THE GREEN MIRID PROBLEM - SOME RECENT EXPERIENCES

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Introduction

Green mirid, *Creontiades dilitus* (Stal), is an important sporadic pest of cotton at the seedling stage and through early squaring. Together with other sucking pests such as thrips, aphids and mites, they will continue to demand specific control actions after the introduction of transgenic (Bt) cotton varieties. In some seasons green mirid infestations result in the loss of early squares and delays in crop maturity. Controlling green mirids, particularly during early squaring, relies on the use of broad spectrum organophosphates (dimethoate or omethoate) or synthetic pyrethroids. The use of these products disrupts beneficial insect populations at a crucial early stage of the season. For this reason it is important that controls be applied only when necessary. The decision to control green mirids is further complicated by the uncertainties of sampling and action thresholds. In this paper we present some of our recent investigations related to sampling and damage caused by green mirids in cotton.

Methods

Variety CS189+ was sown in a double-skip configuration on 29 September 1995. In order to investigate the within-field distribution of green mirids and the accuracy of suction sampling, 20 m lengths of row were suction sampled in a 100 m x 100 m grid arrangement across a 50 ha field (50 sample total) on 16 November 1995.

Green mirids were also sampled at 7-day intervals in three different insecticidal treatment regimes in a large-plot unreplicated experiment at Warra during 1995/96. The treatments were unsprayed (no insect controls applied), treatment with a DowElanco experimental compound that had no activity against green mirids but provides good control of heliothis, and conventional treatment (organophosphate for mirids and endosulfan for heliothis early season). A McCulloch suction sampler was used to sample insects on five 20 m lengths of row per treatment. Nymphs and adults of green mirids were counted and data presented as numbers/m. In conjunction with these counts, assessments were made of square production on the different treatments. Similar results are presented for unsprayed and conventional treatments at Warra during 1992/93.

Results and Discussion

When sampled on 16 November 1995 the plants averaged 17.6 cm high with 8.3 nodes (2.5 fruiting nodes/plant) and there were 0.022 adults/m and 0.192 nymphs/m. At these low adult densities there was no significant variation in abundance across the field. However, for nymphs there were significant differences ($P<0.05$) in abundance across the field, with higher densities along the eastern margin of the field (Figure 1). Sampling statistics (indices of dispersion and goodness of fit) indicate that to achieve 20% sampling accuracy based on 20 m row suction samples, a total of 21 samples would be required. Such sampling intensity is obviously not economically practical.

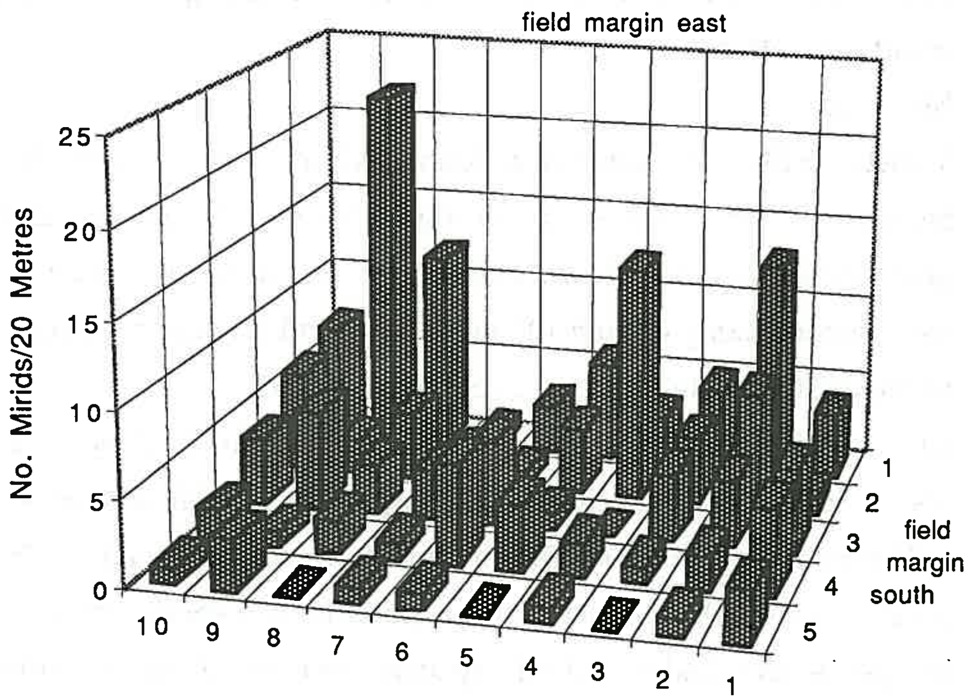

Figure 1. Distribution of green mirid nymphs at Warra (16/11/95).

