Integrated Pest Management (IPM)

Optimising your early season crop management

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Integrated Pest Management (IPM)

Optimising Your Early Season Pest Management

Integrated Pest Management (IPM) in cotton is a story of innovation and resilience. Born out of the urgent need to overcome severe *Helicoverpa armigera* insecticide resistance that once jeopardised the industry's future, IPM has grown into a comprehensive approach tackling all of cotton's insect and mite pests.

A clear breakthrough arrived in 2004 with Bollgard® II technology, which eased the daily battle against *Helicoverpa* and allowed farmers to refocus on agronomy. Even so, the journey since hasn't been all smooth sailing with new pest challenges and, more recently, the resurgence of insecticide resistance.

But at the heart of IPM's success is something even more valuable: people like YOU.

For those who haven't experienced what it was like to battle resistant pests in conventional cotton, the hard yards undertaken to develop IPM might seem unrelatable. However, the innovations that have arisen from pest research over the past 50 years have created a solid foundation for sustainable pest management not only today but also well into the future.

This booklet from CottonInfo is designed to provide you with essential IPM insights and practical tips to help you get your crop off to a fantastic start for the season. Dive in and discover how IPM continues to evolve thanks to the dedication and foresight of the people shaping its future.

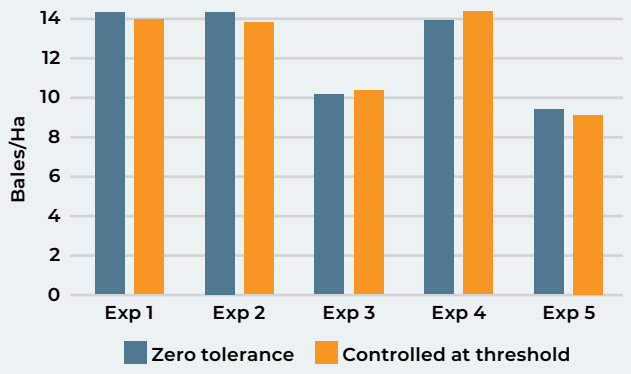
The printing and distribution of this publication has been made available by sponsorship from Sumitomo

Good, Bad or Just Ugly? – Thrips & Crop Establishment

No one aims to grow an unsightly crop, and thrips can cause some of the ugliest leaf symptoms you will see on establishing cotton crops. Despite the unsightly appearance, most crops usually recover without long-term harm or delay, however high thrip numbers combined with cool conditions may require management action.

Extensive research shows that thrip management doesn't have to be a gamble.

When to hold or fold – Sample 20-30 plants weekly between emergence and six true leaves using a hand lens to count thrips. Control thrips when they exceed 10 per plant and are causing severe clubbing of the leaves. No action is needed if thrip numbers are below 10 or leaf damage is mild, as the crop will recover without impacting maturity or yield. Research in the Riverina under cool conditions with high yields confirmed that this management approach produced the same crop maturity and yield outcomes compared with a strict zero-tolerance approach.



Lint yields from across 5 experiments spanning several years in the Riverina comparing thrips controlled at threshold with a zero tolerance approach. There were no significant treatment differences.
Sourced from CRDC Final Report DAN1501

Wouldn't it just be easier to control thrips and avoid the damage and potential worry?

While thrip-scarred seedlings are unpleasant to look at, there are compelling reasons to tolerate some initial thrip damage. First, two-spotted mites also often infest crops during the seedling phase. If thrip populations are below the threshold, allowing them to remain can help suppress developing mite populations, potentially eliminating the need for mite control later in the season.

Secondly did you know that seedling thrips mostly reproduce asexually, effectively cloning themselves just like aphids. Testing in 2023/24 identified a disturbing new trend of thrips resistance to fipronil (Group 2B). Coupled with recent problems with Group 1A insecticide (e.g. dimethoate) resistance in aphids, the use of either compound to target below-threshold thrips populations is exacerbating resistance issues for both species. Tolerating some thrip-induced ugliness early season (within reason) is a strategic decision you can make to avoid worsening resistance and encourage a balanced ecosystem in your fields.

Ugly but ok. These young cotton plants have less damage on the newest leaves and will make a complete recovery without any lasting impacts. Simone Heimoana

Are thrips effective mite predators?

Although their damage can be unsightly, thrips play an important role as predators of two-spotted mite eggs. Of the two most common thrips species in early cotton, tomato thrip (*Frankliniella schultzei*) nymphs are particularly effective, consuming 2-6 mite eggs per day, while seedling thrips (*Thrips tabaci*) consume 1-2 eggs daily. Adult thrips can consume up to 7 eggs per day, but their average is usually only 0.5-1.

Impact on mite biological control

A female two-spotted mite lays about 4 eggs per day for just over two weeks, totalling around 60 eggs. These eggs hatch into 10 males and 50 females, which each lay another 60 eggs. This can result in a population explosion, reaching 2,500 mites by the start of the third generation and 150,000 mites within 8 weeks.

