CSE86C Executive Summary

Trap crops act as diversionary hosts for key pests, attracting and concentrating the pests and their eggs into a relatively small area where the population can be controlled, often by mechanical means. Within the Australian cotton industry trap crops are planted by individual farmers, and/or by members of Areawide management groups as a means of diverting *Helicoverpa armigera* and *H.punctigera* eggs away from cotton and also to suppress the overall population of *Helicoverpa* within a locality.

This project set out to quantify the effectiveness of the main types of trap crops deployed by cotton farmers, and to measure their impact on egg densities in surrounding cotton. Another aim was to quantify the night-time activity levels and egg laying behaviour of *Helicoverpa* moths within trap crops and in associated cotton crops.

In the course of the project over 50 trap crops were monitored and sampled. The main trap crops studied were chickpeas, pigeon peas, sorghum, and sunflower. The findings of this project confirmed that spring and late summer trap crops can play a very valuable role by attracting very high densities of *Helicoverpa* eggs and therefore in creating a significant population sink. In doing so, trap crops help to suppress the overall population, and possibly subsequent populations, of both species of *Helicoverpa* within a region. Such suppression must lead to reduced egg pressure on cotton crops, and this potentially reduces the frequency and/or severity of chemical insecticides that farmers may otherwise have had to apply to protect their crop. By reducing farmers' dependence on chemical insecticides, trap crops help to slow the evolution of resistance, and they help to reduce potential adverse environmental effects of disruptive sprays.

The project findings suggest that mid-summer trap crops like pigeon pea are not always highly attractive, and may not necessarily divert eggs away from cotton. The failure to detect any evidence of gradients in *Helicoverpa* egg density in proximity to cotton crops, and the significant influence of individual trap crop spatial configuration on the number of eggs attracted suggests that there are aspects of moth egg laying behaviour that we do not yet fully understand or know about. The theoretical evaluation of the proportion of the cropping area that should be sown to trap crops demonstrated that if trap crops have to compete against cotton they need to be either highly attractive and/or planted in proportionally large areas.

The project demonstrated that larger individual trap crops attracted proportionally higher densities of eggs than smaller trap crops. Direct comparisons showed that trap crops planted as blocks attracted significantly higher egg densities than strips or patches. Some of the information on the effectiveness at attracting eggs of individual trap crop size and layout configurations has been utilised in the INGARD® Resistance Management Strategy. In particular, the minimum requirements for the size and shape of INGARD® refuges takes into account the finding that patches and strips are inferior to blocks.

During the project M.Dillon made a substantial contribution to the production of the "Spring Trap Crop Management Guidelines" for cotton growers. Project results were also widely disseminated at field days, farm walks, industry seminars and conferences, and in industry related print media.

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