



NORTHERN NEWSLETTER

ESTABLISHMENT TO FLOWERING

Welcome to the next edition 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), Department of Agriculture and Fisheries, Queensland (DAF), NT Department of Industry, Tourism and Trade (DITT) and AgEcon.

Pest control

Cotton can be damaged by a range of insect pests during the season. Employing an experienced crop consultant/agronomist to regularly monitor the crop and help you make pest management decisions is crucial for timely control of these pests.

DOZEN DEEDS FOR NORTHERN AUSTRALIA

Rule 1. Planning, preparation and stewardship

Engage a cotton agronomist/consultant

The exotic pest, fall armyworm (*Spodoptera frugiperda*) has recently been detected for the first time in Australia. Inspections of cotton crops near Mareeba in Northern Queensland found no evidence of fall armyworm activity in either Bollgard® 3 or unsprayed conventional cotton refuges.

While there are numerous products registered for the control of various cotton pests; many insecticides, if used at the wrong time, can cause more problems than they solve by disrupting the balance of natural pest enemies ('beneficials'). This can subsequently flare secondary pests, which may then require further, often harsher methods of control.

It is particularly important to avoid the usage of broad spectrum non-selective products where possible. In the past, repetitive application of dimethoate at various locations in Northern Australia has resulted in cotton aphid outbreaks during boll opening. Several seasons of testing have revealed extreme resistance to organophosphate insecticides in Western Australia and north Queensland. The levels of resistance present are likely the result of long-term usage of these products for vegetable production where cotton aphids are a regular pest. Where possible, use the most selective insecticide you can afford, particularly between emergence and crop cut-out.

The industry needs to be on the lookout for any incursions of exotic pests, insects, weeds, diseases and pathogens.

Please report anything suspicious to your local relevant biosecurity authority, for testing and identification. See the Industry Insights section for a focus on sucking pests - harlequin bugs and other cotton stainer bugs, in particular.

For further information on pest management in cotton download CottonInfo's:

- [Cotton Pest Management Guide](#)
- [Pests and Beneficials in Australian Cotton Landscapes](#)

Disease pathogens

A disease occurs when a pathogen is exposed to a susceptible host variety and the environment is favourable for an infection to take place. A disease can be controlled by excluding or eliminating the pathogen, growing a resistant variety or by modifying the environment.

If pathogens aren't present in an area, don't introduce them! Always practice good farm hygiene and insist that vehicles, machinery and equipment - even your boots - are clean before moving on or off farm: Remember to "be a good mate and leave it at the gate".

All cotton seed in Australia is supplied with a standard fungicide seed treatment for the control of seedling diseases. The seed also undergoes a rigorous process to ensure that disease cannot be transmitted on the seed.

Wet and humid weather is usually a significant factor in disease development. There are several leaf pathogens that can infect cotton and cause various leaf spots, and even defoliation, when a crop is exposed to an extended period of wet weather.

The most common of these observed in Northern Australia is alternaria leaf blight. This disease is rarely a problem for healthy crops but can cause significant leaf damage in later planted crops which are exposed to cool overnight temperatures and dewy conditions. The simplest way to avoid this disease is to ensure that peak boll load occurs during autumn as opposed to mid-winter. Alternaria may also be present during the wet season, but damage has tended to be limited to the lower canopy, with senesced leaves rapidly replaced at this time of year.

For more information download the CottonInfo [Alternaria leaf spot - the IDM fast facts series](#).



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DOZEN DEEDS FOR NORTHERN AUSTRALIA

Rule 7. Have a plan for weed control

Weed control

It is important to control weeds, in order to reduce competition for the crop and maximise yield potential, as well as removing plant species which are capable of hosting pests and diseases. 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 Bollgard 3 Resistance Management Plan (RMP) and also for general farm hygiene. Volunteer and ratoon cotton 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).

Consult the Roundup Ready Flex Cotton Weed Management Guide (WMG) 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.

A key part of the RMP 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 Control of volunteer and ratoon cotton guide.

DOZEN DEEDS FOR NORTHERN AUSTRALIA

Rule 9. Monitor to manage the crop

Monitoring the crop

Utilise your consultant/agronomist to monitor crop growth and progress, as well as insect pests and disease, and to prescribe methods of control, if required. A consultant/agronomist can provide a fresh set of eyes and will also have an understanding of where the crop should be up to based on their knowledge of other crops in the district. Critical aspects which your consultant can assist with are growth rates, plant height management and fruit retention.

Cotton is a responsive crop to manage, hence growers are able to monitor and manipulate the plant for ease of management and to maximise yield. The rate of growth of a cotton crop is determined by temperature, sunlight and soil moisture. Depending on these variables; in particular temperature, the crop will follow a specific growth pattern.

This predictability allows for management and monitoring to influence crop growth and development. Using the relationship between the rate of development and temperature, a measure of crop progress is described as Day Degrees. Certain crop milestones are likely to occur relevant to the number of Day Degrees accumulated throughout the season.

