



NORTHERN NEWSLETTER

JANUARY, 2022 EDITION: COTTON PLANTING

www.acresofopportunity.com.au

Welcome to the next issue of the Northern Newsletter, brought to you by Acres of Opportunity, a collaboration between Cotton Seed Distributors (CSD) and Bayer Crop Science, with contributions from Cotton Australia, CSIRO, the Cotton Research and Development Corporation (CRDC), the Department of Agriculture and Fisheries, Queensland (DAF) and AgEcon.

THE PRACTICALITIES OF PLANTING

In Northern Australian environments, it is critical to make the best of what may be a limited opportunity and break in the weather. In this case, the motto of 'plant once and do it right' will be even more important, as you may only get one opportunity.

WHAT IS A PLANTING WINDOW?

A planting window is a resistance management technique that restricts the period in which planting can occur,

with the aim of restricting the number of generations of *Helicoverpa* spp. exposed to the toxic proteins in Bollgard® 3 each season.



Please refer to the [Cotton Planting Windows and Key RMP Timings For Northern Australia](#) for further information.

Please be aware that the planting window for each valley in Northern Australia will be 8-weeks for the 2021-22 season. Planting windows have been set for these valleys:

VALLEY	PLANTING WINDOW
Douglas-Daly and Katherine	4th December, 2021 to 28th January, 2022
Mareeba/Dimbulah	3rd December, 2021 to 27th January, 2022
Ord River	TBC
Gilbert	24th December, 2021 to 17th February, 2022
Flinders	TBC
Leichardt River	TBC
Burdekin	TBC
Normanby River	TBC
Wiso	TBC



10 POINT PLAN FOR IRRIGATED COTTON

Rule 4: **Planting and establishment.**

It's important to have your planter serviced early and ready to go when conditions are right.

Ideal depth depends on the method of establishment and the soil conditions. A simple rule of thumb is to use the "knuckle" method (25-35 mm) as a quick and easy measurement tool in the field, and it is best to speak to your agronomist about the ideal depth for your soil type. Factors such as soil crusting, soil moisture profile and surface soil temperatures all need to be considered when deciding on a planting depth.

The ideal speed for planting cotton is between 8-10 km/hr, in order to prevent the planter unit from bouncing, ideally having it steady and stable as it moves along. Excessive bounce will lead to poor seed depth and placement uniformity which can result in variable establishment.

Aim to establish no more than 6-7 plants per metre of row. As plant establishment is likely to be rapid in Northern Australia, the usual losses observed in southern Australia that reduce plant stands after sowing are unlikely to occur. Your agronomist will be able to suggest a suitable planting rate at the time of planting.

DRYLAND SPECIFIC CONSIDERATIONS

The key for accurate timing is to ensure sufficient rainfall moisture is available to get the cotton seedlings off to a good start. Wet season rainfall will determine available moisture for dryland crops through the growing season. While this is uncontrollable, planting time can be somewhat managed to ensure that certain growth stages are likely to occur during the wet season. Timing will be a balance between optimising crop establishment, soil water during flowering and boll fill, and avoiding rain during boll maturity and opening that can downgrade fibre quality, although this is less likely due to the drier conditions in Northern Australia during picking.



8 GOLDEN RULES OF DRYLAND COTTON

Rule 4: **Plant into standing stubble and plan refuges.**

Cotton should be planted into groundcover (e.g. pasture) to aid in establishment, help to retain moisture, reduce the possibility of runoff and erosion and to reduce surface soil temperature. The groundcover can then be sprayed out after planting.

ROW CONFIGURATION

It is important to consider how your choice of row configuration will fit in with your farming system, as well as the effect it will have on your crop and its growth. Traditional 75 cm or 1 m row spacings should be transposable into Northern Australia.

THE EFFECT OF TEMPERATURE ON ESTABLISHMENT

While the impact of low temperatures on germination and establishment is well understood and has been thoroughly studied, it is important to consider that high temperatures can also reduce seedling establishment and in extreme conditions, can lead to seed and seedling death. With the growing expansion of the cotton industry into Northern Australia, research into the effect of higher temperatures on germination has become a greater focus. Current research conducted at CSD's Quality and Research Centre has demonstrated that exceeding the

upper threshold of optimal germination temperatures can have just as detrimental effect on establishment as planting into temperatures that are too cool. In the field, there are a large range of variables influencing establishment. Depending on other factors, extended exposure of seeds to temperatures in the high 30s to 40°C may be sufficient to have a substantial negative impact on establishment. This is where the importance of groundcover becomes a consideration as good stubble or mulch cover can reduce ground temperatures at planting.

