

Executive Summary

Raingrown cotton production in Queensland has been expanding in recent years and in the 1998/99 season reached 33% of hectares planted (irrigated plus raingrown) and represented 20% of Queensland's cotton production (Dowling 1999).

Recent developments in the application of crop models indicate that the use of models would enhance the advice given to growers for the production of raingrown crops. However improvements need to be made in their ability to cope with the water balance associated with various row configurations. This project was designed to provide data to achieve this improvement and to investigate the response of cotton to row configurations on a number of major soil types and over various environments.

Row configuration (no skip, single and double skips) by variety experiments were conducted on Waco and Box soils on the inner Darling Downs (Pirrinyan and Nandi - Daandine areas) in 1995/96 and 1996/97. Experiments in 1997/98 were conducted on Waco, Box and Grey Clay soils. In 1998/99 experiments were established on Waco Grey Clay and Mywybilla soils at Pirrinyan, Warra and Macalister respectively. In addition to these inner Darling Downs experiments plantings were made at Hermitage Research Station on the eastern Downs in 1995/96 and 1996/97, but with minimal data being retrieved.

Row configurations were based on 1.0m spacing. In some experiments a no skip treatment with 0.76m or 0.75m row spacing was included. In 1996/97 additional plant densities were trialed and in 1997/98 a configuration referred to as an alternate skip (rows 2m apart) was included at the Warra site. The cotton cultivars included varied over the experiment series and in later experiments were Siokra V15i.

Crop development, biomass accumulation, leaf area accumulation and root length density were monitored in addition to yield and fibre quality. The time course of soil water depletion within the plant row, between rows and at intervals of 0.5m from the plant line to the middle of the skip, was followed with a neutron probe.

Significant yield advantages from skip row configurations were not found in these trials but fibre quality was enhanced. Superior gross margins from skip row cotton can be achieved due to savings in variable costs and improved fibre quality resulting from the extra soil water available for developing bolls. Neither plant densities nor varieties significantly altered these outcomes. The crops on the Eastern Downs indicated that good yields can be achieved in this region and that a narrow row configuration was favoured.

The experiments provided new insights into the extraction of water from the soil profiles which will enable the redevelopment of water supply routines in the cotton predictive models.