

# Kerby on Bollgard II management

By Dr Tom Kerby, Delta and Pine Land Co

In the 15 years I have been visiting Australia there have been many changes in management systems with the introduction of Ingard, Roundup Ready and now Bollgard II technology. The swift adoption of Bollgard II provides the opportunity to focus on the management of other aspects of cotton production — other than heliothis control — to generate high yields.

Much of the research in the early 1980s focused on the effects of water stress, mepiquat chloride (Pix), insect pressure and nutrition on yield. But it is critical to examine more than just impact on yield to know if we are making the right management decisions. By closely monitoring plant growth through plant mapping, growers will be able to understand and react to factors affecting crop growth.

## BOLLGARD II VS INGARD VS CONVENTIONAL

Differences will encompass interactions of basic inputs to the plant, how the crop is read and subsequent adjustments to maximise yield potential.

The introduction of Bollgard II will result in growers leaning towards indeterminate varieties and managing for factors such as plant growth dynamics, increased early boll loads and secondary pest control.

### Plant growth dynamics

Plant growth is easily monitored with programs such as Benchmark, an invaluable tool for crop growth assessment which helps with management decisions throughout the season. Recording plant height and node number allows comparisons of actual growth against a target curve.

Growth patterns can be recognised and



Tom Kerby talks about Bollgard at a Deltapine field day.

mepiquat chloride application can be considered in anticipation of rapid plant growth. A heavier early boll load generally reduces the need or rate of application of mepiquat chloride, although Benchmark will help monitor and determine both, as well as timing of irrigations and maintaining adequate nutrition — important factors in keeping the crop going.

### Early retention

Early season boll retention is mostly dependent on insect pressure. Thresholds need to be set so as not to reduce yield — 65 per cent retention in the first 5–10 fruit nodes should be a minimum threshold. Research indicates that thresholds slightly above this figure do not significantly impair maturity or yield.

An early fruit retention of 80 per cent, however, is a heavy boll load and if the plant does not have sufficient leaf area, early cut out may occur. The plant's resources are drawn to the development of early bolls and may sacrifice continued growth and node production. The benefits of indeterminate varieties, water manage-

ment and nutrient application are key considerations in this regard.

### Nutrition

Nitrogen is accumulated in the leaves and deficiencies generally will not restrict growth until early boll development. Seed in the developing bolls is a very strong sink for nitrogen and during peak boll fill, cotton typically requires 3–4 kg N/day.

Potassium also accumulates in vegetative growth and is utilised in the burr (boll wall) during boll set. Potassium is involved in creating turgor pressure for fibre elongation — the crucial time being in the first 21 days as boll fibre length develops. The demand for nitrogen and potassium during boll fill is greater than the plants can obtain from the soil, so these nutrients are remobilised from the leaves to match the demand from the developing bolls.

Growers can maintain adequate nutrition in high retention Bollgard II crops in two ways. The first is to raise the concentration of nitrogen and potassium in leaves through higher rates of soil applied fertilisers or with appropriately timed foliar applications.

The second way is to increase the 'nutrient reserves' stored in vegetative material. More indeterminate varieties have advantages. They tend to produce a greater number of nodes and fresh leaves in which nutrients are stored and used as a reserve for the developing bolls. And they often have a larger root system to intercept nutrients from the soil.

The upper six nodes or seven fruiting branches are responsible for 80 per cent of the photosynthesis within the plant. Varieties that are more indeterminate tend to maintain a higher number of nodes above white flower (NAWF) for longer. In fact, it has been shown that an additional 20 kg of lint is produced for each day NAWF is around eight after first flower (as long as good retention is maintained).

Varieties that are more indeterminate appear to have the attributes required to avoid early cut-out and are considered the most appropriate material for Bollgard II. They continue to produce nodes while filling bolls — a tendency that elevates yield potential.

For more information contact Deltapine on Freecall 1800 006 088.



Tony May, Tony Quigley and Tom Kerby discuss Bollgard management.