Suction sampling for green mirids on each of the three treatment regimes indicated relatively low adult densities (0.1/m) during late October (Figure 2). On the unsprayed, adult densities peaked at 0.2/m during late November and nymphal densities peaked at 0.38/m during early December. The DowElanco product was applied on 28 November and 8 December. Endosulfan was applied to the conventional on 27 November followed by an endosulfan plus dimethoate on 2 December. The effects of these treatments on the green mirid populations are apparent from Figure 2.

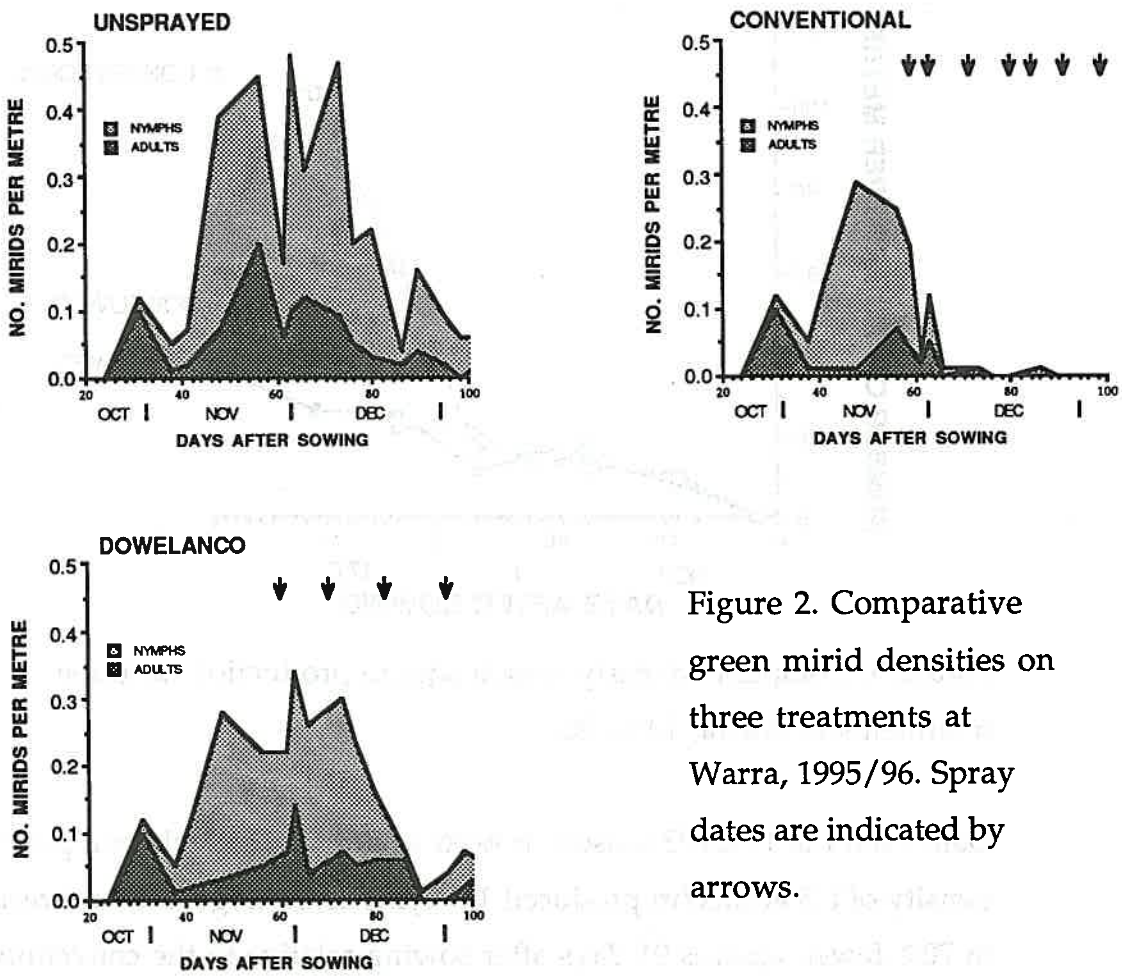

Figure 2. Comparative green mirid densities on three treatments at Warra, 1995/96. Spray dates are indicated by arrows.