Thrips can reduce mite populations. On average, 2-3 thrips can consume all the eggs laid by a female mite. If this occurs during early mite infestation the cumulative impact is significant. However, removal of thrips and other predators by unnecessary pesticide use skews the ratio of mites to predators. The resulting mite outbreak typically occurs 6-12 weeks later, long after the initial pesticide application is forgotten.

Allowing below-threshold thrip populations to remain in early cotton crops can be a strategic approach to controlling mite populations and preventing long-term infestations.

Tiny Disrupters – Mites

Mites are tiny arachnids that feed on plant sap. Two-spotted mite (*Tetranychus urticae*) causes significant yield loss in cotton. Related species such as strawberry mite (*T. lambi*) and bean spider mite (*T. ludeni*) seldom cause notable damage. The other species occasionally encountered in cotton are broad mites (*Polyphagotarsonemus latus*).

How can I tell the difference?

Two-spotted mites have dark patches on either side of the front half of their bodies only, and cause distinctive brownish areas on the underside of cotton leaves at the junction of the petiole and leaf blade an in the folds between leaf veins. As feeding progresses, red patches appear on the opposite upper side of the leaf, eventually causing the leaf to turn completely red and fall off. Strawberry and bean spider mites have dark patches all around their bodies and mainly cause leaf stippling (tiny pale spots) without the brown areas or leaf reddening.

Conditions for outbreaks

Mites thrive in hot predator-free conditions. Begin sampling for mites early, but don't take any control measures until the crop is at least well into the squaring stage. Avoiding early season pesticide use allows natural enemies to build up and provide biological control.

When to Act

Late squaring to cutout: Control mites if 30% or more of plants are infested or if the number of infested plants is increasing by more than 1% per day (e.g., a 10% change between weekly checks) between late squaring and first open boll.

Older Crops: Only control mites between first open boll and 20% bolls open if populations are increasing by 3% or more per day. Once more than 20% of bolls are open, mite control is no longer necessary.

For detailed guidelines that account for regional variations, refer to the Cotton Pest Management Guide (available from the www.cottoninfo.com.au).

Strawberry Mite.

Bean spider mite.

Two spotted mite.

Leaf reddening is a characteristic unique to two spotted mites only. Other species do not cause these symptoms. Janelle Montgomery.

Challenges and Strategies for Mite Control in Cotton

The number of miticides available for use in cotton is limited. Recent resistance issues further complicate this problem, particularly in northern New South Wales (NSW).

Resistance Issues

- **Abamectin**: Moderate to high resistance to abamectin has developed primarily due to prophylactic use (particularly when included with mirid or thrip sprays by crop managers trying to stay one step ahead and prevent mite outbreaks). Indiscriminate widespread use has significantly reduced abamectin's effectiveness as a miticide.
- **Diafenthiuron**: Increased use of diafenthiuron in recent seasons for cotton aphid and mite control has resulted in moderate to high resistance in mites and control failures in northern NSW localities.

Effective mite control options are therefore very limited, particularly in regions where resistance levels are high. One of the few remaining effective miticides is etoxazole. While it fits well within Integrated Pest Management (IPM) due to its narrow spectrum, meaning it does not harm most natural enemies, the risk of overusing etoxazole is now high. To avoid resistance, etoxazole use must be well-considered and label requirements strictly followed.

The Integrated Resistance Management Strategy (IRMS) has been updated with important details regarding the use of etoxazole and other registered miticides for the 2024/25 season. Adhering to these guidelines is crucial to manage resistance and maintain the efficacy of available mite control options.

Broad mites

These tiny creatures measuring 0.2-0.3 mm long, typically go unnoticed until crop foliage begins to show symptoms that look a little bit like phenoxy herbicide damage. Leaf undersides often present with a 'wet' appearance, with curled leaf margins and thickened veins. New growth is likely to be most affected at the terminal and other growing points. Under high infestations bronzing of the leaf undersides can occur, with leaves becoming hard and brittle.

Broad mites are an occasional pest and most commonly encountered during warm humid seasons. Due to this infrequency, the impact on yield is unknown. Generally, plant symptoms are observed near crop cutout and therefore yield impacts should be minor as canopy development is largely complete and fully formed foliage generally remains unaffected.

Interestingly, broad mites are so small that they hitchhike from plant to plant by attaching themselves to the legs of silverleaf whitefly with the outbreak of these pests often going hand in hand. There are no registered control options for broad mites in cotton. However, broad mites have natural enemies including predatory mite and ladybird species. Predatory mite species that control both broad and two spotted mites can be purchased for crop release in Australia.