REFUGE AND TRAP CROP PLANNING

Refuge planning is a critical part of the Bollgard 3 Resistance Management Plan (RMP). A refuge is an area of crop without the Bt gene (generally Roundup Ready Flex® cotton or pigeon peas).

Under the RMP for Northern Australia, growers in Northern Australia have the following refuge options:

Crop	Conditions	% of Bollgard 3 area	Regions permitted
Conventional cotton	Irrigated or dryland, unsprayed conventional cotton	5.0	All regions
Pigeon pea	Fully irrigated or dryland, unsprayed	2.5	All regions

An end of season pigeon pea trap crop must also be planted. Trap crops and refuges serve different purposes. Growers have the option to utilise their entire pigeon pea refuge as the trap crop, or if a grower has an unsprayed cotton conventional refuge they need to plant an additional 1% of the Bollgard 3 crop area to pigeon peas as their trap crop.



For comprehensive trap crop requirements please refer to the **Resistance Management Plan (RMP) for Northern Australia**.

- Unsprayed means not sprayed with any insecticide that targets any life stage of *Helicoverpa* spp.
- It is preferable that the whole refuge area is planted within the 2-week period prior to planting Bollgard 3. If this is not possible, refuge planting must be completed within 3 weeks of the first day of sowing of Bollgard 3.
- All Bollgard 3 fields must be no more than 2 km from the associated refuge.
- Refuge crops must be at least 24 metres wide and each refuge area must be a minimum of 0.5 hectares.
- Destruction of refuges must only be carried out after the Bollgard 3 crop has been harvested.
- In keeping with biosecurity best practice, ensure you check any restrictions on transportation of harvested cotton crops (including refuges) interstate. Seed cotton originating from non-Bollgard refuges cannot be sent south for ginning if it originates from the Northern Territory and Western Australia, due to the biosecurity risk of transporting pink bollworm (*Pectinophora gossypiella*) interstate.

- Further information on refuge requirements can be found by visiting: www.bollgard3.com.au.
- You can also calculate your refuge requirements at: www.bollgard3.com.au/refuge-calculator.
- **Biosecurity risk management plan for transportation of cotton modules from Western Australia and the Northern Territory to Southern Queensland for ginning.**

HAVE A PLAN FOR WEEDS



10 POINT PLAN FOR IRRIGATED COTTON

Rule 5: **Weed control.**



8 GOLDEN RULES OF DRYLAND COTTON

Rule 5: **Have a plan for weeds.**

It is important to control weeds, in order to reduce competition for the crop and maximise yield potential. There are a number of tools available to manage weeds during a cotton season.

The cotton plant can also become a weed itself, if not controlled properly following harvest. It is essential to control both volunteer and ratoon cotton before, during and after the cotton season, as part of the RMP and also for general farm hygiene. Volunteer and ratoon plants can harbour unwanted pests and become very difficult to control if not acted on when they are small.

The Roundup Ready Flex® Weed Resistance Management Plan details strategies that can be implemented to minimise the risk of glyphosate resistance developing in weeds on-farm.



For more details visit www.bollgard3.com.au and download the Roundup Ready Flex Weed Resistance Management Plan (WRMP).

NUTRITION

Application and timing of nutrients in a cotton crop are essential to achieve maximum yield. Engaging the services of a local agronomist will help in making these decisions and help to manage the cotton crop throughout the season.

Virtually all soils will have a nutritional profile that will benefit from some additional inputs. It is important

to match nutrition applications with realistic yield expectations. Apart from nitrogen, cotton requires similar amounts of nutrients as other comparable crops such as corn or soybeans. Nitrogen management is a balance in managing excessive crop growth, maturity and reducing losses (runoff, leaching and denitrification). For efficient uptake, all crop nitrogen should be applied prior to flowering, 30 to 45 days after planting.

Consult the Roundup Ready Flex Cotton Weed Management Guide (WGM) for clear recommendations for weed control practices in a Roundup Ready Flex cotton crop. The guide includes a range of herbicides which offer different modes of action throughout the season, reducing the risk of glyphosate resistance developing on your farm and saving you time and money in the future.



For more details visit www.bollgard3.com.au and download the Roundup Ready Flex Weed Management Guide (WGM).

A key part of any Resistance Management Plan for growers of Bollgard 3 cotton is the control of volunteer and ratoon cotton.

It's important to act on early season weeds (including cotton volunteers) when they are small, and ensure cotton is fully destroyed post-harvest as it can become a woody weed (ratoon). It is also important to implement appropriate cultural methods and herbicide strategies to control volunteer cotton.



