CHOOSING A CULTIVAR

Peter Lawrence

QDPI, Biloela

In 1985 one of the main questions asked by growers was "How does Deltapine 90 and Siokra compare with Deltapine 61?". Now in 1986, the questions is "How does Deltapine 90 compare with Siokra?".

To start answering this question let us examine the relative yields of the two cultivars in different cotton growing regions over a few seasons. Table 1 is a summary of most of the data from both small and large plot trials conducted by CSIRO, QDPI and CSD where Siokra and Deltapine 90 were both evaluated.

My conclusions from this data are:

Siokra is the best choice for the southern Darling Downs and for the Breeza/Boggabri regions.

Deltapine 90 is the best choice for raingrown conditions and for Bourke.

For all other cotton growing regions the choice between Siokra and Deltapine 90 will partially depend on the type of season expected. For example, the 1984/85 season favoured Deltapine 90, whereas the 1983/84 and 1985/86 seasons favoured Siokra. Since it is difficult, if not impossible, to predict the type of season in advance, let us enquire how agronomic and insect management strategies can affect our choice of cultivar.

Data and ideas presented on the management of cultivars has been obtained from observations on commercial crops and results collected from trials in the four major cotton growing regions of Queensland.

Table 1: Relative yields of Siokra and Deltapine 90 in different cotton growing regions and different seasons.

Region	yield Siokra as % of Deltapine 90			
	83/84	84/85	85/86	
Irrigated				
Emerald	98	98	111	102
Callide/Dawson	101	93	113	102
Darling Downs	111	129	112	117
St George	-	84	112	98
McIntyre	103	101	96	100
Gwydir	123	98	107	109
Namoi	128	89	109	109
Breeza	-	106	144	125
Bourke	-	92	89	91
Warren	113	104	93	103
Raingrown				
Central Queensland	-	101	98	
New South Wales	-	96	87	

Increasing suitability of Siokra

Bourke
St George
McIntyre
Central Q
Warren
Namoi / Gwydir
Downs
Breeza

PLANTING

Deltapine 90 is more sensitive to time of planting than Siokra. The optimum planting date for Deltapine 90 appears to be similar to Deltapine 61, that is, early October to early November. Significant yield reductions occur when Deltapine 90 is planted after early November.

Siokra on the other hand has a wider planting period and performed well even when planted in late November or early December (eg. see data in Table 2).

Deltapine 90 is more sensitive to high plant populations than Siokra. Observations on commercial crops indicate that high populations of Deltapine 90 (ie. more than 14 plants per metre) causes more plant competition which results in vigorous vegetative growth and poor, early fruiting branch development. These crops are more prone to square loss from insect activity and/or adverse cloudy weather. In the Callide Valley, plant stands of 6-10 per metre appear to reduce this early, vigorous growth.

Siokra is less sensitive to high plant populations. But thin or gappy stands of Siokra develop awkward bushy plants which are prone to lodge at maturity. Such crops have resulted in quality deterioration due to boll rots and fibre discolouration. Plant stands of 9-12 evenly-spaced plants per metre are advisable in the Callide Valley.

Siokra seedlings are more vigorous than Deltapine 90, especially under cooler planting conditions.

GROWTH HABIT

The alluvial soils of the Callide Valley are one cotton growing area requiring the growth regulator Pix to control vegetative growth of cotton.

The different growth patterns of the two cultivars require that Pix be applied at different rates and times for each cultivar.

Deltpaine 90 has a rapid terminal growth from the period of early square production to peak flowering. During this time, split applications of Pix are required to steady vegetative growth and set the plant into a fruiting cycle. On the alluvial soils of the Callide Valley, a total of 1.5-2.0 litres of Pix per hectare split over three applications is generally required for Deltapine 90.

With Siokra, the production and retention of early fruit steadies the terminal growth. A more balanced plant with a high fruit load on a shorter plant is produced from Siokra. Therefore, rates of Pix are considerably less than for Deltapine 90. Rates of 0.8-1.0 litre of Pix per hectare applied in a single or split application are adequate.

Considerably less Pix is required for both cultivars on black soils.