NSW DPIRD technical staff examining samples for two spotted mites. Hayley Yandell Smith

Broad mite damage showing leaf distortion and vein thickening. P Grundy

Adult silverleaf whitefly with broad mite hitchhikers. R Lloyd DAF

IPM considerations for mites in 2025

With limited options for mite control in 2025, an integrated approach is crucial.
Key tactics include:

Natural enemy conservation: Protect natural enemies, including thrips, from early establishment onwards.

Selective pest control: Only control thrips and mirids when necessary, giving consideration to the crop's compensatory ability.

Delayed mite control: Avoid controlling mites before late squaring to give natural enemies a chance to manage populations.

Monitor and act: Monitor mites closely from squaring onwards and take action only when populations exceed thresholds.

Careful crop placement: Be mindful of earlier maturing crops (e.g. sorghum) that could host mites and be a source of large populations that migrate to nearby cotton fields.

Limit diafenthiuron use: Avoid using diafenthiuron for all pests if possible. When necessary, restrict it to a single application per field and farm.

Sow into clean fields: Weeds and volunteers can overwinter mites. Eradicate well before sowing to avoid mite displacement onto newly emerged cotton.

This satellite image shows sorghum (red) between two cotton fields (blue). The impact of mites migrating out of the sorghum into the cotton can be seen on the adjacent field edges (yellow & green) demonstrating the importance of considering the placement of crop rotations.

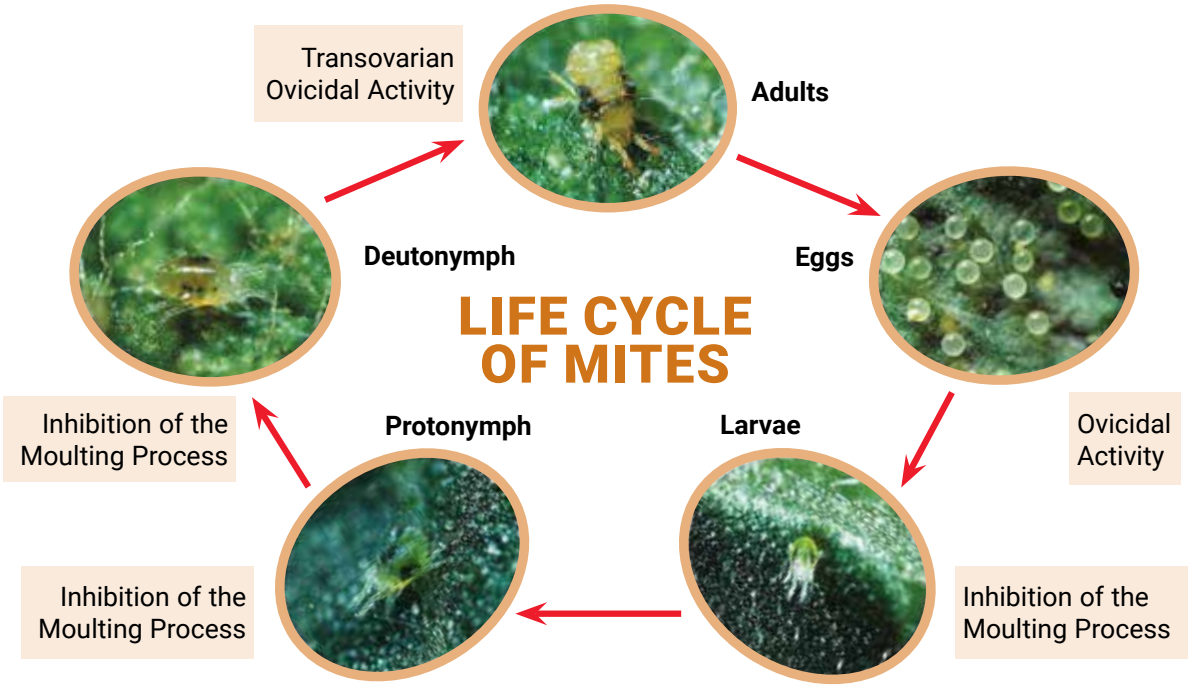
ZEAL® SELECTIVE MITICIDE – AN INSECT GROWTH REGULATOR FOR CONTROL OF MITES

Zeal miticide from Sumitomo Chemical Australia is for the control of mites in cotton. Use in maize and popcorn is also allowed under permit (PER88259). The active ingredient in Zeal, etoxazole, has no cross resistance to existing miticides – therefore making it an ideal rotation option in a resistance management strategy. While highly efficacious against a variety of mites, Zeal is very safe on beneficials, ensuring a good fit in IPM programs.

Mode of Action

Zeal contains the active ingredient etoxazole from the Diphenyloxazoline group, classified as a Group 10B insecticide. Etoxazole is an Insect Growth Regulator (IGR), or more specifically a moult inhibitor, which has excellent contact activities against juvenile stages from eggs to larvae and nymphs, and an indirect effect on adults.

