

# Using Pix on UNR cotton: A reply

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The article titled “Using Pix on UNR Cotton” appeared in the April–May 2005 issue of *The Australian Cottongrower*. It is an extension article about a Pix trial on ultra narrow row (UNR) and one metre cotton at Merrowie Station, Hillston in southern NSW.

Row spacing in the UNR cotton was 25 cm. Unfortunately the trial was poorly designed so that results and conclusions reported are either inaccurate or not meaningful. So also is the possible extension message, which is disappointing, particularly in a year when the cotton industry’s extension system has been under review. As an objective reader, the article tells me something about cotton in southern NSW but almost nothing about how or why Pix is used on UNR cotton.

In fact why was the work even done? After all, the article states that “there were detailed experiments in 2001–02 and 2002–03 in UNR and conventionally spaced cotton in Hillston, Breeza and Narrabri which gave no statistically significant differences in yield, maturity or fibre quality compared to existing production practices.” Was the effect of Pix not investigated in those years, even though it was “a popular management option,” according to the article?

The aim of the work is uncertain. Perhaps it was “to make direct comparisons of the effects of Pix between UNR and conventionally spaced crops,” or was it “to understand how UNR crops respond to growth regulators in order to tailor management.” Both quotes are taken from the introduction to the article but neither quite explains the conduct of the experiment.



The Pix trial on UNR at Hillston.

There was another article on “15 inch” or 37 mm row cotton in the February–March issue of *The Australian Cottongrower*. It was based on observations, not research. Therefore narrow row cotton is getting some attention, but will this interest continue after the very big yields on one metre cotton in 2004–05?

## EXPERIMENTAL DESIGN

The treatments applied to both UNR and conventional (one metre) cotton in the Hillston experiment were:

- Pix at 600 ml at first square (December 12), plus another 300 ml on December 22, followed by the so-called “cut-out” application on January 19 of 1.5 litres per hectare — that is, a total of 2.4 litres per hectare.
- As above, without the 600 ml rate at first square.

There was no nil Pix (control) treatment so we cannot determine how UNR and conventional crops in southern NSW respond to growth regulators, if at all. Without a control this gives four treatments. There were also four replications, giving nine degrees of freedom (df) for error, which is insufficient.

Non-statisticians need only know that a minimum 15 df for error is needed to detect small differences between treatments — for example, in yield. Otherwise any differences are considered to be due to random variation. The solution is to increase the number of treatments and/or replications.

The objective of trialling UNR cotton in southern NSW must be to describe a management system for a cooler environment or shorter season than occurs in the majority of the industry. In most seasons at that location one metre cotton does not cover the rows so one alternative is to put the rows closer together.

I suspect that, as elsewhere, the aim of Pix usage is to advance maturity or to stop the plant putting on late season squares which cannot be matured before the onset of cool weather. It is no doubt thought to be an important option in a short season.

But both rate and timing of Pix need to be considered. The experimental design should have included UNR and one metre rows, with one determinate variety and several Pix responsive or indeterminate

varieties. Such a plan would have allowed the real value of Pix to be determined.

A range of nitrogen rates should also have been used since nitrogen status affects maturity and therefore interacts with Pix requirement. Two experiments looking at the three variables — variety, Pix and N rates — on each of two row spacings would be detailed but are practical. After all, the interactions between the variables are more important than the main effects.

We know from published information that V3RRi is very unresponsive to Pix so why was it the only variety used? Why was 2.4 litres per hectare of Pix applied when we don’t even need that much on indeterminate varieties in a much longer daylength environment? Why were both UNR cotton and one metre cotton sown at 12 plants per linear metre?

Have plant population studies been done to determine the optimum sowing rate for UNR cotton? It is unlikely that the same plant spacing within rows is optimum for both cotton types when the spacing between rows is so different. Why was vegetative growth rate not measured regularly so that the timing and rates of Pix used could be compared to a published standard?

