Germinating Ideas

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Welcome to this edition of Germinating Ideas, the first for 2006. In this edition we will look at late season management of crops especially Bollgard II, and preparing from defoliation, one of the most important activities in ensuring a good clean pick.

Late season crop management

Bollgard II now allows the opportunity to benefit from later fruit to help contribute to both yield and fibre quality. Because this later fruit can be utilised there is a need to ensure that nutrition, water and insect management continues late into the crop's life cycle.

Ongoing monitoring of plant inputs right through to plant maturity will help to determine the amount of later fruit and its quality. The final contribution of this later fruit will depend on adequate resources being available to finish them off to a harvestable state.

It will always be a calculated risk as to how late a crop can be pushed. Cooler and potentially wetter weather can seriously delay picking and affect fibre quality.

A favourable warm finish to the season can allow for later fruit on conventional cotton crops to also contribute to yield and final fibre quality. The amount and impact of later season Heliothis pressure is an important factor.

As many crops approach cut out (less than four nodes above white flower) it is important to manage these crops right through to final maturity. Peak water demand occurs three to five weeks after the start of flowering and water use can be as high as 10 mm per day. From the last effective flower through to pre harvest, crop water use can continue at up to five mm per day until defoliation. Knowing the last effective flower date for your region can be useful to determine the amount of later season inputs required.

To maximise the potential of later fruit from the last effective flower date through to harvest, good moisture levels must be maintained. Fibre elongation occurs in the first 20–30 days post flowering and fibre wall thickening over 40–60 days post flowering depending on temperatures. Soil moisture levels are the single biggest factor that can affect fibre length.

Late bolls on the top of the crop can contribute to yield.

Temperature is the main determinant of the time taken from flowering through to boll opening. But the supply of carbohydrates can affect the final size of the bolls and degree of fibre development.

Excess nitrogen can delay crop maturity leading to potential losses if picking is delayed due to wet weather. Boll rots and other diseases can also be more prevalent in crops high in nitrogen with associated excessive vegetative growth. Tall rank crops are generally more difficult to defoliate and they may require subsequent applications of a harvest aid.

PREPARING FOR DEFOLIATION

Correct preparation and timing of defoliation is critical to achieving the best fibre quality and yields under given seasonal conditions.

The science, or art, of defoliation is the last agronomic decision made for crops and getting it wrong can have deleterious affects on cotton grades and quality factors. Australian cotton processors strive for maximum fibre quality and grades but they must have good quality and well-prepared seed cotton to maintain these high grades whilst maintaining adequate throughput through their cotton gins.

The optimum harvest date occurs when all of the physiologically mature bolls are open and before yield and quality deterioration from adverse weather has occurred.

Defoliation is required prior to cotton harvest to minimise trash and moisture levels in the module and increase harvest efficiency. There are many harvest aid products on the market today to assist in achieving a good clean defoliation. There are also many methods for determining when a crop is ready for its first preconditioning but the ability to correctly assess crop maturity is paramount.

The main fibre and lint characteristics are:

- Colour;
- Trash;
- Fibre length;
- Micronaire;
- Neps; and,
- Length uniformity.

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When all of these components are combined and the gin out turn percentage is factored in, the final yield and quality details are determined. This contributes to the overall viability of the crop.

Methods of timing defoliation

The correct timing of defoliation is when the youngest harvestable boll is physiologically mature. For many years the percentage of bolls open has been a reliable guide to the timing of defoliation. This was prior to the introduction of plant growth regulators.

Their introduction has allowed for a more precise methodology for defoliation timing.

Cotton bolls are mature when the fibre is well developed, seeds are solid and cotyledons fully developed and the seed coats are clearly visible as a dark brown colour when bolls are cut cross sectionally. The last or 'cut out' boll will generally be between four to six nodes from the terminal and is the last harvestable boll on the plant.

- Percentage open: Generally a level greater than 60–65 per cent is safe for defoliation. Variability across fields — for example, head ditch and tail ditch — can result in difficulties with this method;

A well defoliated cotton crop.

- Nodes above cracked boll (NACB): Three to four nodes of first position bolls above the highest cracked boll in the first position (the cut out boll) means the crop will be mature and ready for defoliation. Many plants can be checked quickly using this method and this can be useful where a crop is uneven; and,
- Maturity assessment: When mature bolls become difficult to cut with a sharp knife, the seeds and their coats are generally well developed. This method can be done quickly and when more than 98 per cent of harvestable bolls are at this stage, the crop is ready to defoliate. This method can be a quick final check. Care must be taken when using a knife to cut bolls as serious injury can occur.

These methods, whether used alone or in combination, can be useful in determining the optimum timing of defoliation. For more information refer to the CSD Grower Information brochure 'Defoliation for Quality Cotton'.