

Does high mirid pressure at early squaring have an effect on yield?

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AT A GLANCE...

- As expected, once crops began flowering, large numbers of mirids affected retention and lint, but not boll numbers.
- In general, pre-flowering crops with squares were not significantly affected by mirids either in terms of percentage retention or ginned lint – but there may be subtle regional differences in the impact of mirids.
- These results show the complexity that underlies insect management decisions due to the pest, plant response and regional differences in climate and season length.

IN recent years there has been an increase in the number of insecticides applied to pre-flowering crops, but are these sprays having any positive effect? To answer this question the CottonInfo Regional Extension Officers, working with CSIRO, set up trials to test if high mirid numbers during early squaring affected yield. The trials were conducted in the Darling Downs,

Macintyre, Gwydir, Macquarie and Murrumbidgee. This article summarises the methodology and findings of the regional trials.

We placed 12 cages over plants to test the effect of mirids (see photo). Each cage covered one metre of crop row, and had soil heaped up around the base to ensure a tight 'mirid-proof' fit. By using cages for both the mirid-free control and mirid-present treatment, we could account for the effect of shading by the cages. The crop under each cage was mapped (height, nodes, squares, fruit) when the trial began.

To half of the cages we added at least twice the recommended action threshold of mirids (adults and nymphs, eight mirids per metre in the north and four per metre in the south). The other half of the cages were mirid-free controls. At three sites (Macintyre, Macquarie and Murrumbidgee) cages were set up during early squaring (pre-flowering) but at two sites (Gwydir and Darling Downs) environmental factors delayed the trials, so that cages were not set up until early flowering.

Cages were left in place for two weeks, allowing sufficient time for mirids to damage plants. At the end of this period, the cages were removed, and the plants were mapped again, focusing on percentage retention and fruit numbers to record the immediate effect of the mirids on the plants. During boll opening, handpicking was used to determine the theoretical maturity dates



Cotton under the tent at Riverview, Warren.
(SOURCE: Annabel Twine, CottonInfo)



Sally Ceeney taking crop measurements.

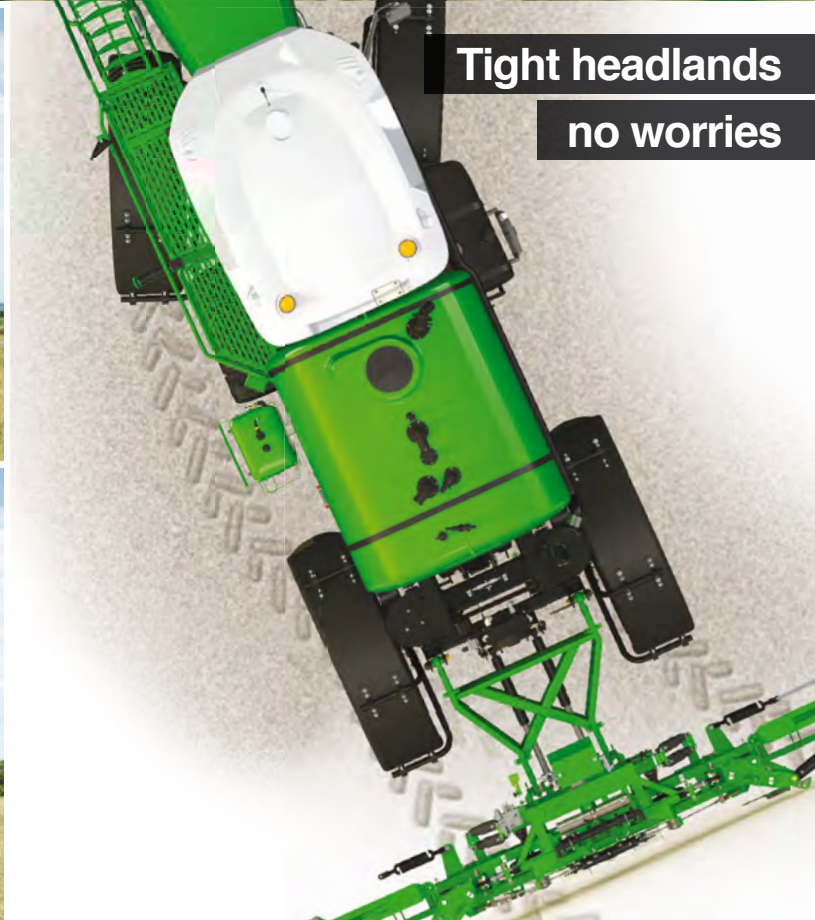
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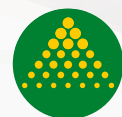
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TABLE 1: The effect of mirids at flowering and pre-flowering trial sites