FRUITING

Siokra has the capacity to produce more squares per metre than Deltapine 90 under similar management conditions (Figures 1 and 2). However, the percentage of those squares retained and developed into harvestable bolls is obviously less with Siokra.

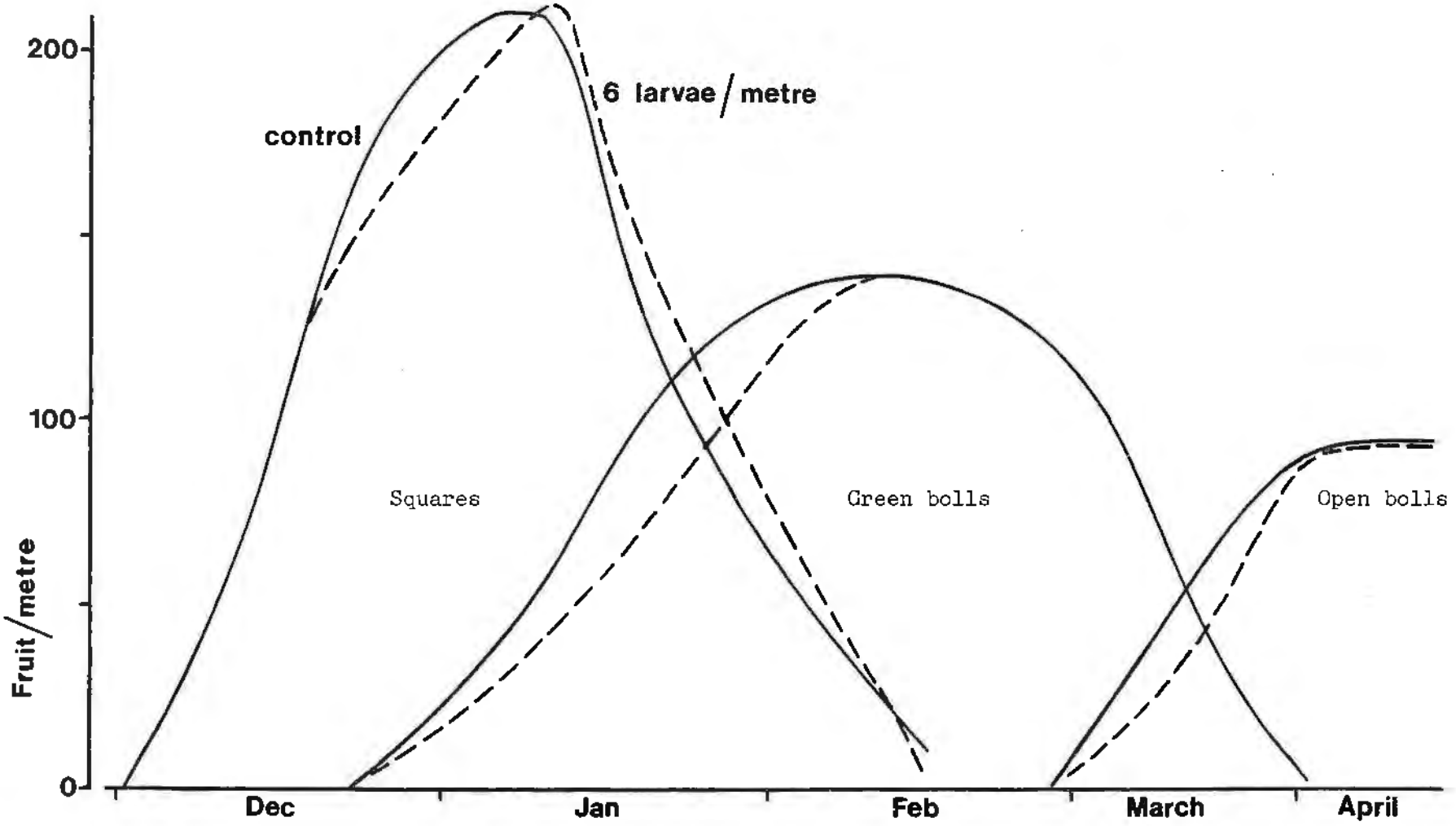

Figure 1. Square, boll, and open boll production for zero damage and simulated square damage equivalent to six larvae/metre in Siokra at Biloela in 1985/86.

