

Germinating Ideas

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With the 2004–05 cotton season upon us this edition of Germinating Ideas will look at:

- Insect and plant monitoring and the importance of adequate monitoring in all cotton, particularly Bollgard II;
- The use of plant growth regulators and varietal yield response, particularly with the new Bollgard II varieties; and,
- Improvements in cotton fibre quality made through plant breeding by the CSIRO plant breeding team at the ACRI.

MONITORING AS IMPORTANT AS EVER IN BOLLGARD II

Season long control of heliothis offered by Bollgard II brings enormous benefits to insect management:

- Reduced insecticides for heliothis allows greater opportunity to preserve beneficial insects;
- One of the biggest variable costs in cotton production — insect control — is more predictable; and,
- There will be reduced labour in ground applying insecticides.

Despite all of these advantages, there is nothing to suggest that Bollgard II crops should not be checked and monitored any

TABLE 1: Varietal comparison of responsiveness to PGRs

Yield responsiveness	Conventional and Roundup Ready	Bollgard II
MORE	Sicot 189, Sicot 189RR, Sicot 289RR Sicot 80, Sicot 53, Sicot F-1, Sicot 73 Sicala V-2, Sicala V-2RR, Siokra 24 Sicot 71 Sicala 45, Sicot 60RR Sicala 43 Siokra V-18 Siokra V-16 Sicala 40	Sicot 289BR, Sicot 289B, Sicot 80B Sicala V-3BR, Sicot 13B Siokra V-18B, Sicot 14B Siokra V-16BR, Siokra V-16B, Sicot 71BR Sicala 60BR, Sicot 12B Sicala 40BR, Sicala 40B
LESS		

NOTE: Just because a variety is not as yield responsive does not mean it will never need Pix. The VGR technique should be used for all varieties.

less regularly or rigorously than conventional cotton. The checking will be just different for a number of reasons:

- With reduced insecticide applications in Bollgard II there may be greater populations and a more diverse range of insects — both good and bad. It is important to have a good understanding of what is present as control decisions may be more complicated.

- Mirids can cause damage very rapidly and their populations can fluctuate frequently. They should be monitored at least two to three times per week. Using a beat sheet is the most effective and consistent way to monitor mirid populations.
- Mirid control decisions should be done using a combination of insect numbers and fruit retention. Extensive research and experience has shown no yield or maturi-

FIGURE 1: Improvements in fibre length over the past 30 years

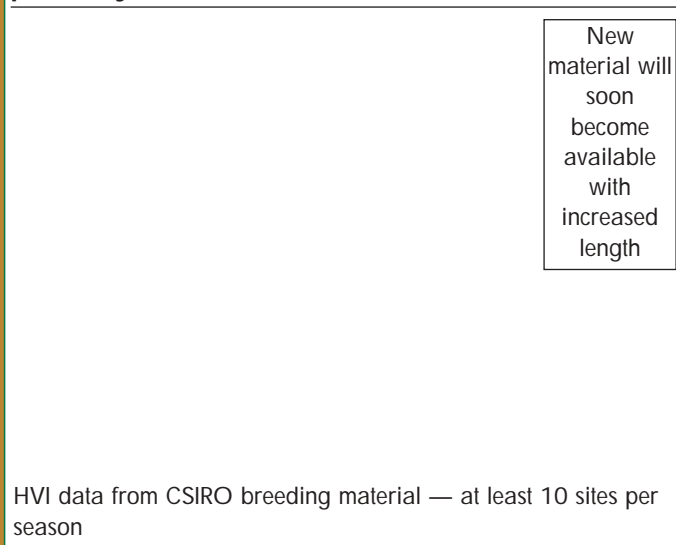
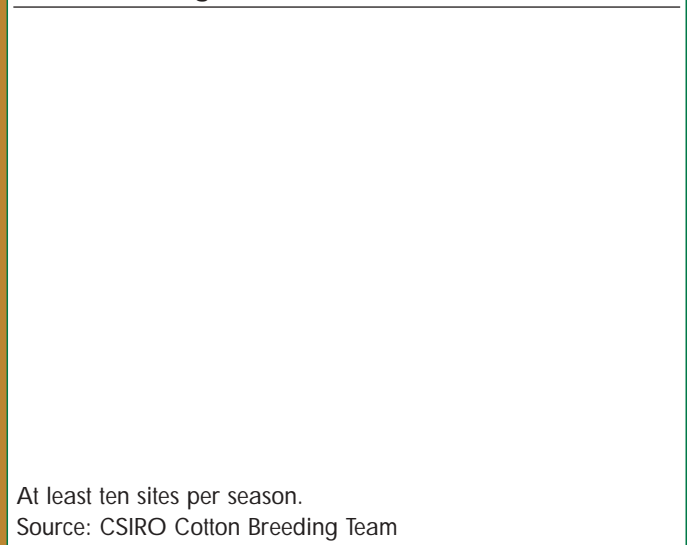


FIGURE 2: HVI strength data (grams/tex) from CSIRO breeding material from 1974 to 2003



ty penalty for first position fruit retention levels of 60 per cent at flowering.