Flowering locations: Darling Downs, Gwydir				
Timing of measurement	Measurement (per metre)	Control	Mirids	Stats (unbalanced ANOVA)
Cages removed	% retention	58	36	df=20 P=0.023*
Cages removed	Number of fruit	117	90	df=20 P=0.014*
End of season	Number of bolls	90	81	df=20 P=0.27 NS
End of season	Raw lint (g/m)	425	343	df=20 P=0.031*
End of season	Ginned lint (g/m)	195	155	df=20 P=0.021*
Pre-flowering locations: Macintyre, Macquarie, Murrumbidgee				
Timing of measurement	Measurement (per metre)	Control	Mirids	Stats (unbalanced ANOVA)
Cages removed	% retention	78	77	df=15 P=0.77 NS
Cages removed	Number of fruit	61	58	df=15 P=0.49 NS
End of season	Number of bolls	112	108	df=19 P=0.60 NS
End of season	Raw lint (g/m)	590	567	df=28 P=0.46 NS
End of season	Ginned lint (g/m)	269	258	df=28 P=0.43 NS

of the treatments and to measure the raw and ginned lint under each cage. The handpicked lint was ginned at the CSD Wee Waa laboratory facility.

We know from previous work (Khann *et al*, 2006; Sequiera *et al* 2018) that once the crop starts flowering it is susceptible to mirid damage. So it was not surprising that at the two sites where flowering had started (Gwydir and Darling Downs) the high number of mirids had reduced percentage retention and the number of fruiting bodies when the cages were removed; and had reduced the amount of raw and ginned lint at the end of the season (Table 1), although they did not reduce boll numbers.

At the other three sites where the experiment was conducted

pre-flowering (Macintyre, Macquarie and Murrumbidgee) we found no significant effect of the presence of high numbers of mirids on percentage retention and number of fruit, nor in the amount of raw lint and ginned lint at the end of the season (Table 1).

But the combined results of the sites tested pre-flowering may hide variability between regions. For example, at both the Macintyre and Murrumbidgee there were no significant effects of mirids; but at Murrumbidgee sites, lint numbers tended to be lower in the mirid cages (Ginned Lint: Mirid=199 g per metre, Control=218 g per metre) while at the Macintyre they tended to be higher (Ginned Lint: Mirid=321 g per metre, Control=297 g per metre).

While this suggests that cotton at the two locations may differ in its ability to compensate, the differences may be caused by light changes in the cages. The cages reduce the Photosynthetically Active Radiation (PAR) by about 30 per cent. At the Macintyre where the PAR is already very high, this reduction may have less effect, whereas down south where the PAR is often lower, further reducing the PAR with cages may have affected the ability of the plants to recover immediately to the damage. It would be good to repeat the trials using more cages at Macintyre and Murrumbidgee, and similarly to test the effect of low PAR on the plant's ability to compensate at the time of fruit loss, in order to better understand these differences.

Thanks to: Mick Bange and Sharon Downes for helpful comments; to the growers who allowed us to conduct the trials on farm; and to CSD for ginning the trials.

**Macquarie Valley: Sally and Matt Ceeney at "Riverview"
Gwydir Valley: Mungindi: Anthony & Von Barlow "Wyadrigah"
Darling Downs: (Cecil Plains) Stuart, Maxine and Tyson Armitage "Wamara"
Murrumbidgee: IREC field station Whitton NSW
Macintyre: James and Christinal Duddy "South Callandoon" Goondiwindi .
Consultant Pablo Vega assisted in collection of trial data.**

This trial work was conducted by CottonInfo: a joint partnership between CRDC, CSD Ltd and Cotton Australia. The Regional Extension Officers are based in cotton growing valleys – to contact your local REO, visit www.cottoninfo.com.au/contact-us.

References:

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