

Pest Profile

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Strategies to Manage Sucking Pests in Cotton in a Wet Season

The 2010-11 season is shaping up to be quite different to recent seasons.

The past 10 years have been dominated by drought and this has influenced the pest spectrum and hence subsequent management strategies. Dry conditions with low winter rainfall, few overwintering hosts and consequently lower overall pest pressure means a lower risk from secondary pests that depend on weed hosts to survive from one season to the next.

In contrast, a mild, wet winter followed by a mild wet spring as has been experienced in 2010, provides the ideal situation for pest survival and early season build up of populations, especially sucking pests.



Photo: Melina Miles, QLD DEEDI

In this document we provide strategies for the management of pests to achieve the best yield outcome with the least expenditure on pest management. More detailed information about the identification and specific management of sucking pests can be found in the Cotton Pest Management Guide (CPMG) and the Cotton Insect Pest and Beneficial Guide (http://www.cottoncrc.org.au/content/Industry/Publications/Pests_and_Beneficials/Cotton_Insect_Pest_and_Beneficial_Guide.aspx)

Early Season Pest Issues

Already in this season, many consultants have reported high populations of mites on seedling cotton, in most regions. High populations of aphids have also

been reported in some regions and this raises concerns about cotton bunchy top disease. At present the incidence of mirids is low but there are signs of increasing populations. However, the abundance of weeds also means that there has been good build up of beneficial insects such as ladybird beetles and other natural enemies that feed on insect pests.

Significant thrips populations were reported in southern regions and these provide strong suppression of mites, but in most central and northern regions thrips populations have been lower than previous years. This may be due to a large number of other hosts (in contrast to recent years when thrips concentrated in cotton as it was the only host available).

Recent trips into inland Australia by entomologists indicate that there are significant *Helicoverpa* and mirid populations that may move east to cotton regions when (if!) their hosts dry out.

In addition, the dramatic increase in cotton area places added pressures on consultants and agronomists to cover the area effectively and on product supply. Coupled with recent rainfall and cool and cloudy weather it has been a challenging start to the season.



Cotton Catchment Communities CRC

So how do we manage this situation?

Over-use of insecticides against sucking pests can disrupt natural enemies, resulting in outbreaks of secondary pests such as aphids, mites and silverleaf whitefly which can be difficult to control, especially if product is in tight supply. An effective strategy revolves around:

Effective sampling:

Ensure there is effective sampling to know exactly what is happening in the crops, especially in relation to pest population development, plant growth and development and the beneficial complex. This requires the use of several sampling techniques;

- *Visual checks* for Helicoverpa, mirids and beneficials. Look at the entire plant – under leaves, along stems, in squares and around bolls.
- *Leaf samples* for aphids, mites and silverleaf whitefly (SLW). Leaves between the 3rd to 5th mainstem node below the terminal.
- *Beat sheet* for mirids and beneficials. The beat sheet is a yellow or white canvas of 1.5 by 2m which is placed in the furrow and extended up and over the adjacent row of cotton. With a 1m stick beat the plants 10 times against the beat sheet to dislodge insects and record their numbers per metre.
- *Sweep net* for mirids and beneficials. Take a 20m sweep along one row at several sites per field.
- *Egg collections* to assess egg parasitism in conventional cotton. Randomly collect about 20 brown eggs (eggs that are about 2 days old) of Helicoverpa spp. on leaves or squares. Keep leaves in moist jars to see how many hatch and how many turn jet black. Avoid collecting fresh

white eggs as parasitoids may not yet have found them.

- *Frequent checking* every 2-3 days allows pest populations and damage to be detected early. Pest infestations are rarely uniform across a field, so multiple samples are required to get a representative estimate. Avoid unrepresentative areas e.g. head ditches, but for some pests such as mites or aphids that may be more abundant of field edges a specific check in these areas may help get a better picture of pest distribution.

For more detailed information about sampling refer to CPMG page 44.

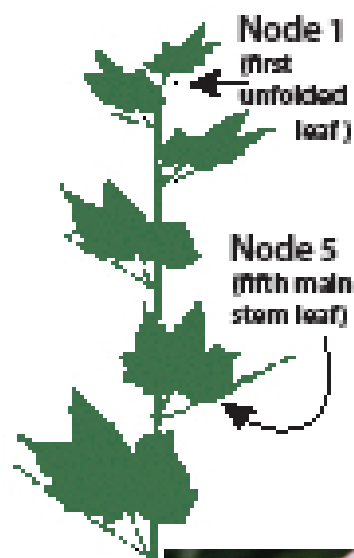


Diagram 1. Sample one mainstem leaf per plant from the 3rd, 4th or 5th node below the plant terminal. Using the leaf from the 4th node allows these same leaves to be collected and scored for aphids and mites.



Photo 1. To score a leaf, carefully turn it over by the tip of the leaf blade. Use the binomial method to score leaves with 2 or more adult whitefly as 'infested' and leaves with 0 or 1 adult as 'uninfested'.

Assess pest population development:

When sampling look at the pests closely and note how they are developing – do mite colonies look healthy with lots of eggs and nymphs, or are there lots of thrips in the colonies and few eggs or nymphs that would suggest poor survival? In addition to regular sampling, it is also useful to mark known groups of plants that are infested and return to them each check, especially for pests that are often patchy such as mites or aphids – it is easy then to compare the current situation with the previous check to assess the condition of colonies.