- Be aware of the implications of the use of broad-spectrum insecticides for mirid control. For example, repeated applications of organophosphates (such as dimethoate and omethoate) may select for resistance in aphids.
- Mites, aphids and whiteflies can increase very rapidly, with potentially serious consequences. Monitoring rates of increase in all of these pests is paramount to their effective management. Sampling procedures for all of these pests are available on the Australian Cotton CRC website.
- Regular measurement of plant vigour early in the season, using the early season diagnostic tool, can identify problems in the crop before it's too late to manage.
- Strategic monitoring of plant nutrient levels through leaf blade and petiole tests can identify crop nutritional deficiencies before it's too late.

Effective monitoring and good decisions based on this information can possibly allow you to reduce costs and get the best out of Bollgard II in terms of yield and quality.

Two of the best value for money things you can put on a Bollgard II crop are your (or someone else's) shadow on the crop and footprints on the ground.

PLANT GROWTH REGULATOR USE IN BOLLGARD II

Plant growth regulators (for example Pix) can be a valuable tool for use in cotton, particularly Bollgard II. But this is dependent on many factors — the most important is the vegetative growth rate of the crops in question. In general, Bollgard II varieties are not as responsive to Pix compared to conventional varieties.

The important factors to consider:

- Higher VGRs may indicate a higher responsiveness to PGRs.
- Variety — all varieties vary in their response to PGRs (Table 1).
- PGRs should not be applied to moisture stressed crops.
- Crops with high fruit retentions may have a reduced requirement for PGRs.



A cut out Pix trial at Theodore with an untreated area left for comparison.

Applying Pix to crops that do not need them can actually reduce yields.

Bollgard II crops, along with conventional cotton, require monitoring at critical times, particularly first flower, to assess whether Pix applications should be made and then to determine a rate that should be used.

MEETING THE FIBRE QUALITY CHALLENGES IN PLANT BREEDING

At the ACGRA Australian Cotton Conference in August, there was considerable discussion about the need for Australia to continually 'stay ahead of the pack' in regards to fibre quality — particularly length, strength and micronaire.

A number of factors impact on all of these fibre quality attributes to varying degrees, particularly location (region), climate, management and variety. In saying this, it's interesting to reflect on the advancements made by the CSIRO breeding over the past 30 years.

Fibre length

While management and climate play a

significant role in determining fibre length, so too does variety. In the past 30 years the CSIRO plant-breeding program has achieved an improvement in fibre length of approximately 0.1 inch (three 32nds) in its breeding material (Figure 1). Current breeding objectives are to further increase fibre quality.

Fibre strength

Fibre strength is mostly determined by variety. Plant breeding in Australia has achieved an improvement of over 10 grams per tex in the past 30 years (Figure 2). Current breeding objectives are to also further improve fibre strength.

Micronaire

Micronaire is a measure of both fibre fineness and maturity. It poses a significant challenge in both plant breeding and crop management as it is heavily influenced by climate, and unlike the other fibre quality attributes, it has both an upper and lower discount level. Recent hot, dry seasons have seen incidences of high micronaire throughout the industry, particularly in the northern regions.

But during the mid-late 1990s, low micronaire was a major concern, particularly in the southern production areas. Achieving intermediate micronaire levels is a key objective of the CSIRO breeding team. This will rely on breeding region-specific varieties with intermediate micronaire, achieved with fine but mature fibres, as desired by spinners.

TABLE 2: Progress in fibre quality across two decades

	Length (inch)	Strength (g/tex)	Micronaire
1991 to 1993	1.19	28.9	3.9
2000 to 2002	1.18	31.4	4.0
HVI data from 10 sites in each of three years			
Major varieties: 1993: Sicala V1, Siokra L23, Siokra 1-4, CS50			
2002: Sicot 70/71, Sicot 80, Sicot 189, Sicot 289i, Sicala V-2RR			