On the conventional treatment, retention of squares at the first positions declined dramatically from 83.3% on 16 November to 51.9% on 27 November. These losses were mostly attributed to green mirid damage. Square counts for each of the treatments (Figure 3) show the relative effects of green mirid populations on fruit production. As the conventional suffered some green mirid damage before controls were applied, the conventional does not represent a 'no mirid' treatment. However, relative to the conventional, there were 52-66% fewer squares on the DowElanco and unsprayed treatments 90 days after sowing. Subsequent square production on the DowElanco treatment compensated for the earlier losses and there was no difference in maturity between this treatment and the conventional.

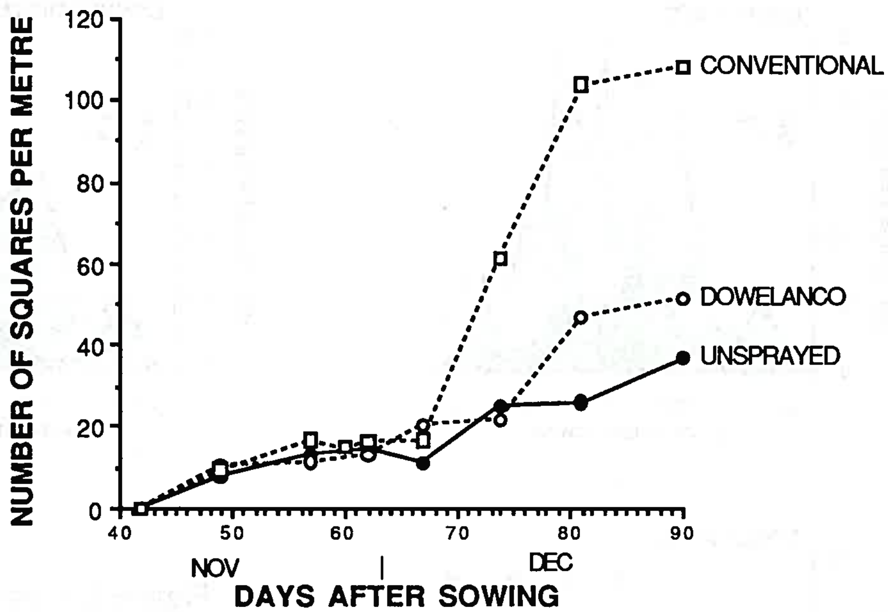

Figure 3. Comparative early-season square production on three treatments at Warra, 1995/96.

Data from the 1992/93 season showed a similar trend where a peak density of 0.3 adults/m produced 1.2 nymphs/m (Figure 4) and resulted in 70% fewer squares 91 days after sowing relative to the conventional (Figure 5). Most of the square losses on the unsprayed could be attributed to green mirids as heliothis activity during this period was relatively low. While square production ultimately compensated for the early square losses, the unsprayed was harvested 3 weeks later than the conventional with no adverse effect on quality parameters.

