

ROW CONFIGURATION OPTIONS FOR DRLYAND AUSTRALIAN COTTON

Michael Bange¹, Jane Caton¹, Darin Hodgson¹, Rose Brodrick¹, David Kelly², Robert Eveleigh³, John Marshall³ and James Quinn³

1. CSIRO Plant Industry, Narrabri, NSW, 02 67991500
2. Macpherson Agricultural Consultants, Goondiwindi, Qld.
3. Cotton Seed Distributors, Wee Waa, NSW.

SUMMARY

Dryland cotton is often grown using skipped rows because of variable summer rainfall. Skip configurations are used to: increase the amount of soil-water available for the crop especially during flowering, which can influence the potential lint yield and quality; reduce the level of variability or risk associated with production; and reduce input costs. Expansion of production into new areas and the need for flexibility in farm equipment setup has meant there are more alternative configurations to the traditional single and double skip configurations. Super single (1 present, 2 skipped) may be suitable where rainfall is considered too low for profitable double skip production, while alternate row (1 present, 1 skipped) configurations are being considered instead of double skip to take advantage of equidistant spacing to improve yield and quality. This paper presents the latest summary of research comparing the yield potential of different dryland configurations. This information can be used in conjunction with other factors such as costs, fibre quality, climate, cropping history and equipment availability.

INTRODUCTION

Dryland growers can choose to sow their crops using conventional solid row configurations similar to those used in Australian irrigated production, or use configurations that considerably increase row spacing or remove entire rows. The intention behind skip row configurations is to provide slowly available soil water to the planted rows to allow continued growth during dry periods between rainfall events. The benefits lie primarily in: (a) a reduced risk of negative effects of water stress on fibre quality, (b) reduced yield variability, and (c) better economic returns due to production costs being reduced more than the yield loss relative to solid planted cotton (Bange et al. 2005). Skip row cotton provides an option for increasing the area of cotton which can be grown, allowing some upside in production if conditions are favourable and less downside in potential yield losses and fibre quality discounts if the seasons are un-favourable.

To allow growers to choose the appropriate configurations, information on differences in relative yield and quality potential, and costs between configurations is needed. This paper summarises the latest information from data collated from both on-farm and specific field experiments that compare

the differences in yield between a range of dryland row configurations (solid, single skip, double skip, super single and alternate row). A closer examination of super single and alternate row compared with double skip is also included.

METHODS

A considerable number of controlled field studies (dryland and limited irrigated) in Australia have been conducted over many years to compare the lint yield of dryland row configurations. The key benefit of these comparisons is that the different configurations are compared at the same site with the same management. Early comparisons (especially single and double skip compared with solid) included those undertaken by Bruce Pyke, John Marshall and Brian Hearn. In the late 90's Phil Goynes continued these comparisons on the Darling Downs. Details of these experiments are found in Bange et al. (2005). In recent years CSIRO and CSD have continued these controlled comparisons across the industry with both grower and consultant assistance. These later comparisons now include configurations such as super single and alternate row (1 in 1 out, or 80 inch).

To compare the yield potential of the various configurations all available data from these studies are combined. The data is then plotted from one particular configuration against another to determine at what point where one configuration on average outperforms the other.

RESULTS AND DISCUSSION

In recent evaluations (10 sites from 2005 to 2012) involving comparisons of super single and double skip row configurations (Figure 1) super single performed better when yield potential for double skip was low, and this was generally associated with low seasonal rainfall. Using the responses in Figure 2 super single performed better when the yield potential of double skip was less than 2.3 bales/ha.

In the case of evaluations (7 sites again from 2005 to 2012) involving alternate row configurations compared to double skip it shows that alternate row was either better or similar to double skip (Figure 1). It should be noted however that the lowest yield attained by the double skip in these comparisons was 3.7 bales/ha and all sites had considerable seasonal rainfall (most of which occurred early in

the season). This meant that no full comparisons of configuration like those presented in Figure 2 could be made for alternate row configurations.

When recent data from all comparisons of other configurations were combined (solid, single skip, double skip, and super single), updated potential yield responses between configurations were developed (Figure 2). In these graphs the crossover values where one configuration begins to outperform the other are also labelled. This information can be used in conjunction with other factors such as changes in costs, fibre quality, climate, cropping history and equipment availability in making choosing a row configuration.

