

# Managing whitefly in central Queensland

By David Kelly, Richard Sequiera, Paul Grundy, DPI Queensland/ Australian Cotton CRC

The first serious outbreak of silverleaf whitefly (SLW) on Australian cotton occurred on the Central Highlands in the 2001–02 season. It impacted on a variety of crops including cotton, peanuts, melons, sunflower, soybeans and nursery plants. It also diminished air quality (from clouds of insects), thereby affecting quality of life of townsfolk and destroyed numerous varieties of garden plants.

The outbreak occurred partly due to the inability of local cropping industries to control the pest in a number of situations, especially cotton. To address this issue, the local cotton industry invested much time and effort before the 2002–03 season in learning more about the pest and developing a comprehensive integrated pest management strategy suited to the region.

This involved a study tour to the US by local consultants, growers, researchers and extension staff (funded by CRDC, CSD, and the grower associations in CQ), and a visit from one of the leading authorities on SLW management in the world, Dr Peter Ellsworth from the University of Arizona.

In the 2002–03 season, a well planned and executed IPM program for SLW in CQ resulted in a significantly reduced population of the pest on an area wide scale.

Despite higher founding populations in early spring (August), SLW was successfully managed in cotton with little or no impact — such as migration to other crops and town areas. Successful SLW population management included timely application of efficacious and IPM-compatible insecticides, particularly insect growth regulators (IGRs), and a 'go soft' approach for management of other pests early in the season. This strategy was complemented by high levels of parasite/predator activity, most likely facilitated by the use of less disruptive chemistry.

## Management strategy for 2002-03

The adopted management strategy was based on programs being successfully utilised in the cotton industries of southern Texas and Arizona. The key points of the strategy were:

- Sampling: The ability to identify and monitor populations before they reach outbreak levels is crucial in the effective management of this insect.
- IPM-friendly chemical usage: Management of



Cotton and rockmelons next door to each other. Photo David Kelly, DPI Emerald.



Extreme silverleaf whitefly populations destroyed soybean crops in the Central Highlands in 2001–02. Photo: Neil Forrester, Deltapine.

other pests was altered to avoid the use of broad-spectrum insecticides that will impact on natural enemy (predators and parasites) populations. When correct thresholds were reached, populations were treated with efficacious insecticides (usually IGRs first), to prevent the population spreading. There was strong adherence to the insecticide resistance management strategy (IRMS) for SLW products because of the recognition of the enormous ability this insect has to develop resistance to insecticides.

- Cultural: There was strong promotion and adherence to post-harvest sanitation, removing SLW hosts (weeds and ratoon crops), especially during the off-season.

More details on the management of silverleaf whitefly in cotton are in the Australian Cotton CRC Research Reviews 'Management of Silverleaf Whitefly in Australian Cotton' and 'Silverleaf Whitefly in Australian Cotton.' These publications are available on the Australian Cotton CRC website [www.cotton.crc.or.au](http://www.cotton.crc.or.au)

It is important to recognise the significance of each component of the strategy. Our experience with the pest in 2001–02 and feedback from the US suggested that failure in any of these areas would probably result in a failure of the whole system.

#### Internal communication

The foundation of this strategy is the high level of regular internal communication within the local industry through Area Wide Management (AWM) groups. Two groups in the Central Highlands meet on a monthly basis during and before the season to plan management strategies and discuss population development across the area. The groups included growers and consultants — but also involve researchers, extension staff, spray applicators and resellers.

Based on the experiences from the US study tour, the local cotton industry also made it a priority to get other industries involved in the area-wide management of SLW. A group called the 'Central Highlands Cross Industry Whitefly Action Group' was formed.

The group included representatives from the grains, horticulture, cotton and nursery industries, local shire and DPI Qld staff. It allowed the sharing of experiences and information regarding management strategies. The group produced a brochure on silverleaf whitefly, its history, how it can be managed in the home garden and how householders can contribute to the area-wide management of the pest.

The brochure was distributed throughout the cotton producing communities in CQ.

#### SLW Populations

SLW numbers on cotton during October and



FIGURE 1: SLW population development for Central Highlands

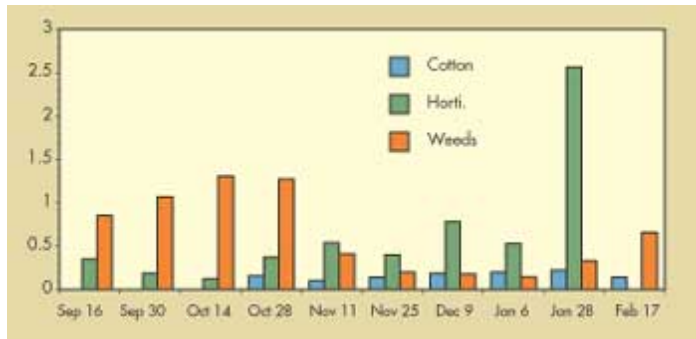


FIGURE 2: Area-wide population trends for SLW nymphs on cotton, horticulture crops, and weeds in Central Highlands for 2002–03 season