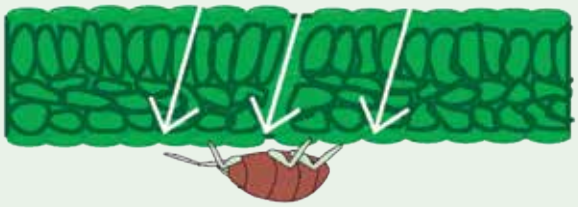
Zeal stops egg, larvae and nymph development on contact and sterilises adult females.



ZEAL ACTS ON MULTIPLE STAGES OF THE LIFE CYCLE OF MITES

Translaminar movement

Zeal applied to top of leap



Zeal has translaminar movement within the leaf providing robust control on the upper and underneath sides of the leaf, this is important as mites preferentially colonise the underneath of cotton leaves. Zeal will remain active within the leaf for up to 14 days.

Scan here to see more information about Zeal

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Integrated Pest Management

Being a mite-specific IGR, Zeal is considered to have a low impact on beneficial insects. It has no or low toxicity to beetles, predatory mites, lacewings, parasitic wasps and predatory bugs. **The following table represents a summary of data regarding effects of Zeal on key categories of beneficial insects:**

Safety to beneficials

Pest attacked by beneficial insect	Beneficial insect	Effect of Zeal on beneficial insect
Aphids, mealybug and TSM	Beetles (stethorus and ladybirds)	None to low toxicity
TSM	Predatory mites	Moderate toxicity (not to adults)
Aphids, scales and mealybug	Lacewings	None to low toxicity
Caterpillars and thrips	Bugs (pirate bugs)	Low toxicity
Pollination	Honey bee	None

How to get the best results from Zeal

- Zeal is best suited to early application before nymphs turn into adults. Other than sterilising female mites, it has limited effect against adults and they will continue to feed and cause damage until they die naturally.
- Have a planned approach to mite control ensuring Zeal is used early in the program.
- The 2024-25 IRMS recommends that Zeal be the first miticide used in the season.
- Consider banding your ground rig application during late squaring to save on costs without compromising efficacy. On older crops, use droppers to ensure adequate coverage of the lower canopy. Use a minimum of 100 L/Ha of water, as water is the least expensive component in ground rig operations.
- If aerial application is necessary, use the highest water rates you can afford and target timing for a good crosswind for maximum coverage.
- Ensuring you get thorough coverage is essential as mites predominantly reside and reproduce on a single leaf. Under-sprayed areas on leaves will assist mite survival and potential resurgence.
- Correct timing requires careful monitoring. Apply Zeal while the mite population is still developing and predominantly juvenile.
- Only one spray of Zeal can be used per season. Knockdown miticides can be used in the same season as Zeal but should follow Zeal.
- Crop placement and field history should be considered, DO NOT plant in weedy fields or adjacent to other host crops of mites.

Key considerations when using Zeal

- Target Zeal early at late squaring to mid flowering (well before crop row closure), as stipulated by the IRMS.
- Get your application right: Ensuring effective application is crucial for success with products like Zeal. Even though current resistance levels are very low, sub-optimal dosages can significantly increase the risk of selection for resistance.
- Alternative miticides available for use in cotton such as diafenthiuron and abamectin have high levels of resistance so Zeal should be conserved by using it strictly as per the IRMS guidelines and in conjunction with non-chemical IPM techniques.
- DO NOT use Zeal on very high populations. Start scouting early to ensure mites are detected early when numbers are low.
- If numbers are building at 1% per day (7% per week) its time to spray.
- Thrips are excellent predators of mite eggs. 3 thrips can eat all the eggs of 1 mite.
- If a second mite spray is needed, use an alternative mode of action and it should be 4 weeks following Zeal.
- Etoxazole is very stable in water with a long half-life at neutral (pH 7) to high pH (pH 9).
- Whilst the addition of an adjuvant with Zeal is not mandatory it may improve coverage and uptake.

Zeal use in maize and popcorn

Zeal can be used for controlling Two spotted mite in maize and popcorn under permit (PER88259) at 350 mls/ha. As maize, popcorn and cotton are often grown in close proximity or in rotation consideration of how Zeal is used in maize and popcorn can be important when planning use in cotton.

When assessing maize or popcorn for mites it is recommended to start scouting early and look along the rib of the leaf looking for mites and webs …. If any are seen flip the leaf over as there will be more under the leaf allowing a more accurate assessment of numbers.

Like cotton it is preferred to spray early onto smaller plants and smaller mite populations rather than later, on bigger plants and more entrenched populations.

Sumitomo recommend applying Zeal on maize or popcorn by ground rig at 80 -100 L/ha, or if by air apply in 30 L/ha of water.

