

Germinating Ideas

By Craig McDonald, CSD Extension and Development Agronomist

The 2002–03 cotton season has now entered the important phase of boll filling and fibre development. This edition of Germinating Ideas will cover a number of key areas including:

- Plant cut-out and final watering decisions;
- The impact on fibre quality of limited water;
- Bollgard II crop features; and,
- An update on the CSD Fusarium (FOV) program.

CROP CUT OUT AND THE FINAL IRRIGATION

Crop cut-out is when the plant has reached physiological maturity and has reached the limit of the number of fruiting bodies that it will set. No new squares or bolls will be added. Visually, cut out is when nodes above white flower are about four.

Crops can cut out earlier than planned due to limitations in inputs such as water or nutrients. Extremes in temperature can also cause an early cut out. These crops can then start to grow again if more water, rain or irrigation is received or fertiliser is applied.

Timing of the last irrigation can be very difficult as it is important to give the crop every opportunity to mature every last harvestable boll but not delay it so as to risk weather damage or possible boll rot. Deciding what will be the last harvestable bolls and setting the crop up for defoliation is part of timing the last watering.

The use of soil moisture monitoring equipment can be invaluable to assess how much moisture is in the ground and how much the crop is using. The crop should gradually use up the existing moisture reserves as it heads towards defoliation.

It is never an easy decision — but in many cases this season the decision will be easier as there will be no water available.

FIBRE QUALITY AND LIMITED WATER

As many cotton farms are now out of, or very close to running out of water, the issue



Crop irrigation at Emerald.

of fibre quality development is important.

There may be several different scenarios for irrigated crops this season including:

- Fully irrigated cotton — watered on time but now left with no water;
- Irrigated cotton — irrigations were stretched and the crop is potentially one watering short; and,

- Irrigated cotton — fully watered on time until the water was shut off mid season, but it then receives a late rainfall/irrigation.

Each situation will have varying effects on cotton fibre development. Weather and management will influence fibre quality in

68 ▷

each boll depending on timing and severity of each factor.

Under water stress, younger bolls may be shed so that the plant can develop the older bolls. There is a priority for seed and fibre development over total fruit retention.

As younger bolls are shed, more carbohydrates are made available for fibre thickening in the older bolls and the risk of high micronaire is increased. Fibre elongation occurs first so plants stressed at peak flowering will have fibre length more affected than those plants stressed later will have limited fibre thickening.

At any one time some individual bolls will be completely mature, some will be starting fibre thickening and some will be commencing fibre elongation. Moisture, or any other stress will have a varying impact depending on the stage of development of individual bolls.

In summary, when a crop runs out of water before the normal final irrigation date, the impact on fibre quality will be:

- If the crop has cut out some time before, fibre length will not be affected because all bolls will have completed fibre elongation. Top bolls will not finish fibre thickening and micronaire could be reduced slightly.

- If the crop is still flowering, fibre length may be reduced as well as micronaire. The full impact on machine harvested fibre quality will depend on the number of immature bolls that open and are harvested.*

BOLLGARD II FEATURE CROP

Throughout the 2002-03 cotton season CSD's agronomic team has been monitoring a number of Bollgard II crops across the cotton growing regions. These crops have been featured at several CSD Bollgard II field days and also on the CSD website in the Trials on Line section.

One of these crops is at Emerald and is an experimental line CSX 317. It was planted on September 24 2002 in ideal conditions at 11 kg per hectare. Final plant stand is 10 plants per metre.



Greg McNamara and Steve Allen in the Fusarium plot trials at Pampas.

Table 1 shows the details of this crop at different monitoring times.

The crop has received five in-crop irrigations and one spray for mirids. It received 35 mm of rain and a hailstorm on Christmas Eve. The trial field came very close to an IGR spray for whitefly but the hail dissipated the build up. No other insecticides have been applied.

Crop cut-out was reached quite early with 33 per cent of sample plants almost devoid of squares on December 19, 2002. Conventional cotton planted at the same time is at least one week behind the Bollgard II crop.

Defoliation is planned for late in January and picking will follow in early February.

THE FUSARIUM PROGRAM - AN UPDATE

The CSD/CSIRO Fusarium (FOV) program has three major components. They are:

- Progeny line screening program for Fusarium tolerance;
- Agronomic trials; and,
- Seed increase of FOV tolerant lines.

CSD and the CSIRO have conducted a Fusarium breeding program since the 1994-95 cotton season. Most of this work

is carried out on the southern Darling Downs and a Fusarium screening nursery has been established at Pampas and Norwin.

There are over 8,500 individual plots at these trial sites containing progeny row lines that are assessed for tolerance to Fusarium. All trials are registered under the CRDC protocols and each site has the FOV strain identified by the QDPI at Indooroopilly.

Potential Bollgard II lines are a major part of the screening program. Screening is now in its third season. There are several Bollgard II lines with Fusarium resistance at least equal to the industry standard,



Emerald Bollgard II grower Greg Jensen.

TABLE 1: Details of Bollgard II crop at Emerald

Date	Plant height	Total nodes	VGR (cm)	Retention %	Fruiting factor	NAWF	Fruit count per metre
07/01	-	-	-	-	107b	-	107b
19/12	83.3cm	20.9	6.2	-	-	4.5	114b, 49sq
13/12	-	-	-	-	-	5.0	-
3/12	72.1cm	19.1	7.2	78	1.9	7.8	48b, 187sq
21/11	48.5cm	15.8	4.9	73	1.5	9.0	46b, 159sq
14/11	37.3cm	13.5		70	1.3		-

Source - CSD Agronomic monitoring 2002-03; b=bolls; sq=squares

Sicot 189. The aim of the project is to develop lines with significantly greater resistance to Sicot 189 to help reduce the impact of, and slow down the spread of the disease.

CSD is also conducting several 'box trials' on the Darling Downs and at Boggabilla. Box trials are done using commercial planters in commercial fields. The seed boxes are allocated particular experimental or commercial varieties and the boxes are then swapped around after each 'plot' is planted according to a predetermined random plan.

Early season plant establishment in each plot is recorded and this is compared to a late season plant stand count. Stem cut rankings are also done across all plots to rate the amount of FOV that is present.

Several agronomic trials are also underway including time of planting, herbicide treatments, seed treatment, fertiliser and biocontrol agents.

Soil core samples are taken at various depths and a known susceptible variety is planted in each core sample to determine the amount of Fusarium and distribution through the soil profile. Cereal rotation trials comparing incorporation and burning of residues are being conducted at Goondiwindi and Moree.



Planting a 'box trial' on the Darling Downs.

Glasshouses are used for seed increase during the winter to produce seed for planting of trials in the spring.

Results from the Fusarium screening program have been encouraging with several varieties now in commercial variety tri-

als. Sicot 70, Sicot 71, Siokra V-17, Sicot 80 and Sicot 289i have all progressed through the Fusarium screening program to commercialisation.

*Source – G. Constable, Cotton Production During Drought, Cotton CRC 1995