Cotton lint covered in honeydew from silverleaf whitefly — a problem which has been avoided in Central Queensland. (Photo: Richard Sequeira)

November 2002 were significantly higher than in the previous year (Figure 1). This meant there was a potential for both a more severe and earlier outbreak than had been seen before. In spite of this, populations during December and January were significantly lower in 2002–03 than in 2001–02. This resulted in significantly reduced movement of the pest from defoliated cotton to other crops and into town.

Much of the early SLW population in cotton came from spring germinating weeds, particularly milk thistle. They then moved back onto weeds after the cotton had finished in February (Figure 2). Except in some isolated incidences, there was no close interaction between SLW populations on cotton and horticulture.

A similar trend for population development occurred in the Theodore Irrigation Area (Dawson valley), although slightly later, which may reflect the slightly cooler conditions in that region, and a potentially lower over-wintering base population.

#### Key reasons for this change

Usage of organophosphate products for mirid control was significantly reduced in all areas of CQ in the 2002–03 season compared to the previous year. The avoidance of broad-spectrum chemistry early season allowed the proliferation of predator and parasite insects as the season progressed. Parasitism levels of SLW from native wasps (*Encarsia* and *Eretmocerus*) increased throughout the 2002–03 season, reaching levels greater than 50 per cent in the latter half. During the 2001–02 season, parasitism levels were barely detectable.

The availability and use of IGR products meant that fields approaching outbreak populations could be managed before they exploded and transferred the problem to other areas. Approximately 40 per cent of both the Central Highlands and Dawson valley areas were treated with IGR products. Approximately 98 per cent of the treated area used Pyriproxyfen (Admiral) rather than Buprofezin (Applaud). The efficacy of both products was excellent.

The availability and use of Diafenthuron (Pegasus) and Pymetrozine (Fulfill) allowed the effective management of crops that contained both aphids and SLW without applying two separate products. People using these products observed that they were very effective at suppressing lower SLW populations (to a point where some treated fields did not require subsequent treatment), although they were less consistent against higher populations.

Approximately 50 per cent of the Central Highlands area was treated with Pegasus and 20 per cent with Fulfill in 2002–03. None of either product was used in the Dawson Valley in either season because aphids were not a significant problem in that area.



Dr Peter Ellsworth.

## Grower case studies

Craig Barsby, 'Brearley Downs', Emerald

**Whitefly management:** "We treated all of our conventional cotton (70 per cent) with an insect growth regulator late in the season. We kept a good eye on numbers all season and they started to increase in those fields near the end."

**Words of wisdom:** "Be vigilant, get familiar with what whitefly look like and monitor their populations closely. If you don't, our experience has shown that their populations can explode into a big issue before you know it."

Wayne Reeves, 'Parker', Emerald

**Whitefly management:** "We were very worried about how we would go with whitefly management this season given the experience of 2001–02. We placed a high importance on preventative measures such as farm hygiene (weed control) and planting early, and when we got hail, we made sure we fully destroyed written-off crops rather than abandoning them and letting them become whitefly nurseries. I place a tremendous amount of importance on area wide management. The cooperative decisions we made in the area such as using specific insecticides early season had a huge impact. We closely monitored the crop all season and were fortunate enough not to have to treat for whitefly."

**Words of wisdom:** "You need an 'overall' approach to manage whitefly starting with good farm hygiene and the avoidance of broad spectrum insecticides. Accurate monitoring is essential as is area-wide cooperation. Whitefly can be controlled, its just a matter of doing a few things right."

## Impacts on Industry

There were no reported accounts of cotton from CQ receiving discounts for stickiness in 2001–02 or 2002–03. A project is continuing to measure degradation of honeydew. The attitude of the local industry is that given the enormous potential impacts of honeydew, the highest effort needs to be made to prevent the development of large SLW populations.

There were much fewer SLW swarming through Emerald at the time of cotton defoliation in 2002–03 than 2001–02. A large contributing factor to this was the ability to control the insect in cotton.

## Where to from here?

The management of SLW in CQ was a great success in 2002–03. But the area is acutely aware that whitefly is here to stay and it's another challenge that will need to be addressed every year.

The key challenges from now on are:

- To maintain the momentum of area wide IPM in CQ.
- Promote the awareness of the potential for SLW to become a serious problem in other vulnerable regions outside CQ. The key to this will be effective sampling. Abundance and distribution must be quantified before an outbreak occurs in order to manage the pest successfully.

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Craig Barsby.



Wayne Reeves.