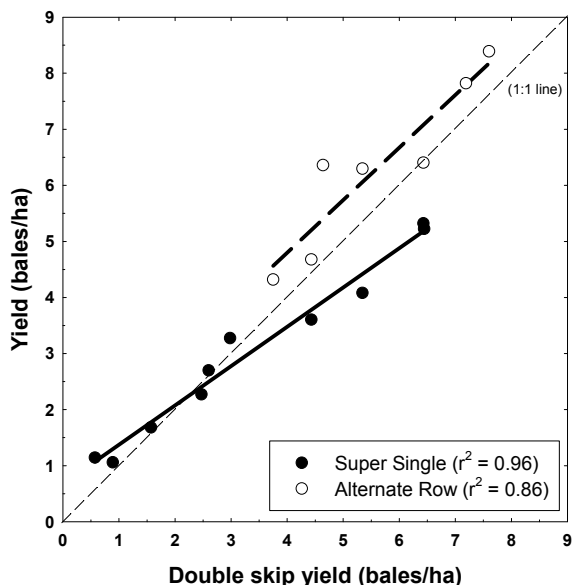


Figure 1: A plot of super single and alternate row configuration yields against the double skip yield measured at the same sites. Also shown is the 1:1 line. The closer points are clustered around the 1:1 line the more the yields between the configurations are similar (Adapted from Bange et al. 2012).

ACKNOWLEDGMENT

Many thanks to the grower co-operators who have graciously allowed these comparisons to be undertaken on their farms.

REFERENCES

- Bange MP, Carberry PS, Marshall J and Milroy SP (2005). Row configuration as a tool for managing rain-fed cotton systems: Review and simulation analysis. Australian Journal of Experimental Agriculture 45, 65-77.
- Bange M, Caton J, Hodgson D, Brodrick R, Kelly D, Eveleigh R, Marshall J Quinn J (2012). Expanded row configuration options for Australian rain-fed cotton. Australian Agronomy Conference. Oct. 2012 Armidale NSW.

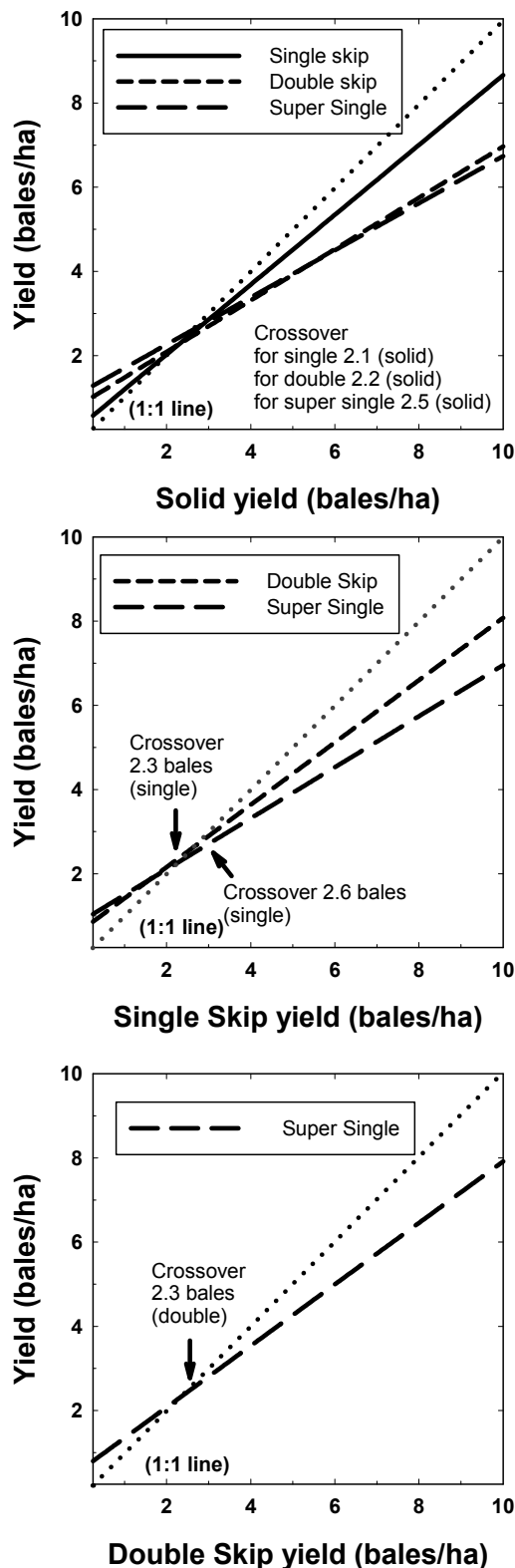


Figure 2: Comparison of average yields of various combinations of row configurations. Responses are generated from controlled comparisons undertaken over many seasons. Crossover refers to the average yield potential at which there is no further improvement in the yield of a particular configuration compared to the configuration stated on the bottom of each graph. For example in the middle graph, when comparing double skip to single skip, the average yield potential at which single skip outperforms double skip is 2.6 bales/ha.