Germinating ideas

By CSD Extension and Development Team

For many areas summer has arrived early with temperatures already soaring into the low to mid 40°C range by mid November and many cotton crops are now coming up to first flower and irrigation ahead of schedule. This is a hectic time of year as growers juggle winter crop harvest and summer cropping activities. About this stage the crop management focus shifts between timely weed control, watering and insect monitoring. This edition of Germinating Ideas will discuss the importance of keeping a careful eye on early season pests.

Early season insects

Insect pressure starts to rise about this time of year after winter crops have hayed off and been harvested and the larger canopied crops have become a more attractive host. During this busy period it is important to ensure that any rapid changes in insect populations do not slip under the radar before problems are identified. Key considerations for early insect management include:

- Establish a routine checking regime early in the season.
- Pay particular attention to weedy sections, including volunteer cotton, or fields adjacent to host crops.
- Correctly identify the pest species present as well as the abundance and type of beneficial insects present.
- Adopt the most recent industry sampling guidelines and control thresholds prescribed.
- Use selective chemistry as much as possible to minimise impacts on beneficial insects.
- Control strategies should consider implications for other pests and ensure insecticide groups are rotated for managing insecticide resistance.

Thrips

Some areas have experienced fairly high numbers of thrips this season, typically in cotton fields with plenty of wheat around them. Many growers anticipated the potential problem and made the decision use a seed treatment or soil applied insecticide. Even so, the rapid haying off of wheat crops under very hot November conditions did coincide with a time when those treatments were starting to run out, particularly in earlier planted cotton around the 5-8 node stage.

Any decision to control thrips at this earlier stage was generally based on the level of plant damage as well as other factors which might have been limiting the crop's development. Spray decisions depend on nymph numbers present and the level of leaf damage (ie. true leaves on average less than one square centimetre). While sprays may help crops re-establish a normal growth pattern, populations will often decline naturally from early to mid December and have less effect as plant growth starts to move along with warmer weather. Thrips also have a beneficial role as predators of spider mites in cotton crops later on.

Western flower thrips

When thrips are still causing damage in fields after an insecticide has been used, this can indicate the presence of Western flower thrips (*Frankliniella occidentalis*). This is an introduced species, resistant to many insecticides, particularly the neonicotinoids which include most of the regular seed treatments and granular insecticides used at planting. While in most situations it is tobacco thrips, *Thrips tabaci*, causing the damage, occasionally high populations

Controlling overwintering sources of Cotton Bunchy Top disease, particularly ratoon cotton (left), is essential in preventing the spread of CBT (leaf symptoms shown on right).

TABLE 1: Recommended thresholds for mirids in warm and cool regions using visual, beat sheet and sweep net sampling methods

		Planting to 1st flower/m	Flowering to 1st open boll/m	1st open boll/m to harvest
Adults or nymphs per metre				
Visual	Cool region	0.7		—
	Warm region	1.3		—
Beat sheet	Cool region	2		—
	Warm region	4		—
Sweep net (> 9–10 nodes)	Cool region	2 adults + 1.1 nymphs	1.5 adults + 0.8 nymphs	—
	Warm region	4 adults + 2.1 nymphs	3 adults + 1.6 nymphs	—
Crop damage				
Fruit retention		60%	60–70%	—
Boll damage		—	20%	20%
Tip damage (% plants affected):				
Light (embyo leaves are black)		50%	—	—
Heavy (terminal & 2–3 upper nodes dead)		20%	—	—

(Source: Cotton Pest Management Guide 2008/09)

of *F. occidentalis* have been identified in areas such as the Darling Downs. Species identification and control options should be discussed with Lewis Wilson, CSIRO/Cotton CRC, Narrabri.

Green mirids

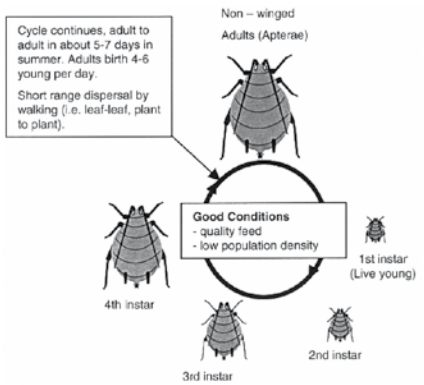
Sucking pests such as the green mirid (*Creontiades dilutus*) have become the primary focus of insect management in Bollgard II crops. Mirids start to migrate into cotton crops from late spring and build up through squaring and early flowering. The types of damage caused by mirids range from blackening and terminal death in young cotton to rapid square loss and shedding of immature bolls once the plant enters the reproductive phase. The very mobile and flighty nature of green mirids makes them more difficult to assess and pest managers often take a more conservative approach to spray decisions.