Plant growth regulators

Excessive growth can lead to reduced penetration of insecticides, as well as a reduction in sunlight penetration into the crop canopy that can reduce the expression of Bt toxins and exacerbate boll shedding. However, the use of growth regulators must achieve a balance between suppressing vigorous early growth and not subsequently inhibiting the production of later fruit if required for yield compensation.

Mepiquat chloride (Pix®) recommendations from temperate Australia based on internode length **DO NOT WORK** in tropical production systems. Yield reductions of up to 26% in wet and 16% in dry seasons occur when excessive Pix application prevents plant recovery from environmental stresses.

Local R&D has developed and validated crop monitoring systems based on maintaining an optimum height range relative to the overall height, node number and crop boll load as the crop develops by only using low rates of Pix (repeat dosages of 200-400 mL/ha when required) and/or other management (e.g. irrigation). The approach is to moderate growth over time, leaving room to change tactics should the weather or other factors post-application work against you. Once applied Pix will have an effect on the crop for approximately 10 days after application and therefore once applied it cannot

be removed. During the transition from wet to dry season conditions it can be difficult to predict field conditions more than several days ahead and therefore it is prudent to make repeat applications of Pix at a lower rate if required than use a larger one-off dose. The impact of Pix can be excessive if the weather changes from wet and overcast to sunny and hot. Also keep in mind that Pix may also reduce root system expansion.

Refer to NORpak for further information on [plant growth regulation in Northern Australia](#).

Crop irrigation regimes

Be prepared to react and change your strategy when the weather changes, and take the time to consider where your plant's development is at and what is going on in your soil profile when making irrigation decisions. It is unlikely two seasons will be the same.

Determine how deep your root system is. Following the wet season and depending on your soil type, your crop's roots may be a metre deep or confined to the top 20 cm of soil. As this will vary between seasons, you need to explore where your crop's root system is at so that you can plan your approach post-wet season, accordingly.

Crop stage - if your crop is young (vegetative or very early squaring) and conditions have turned dry, use this opportunity to encourage your crop to explore the profile. The crop is very resilient to water stress at this time and a break in the wet weather during this period can allow for better root exploration. Alternatively, if your crop is about to commence flowering or is flowering and it has been subjected to wet conditions and has a shallow root system, be prepared to irrigate early, soon after rainfall. Crops with large canopies and small root systems are susceptible to premature cut out if mismanaged during the transition from wetter to drier conditions. It may be necessary to irrigate these crops within a week of last rainfall.

INDUSTRY INSIGHTS

Cotton harlequin bugs and cotton stainers

By Paul Grundy, Principal Research Scientist, Crop Protection and Farming Systems, Department of Agriculture and Fisheries.

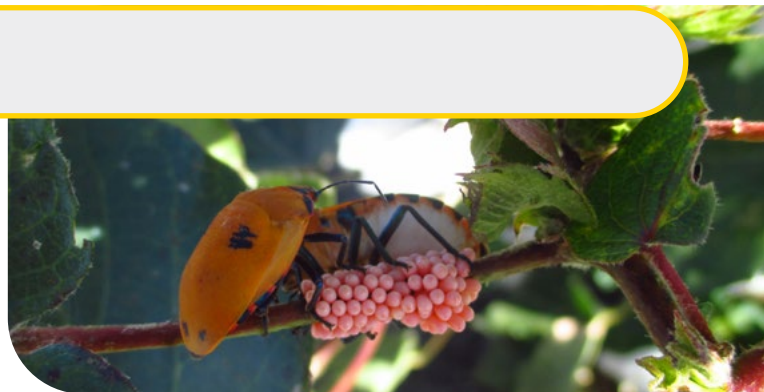
Cotton harlequin bugs and cotton stainers are frequently encountered in northern Australia cotton crops. In particular, harlequin bugs have been common in northern Queensland crops, while cotton stainers have been more prevalent in the Northern Territory.

For southern regions, harlequin bugs are rarely a pest, and cotton stainers occur occasionally.

What are harlequin bugs and cotton stainers?

Harlequin bugs are unmistakable in cotton, being large (15-20mm) orange coloured stinkbugs that may or may not have peacock coloured blue splotches. They are often observed sunning themselves in the upper canopy. After laying eggs, the females guard them to protect them from natural enemies until they hatch after which the adult moves on. During this time, they do not feed. Due to this behaviour and their large size, harlequin bugs are a relatively slow developing pest. Adults will migrate into the crop, mate and lay eggs that take approximately a fortnight to hatch. The first instars do not feed but after the first moult, they begin plant feeding and are likely to be aggregated in groups. As they progress to the later nymph stages, they disperse and become more damaging feeding on developing bolls.

Cotton stainers also migrate into the crop from surrounding bushland areas. Adults feed and lay eggs which are not readily visible, although red coloured nymphs after



hatching can be readily found. Cotton stainers are more likely to be observed well within the canopy foliage next to developing or open cotton bolls.

At what point should control be taken?

