COTTON *TALES*

Central Queensland

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Cotton Catchment Communities CRC
Queensland Government, Department of Primary Industries and Fisheries

Day Degree accumulation to the 07 Jan 09

District		Season 08/09	Season 07/08	Season 06/07	Cold Days	Hot Days
Emerald	from 15/09/08	1588	1558	1532	2	25
	from 31/10/08	1077	992	1003	0	25
Theodore	from 25/09/08	1398	1399	1331	5	28
	From 06/11/08	949	864	863	1	24

Survivors on Bollgard II®

Since late December there have been a number of reports of survivors in Bollgard II® near Emerald. Up to 1.5 medium-large larvae/m has been reported, with all affected fields at mid flowering to late-flowering. Of the 85 Helicoverpa larvae received from Bollgard II® plants in Emerald until 30th December, 31 were H. punctigera and 54 were H. armigera. This value is similar to the % of H. armigera in the sample of eggs collected during December in Emerald, & does not suggests that either species may be differentially surviving on Bollgard II®. Moths have been submitted for resistance monitoring.

Results since 05/06 suggests there is no significant difference among Bollgard II® survivors vs. a random sample in the cumulative frequency of alleles conferring Cry2Ab resistance.

The threshold for Bollgard II® is the same as the Ingard® threshold: 2 larvae >3mm/m in 2 consecutive checks or 1 larvae > 8mm/m. In making a decision to spray, consider predator/pest ratio. The use of more selective insecticide options will help to conserve beneficial insects. Boaqian Lu (Cotton CRC) is continuing his PhD research on economic thresholds for Bt susceptible Helicoverpa survivors on Bollgard II®.

If you have a field at or close to threshold, please let me know so that larvae samples can be collected for resistance monitoring. It is possible to test plants for the presence/absence of the Bt genes. It is also possible to test the levels of Cry1Ac & Cry2Ab expression, however this needs to be compared in damaged versus undamaged plants or similar sites with and without survivors. For example if you have two fields at the same stage, but one has survivors & the other appears not to, it is possible to compare the levels of expression at these two sites. Ideally this would be done when the survivors are still at small-medium stage. Please let me know if you have a suitable situation for this testing.

This season levels of Bt expression in Bollgard II throughout flowering, is being looked at in a number of valleys, in research being undertaken by Baoqian Lu (Cotton CRC) and Sharon Downes (CSIRO), and Monsanto.

Beneficials in Native Vegetation *by Ingrid Renckon*

Recent Cotton CRC research has confirmed non-crop vegetation plays an important role in supporting beneficial insects.

Insect predators (eg. red & blue beetles, ladybirds, damsel bugs & lacewings) have been collected by Ingrid Rencken (PhD student UNE) in native windbreaks (Eucalyptus spp, river red gum, acacia, melaleucas & casuarinas), dryland lucerne, grassy paddocks & stock routes surrounding cotton fields. In general, woody habitats support a higher biodiversity than crops. This non-crop vegetation supports arthropod predators during the winter months by providing breeding sites & alternate sources of food.

Felix Bianchi (CSIRO) has shown that native vegetation (comprising a mix of poplar box, acacia & salt bushes) is a source of white-fly parasitoids. Using sentinel cotton plants infested with whitefly larvae he & his team were able to demonstrate that fields closer to native vegetation had higher rates of parasitism than those fields further away from the native vegetation.

Interestingly, native vegetation did not appear to be a source of cotton insect pests. Ants appeared to be important predators of Helicoverpa eggs & were numerous in cotton fields & within the native vegetation.

In an elegant marking experiment using a rare-earth trace element label rubidium, David Perovic (PhD student Charles Stuart University) demonstrated the movement of arthropod predators from shelter belts into cotton fields. Rubidium marking has the advantage that it is both a contact marker as well as being absorbed by the plant so any insect feeding on the plant is also marked. A 0.4 ha area of native vegetation was sprayed with rubidium. Marked predators (Oxyopes spp, red & blue beetles & ladybirds) were collected 1, 3 & 5 days later in the adjacent cotton field.

He went on to investigate the movement of predators at a landscape level using cost-distance modelling. This method identifies the most efficient path from one location in the landscape (e.g. non-crop vegetation) to another (e.g. cotton crop). Using this model it was shown that the natural enemy density within the crop was positively related to the area of non-crop land surrounding cotton fields, suggesting that the greater the area of non-crop area the higher the expected density of natural enemies within the field. The arrangement of the non-crop vegetation within the landscape may also be important as the model suggested that red & blue beetles preferred to move through wooded areas first, then grasses & then crops. This would mean that red & blue beetles can much more effectively move & colonize cotton crops in landscapes containing forest patches & wind breaks than in landscapes composed of only crops.

Native vegetation plays a significant role in the natural suppression of pest populations, as it supports arthropod predator populations that colonize cotton crops. There is a likely trade off between benefits of insect pest management derived from non-crop vegetation & the costs in establishing, maintaining & managing the surrounding non-crop vegetation.