For further information on **Zeal**, please contact:

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Ardina Jackson (NW NSW)	0477 967 509
Phil Glover (Central & Coastal NSW)	0418 668 586
Charles McClintock (S NSW)	0429 004 290
Frank Galluccio (NW VIC & Riverina)	0418 502 466
Jack Bartels (Eastern VIC & TAS)	0488 036 313
Matthew Hincks (SA)	0409 807 301
Imre Toth (WA)	0429 105 381
OR our Sydney office:	(02) 8752 9000

Fruit Retention for High Yields

Watching an episode of Clarkson's Farm makes it clear how important a crop's appearance is to many people. In cotton farming, we often prefer to see deep green crops loaded with fruit throughout the season, and therefore look to manage the crop for maximum fruit retention across all development stages. However, it's ultimately the plant that decides how many bolls it can retain, and our opportunity to influence this process really only begins just prior to flowering.

Key insights from research

Spraying to manage retention during early squaring is a false economy. Research conducted over three seasons found that bolls set from the very first developed squares were smaller and did not significantly contribute to overall yield or crop earliness. In fact these bolls, located at the very bottom of the crop canopy, were most at risk of weathering and tight lock if rainfall occured during boll opening and harvest.

For high-yielding Bollgard 3 crops, begin active management of retention once the crop develops 4-5 fruiting branches (around 11-13 total mainstem nodes). Any squares lost before this stage are quickly replaced as the crop develops, with no impact on crop maturity or yield, irrespective of whether you are growing cotton in the Riverina or central Queensland.

Adding insecticides when applying herbicides during early squaring provides NO benefit for yield or crop maturity. Instead, it disrupts the establishment of natural enemies crucial for managing mites, aphids, and silverleaf whitefly. Delay the control of pests like mirids until crops have reached later squaring (4-5 fruiting branches), and then only act when pest thresholds and reduced square retention confirm the need for action.

For detailed guidelines on managing retention for high-yielding Bollgard 3 crops, refer to the Cotton Pest Management Guide (CPMG). Check out this video to see how crops respond to early season square loss in real time

Low retention early season? Don't panic! Cotton can compensate without losing yield or quality.
youtu.be/xdLfCxL063s

Understanding the young cotton plant

Can you distinguish between vegetative and fruiting branches on early squaring cotton? If not, your assumptions about square retention early season are likely to be wrong. The first branches on a young cotton plant are vegetative and do not produce squares until later in the season . Young vegetative branches can easily be mistaken for fruiting branches, but including them in retention calculations can lead to the false assumption of poor retention when, in reality, no squares were ever present.

Here's how to tell these branches apart

A vegetative branch has no fruiting sites (left). Fruiting branches have a square opposite the subtending leaf (centre) or a scar indicating a lost fruiting site (right). P Grundy

Insecticide Selection for IPM

Insecticide use is a key component of Integrated Pest Management (IPM). To maximize the benefits and minimise risks, consider the following principles:

1. **Resist the urge to spray**: The hardest decision can be to not spray. Reconsider that impulse to take action when you see crop damage or pests, as sometimes restraint can be the best approach.
2. **Follow pest and damage thresholds**: Use the guidelines in the Cotton Pest Management Guide. These are science-based and balance the risk of economic loss against control costs, including spray costs, resistance risk, secondary pest outbreaks, and the crop's ability to compensate for damage.
3. **Select narrow spectrum insecticides**: Whenever possible, choose the most selective insecticide you can afford. Narrow spectrum insecticides help preserve natural enemy populations and reduce the likelihood of secondary pest outbreaks, minimising the need for additional spraying.
4. **Manage resistance risks**: Some insecticides are currently at risk of becoming ineffective due to pest resistance. Avoid repeated use of insecticides from the same chemical group. Follow the Insecticide Resistance Management Strategy to avoid usage patterns that increase resistance risk.

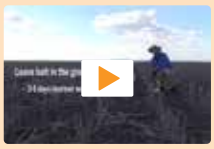
Refer to the CPMG for the latest pest management advice.
Sharna Holman

Soil Pests

Did You Know?

False wireworms have a one-year lifecycle, with one generation per year. Adult beetles emerge in late spring or early summer, often following rainfall. The adults are long lived and lay eggs in the soil. The larvae develop slowly and persist during winter to then pupate during spring. Crops planted in spring coinciding yet to pupate, large larvae, are at high risk of damage.

Research is underway to better understand these pests and improve management for improved cotton establishment. Use baits before planting to check for pests in the soil. If you find them, consider additional control measures during planting to prevent patchy crop establishment.



This video explains how to sample for soil pests.

Sampling for soil insects.
youtu.be i_ODxTAeASw

False wire worm larvae and adult beetles - *Gonacephalem* (left) & *Pteroheleaus* (right). P Grundy

Trends for Bt Resistance Worldwide

The global adoption of transgenic Bt crops shows no signs of slowing, however, widespread usage has led to a rise in pest resistance to Bt, posing a threat to the technology's long-term efficacy.

