

Benchmarking what triggers mirid sprays in cotton – the results from the pilot study.

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Introduction

With Bollgard®II largely controlling *Helicoverpa* damage, the cotton industry has been able to significantly reduce its use of insecticides. This has greatly helped the adoption of IPM, reduced selection for resistance to conventional insecticides, and reduced the risk of environmental contamination with pesticides.

One possible side effect of reduced spraying is that minor pests, once controlled by sprays for *Helicoverpa*, will become major pests in cotton. One such pest is *Creontiades dilutus*, commonly known as the green mirid. In Bollgard®II cotton, controlling mirids and other sucking pests (such as the green vegetable bug *Nezara viridula*) has the potential to undermine the gains made towards reducing insecticide usage when growing Bt cotton because broad spectrum insecticides may be needed to control mirids. What makes this problem more difficult is that there is no clear-cut relationship between yield loss and mirid numbers. The use of broad spectrum insecticides could disrupt the beneficial population and increase the risk of secondary pest outbreaks such as mites, aphids and whitefly. In fact in the 2005/06 season, mirid sprays were implicated in the flare-up of whitefly on the Darling Downs.

In order to manage this real risk, we need to benchmark how the industry is currently responding to the mirid threat.

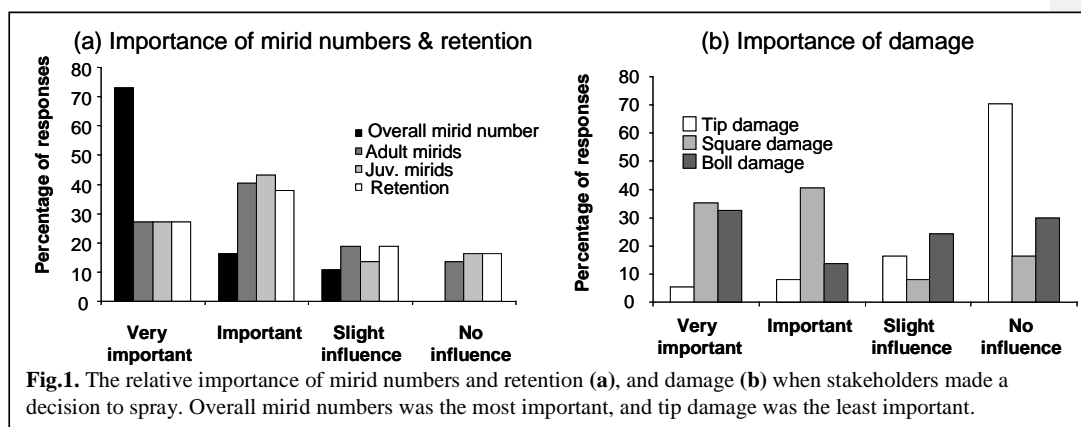
In the 2005/06 season a small survey was conducted with the help of 14 growers, consultants, agronomists and managers in the Namoi, Gwydir, and McIntyre valleys. These stakeholders generously provided information on 38 spray events.

The aim of the survey was to find out:

- 1) what factors triggered the application of a spray for mirids, and
- 2) what control options for mirids were chosen.

