Australia's Chief Scientist, Professor Lyn Beazley, Geoff Strickland, Stephen Yeates.



Dr Stephen Yeates and Dr Paul Grundy.

In 2007, field experiments commenced in the lower Burdekin irrigation area lead by researchers Dr Paul Grundy (DAFF Queensland) and Steve Yeates (CSIRO). This initial research focused on:

- 1) Identifying climatic constraints for cotton production in the Burdekin and developing a set of practices that allow for the types of climatic and environmental risks that exist in this region
- 2) Determining the compatibility and synergies of cotton with the existing sugar / grains farming system.

Paul Grundy said the key focus of the Burdekin research was to determine the feasibility of cotton production with the prospect of wetter than average conditions.

Work with local growers rapidly demonstrated the limitations that periods of low sunshine and high humidity could have on the reproductive growth of cotton. The work also developed and tested novel management practices that could minimise identified constraints under these conditions.

A key concern was how the likely loss of fruit and flowers in response to cloudy wet weather during the wet season would affect later crop yield potential. Yet rather than being a negative, research demonstrated that wet season fruit losses due to shedding could be a beneficial adaptive response by the cotton plant. Shedding would have a limited impact on crop yield providing the crop was managed to ensure later compensatory fruit set when sunny conditions returned.



A key focus of the Burdekin research has been to understand crop and climatic interactions. DAFF Queensland project technicians collect crop sunlight interception data.

'Given these crop responses and climatic constraints agronomy needed to be tailored to maximise plant response for when the weather turns sunny at the end of the wet season' said Paul.

Best management practices were developed collectively ensuring the maximisation of compensatory yield production when sunny conditions returned in autumn, allowing for successful early winter picking. These practices included identification of the best sowing date and variety, management tactics for nitrogen, water, insects, crop trimming and the use of growth regulators.

Crop trimming is an innovation in which early season crops have the terminal shoot mechanically cut off delaying the onset of crop flowering and encouraging the plant to grow an open "vase" shaped canopy which subsequently increases light interception. The resultant delay in flowering from the trimming provides growers with an additional three weeks to conduct important growth stage dependent operations such as side dressing nitrogen prior to the onset of flowering which can be disrupted due to intermittent wet weather and impeded field trafficability.

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Crop “trimming” whereby the terminal growing shoot of a vegetative stage crop is cut off is a useful wet season risk mitigation technique for growers in the Burdekin.



Showing Burdekin growers how cotton plants can be managed to minimise the impacts of high humidity and cloud during reproductive development.

Rapid adoption of a range of practices arising from the CRC research program has already stabilised yields for farmers trialling cotton in the region. Improved nitrogen fertiliser management as a result of this research has significantly increased fertiliser uptake efficiency from 30% to as high as 70%, which is a positive for the environment. Measuring the impacts cotton has on subsequent sugar crops has commenced and will continue beyond the life of the CRC.

‘This work shows that there is real potential for the industry to develop in this region and adapt to any climatic changes that the industry may face’, said Paul.



With the impacts of wet weather on crop physiology being a key research question, field work conducted daily regardless of weather conditions. Paul Grundy downloads a weather station in preparation for an approaching cyclone the following day.