Australia stands out globally for having avoided significant resistance issues in Helicoverpa species during nearly 3 decades of Bt cotton use. This success can be attributed to a combination of exceptional resistance management practices, Australia's isolated geography, and the use of Bt technology in a single crop type - cotton.

The key resistance management practices that have underpinned Australia's success include:

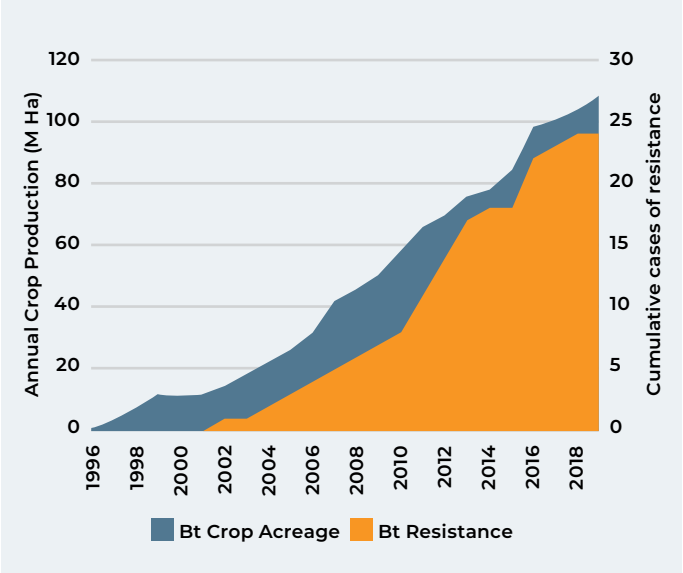
- Compulsory planting windows
- Crop destruction dates
- Unsprayed refuges
- Pupae busting measures

These measures coupled with routine Helicoverpa resistance testing have ensured effectiveness of Bt cotton in Australia. The deployment of Bt traits with less stringent resistance management regulations has led to the emergence of resistance and field failures in many other countries.

Whilst growing unsprayed refuges and enacting pupae busting can be a burden, the benefits for Australia compared to the world are clear.

References

Bruce E Tabashnik, Jeffrey A Fabrick, Yves Carrière, Global Patterns of Insect Resistance to Transgenic Bt Crops: The First 25 Years, Journal of Economic Entomology, Volume 116, Issue 2, April 2023, Pages 297–309, https://doi.org/10.1093/jee/toac183



Global Patterns of Insect Resistance to Transgenic Bt Crops: The First 25 Years.
academic.oup.com/jee/article/116/2/297/6968925

Not All Heroes Wear Capes; Some Have Wings

Red & Blue Beetles

One of the flashier beneficial insects, red and blue beetles (*Dicranolaius bellulus*), are quick to take up residence. They feed on pollen, helicoverpa eggs, silverleaf whitefly (SLW), and mealybugs. CRDC-funded research using DNA diagnostics found that up to 80% of red and blue beetles had SLW in their gut, indicating their significant role as a predator.

Red and blue beetle feeding on mealybug nymph. DAF

Ladybirds

Ladybirds come in various colours and sizes and are easily recognisable beneficial insects. They are key predators for many pests. Known for consuming up to 50 aphids per day, some species, like three-banded ladybirds (*Harmonia octomaculata*), effectively seek out and decimate Solenopsis mealybug populations before they can form hot spots. Gut content research has shown that several ladybird species, including transverse (*Coccinella transversalis*) and striped (*Micraspis frenata*), are effective predators of SLW, with up to a third testing positive for this pest. It is common to find a couple of ladybirds on each beat sheet sample early in the season which is a lot of aphid, SLW and mealybug munching power within your field.

