COTTON IRRIGATION TRIALS IN THE SOUTH BURNETT

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INTRODUCTION

Cotton is entering it's fifth year of production in the South Burnett. Some 600 hectares were planted in 1987 by eight growers located from Cushnie to Windera with the main production area around Byee.

Over two thirds of the crop is irrigated and the area is expected to expand with the completion of the J. Bjelke Petersen dam on Barker Creek near Murgon towards the end of 1988. The dam will improve water supplies along Barambah Creek to an area of 4700 hectares.

Irrigation trials have been conducted at Byee over the last two seasons as part of a Statewide project funded by the Cotton Research Council.

The aims have been to:

* determine the crop yield response to a range of irrigation treatments on Byee soils
* develop a decision support package "WATERSCHED" to help cotton growers make better irrigation decisions
* promote improved irrigation scheduling techniques to existing and potential cotton growers through a range of extension activities.

TRIAL PROCEDURES

Siokra variety was planted in both years in a representative lower alluvia Byee soil of the Black earth great soil group (Ug 5.15).

A range of irrigation scheduling treatments were imposed on six row strips in a commercial block which was prewatered. Treatments were scheduled based on potential crop water use estimated by a crop factor - Class A pan evaporation model using data from the weather station at Byee.

The trial site and results provided a good forum for inseason farm walks and preseason discussion meetings to extend the results to growers.

RESULTS

Peak yields in both seasons were in excess of 8 bales per hectare and were achieved with 3 irrigations for the 90 mm deficit in 1986/87 and for the farm treatment (around 120 mm deficit) in the 1987/88 season (Table 1). The timing of irrigations occurred during the flowering-boll development period (Figure 1).

Table 1. Yield response to irrigation scheduling treatments

Treatment	YIELD - bales/ha (no. of irrigations) 1986/87	1987/88
90 mm deficit	8.5 (3)	8.1 (5)
FARM	8.1 (3)	8.1 (3)
115 mm deficit	7.6 (1)	7.9 (4)
65 mm deficit	7.9 (3)	7.6 (6)
40 mm deficit	7.2 (7)	*
Dryland	6.9	2.9

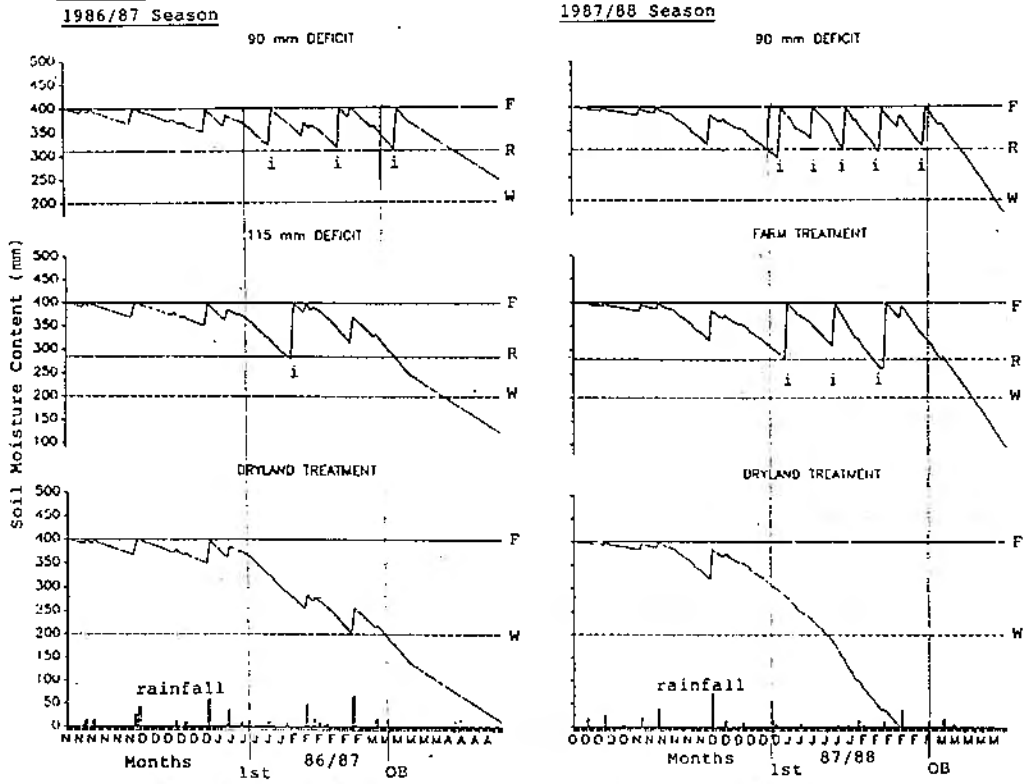
* The 40 mm deficit treatment was not included

Very frequent waterings were unnecessary and in fact depressed yields slightly in both years.

The dryland yields reflect the marked contrast in seasonal conditions with 1986/87 yielding 6.9 bales/ha while in the extreme dry of 1987/88 only 2.9 bales/ha were produced.

In 1986/87 soil moisture for the dryland treatment was close to field capacity at flowering in early January and did not reach wilting point until after bolls had started to open (Fig. 1). By contrast in 1987/88 little rain fell after the start of December with soil moisture dropping 120 mm below field capacity soon after flowering and passing wilting point by mid January.

Figure 1. Soil moisture content (mm) for 3 treatments in two seasons at Byee



Key: i = irrigation, F = field capacity, R = refill point, W = wilting point
1st = first flowers, OB = open boll

CONCLUSIONS AND IMPLICATIONS

High yields of cotton (8 bales/ha) can be produced by scheduling irrigations so that the soil moisture does not drop more than 120 mm below field capacity on Byee alluvial soils. This should allow greater flexibility in irrigation management than in other Queensland cotton districts where deficits of 75 to 90 mm are suggested as optimum. The likely yield depression at deficits greater than 120 mm will be studied in the coming seasons trials.

The decision support package "WATERSCHED" enabled irrigation dates to be easily predicted and will be enhanced when the automatic weather station and computing facilities become fully operational before the 1988/89 season.

Growers are using the trial information now to calculate their crop water requirements so that application for allocations (3 to 4 mL/ha) from the new dam can be prepared. In season they will be supported in the use of "WATERSCHED" to order water and irrigate on time.

The ongoing trials will continue to provide the focus for extension activities to demonstrate the benefits of irrigation scheduling in the coming season.

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