

EVALUATING EARLINESS IN COTTON AT EMERALD - 1983/84.

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At Emerald, in the 1982/83 season, significant levels of field resistance in Heliothis armiger to synthetic pyrethroid insecticides were detected. In the field, many of the later maturing crops were severely damaged by insects despite heavy insecticide application.

Research at Emerald and elsewhere has demonstrated the value of early maturity in avoiding late season insect damage in cotton. Early maturity can be manipulated by both genotype and management.

In two seasons at Emerald, Waite* and Murray* demonstrated the value of early maturing cultivars in experiments at the Emerald Research Station. Their experiments were conducted under three managements systems, (i) fully protected, (ii) managed and (iii) unsprayed. Under these experimental conditions, the early maturing cultivars yielded relatively better in treatments experiencing greatest insect damage.

In other cotton producing areas, particularly in the Southern U.S., earliness has been a major tool in managing Heliothis sp.

With the background of insecticide resistance at Emerald in the 1982/83 season, a demonstration area to evaluate earliness was established in September 1983.

1983/84 Demonstration.

Two varieties, Deltapine 61 and McNair 220 were planted in strips, 24 metres wide. Two of the strips were irrigated at an 80 mm deficit and two adjacent strips were irrigated at a 120 mm deficit according to a simple water balance model. (see Yule and Keefer paper for details.) Insecticide treatments were applied to the whole area using SIRATAC and measurements were made of plant development and crop water use. Two machine harvests were taken as the crop matured and samples from each treatment were ginned to calculate lint yields.

* Entomologists, Department of Primary Industries, Nambour and Emerald respectively.

Results.

The effects of irrigation treatments on plant development and yield of the two cotton varieties are shown in Table 1.

Table 1. Irrigation effects on plant development and yield of two varieties of cotton, Walter site 1983/84.

	McNair 220		Deltapine 61	
	80 mm	120 mm	80 mm	120 mm
Irrigation Deficit	80 mm	120 mm	80 mm	120 mm
Irrigation Number	5	2	5	2
Date of Planting	30 Sept 83	30 Sept 83	30 Sept 83	30 Sept 83
Date of 100 squares m ⁻²	28 Nov 83	28 Nov 83	2 Dec 83	1 Dec 83
Date of 80% boll opening	25 Feb 84	25 Feb 84	2 Mar 84	2 Mar 84
Max plant height (cm)	95	82	121	105
First pick yield (bales/ha)	8.28	7.60	7.73	9.11
Second pick yield (bales/ha)	0.52	0.42	1.58	0.85
Total yield (bales/ha)	8.80	8.02	9.31	9.97
% harvest in 1st pick	94	95	83	91

The table shows that McNair 220 produced squares about four days earlier than Deltapine 61 and was approximately six days earlier in terms of 80% boll opening.

Deltapine 61 grew taller than the McNair 220 and was taller throughout the season regardless of irrigation strategy. However, frequent irrigation produced a greater height response in Deltapine 61 than in McNair 220.

Using percentage of crop harvest at first pick as a measure of earliness, McNair 220 was consistently earlier in maturity than Deltapine 61. Irrigation strategy had little effect on earliness of the McNair 220 but frequent irrigations (the 80 mm deficit treatment) delayed the maturity of Deltapine 61.

Comparing the 1982/83 and 1983/84 seasons.

Since irrigation strategies for the Walter site were similar for both seasons, a comparison is made between Deltapine 61 in 1982/83 and in 1983/84. Figures 1 and 2 compare the square production patterns. For both irrigation treatments, square production in 1983/84 was greater during December and continued for a longer period into February. This suggests that seasonal conditions were more favourable in 1983/84 than in 1982/83.

Figure 3 shows the development phases for both varieties in 1983/84 and for Deltapine 61 in 1982/83. McNair 220 was earlier in maturity than Deltapine 61 in 1983/84. Deltapine 61 in 1982/83 was earlier in maturity than Deltapine 61 in 1983/84.

Conclusions.

Earliness can be manipulated by both variety and irrigation strategy. In 1983/84, a favourable cotton season, earliness gave no yield advantage. This could be expected in a season with low insect numbers, particularly with low numbers later in the season. Earliness will only be important if it allows escape of late season insect pests or stabilizes production in some other way.

Acknowledgements.

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Figure 1. Square Production of Deltapine 61 Irrigated at 80mm Deficit.