Transverse ladybird. P Grundy

Spiders

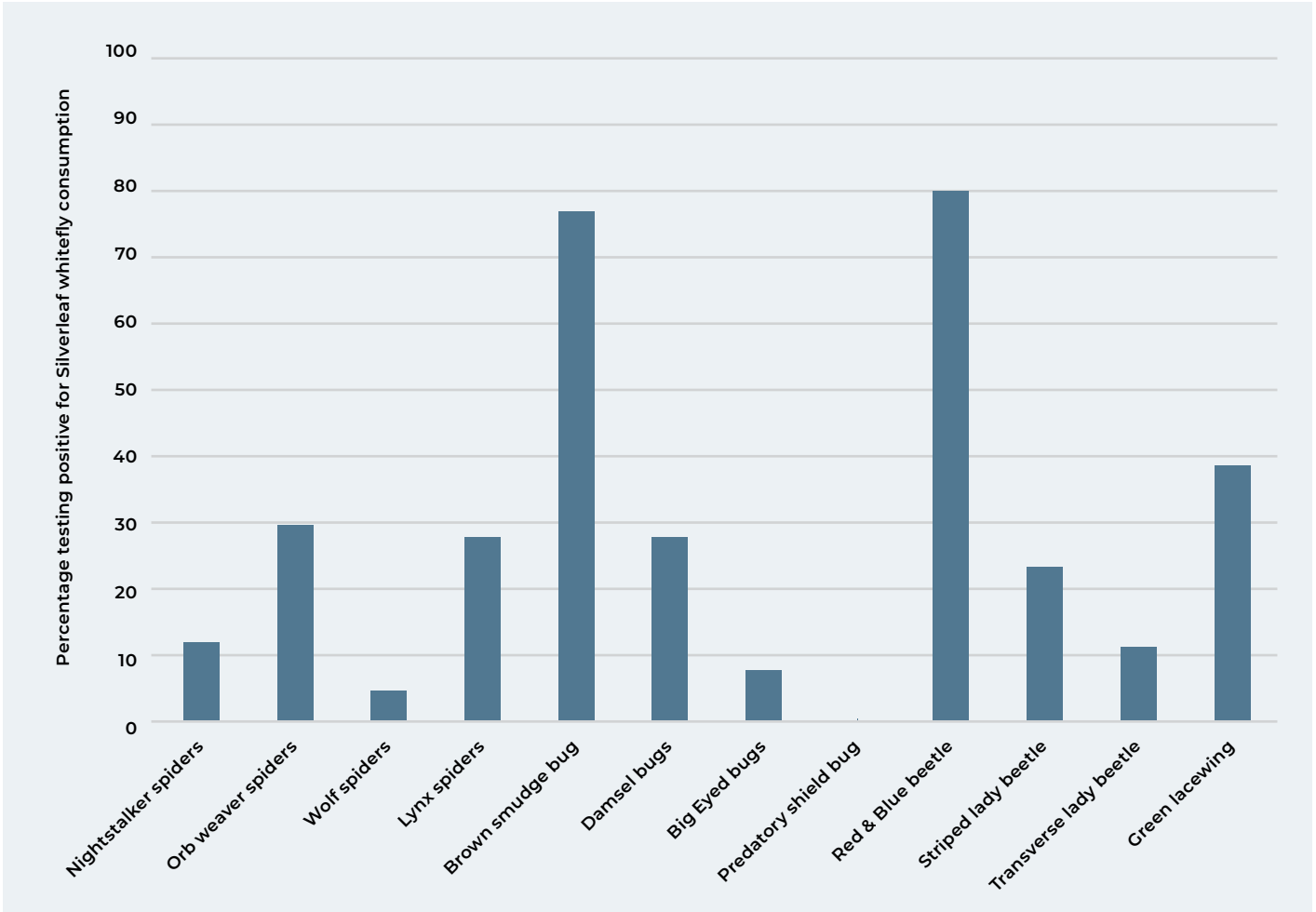
Spiderlings arrive early in cotton fields 'ballooning' in on wind currents from surrounding areas. Night stalker, lynx, and jumping spiders freely range through the canopy, consuming pests such as green mirids. Later in the season, web-building spiders provide considerable biological control by trapping and consuming many pest insects, including helicoverpa moths and SLW, some of which just perish from being entangled in their webs.

Christmas Spider. P Grundy

Thrips

Thrips are actually double agents, transforming from a seedling pest to an important predator of two spotted mite eggs.

Seedling thrips. Lisa Bird



The percentage of cotton field collected predators that were found to test positive for ingestion of silverleaf whitefly using DNA diagnostics. Sourced from CRDC Final Report CSP1303

Sampling Tips and Decision Making

Effective decision-making hinges on reliable information gathered through crop scouting and coupling that information with current IPM knowledge.

Knowing what to look for, when to look, and how to interpret findings is crucial. Different insects require specific sampling techniques based on their behaviour, lifecycle, where they establish in the crop and damage potential. Here are key considerations for effective sampling:

1. **Ensure sample size relative to field area**: Recommended sample numbers may seem arduous, but they are minuscule compared to the size of most fields. For instance, in a 100-hectare cotton field with metered hills, 6-8 beat sheets cover less than a thousandth of a percent of the field.
2. **Carefully observation of crop symptoms**: While taking samples, observe crop symptoms. This provides opportunities to identify emerging pest hot spots, unusual plant symptoms, and overall crop uniformity.
3. **Recognise patterns**: Sufficient samples ensure confidence in average score results. Vary sampling intensity with pest abundance – adjust sampling accordingly when pest numbers are low or increasing.
4. **Consider what's nearby**: Surrounding grain crops or native vegetation can influence insect abundance in adjacent cotton fields. Factor this in when scouting as these areas can often provide early indication of pests like sucking bugs, mites or silverleaf whitefly (SLW).
5. **Interpret crop signals**: Not all crop damage results from insects. For example, environmental stress often leads to fruit shedding. Look for patterns in crop damage to confirm pest influence or other factors affecting crop health.