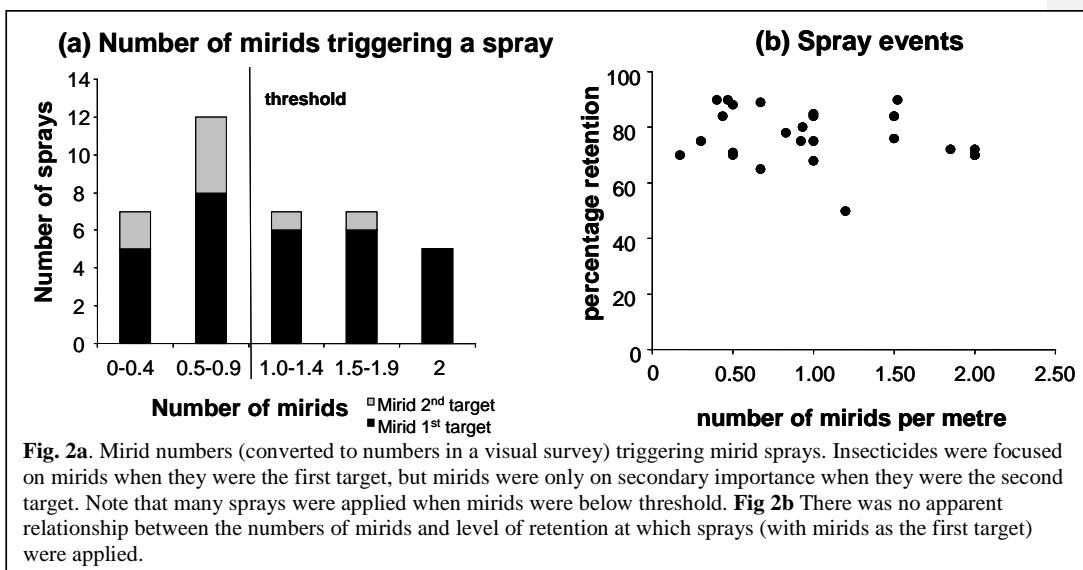
The survey was a pilot study as a precursor for an industry wide survey to be conducted in the coming season. Below are the results of the study. Because of the small sample size and non-independent nature of the data collected (the same individuals provided information on more than one spray event) statistical analysis of these results is difficult. Nevertheless the results indicate some interesting trends.

Spray Triggers



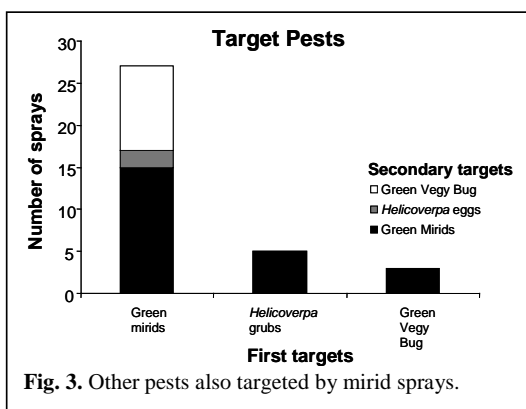
The most important factor triggering a mirid spray was the overall number of mirids (rather than the number of adults or juveniles; Fig. 1a). Retention and square damage were also important, while tip damage had little influence on the decision to spray (Fig. 1b). The importance of mirid numbers is interesting, given that mirid numbers triggered sprays even when well below threshold (Fig. 2a). Insecticide sprays were applied to mirids when they were the first target of the spray, or when they were only the second target of the spray (with another pest as the first target). Even if only applications targeting mirids first are examined, sprays still occurred on very low numbers of mirids. In addition, there was no correlation between mirid numbers and retention rates (Fig. 2b) indicating that respondents were not spraying on low mirid numbers because retention rates were also low.

The pilot survey indicated that although retention rates were important, there was no correlation between retention rates and their importance to the decision to spray. It is generally



considered that retention needs to decline below 60% before yield loss is considered to be a problem, but this yardstick was not followed by respondents as retention at both high and low levels were considered to be equally important in forming a decision to spray. With the advent of very high yielding crops, there may be less tolerance to lower levels of retention. In addition, different types of stakeholders may have different views on acceptable retention levels. An