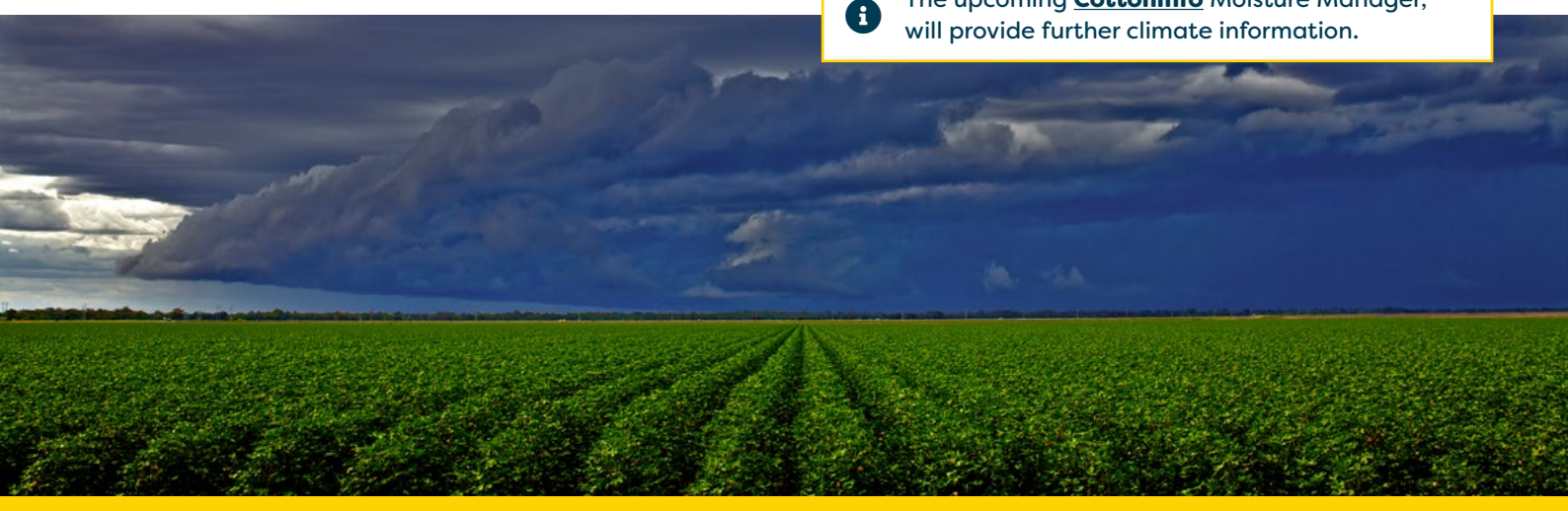
For more details visit www.bollgard3.com.au and download the Resistance management: Control of volunteer and ratoon cotton guide.

WEATHER

Sea surface temperature anomalies show warm water around Australia's perimeter and low barometric pressure at Darwin, adding to the broad-scale moisture from the Walker circulation during the decaying La Niña condition. Outgoing Longwave Radiation forecasts to the 10 February show cloudiness continuing over the tropics, as the chance for Coral Sea cyclones increases with a passing Madden-Julian Oscillation (MJO). Studies have shown up to 25% of land-based moisture is recycled locally to add to tropical storms and rain events. With the landscape wet after an active monsoon, probabilities of storm events occurring remain high, and 'weather' model guidance can be valuable, more so than longer-lead forecast tools. Crop ETO and plant demand for water are likely to remain lower than normal to mid-February, although Tropical Cyclones can be a game-changer coming into the peak growing season.



The upcoming [CottonInfo](#) Moisture Manager, will provide further climate information.



CANOPY MANAGEMENT AND MEPIQUAT CHLORIDE CONSIDERATIONS FOR THE TROPICS

Crop growth during the vegetative and early flowering stages can be highly vigorous under tropical conditions (particularly if soil water and nitrogen are abundant). When this leads to self-shading of lower fruiting branches, shedding responses can be exacerbated. Dense canopies can also allow increased survival of *Spodoptera litura*.

This fruit loss can in turn trigger internode expansion in the upper canopy, creating a negative feedback loop that results in rank growth. The challenge for crop managers is to temper vigorous canopy development without compromising yield potential, particularly when fruit loss requires time for compensation before the onset of soil moisture, radiation or minimum temperature constraints

There's large amount of research on managing canopy responses with mepiquat chloride (commonly referred to as Pix®), for irrigated crops in the Burdekin and Ord, and a method for mepiquat chloride use in irrigated crops that balances canopy development without compromising the crop compensation ability (should fruit shedding occur) is described in NORpak Burdekin. While the suitability of this model for rainfed crops has not yet been tested, consider the following points when making canopy management decisions in tropical crops:

