The essentials for successful cotton in the Burdekin

By Stephen Yeates and Paul Grundy

In this article we tell the story of some of Burdekin growers pioneering cotton and how their partnership with local R&D is progressing robust production practices for this unique cotton growing environment.

Burdekin farmers evaluating cotton over the past five summers agree that growing in the tropical wet season, combined with the need for cotton to be compatible with sugar in rotation, have required both locally developed management practices and customising production costs that reflect the yield potential of the climate.

Lyndsay Hall and sons Peter and Russell have planted cotton in the Burdekin since 2004. Lindsay has long recognised the need for crops to break a sugar monoculture.

“We saw two opportunities for cotton in our business,” he says. “Firstly, along with grain crops it could provide an alternative to sugar when prices are low, and secondly as a break crop between sugar crops – that is grow cotton rather than have valuable irrigation land fallow during summer. Water is not a limitation in the Burdekin.”

The reasoning was similar for long-term sugar growers Wayne and Angelo Dal Santo who grew their first cotton crop in 2008. In most years, 20 per cent of their land lies fallow between cutting the last rattoon around November and planting cane in about April, therefore a cash crop that could provide weed control and had a tap-root was desirable. The approval for growing genetically modified Bollgard II Roundup Flex cotton varieties in northern Australia granted late in 2006 provided the catalyst to test cotton during the following wet season’s fallow.

“We were already spraying glyphosate to control weeds during the fallow, so by growing cotton we could also generate income and provide a break between sugar crops,” said Wayne.

In hindsight, planting a commercial area of cotton in 2008 when the Halls, Dal Santos and 10 others first did was a brave decision as there was no local knowledge on how to grow the crop – just a ‘best bet’ based on a desktop assessment of the best sowing date and extrapolation of husbandry practices from other areas. Variety, nutrition, growth regulator management, row spacing and planting population were all speculative.

An overwhelming demonstration of this risk was the difference in performance between the varieties available at the time, Sicot 80BRF and Sicala 60BRF, which when averaged over 12 fields in 2008 had a yield average of 4.0 and 8.6 bales per hectare respectively. For the growers who tossed a coin to choose between these two varieties with no local data, the contrast between outcomes could not have been more stark.

Not surprisingly with examples such as this, yields were variable in 2008 with some promising yields of around 10 bales per hectare and excellent fibre quality being produced in some fields.

History has repeatedly shown for new crops that farming practices cannot be simply transferred from traditional agricultural areas to northern Australia. They are most likely to be unsuitable, and destined for failure. Cotton research commenced in 2008 to meet the need for local production knowledge, and in the hope of avoiding past errors in northern Australia.

The research that was conducted over a subsequent five year period had two objectives:

■ To examine ways to mitigate the risk of wetter than average years so that growers who used cotton as an annual rotation cropping option for cane could do so without suffering losses in wet years and achieve good returns in average or drier than average years; and,

■ The development of agronomic practices that better suit local conditions.

The approach was to work closely with the farmers growing cotton, and much of the research has been conducted on their
farms. Having pioneering growers sowing commercial scale areas of cotton helped to focus research priorities and identify problems.

Research found that many southern production practices required modification for Burdekin growing conditions. The most notable issues were growth regulators, nitrogen fertiliser management and identification of regionally appropriate varieties. Sowing date was confirmed to be just prior to the monsoon (in late December to early January) so that crops are most likely to avoid cloudy weather during flowering and boll growth in March and April. Yield potential was found to be dependent on:

- Sunny weather conditions during March and April; and,
- Responsive management.

So what was the actual impact of this partnership between R&D and commercial test farming of cotton in the Burdekin? We believe the following two examples indicate the success of this research program.