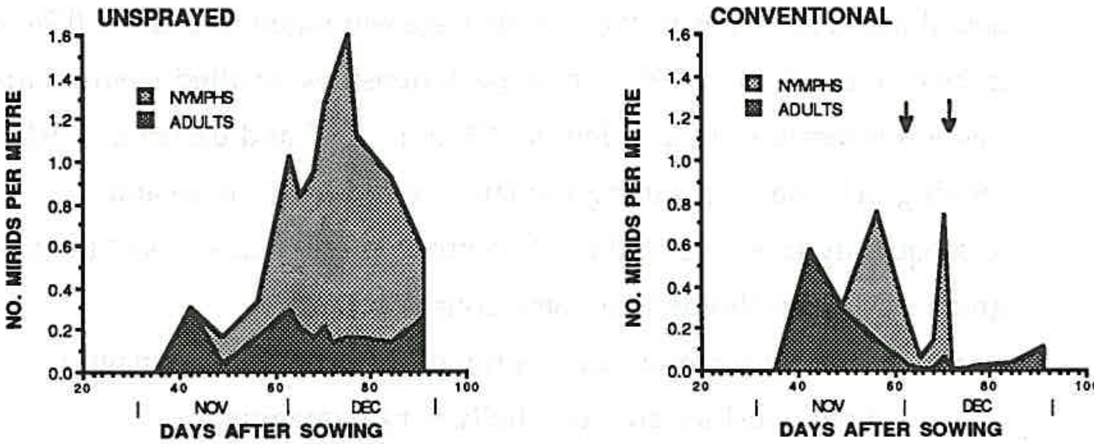

Figure 4. Comparative green mirid populations on the unsprayed and conventional treatments at Warra, 1992/93.

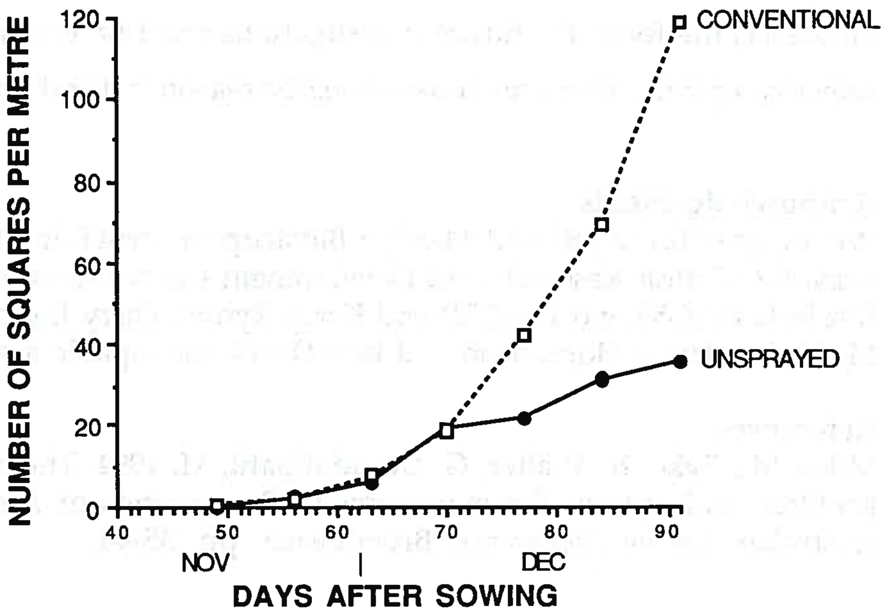

Figure 5. Comparative square production on unsprayed and conventional treatments at Warra, 1992/93.

Conclusions

Based on our experiences in 1995/96 and previously in 1992/93, post-squaring thresholds of 2 to 4/m (entomoLOGIC 95) would seem very conservative estimates. Suction samples are known to underestimate absolute mirid densities, especially as the plants increase in size (Miles *et al*. 1994). If suction sampling is assumed to have 50% efficiency, the actual mirid densities in these trials were estimated to peak at 0.96/m in 1995 and 3.2/m in 1992. These peak densities resulted from relatively low adult densities (equivalent to 0.2/m in 1995 and 0.6/m in 1992) moving into the crop during the late pre-squaring phase and subsequently breeding in the cotton crop. These data support the low green mirid thresholds that some consultants use.

Green mirids thus present three problems for the pest manager:

1. Low densities are potentially very damaging.
2. Sampling methods are not entirely reliable.
3. Options for their control are disruptive.

Our research has added to our knowledge on sampling and thresholds and provided further support for the pest status of green mirids. However, the focus for future investigations must be towards more selective options that will conserve early-season natural enemies.

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References

Miles, M., Pyke, B., Walter, G. and Malipatil, M. 1994. The mirid problem and options for management. Proceedings of *The Seventh Australian Cotton Conference*, Broadbeach. pp. 35-44.