- **Fruit shedding.** Cloud and hot nights (>24°C) will cause fruit shedding, which is likely to lead to greater expansion of new internodes. Consider mepiquat chloride application to temper new growth but avoid high rates that may stifle timely yield compensation.
- **Weather and stress factors.** The impact of mepiquat chloride can become rapidly negative if the application is followed by unfavourable weather conditions or crop stress factors. Use caution if soil moisture is limited (due to drying conditions or poor root expansion) or the crop is likely to be exposed to severe cloud or heat. The use of lower application rates when faced with uncertain conditions may be prudent.
- **Seasonal transition.** The transition from wet to dry in some seasons can be sudden and can slow canopy growth, particularly if crops with shallow roots become stranded in rapidly drying soil. The roots will continue to grow and exploit deeper moisture (and leached nitrogen), and an overdose of mepiquat chloride at this time can result in premature cut-out or a near cessation of flowering that may reduce yield potential or delay crop maturity. Recent research on tropical cotton in Brazil found that mepiquat chloride applications reduced root growth. This is something to bear in mind particularly for rainfed crops.

- **Start early to manage final crop height.** The focus on crop height often occurs too late to manage effectively, as crops can reach +40cm before the first fruiting branch is initiated, and the risk posed by mepiquat chloride during early vegetative growth (from 4-5 true leaves onwards) is lower than during flowering. Applying mepiquat chloride to a rank crop will not reverse the height that is already there; the management action was needed several weeks earlier.
- **Not all mepiquat chloride formulations are equal.** Be aware that there are formulations with different concentrations of active ingredient. Individual applications are best confined to modest rates of 7.6-15.2 g ai/ha. For older versions of mepiquat chloride this equated to 200-400mL/ha of product, however ADAMA's recently released RX380® has 10 times the concentration, meaning only 20-40mL of product per ha is required. Read the label carefully to avoid costly mistakes.
- **Think ahead.** Mepiquat chloride will negatively impact crops experiencing moisture or nutritional stress. Avoid mepiquat chloride if in-crop nitrogen or irrigation applications are likely to be delayed.

Cotton canopy management is dynamic and the use of inputs such as mepiquat chloride will always be challenging because of complex interactions between the plant and the environment. Under tropical irrigated conditions, yield increases due to mepiquat chloride application are rare. Across 21 experiments over 15 years (see Table 1 below), periodic treatment with modest rates usually reduced plant height without yield reduction. Yield was reduced where high rates (>15.2 g ai/ha) were used, limiting the crop's ability to compensate for stress.

Five paddock scale and small plot replicated trials at the Ord River in 2020 and 2021 confirmed the above responses to mepiquat chloride for irrigated cotton with the following key findings:

- Canopy sizes between 85% and 120% of Burdekin control produced the highest yields in all trials (paddock scale 11.5 to 12.2 b/ha)
- Whenever shorter canopies were grown by applying mepiquat chloride during stressful conditions (low solar radiation, nutrient deficiency, water logging) yields were reduced by 13% to 25% compared to the larger canopies. A combination of lower node number and or lower lint% contributed to reduced yield.
- Smaller high yielding canopies were only grown when unstressed conditions followed mepiquat chloride treatment.

Table 1: Summary of mepiquat chloride (MC) experiments in tropical Australia and their effect on cotton yield (2004-2021, Yeates and Grundy).

Yield change	Number of MC Treatments	Number of Experiments	% of untreated control yield	Reason for yield difference
Increased	10	2	112-114	Lodging of untreated control.
Decreased	13	8	75-87	MC prevented compensation from stress.
Same	88	11	100	

INDUSTRY PROGRAMS

CSD INDUSTRY SUPPORT PROGRAM

CSD offers dryland cotton growers the opportunity to reduce their production risk via the Industry Support Program. For eligible crops which are registered under the program, a dollar for dollar credit towards the following season's seed will apply, if the dryland cotton crop is unable to be picked (excluding crops which are destroyed through hail damage). Terms and conditions apply.

 Further information, visit: www.csd.net.au/isp.

Please be aware that registrations for Northern Australian growers will be subject to the conditions on the Northern RMP. Registrations for the CSD Industry Support Program must be received by CSD via email within the eight-week Northern Australia planting window for each region.

ROUNDUP READY PLUS® PROGRAM

The Roundup Ready PLUS program is designed to reward cotton growers who plant cotton containing Roundup Ready tolerance technology and who use herbicides sustainably and help slow or prevent development of glyphosate resistance in key weed species. The program encourages growers to use a range of weed control practices through product recommendations, education and stewardship campaign and financial rebates. Terms and conditions apply.

 Further information on the Roundup Ready Plus program visit: www.roundupreadyplus.com.au.

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*Roundup Ready herbicides refers to Roundup Ready® Herbicide with PLANTSHIELD® and Roundup Ready PL Herbicide with PLANTSHIELD Technology. Always refer to and follow product labels.