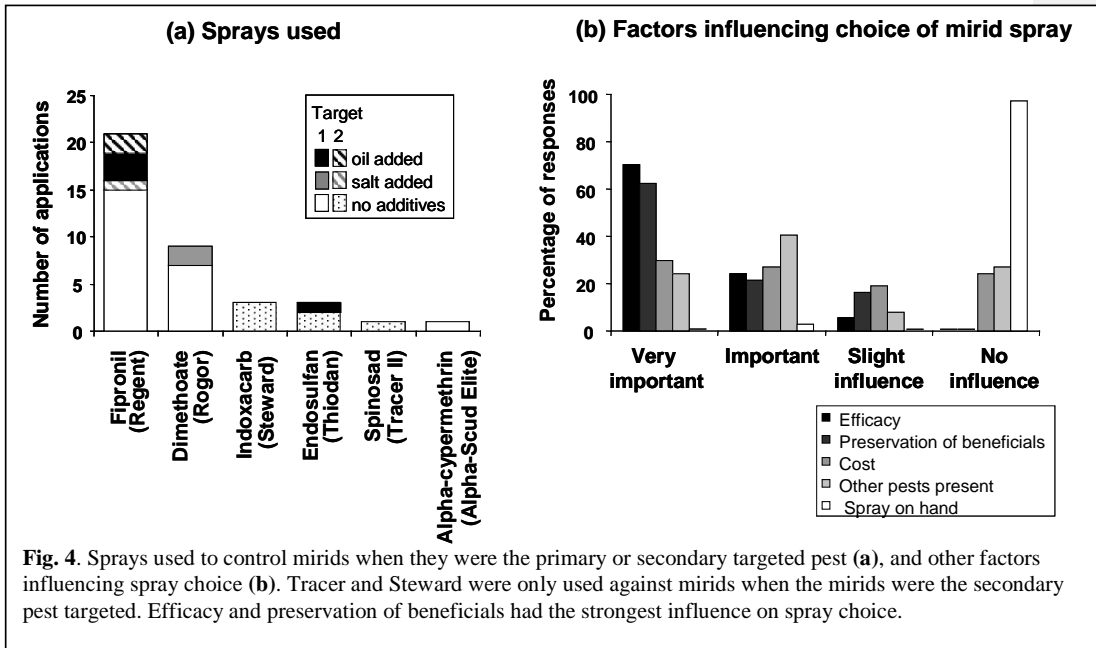
expanded survey in the 2006/07 season should help clarify the current role of retention levels in the decision to spray for mirids.



Retention may not have been as important as mirid numbers, but it was measured more accurately than damage. Damage caused by mirids was largely qualitatively assessed, with respondents giving a percentage figure on damage to 54% of sprays reported, a qualitative assessment (“minor” or “increasing”) to 14%, and no comment on damage to 32% of sprays reported.

Control Options

When respondents sprayed for mirids, they often also targeted two other pests, *Helicoverpa* and green vegetable bugs (Fig. 3). Not surprisingly, when the spray event was primarily focused on the other pests, the choice of spray was affected (Fig. 4a) with both Steward and Tracer only used against mirids when they were considered to be the secondary target.



On occasions, respondents included oil and/or salt as part of their control options. Both additives were used in conjunction with Regent, salt was used with Rogor and oil with Thiodan (Fig. 4a). Both efficacy and the preservation of beneficials strongly influenced the choice of spray (Fig 4b) suggesting that respondents were concerned in general about losing the 'mopping-up services' of beneficials and triggering flaring by other pests which were not as yet causing problems.

Conclusions

In summary, this pilot survey indicates that:

- The decision to spray for mirids is influenced largely by mirid numbers present in the crop, with retention levels considered to be less important.
- Stakeholders are not being guided by current mirid thresholds
- Damage is often estimated rather than measured, indicating a need for an easier way to measure damage.
- Mirid sprays often also target green vegetable bugs.
- Within the industry there is concern about losing beneficials to insecticides.

Comment [RJM1]: It is apt to point out here that perhaps this is why thresholds are ignored

The survey identified holes in our understanding, confirmed impressions that people had about mirid sprays, and indicated avenues of research particularly relevant to the stakeholders. In the coming 2006/07 season, we hope to expand the survey to one which covers the whole cotton

industry in order that we can properly benchmark our current practices, quantify differences between valleys, and see if the findings in the pilot study are applicable industry-wide.

In addition the expanded 2006/07 survey will look more closely at:

- when stakeholders detect mirids but don't spray
- the influence of other pests on the decision to spray and spray choice.

For the much more comprehensive survey to be productive it will need goodwill and input from stakeholders.

If you would like to participate in the 2006/07 survey, or just want more information, please contact me at:



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