## RESULTS

According to the results in the article there were no differences in yield, maturity or quality between UNR and one metre cotton for the third successive year. But I would say that all the trends were expected. The mean hand-picked yield of the UNR cotton was 10.3 per cent higher than the yield of the one metre cotton. It was entirely due to a higher plant population because the UNR plants had significantly smaller bolls and significantly fewer nodes, total fruit and total fruiting sites when compared to the plants on one metre rows.

A 10 per cent yield difference would be commercially significant despite not being detected experimentally. Plant population appears to be the key. It is the only yield parameter which can be controlled.

Other work referred to in the article apparently shows that early inter-plant competition for light reduces yield in UNR

cotton. Therefore why not reduce plant population within rows and/or increase row spacing? If early maturity is the goal then use less nitrogen.

The data in this trial tell us little about the relationship between early retention and maturity at either row spacing. On the basis of this work it cannot be claimed that higher first position boll retention in UNR cotton is important to avoid delaying maturity. In fact the reverse is the case.

First position retention was significantly less in UNR cotton (40 per cent), compared to one metre cotton (53 per cent), while there was no difference in days to 60 per cent maturity. Total retention could be a better indicator of maturity since it also was not different between treatments.

Total retention was low, averaging 61 per cent across all treatments. Perhaps it was caused by grubs or cold weather. If early fruit shedding in UNR cotton is “most likely due to low light levels resulting from

early canopy closure” as claimed, why were both first position and total retention also low in the one metre cotton?

First position retention in one metre Ingard cotton in other areas was often up to 80 per cent. Whatever the reason, low retention is a major problem. Retention in Bollgard at Merrowie in 2004–05 should be checked.

The outstanding question remains, “What was the real objective of using Pix”? Mean final height of the one metre

cotton was 61 cm while the UNR was only 49 cm. How small do we want the cotton to be? Without a nil Pix control we do not know if the high rates of Pix decreased yield or advanced maturity or even affected plant height.

### MANAGEMENT OPTIONS

Research which produces the same result in three successive years is normally regarded as having proven a point. Unfortunately, in at least one of those years the result was inconclusive.

Therefore we cannot be totally confident that we would not expect differences in yield, maturity or quality between these row spacings in the future. Growers in southern NSW who feel there is a future in UNR cotton for their area or farm might consider a few ideas, such as:

- If one metre rows have been unsatisfactory, it is unlikely that the best option is at the other end of the spectrum. Consider 37, 50 or 75 cm rows, if either one is practical, but be ready to change other management practices as well. Otherwise stick with a UNR system if it is making money and looks sustainable.
- Try more indeterminate varieties. Spraying V3RRi seven times confirms that variety choice has almost been a

lottery. Good Ingards were sprayed one to three times. Bollgard varieties will not need spraying for heliothis at all and more indeterminate varieties will respond to Pix.

- Reduce plant density to three to six plants per linear metre. Ignore plant structure. Several varieties have a so-called columnar structure which might appear best for UNR. But they also give outstanding yields when planted at less than 10 plants per metre on one metre rows. The reverse might also be the case.



Picking a 15 inch crop.

- Use less nitrogen with some applied pre-sowing and the remainder flown on as a solid or liquid or with irrigations. Try foliar fertilisers from first flower to see if they assist retention.
- Pix requires a lot more work. I cannot see how big pre-Christmas rates could be beneficial. But very small rates early might assist retention. Try several rates of 50 ml per hectare with a good foliar fertiliser from two weeks after first flower. Check retention weekly. The reason for using late Pix is the same in all latitudes. Late Pix should benefit indeterminate varieties.

### CONCLUSIONS

The agronomy of UNR cotton does not appear to have been consolidated after three years of research. It is all the more disappointing when that UNR research has been poorly designed because the results are inconclusive.

We cannot say with confidence that there is no difference in yield, maturity or quality between UNR and one metre cotton. Site mean fruit retention was very low compared to accepted standards. I suspect that maturity would be advanced if retention were higher.

