

Silverleaf whitefly situation in the Central Highlands

By David Kelly and Amanda Noone

It is difficult to imagine the development of a whitefly problem without seeing it. One day the pest will appear as a few specks flying across your vision — easily mistaken for some flower pollen or a leafhopper. Within a short period of time they're in numbers that get up your nose, in your ears and start leaving honeydew on leaves and lint.

To get some idea of what this pest is like, think of something with the mobility of a mirid, the rapid reproductive ability of an aphid and as difficult to detect as a mite. If this doesn't sound bad enough, control is a real challenge due to insecticide resistance and difficulty in getting insecticide applications to contact the pest, especially nymphs which live on the underside of leaves.

It has been acknowledged that silverleaf whitefly (*Bemisia tabaci* Type B) has been in Emerald for the past six years. A number of shrub plants around the town were known to be harbouring numbers during this time and small populations had sometimes been found in crops. At the end of last season (2000–01) they reached quite high numbers in some late planted cotton, although this didn't occur until April–May.

With this warning, the Cotton Research & Development Corporation (CRDC) contracted Dr Paul DeBarro, CSIRO, Brisbane in May 2001 to commence regular and more intensive monitoring of the situation and provide advice to the industry as appropriate.

WHAT HAPPENED THIS SEASON?

Monitoring began in August, and through to November, it appeared that there would not be a problem this season. At this stage there were a small number of fields with low populations — mostly adjacent to alternative hosts such as melons and pumpkins.

By December populations had increased significantly, particularly in the fields where the pest had been found initially. In addition the whitefly populations had spread to the point that almost every field in the district had a whitefly population of some sort by the end of the month.



Whitefly adults



Whitefly nymphs

No pesticides are currently registered for whitefly on cotton in Australia. Therefore, in mid December the CRDC, on behalf of the cotton industry, applied to the National Registration Authority (NRA) for emergency use permits for a number of products. By early January permits had been approved for diafenthiuron (Pegasus) and buprofezin (Applaud) for use in the Emerald Irrigation Area.

Pegasus is currently registered on aphids and mites in cotton and has some activity against all life stages of whitefly.

Applaud is an Insect Growth Regulator (IGR) currently registered on some horticulture crops. It is a chitin synthesis inhibitor, preventing nymphs from moulting. This season it cost about \$170 per hectare.

Through January and early February populations continued to escalate and crops were being treated regularly for the pest. Pegasus was used quite widely and achieved adequate results, although given the nature of the pest the effects of the product were short-lived. Pegasus use was also limited by a 35 day withholding period and a label requirement of six weeks between applications. Some knock-down products such as pyrethroid mixes (with PBO or OP), used to control heliothis offered limited control of whitefly adults but provided very little residual or activity on nymphs.

Defoliation began in early February causing major migration from defoliated crops to later planted crops or those delayed by hail in November. By mid to late February, these non-defoliated crops were receiving extreme pressure and in many cases attempts at control seemed pointless given the lack of residual control and the immediate reinfestation.

At this stage we don't know if there will be any discounts of local cotton caused by honeydew produced by the whitefly. (The good news is classing results of the Emerald crop indicate little or no problems from honeydew contamination, even in fields with severe infestation — Editor.)

But we do know that the cost of attempting to control it has been significant, with most people applying between two and five sprays specifically for whitefly.

Significantly, this pest won't be managed like this in the future. It became painfully obvious this season that attempting to control a population when it is rapidly increasing is very difficult.



Honeydew on leaves

Some of the insecticides used once or twice became ineffective, highlighting the insect's ability to develop resistance very rapidly. They were able to get us out of trouble this year, but they may not work as well again.

WHY THIS SEASON?

This is a question many of us have been grappling with. Why did the population outbreak this year after being apparently static for the previous four to five years? Speculation includes the following:

- The local populations that seemed to be static were always building up and finally reached a point where the base population at the start of this season was high enough for an outbreak to occur;
- The particularly hot summer (80 days over 38° C) allowed the population to increase more rapidly; and,
- Widespread OP use early season to control green mirids flared the population.

Most probably the explanation lies in a combination of these factors plus perhaps other unknowns specific to this season.

CURRENT ACTION

In late February the CRDC arranged for a group of researchers and industry representatives to visit Emerald to appraise the situation first hand and meet with growers to start assessing what needs to be done before next season.

Based on this visit, the CRDC established a contingency fund and a number of responses were initiated.

A trial area of cotton planted on the Emerald Agricultural College will be used for extensive trials to be carried out in April–May.

These trials will assess:

- The efficacy of current and new insecticides;
- Seed treatments;
- Use of bio-rationals (oils, soaps, biopesticides); and,
- The impact of early season broad spectrum chemistry on whitefly populations.

Investigations are also being carried out to determine the effect of weathering on honeydew.

Monitoring of whitefly populations will occur over

the winter to determine overwintering hosts plus the size and distribution of the population that will start next cotton season.

THE FUTURE

The CRDC has clearly indicated there will be an increased focus on silverleaf whitefly now that it has emerged as a field problem. This will build on the research program that has been maintained on this pest by the Cotton and Horticulture (now Horticulture Australia) R&D Corporations over the past five years.

This season's experience has shown that the future of managing this pest will be through an integrated and area wide approach. We are fortunate to have a number of models used in cotton in other parts of the world that can be used as a template.

Over the next few months the CRDC is planning to address many of these issues through its R&D program and by facilitating meetings to establish some agreed management practices for next season.

Silverleaf whitefly caught us slightly unprepared this season. Although it was recognised that numbers were present and increasing, it was impossible with the current level of knowledge to anticipate the sheer speed of the population explosion. It has been difficult to predict the effect of a whitefly outbreak on Australian cotton when it has never occurred before. Management has also been a challenge with no specific whitefly control agents currently registered on Australian cotton.

We now have time to assess our needs for next season over the next couple of months and have a management plan in place in case whitefly shows signs of continuing as a pest at Emerald. Other cotton-growing areas could benefit from this as well if silverleaf whitefly populations show signs of increasing in importance.

A positive to come from this season has been the tremendous level of cooperation shown within the industry regarding this problem. An important next step is to extend this cooperation to other industries so the pest can be managed on an area wide basis.