Both species can feed on developing bolls, causing damage and subsequent yield loss. In addition, cotton stainers can feed on open cotton bolls causing seed loss and lint discolouration. As these pests are not common in southern cotton, threshold guidelines were derived from glasshouse and cage studies that sought to compare the damage they might cause with a more frequent and better understood pest - green vegetable bugs. These tests found that harlequin bugs cause one quarter of the damage that green vegetable bugs might cause, whilst cotton stainers are slightly more damaging representing one third green vegetable bug equivalent.

What does this mean?

For green vegetable bugs, the action threshold is triggered when numbers reach 0.5-1.0 bugs per metre of crop row. The lower threshold is applied for visual sampling, whereas a higher value is used for beat sheeting due to differences in sampling effectiveness. Harlequin bugs are NOT easily sampled with a beat sheet due to their ability to cling

onto the foliage and avoid being dislodged. Given this behaviour and their bright colours, visual sampling is likely to be the best method for this pest. Based on the green vegetable bug equivalent, the suggested threshold for harlequin bugs sampled visually would be two bugs to the metre of crop row. In comparison, cotton stainers are more easily sampled with beat sheeting, with three stainers per beat sheet the suggested trigger point for control.

The damage potential posed by harlequin bugs decreases as the crop matures and lower canopy bolls open. On the other hand, cotton stainers can remain a pest throughout the boll opening period.

Damage to bolls up to 20 days old may cause shedding or warty growths on the inner boll wall, while older bolls are unlikely to show obvious external symptoms. Damage at this stage is to the developing seeds, reducing seed size and lint production. Tight-lock can result around damaged seeds, preventing the lint from fluffing out as the boll opens, and damaged locks (boll segments) often appear yellow or stained.

Where cotton stainer adults and nymphs are observed feeding in open bolls, the threshold for control action should consider the potential for quality downgrades of the lint as well as the loss of seed weight and seed viability.

Sucking bug distribution within fields can be clumped. Take this into account when sampling and also keep an eye out for boll damage. Harlequin bugs likely to be encountered around field edges compared to the middle. This insect typically poses more problems in smaller or narrow fields compared to much larger management units.

An additional consideration is that feeding by these pests can create entry sites for later boll rot pathogens under rainy or humid conditions. This is more likely to be of concern in northern Queensland where rainfall may still occur during May, coinciding later boll filling and opening boll opening compared to the Northern Territory and Western Australia cotton regions, where the crop is likely to experience drier conditions at that stage.

What options are there for control?

Unfortunately, there are no genuine soft options available for control of these species, and in the case of harlequin bugs there are no specific registrations. As a guide, products that are registered for green vegetable bugs are likely to provide similar control for harlequin bugs. If you find yourself needing to make a control decision refer to Table 3 (page 10) of the Cotton Pest Management Guide to best balance the available options against the beneficials that you are most wanting to preserve, as differences in product impacts do exist for some natural enemy types. Take into account the potential knock-on effects for other pest species such as aphids or mealybugs. Aphids in several locations in northern Australia have been found to have high levels of resistance to dimethoate, so the use of this product is likely to flare aphids if they are present.

Neutral conditions favoured, although “Modoki” phase offers hope for cotton areas

By Jon Welsh, AgEcon.

With most areas now getting a true taste of what they would expect for a La Niña monsoon, 2021 is certainly shaping up as one where most farms are in a much improved state from 12 months ago. While the official word is that La Niña has decayed, residual warm sea temperatures linger and broad low air pressure remains camped over us. The MJO has been buried in that broad scale mass of low air on the equator, making it hard to track. However, its shaping up to make a return into Phase 6 over Australia which may impact eastern areas in April. The outlook for 2021 is certainly more nuanced this year, but could have a silver lining with the formation of a “Modoki” La Niña, which doesn’t occur very often.

For more details, visit [AgEcon’s website](#).

INDUSTRY PROGRAMS

The Roundup Ready PLUS® Program

The Roundup Ready PLUS program is designed to reward cotton growers 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 campaigns and financial rebates.

Record herbicide usage for rebate by between May 1 and August 31.

The program encourages growers to use a range of weed control practices through:



Product recommendations



Education & stewardship campaigns



Financial rebates

Terms and conditions apply. For further information, visit: www.roundupreadyplus.com.au.



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RESOURCES AND TOOLS

Resources

- [NORpak: Cotton Production and Management Guidelines](#)
- [Tropical Cotton Production: Considerations for Northern Cotton Growers](#)
- [Growing Cotton in Northern Australia Guide](#)
- [Acres of Opportunity Irrigated Cotton Guide](#)
- [Acres of Opportunity Dryland Cotton Guide](#)
- [2020 CSD Grower Information Guide](#)
- [Australian Cotton Production Manual](#)
- [CSD Variety Guide](#)
- [FastStart cotton website](#)
- [CSD Variety Trial data](#)
- [Bollgard 3 Northern Resistance Management Plan \(RMP\)](#)
- [Planting Windows in Northern Australia: Quick Guide](#)
- [The Dozen Deeds for Northern Australia](#)
- [Australian Cotton Pest Management Guide](#)

Tools

- [Cotton Field Weather Network](#)
- [Canopy Temperature Network](#)

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