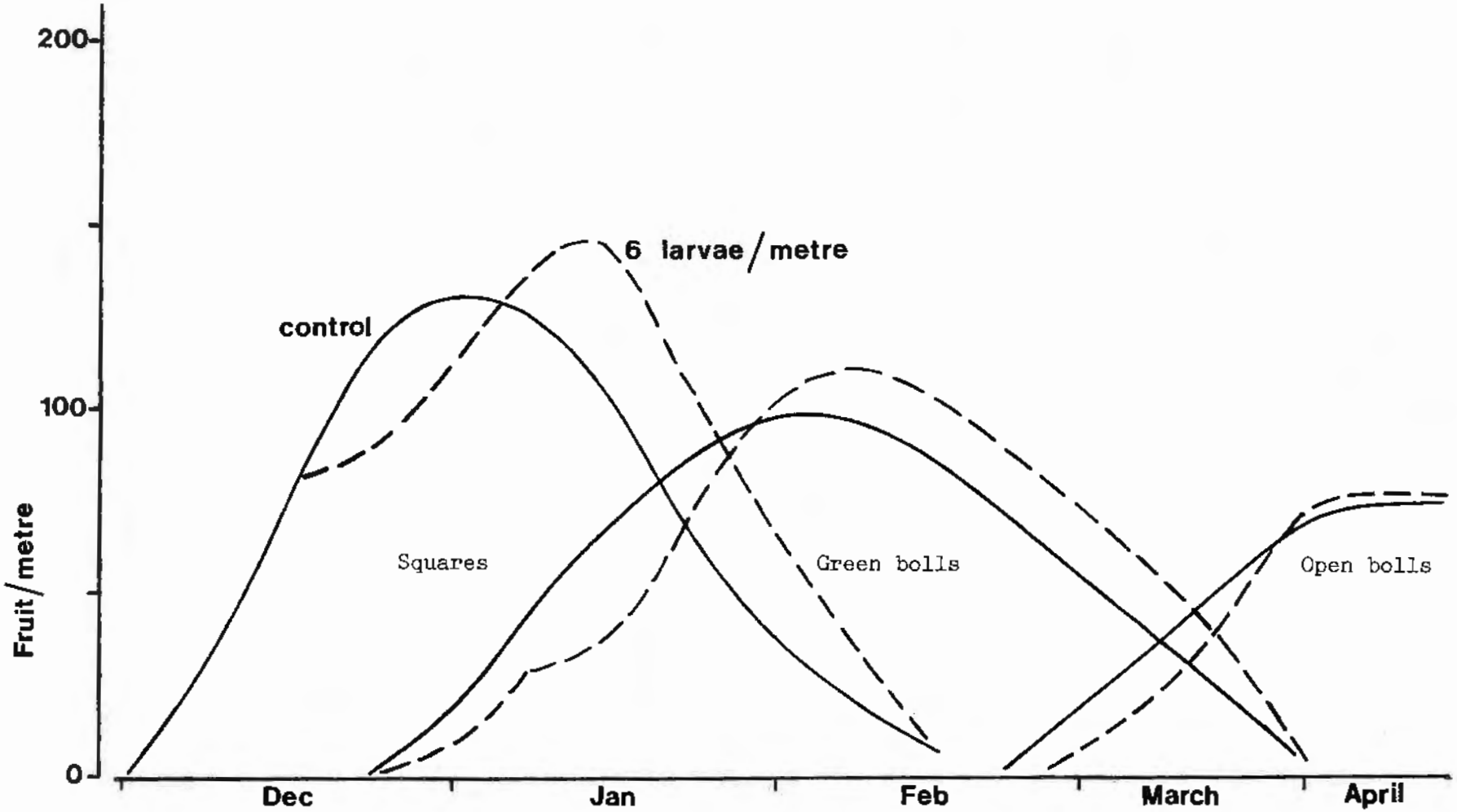

Figure 2. Square, boll, and open boll production for zero damage and simulated square damage equivalent to six larvae/metre in Deltapine 90 at Biloela in 1985/86.