**Closing the gap between commercial and potential yield**

Figure 1 shows the gap between average commercial yields and yield potential (derived from small plot experiments on a well drained soil) together with the best commercial farm average picked each season. The gap between yield potential and the valley average has narrowed considerably since 2008 despite lower overall yields since 2010. Prolonged cloudy weather in March has been confirmed to have a strongly negative impact on yield potential. Cloudy conditions during March in 2010–12 capped yield potential for these seasons. A run of wetter than average seasons has gripped the Burdekin since 2007, and 2012 had the wettest monthly total on record for March. Two consecutive weeks of cloudy weather after March 16 significantly reduced both R&D and commercial test farm yields. This contrasts with 2008 and 2009, which were very wet prior to flowering (2009 is the wettest season on record with over 1800 mm falling during January and February) but had sunny conditions during March and April allowing crops to compensate and produce high potential yields.

**The benefits of locally-focused research and development**

The commercial and research partnership in the Burdekin has allowed new growers who tried cotton for the first time from 2010 onwards to avoid the costly learning curve that was experienced by the initial pioneering growers between 2008–09.

Layton and Sheree MacDonald grew their first crop of cotton in 2011 and Jeff Marson in 2012. By this time the varieties Sicot 74BRF and Siokra 24BRF had been shown to be best suited and significant advances had been made in tailoring growth regulator and nitrogen management to wet season conditions.

Layton and Sheree came to the Burdekin to be closer to family, shifting from Emerald. They bought a reasonably run-down cane farm near the township of Millaroo that offered tremendous potential once the fields were re-worked and the weeds better managed. Layton identified that cotton could have an excellent fit as a high value crop that with Roundup Flex technology would give them an edge with weed management.
Despite the challenging seasonal conditions of 2011 and 2012, and trying a new crop on a new farm in a new area, the MacDonald’s produced the highest farm yields in both seasons using a tailored management approach based knowledge gained from the R&D and previous growers. They have grown crops with good margins as a result of carefully managing inputs to suit conditions as the season has progressed each year.

Sugar grower Jeff Marson grew cotton for the first time in 2012. He had observed cotton on a neighbour’s farm and also saw an opportunity for a rotation crop during the cane fallow. Jeff grew cotton on clay and sandy textured soils (the former proving challenging) and despite a lack of suitable equipment was able to grow a reasonable crop of cotton for the conditions of 2012. He is looking forward to having a test field planted to cotton again this coming season.

Jeff’s crops in 2012 confirmed the experience of others that yields on clay soils were less than sandier textured soils. Insufficient crop nitrogen uptake has been identified as one reason for lower yields on clay soils. We had expected nitrogen losses to be greater on the sandy soils than the clay soils due to leaching below the roots but research has shown this not to be the case provided most nitrogen is applied in-crop. Improving the nitrogen uptake efficiency in heavy clay soils is the subject of current research. There have been promising results with slow release fertilisers applied at sowing and in-crop application of stabilised ammonia forms of nitrogen.

To sum up

A five year partnership between local farmers new to cotton in the tropics and research has shown cotton can be feasibly grown in the Burdekin. But the profile of climatic risks and production costs are very different to southern production systems due to the occurrence of wetter than average seasons rather than droughts. Being a continuous cropping region permits fixed costs to be calculated for the growing season only and not include the time land would otherwise be spelled in southern production systems for soil moisture conservation or a drought-induced fallow.

It is the spectre of wetter than average seasons that limits yield potential in the Burdekin region. In these seasons (which occur approximately one third of the time), yield potential is limited by cloudy weather and is likely to fall within a range of 6.5-8.5 bales per hectare. In the remaining sunnier seasons, yields are likely to be much higher with test planting suggesting potential for greater than 10 bales per hectare. Yield potential is difficult to predict at planting, so managing a crop in terms of minimising early season input expenses is critical so that costs do not exceed returns in the seasons that end up having more intense and cloudy monsoon conditions with reduced yield potential.

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More information contact Stephen Yeates (CSIRO) 0417 015633 or Paul Grundy (QDAFF) 0427 929172.