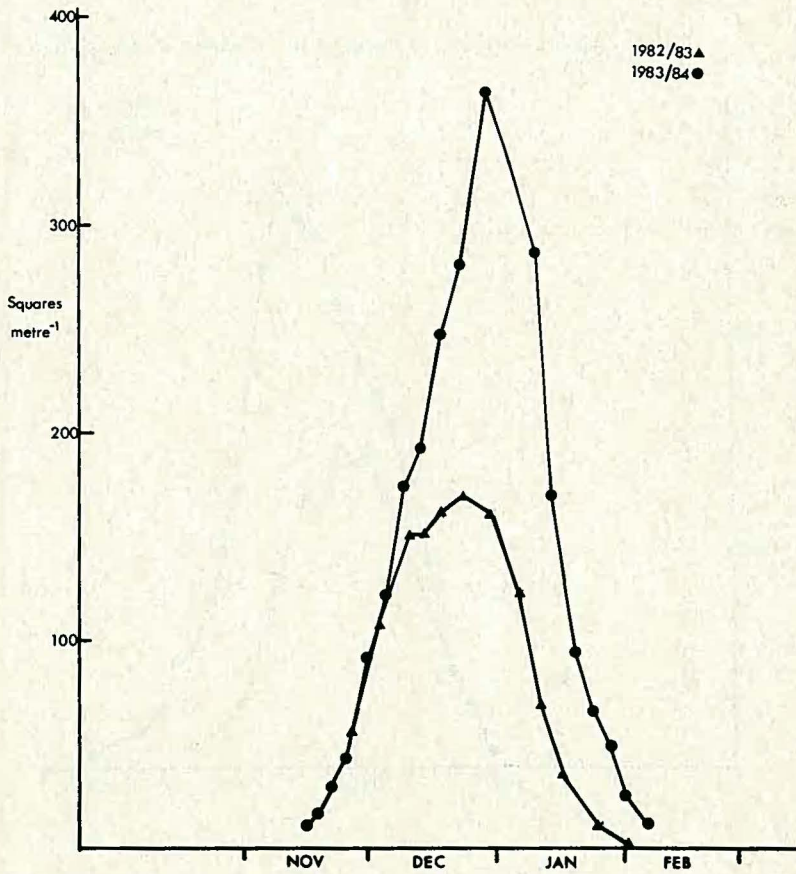


Figure 2. Square Production of Deltapine 61 Irrigated at 120 mm Deficit.

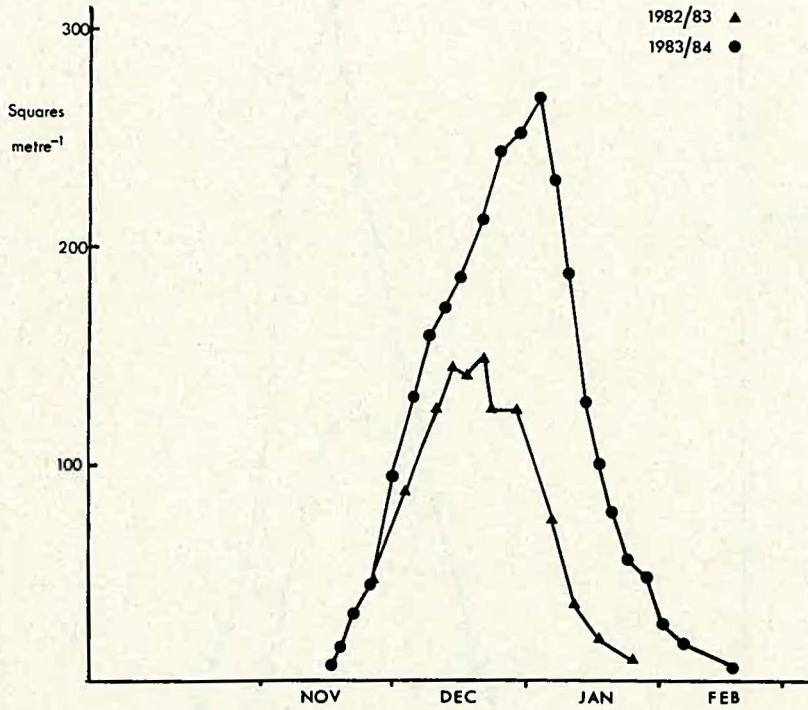


Figure 3. Development Pattern for M^cNair 220 Compared with Deltapine 61 Planted in Two Seasons.