Tools to help assess mite and aphid populations are available on the Cotton CRC web site http://www.cottoncrc.org.au/content/Industry/CRC_home.aspx

Logically assess plant growth

against expectations based on temperatures. The Crop Development Tool on the Cotton CRC web site can provide a solid benchmark so crop growth can be realistically assessed. It is important to monitor plant damage because insect numbers alone do not always indicate the need to control pests.

On young cotton (< 8 true leaves assess tipping out and leaf damage)

- On fruiting cotton changes in fruit retention and fruiting factors are key measures of plant

Whitefly, Aphid & Mite Predators



Whitefly Parasitoids



Information on the impact of insecticides on key beneficial insect groups can be found on the Cotton CRC website <http://www.cottoncrc.org.au/Publicat/Pest> and from the Beneficial Disruption Index table in the Cotton Pest Management Guide.

Aphid Parasitoids

Wasp parasites *Aphidius colemani* and *Lysiphlebus testaceipes* can mummify and kill aphids (mummified aphids appear as bloated pale brown aphids which do not move).



damage, however, if you have low retention check that pests are the cause as other causes may be more important e.g. water logging, cool conditions or water stress.

- Monitor fruit retention at least every 7 days from the 1st week of squaring. This allows changes in retention to be detected before insect damage becomes excessive.
- Determine fruiting factors by dividing the fruit count by the number of fruiting branches. A key period for measuring fruiting factors is around early flowering. Values between 1.1 and 1.3 will provide optimum yield, values less than 0.8 and greater than 1.5 can result in reduced yields.

For more detailed information about assessing plant growth refer to CPMG page 47.

Carefully evaluate

If control is needed by referring to thresholds both for pest numbers and plant damage. The presence of pests does not always require control as damage may not be significant.

Control of pests below threshold generally will not derive any benefit and leads to:

- Use of insecticides that may be more valuable later
- Reduction in beneficial populations,
- Increased risk of secondary pests
- Increases costs
- Excessive spraying also hastens the development of insecticide resistance

Spraying below threshold is an issue for mirids where recent research shows that this practice does not increase yield. Matching

the threshold to the sampling technique is critical. For mirids if you use a beat sheet to sample, use the beat sheet threshold.

Consider when control should be implemented

Is it better now, or better to wait, resample and evaluate if beneficials are reducing the problem (especially appropriate for mite, aphids and SLW where the effect is due to cumulative damage or population build up – hence an instant control decision is rarely required).

When control is required think ahead to later consequences.

More selective options (eg those that have less negative effect on beneficial populations) will reduce the risk from mites, aphids and SLW. Cheap, but less selective, options may increase this risk and therefore incur expensive options later.

Detailed information on the selectivity of all insecticide options

is available in Table 19 on page 58 of the Cotton Pest Management Guide.

Plan ahead

- What pests are likely
- Which control options are the most selective on specific pests
- Where can these product be accessed

The addition of Petroleum Spray Oil (PSO) to insecticides will suppress mites, aphids and SLW. Research has shown that the addition of salt to some insecticides, for mirid and green vegetable bug control, improves product efficacy and reduces the impact on beneficials.

Refer to the CPMG for insecticide options for specific pests.

A farm-wide strategy does not mean spraying the whole farm at the same time but instead the option to spraying only those fields that need treatment so that others serve as sources of beneficials from which re-colonisation of sprayed fields can occur.

Further Information

Cotton Pest Management Guide
http://www.cottoncrc.org.au/content/Industry/Publications/Cotton_Pest_Management_Guide_2010__11.aspx

Cotton Catchment Communities CRC web site
http://www.cottoncrc.org.au/content/Industry/CRC_home.aspx

The Beat Sheet Blog <http://www.thebeatsheet.com.au>

DEEDI IPM web site http://www.dpi.qld.gov.au/26_3510.htm

Contact the researchers;

Dr. Lewis Wilson (thrips, mites, aphids buncy top research) CSIRO, Narrabri. Ph: (02) 6799 1550

Dr. Robert Mensah (mirids and whitefly research) I&I NSW, Narrabri. Ph: (02) 6799 1500

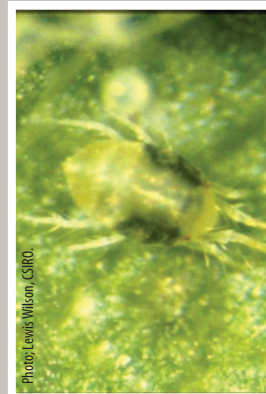
Kate Charleston (Senior Extension Officer), DEEDI, Toowoomba. Ph: (07) 4688 1314

Dr. Moazzem Khan (mirid and stinkbug research), DEEDI, Toowoomba. Ph: (07) 4688 1310.

Key Pests

Mites

Most fields have had mites on seedling cotton so there is a higher risk this season that they will become a problem later (Jan, Feb). Supply of acaricides is tight. Conservation of beneficials, especially thrips in December, January and February will be important to keep this pest under control. Monitor at least weekly and assess yield loss risk to determine if control is required, see CPMG.



Thrips



Silverleaf Whitefly

The widespread hosts and mild winter means SLW are a risk. Effective sampling and application of the threshold matrix is essential to managing this pest. Again, conservation of beneficials is critical in delaying SLW build-up, especially when spraying mirids.



Aphids & Buncy Top

Monitor aphid population to assess survival and spread. Also monitor plants with aphids for leaf mottling indicating infection with CBT. If populations begin to increase or spread quickly control may be warranted to prevent yield loss or CBT spread. Conservation of beneficials will help control aphids.



Mirids

Effective sampling for retention and abundance is essential. Control only if over both thresholds and choose selective options preferentially to help conserve beneficials.