

COTTON - A DECADE AND MORE OF COMMERCIAL CROP PERFORMANCE

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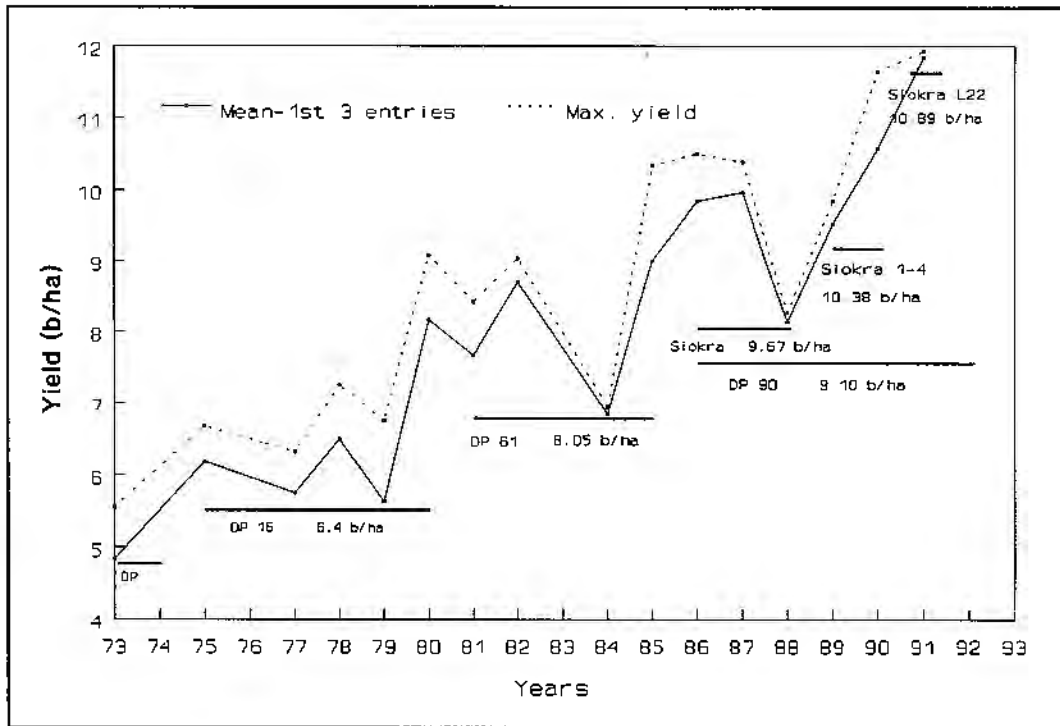
Introduction

Documentation of crop yields and varieties in the Toowoomba Royal Agricultural Show Irrigated Crops Competition since 1972 demonstrates the great advances achieved by cotton breeders as new varieties have been introduced to the industry. Data is based entirely on commercial crops entered in the competition on the Darling Downs. Agronomic data for those crops collected since 1987 also provides an interesting documentation of commercial crop management on the Darling Downs. Unfortunately, previous crop history, which influences nutrition inputs, and insecticide applications were not recorded, depriving us of a more complete picture. Crop yields are determined from the field area, precisely measured, required to produce a full module. The module is then weighed and ginned commercially at the ginnery.

Varieties

The influence of improved varieties on crop yield since 1973 is shown in Figure 1. It represents mean yield of the first three crops in the competition and the maximum yield each year. Horizontal lines below the graph show the period for which each variety was either the dominant or, as in many years, the only variety grown and entered in the competition.

Figure 1. Crop yields 1973 to 1991



Seasonal variations are obvious but the influence of other management inputs which may have changed in the period up to 1987 cannot be determined. Experience suggests, however, that varietal change would have been a major component of the yield advances. The other major component would be the effect of improved pesticide management practices, many of which could be attributed to influences of the SIRATAC program.

The sustained influence of the Deltapine varieties from before 1973 up to the present is testament of their value to the Australian cotton industry.

The Australian CSIRO breeding program made another mark in 1986 with the commercial production of the Siokra varieties. Siokra was introduced at the same time as Deltapine 90, with a slight yield advantage. The improved Siokra lines,

1-4 in 1990 and L22 in 1991, have produced further yield advances. Other new varieties from the CSIRO program are also achieving good yields, however, only two, CS189 and Sicala 33, have been represented in the competition to date.

A significant change in 1991 has been the increased number of varieties entered, in contrast to the previous years when, in the main, one variety only has been included. This represents a significant benefit to the industry in which growers now have a suite of varieties available from both the CSIRO and Deltapine breeding programs. This suite of varieties adds a new dimension to variety management as growers now select and match varieties for appropriate situations on the basis of extensive commercial variety testing. Its influence on future crop yields may well be as profound as those documented to date but almost certainly more complex to interpret.

Nitrogen

Specific details of crop management practices have only been obtained for crops entered in the Irrigated Crop Competition since 1987. An analysis of the information obtained on N fertiliser practice should shed some light on current usage patterns amongst Darling Downs irrigated cotton growers.

As Table 1 indicates, there is no trend apparent in relation to the total amount of N applied, over the 5 year period. The large variability in total application rate between individual crop entries is best related to previous cropping history.

Table 1. Nitrogen use

Year	No. of entries	No. of participating farmers	Average pre-plant (units N)	Average post-plant (units N)	Average total application (units N)	Range of application (units N)
1987	9	7	155	42	176	160-197
1988	2	2	141	70*	176	133-220
1989	4	3	142	70*	162	109-234
1990	8	6	165	44	193	126-224
1991	17	14	128	52	161	50-225

* One user only

In general, cotton on cotton, maize or sorghum received 175 to 225 units N, cotton fallowed from wheat 125 to 180 units N, and cotton on soybean or chickpea ground 50 to 165 units N.

There does appear to have been an increase in the practice of post-plant N application. In 1991, 10 out of the 14 farmers who entered the competition used this practice. Not surprisingly, a compensatory reduction in the quantity applied pre-plant seems to have occurred.

Ninety percent (90%) of the farmers who applied N post-plant in 1991 sidedressed with solid urea, at rates from 35 to 90 units N. Only one applied water run N. Pre-plant N application was generally in the range of 100 to 150 units N. In 1991, 50% of this was as solid urea, 50% as anhydrous ammonia.

Using this information as an indicator of N fertiliser practices in irrigated cotton on the Darling Downs, we can conclude that:

- there has been a levelling out in total N application rates
- fallow history is the major determinant of total N applied
- an increased frequency of post-plant N application has occurred
- a wider use of water run N application is likely in time

Other agronomic considerations

A phosphorus fertiliser was used by the majority of farmers each year, with the average application rate in each of the five years being 20 kg/ha P approximately. Actual application rates varied from 10 to 45 kg/ha P. Addition of other elements via fertiliser was not common. During the 5 year period 1987 to 1991, 40 cotton crops were entered in the competition. Ten percent (10%) of these received potassium, 10% received sulphur and 20% received zinc.

Weed control practices were relatively consistent over the period and between most farms. Two herbicides were usually applied pre-plant to control both grasses and broadleaf weeds. This was generally topped up with a band application at planting.

All crops entered in the competition received a pre-plant irrigation. The average number of in-crop irrigations was three, with up to 5 being common for those crops in the Northern Downs, closer to Dalby, on soils of lower water holding capacity.