Spraying for mirids needs to be considered carefully as this can disrupt beneficial insects and cause problems with whitefly, mites and sometimes aphids. The three main methods of sampling for mirids are visual checks, sweep nets and beat sheets. Research by Dr Moazzem Khan, QPDI&F, confirmed that yield loss due to mirid feeding varies with crop stage and therefore different thresholds apply at different times of the season (Table 1).

Management points to remember for mirid control:

- Always use the crop damage component together with the mirid numbers when applying the thresholds;

FIGURE 1: Cotton aphid life cycle when on a suitable host plant such as cotton



(Source: L.Wilson & A. Spora, Cotton CRC)

- Ensure the interpretation of mirid counts is adjusted according to sampling technique, particularly for the higher beat sheet thresholds; and,
- If mirid control is required, choose the most selective option to avoid flaring secondary pests.

Aphids

The build up of aphid populations in winter crops and weeds often prompts concerns about early season infestation of cotton. Winged aphids migrate out of winter host crops and may move onto cotton seedlings to 'test' feed but most of these species will not establish and reproduce on cotton. Cotton aphids, (*Aphis gossypii*), are the main aphid pest in cotton and while mainly a late season pest, high numbers can occur earlier in the season with potential impacts on cotton yields and the spread of disease. Green peach aphids (*Myzus persicae*) and cow pea (*Aphis craccivora*) will also colonise cotton but do

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Seedling damage from thrips at Bourke this season (left) and rapid recovery of normal growth (right) in this case after an insecticide application and irrigation.

not do well on cotton and decline through the hotter months.

The life cycle of the cotton aphid helps to explain why these insects can be a difficult pest to manage (Figure 1). Cotton aphids usually reproduce asexually with females giving birth to live female young without having to mate. These aphid 'clones' will be completely resistant to any aphicide that their mother was resistant to. The life cycle takes five to seven days and the adult female can then give birth to four to six young per day. Movement of non-winged aphids is generally short range (plant to plant) but if conditions become unsuitable, adult aphids will produce young that grow into winged adults.

Aphids do not diapause and can only survive on a living host plant. Farm hygiene through winter in controlling host plants, especially ratoon cotton, plays an important role in limiting aphid survival. Careful scouting of early aphid populations should begin from seedling emergence and sampling should only focus on non-winged adults and nymphs. The new sampling technique and threshold system for cotton aphids uses a scoring system based on the number of aphids per leaf which has been calibrated with the estimated yield loss. More information can be found on the Cotton CRC website.

Aphids and neonicotinoid resistance

Field populations of cotton aphids with resistance to the neonicotinoid insecticide group were detected for the first time in the 2007–08 season and this was followed up last season with two commercial field failures confirmed (Dr Grant Herron, NSW DPI). The development of resistance is thought to be the result of continued exposure to insecticidal seed treatments and topically applied products from the neonicotinoid group including imidacloprid (Confidor and Gaucho), thiamethoxam (Actara and Cruiser) and clothianidin (Shield).

Seed treatments are targeted primarily for the control of thrips. The current Insecticide Resistance Management Strategy recommends that where a foliar application is required to control aphids, the first application should be of a different mode of action to the seed treatment. The low spray regime in Bollgard II cotton has been associated with a reduced use of the organophosphates and carbamate products. Insecticide resistance monitoring by Dr Grant Herron has shown that there is no resistance to these and a number of other products when once there was, providing a number of control options if used carefully.

Aphids and Cotton Bunchy Top

Cotton aphids are the primary vector of 'Cotton Bunchy Top' (CBT), the disease responsible for considerable yield losses in the 1998-99 season. While large scale occurrences have not been seen in recent years, plants showing symptoms of the disease are still frequently reported and associated with aphid 'hot spots'. This highlights the importance of controlling overwinter hosts of aphids and CBT, particularly volunteer/ratoon cotton.

Research by Lewis Wilson, (CSIRO/ Cotton CRC), has shown the spread of CBT is generally quite slow because of a low transmission rate, particularly if only one aphid settles on a plant, and the latent period (10–14 days) between when a plant is fed on by an infected aphid and when the plant is then capable of infecting new aphids. The exception would be when large populations become established in a field early and winged aphids are produced which could spread the disease more widely.

Under most scenarios growers can manage the risk of CBT by managing aphids according to prescribed thresholds which are based on potential for yield loss rather than the potential for disease transmission. By reducing aphid populations, beneficial insects will also be preventing CBT transmission.

For more detailed information on insect control in cotton refer to the CSD website www.csd.net.au, Cotton Pest Management Guide (CCC CRC/NSW I&I) or the Cotton CRC website www.cottoncrc.org.au