In comparison to Deltapine 90, Siokra recovers rapidly from square loss. Damage equivalent to six Heliothis larvae per metre was simulated in both cultivars over a two week period at Biloela in 1985/86 (Figures 1 and 2). Siokra recovered within two days, whereas Deltapine 90 recovered within two weeks. For both cultivars, the damaged treatments exhibited no delay in maturity and no loss in yield or fibre quality in comparison with the respective control treatments.

Siokra is the better cultivar if there is a high probability of hail damage. It has excellent recovery of fruit production after hail damage and is resistant to bacterial blight which often spreads after a hail storm.

INSECT MANAGEMENT

There are obvious differences between the two cultivars in attractiveness and tolerances to insects, with most Siokra crops receiving one or two sprays less than Deltapine 90 crops.

In comparison to Deltapine 90, Siokra has rapid fruit-set, significantly higher square production, rapid recovery from square loss, an open canopy, and a shorter fruiting period. The combination of these characteristics is probably the main reason that Siokra requires less insecticide sprays.

The open canopy of Siokra enhances insecticide penetration of the crop resulting in fewer excapes of medium to large Heliothis larvae. Consequently, 'softer' chemicals (Endosulfan, Chlordimeform, Dipel) were used more extensively with Siokra crops. Deltapine 90 fields were sprayed more and suffered more boll damage

throughout the boll production period. Its lush, rapid growth and closed canopy required particular attention and monitoring to avoid excessive damage from escaped larvae.

The presence of sap-sucking insects (green mirids and apple-dimpling bugs) during early to mid-season had more detrimental effect on early fruit retention in Deltapine 90 than in Siokra.

Fields of Siokra were sprayed significantly less for pink-spotted bollworm than Deltapine 90 fields.

IRRIGATION

During the fruiting phase, Siokra has a higher daily water use than Deltapine 90 (Table 4). This is probably why commercial experience in some regions suggests that Siokra responds to more frequent watering during the peak-flowering period than Deltapine 90. The lower daily water use of Deltapine 90 probably contributes to its higher yields relative to Siokra under irrigated low moisture regimes (Table 2) and under raingrown conditions (Tables 1 and 2).

Observations on commercial crops suggests that if rain follows an irrigation during the early fruiting period, Siokra has out-yielded Deltapine 90 under the resultant water-logged conditions. This observation is supported by data from Emerald (Table 2) which indicates that Siokra is superior to Deltapine 90 under a 45 mm irrigation deficit strategy. Therefore, Siokra is best suited for early plantings on farms using bores for irrigation where some paddocks must be watered early so that the whole farm will be finished before moisture stress occurs.

Further investigation into the optimum refill points for maximising yields of these two cultivars is still required. The 1985/86 data from St George (Table 3) suggests an optimum of 90 mm for both cultivars, whereas, the 1985/86 data from Emerald (Table 2) suggests an optimum of 45-75 mm for both cultivars. Irrigating at a 45 mm deficit increases the chances of receiving a rain after irrigation. This is one reason why the optimum deficit for Siokra at Emerald in 1983/84 and 1984/85 was 75 mm.

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Table 2: Cultivar yields under different irrigation strategies and times of planting at Emerald in 1985/86.

Irrigation deficit	yield (bales/ha)			
	normal planting		late planting	
	Siokra	Deltapine 90	Siokra	Deltapine 90
45 mm	10.3	10.1	8.6	6.9
75 mm	9.2	9.4	8.3	6.9
150 mm	4.7	5.6	7.1	5.8
raingrown	2.0	2.4	2.7	2.6

Table 3: Cultivar yields under different irrigation strategies at St George in 1985/86

Irrigation deficit	Yield (bales/ha)	
	Siokra	Deltapine 90
70 mm	4.7	-
90 mm	5.1	5.2
105 mm	-	4.7

Table 4: Daily water use of Siokra and Deltapine 90 in different cotton growing regions.

Region	Month	daily water use (mm/day)	
		Deltapine 90	Siokra
Darling Downs	January	3.2	4.1
	February	2.5	2.0
St George	January	4.6	5.4
	February	5.5	7.4
	February	6.2	8.0
	March	6.0	6.2
Callide	December	5.6	7.2
	January	6.8	8.0
	January	8.6	9.0
	February	3.8	5.6