If your sampling shows that pests are present, also consider the following before reaching for the application equipment:

1. **Use thresholds**: Don't take action until pest numbers, their rate of change or other indicators exceed recommended thresholds for the crop stage (many pests are only damaging at particular times).
2. **Protect natural enemies**: The free biological control provided by predators and parasitoids is often under-appreciated until a disruptive spray causes a secondary pest outbreak. If you have to spray, choose the most selective insecticide you can afford (see the Impact of pesticides on natural enemies table in the Cotton Pest Management Guide) to minimise disruption of natural enemy populations.
3. **Prevent resistance**: The effectiveness of registered chemicals is monitored by researchers. Resistance in key pests such as SLW, aphids and mites is continually changing, so avoid consecutive applications of products with the same mode of action, and check the latest Insecticide Resistance Management Strategy and pest surveillance results to avoid experiencing in-field product failure or contributing to regional resistance levels.
4. **Be mindful of bees & sensitive areas**: Consider label restrictions for foraging bees or potential for contamination of nearby environments such as crops, riparian areas or waterways. beeconnected.org.au

Finally, take the time to review and reflect on your recent pest management experiences. Are there other management or agronomic changes that could be made that might better prevent a similar pest outbreak situation in the future, such as improved farm hygiene or adjusted planting windows?

Sharna Holman

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CottonInfo is an initiative of industry partners CRDC, Cotton Australia, and Cotton Seed Distributors Ltd designed to connect cotton growers and consultants with research. The CottonInfo team – made up of Regional Extension Officers, Technical Leads and myBMP experts – takes the research and development invested in by CRDC and turns it into practical information and knowledge that's designed to Help You Grow: grow cotton, grow knowledge, and grow industry connections.

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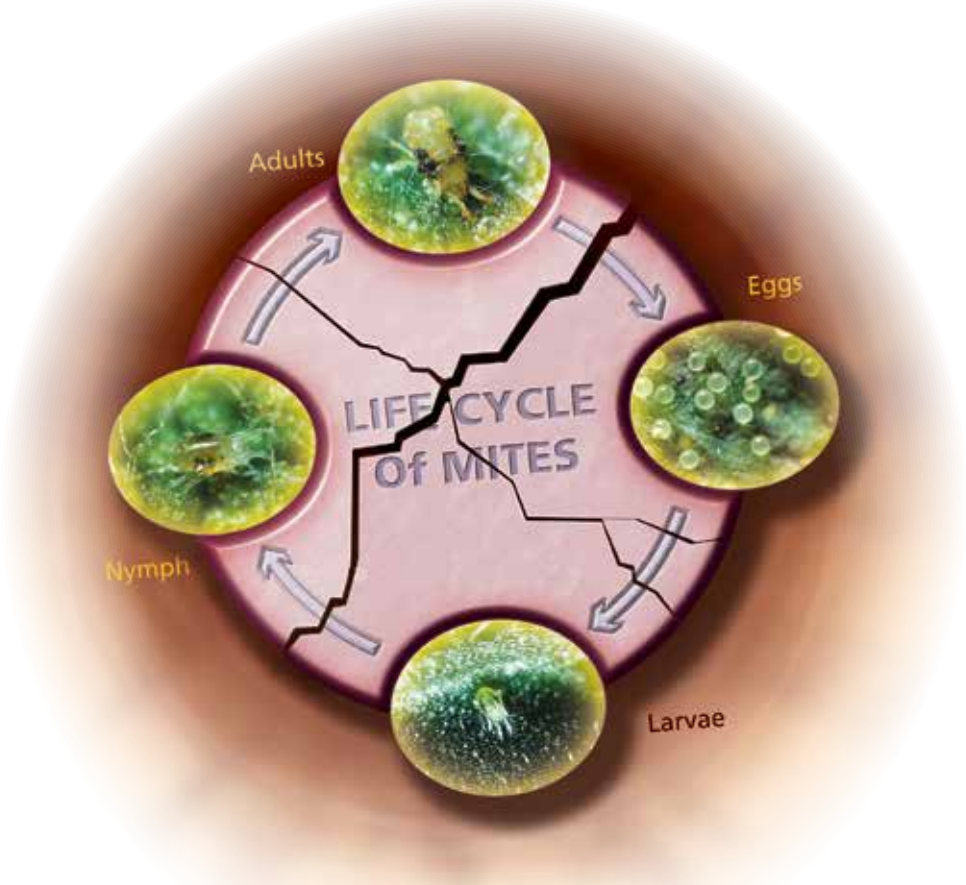
MITICIDE

WIN THE FIGHT AGAINST MITES

BREAK THE CYCLE



For use in cotton, maize* and popcorn*
Controls the mite population by:

- **Inhibiting the moulting process of nymphs**
- **Ovicidal activity – sterilises eggs**
- **Sterilises females**

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