Final Report – CSP100C

Construction of glasshouse for research into plant / herbivore interactions.

Actual start date:	Anticipated completion date:	*OFFICE USE ONLY:*
1/7/98	*30/6/99*	**Date of receipt:**

Project title (as per original application)

Construction of glasshouse for research into plant / herbivore interactions.

CRDC Project Code CSP100C **CRDC Responsible Director (if known)**

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Project title: Construction of glasshouse for research into plant / herbivore interactions and functional responses of predatory insects of *Helicoverpa* spp. on cotton.

Aim

- To build a new glasshouse to provide a facility for basic research into plant / herbivore interactions.

What was the background of the project?

Several projects, significantly funded by the CRDC or CRC, are aimed at improving IPM in cotton through (i) better understanding of plant responses herbivore damage (cotton pests) or (ii) through better understanding of the role of beneficial insects. Such research is vital if reliance on synthetic insecticides, with incumbent insecticide resistance and environmental problems, is to be reduced. This research requires access to glasshouse space to conduct experiments in a more controlled environment than the field. However, there is no glasshouse space allocated for research into plant / herbivore / predator research and space in other glasshouse is at a premium, especially through winter. This limitation often precludes basic research through winter on plant responses to real or simulated pest damage, interactions between plant growth and insecticides or plant hormones, cage studies of pest damage / predation for omnivorous insects and studies on prey consumption by predators. Outcomes of glasshouse experiments will contribute to development of recommendations to the cotton industry regarding pest status of herbivores, responses of plants to damage and compensation, thresholds for pests and interactions between insecticide use and plant growth.

What were the project objectives and to what extent were these achieved?

To purchase a new glasshouse and construct it at ACRI. The glasshouse has been constructed and is now in full use (see Photo 1). Construction was delayed initially due to wet weather through the winter of 1998. Minor problems have been experience with cooling but these are being rectified.

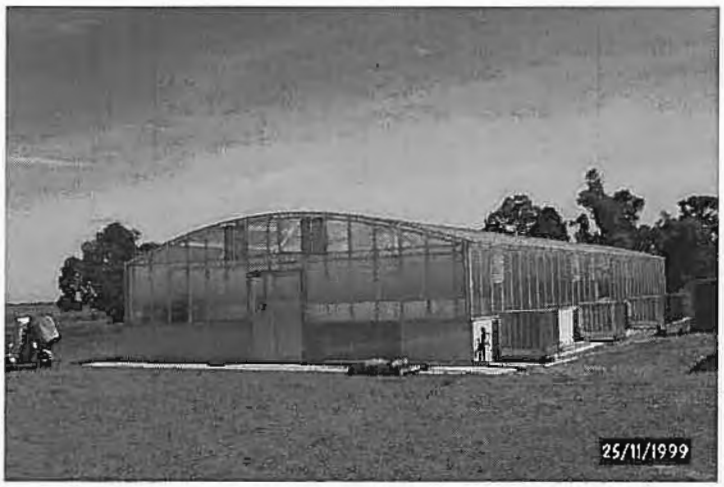

Photo 1. Completed glasshouse at ACRI.

The glasshouse was designed with three internal divisions – one designated pesticide free. Each of the sections has a designated manager (Wilson, Mensah or Milroy) to ensure that the glasshouse is maintained and to ensure equitable allocation of space to projects. The glasshouse is currently in use for a range of experiments (see Photo 2) including

Effect of aphids on plant growth (Wilson)
Comparison of real versus simulated pest damage (Wilson, Khan)
Oils for control of pests (Mensah)
Semiochemicals for management of Helicoverpa (Mensah)
Pest / parasitoid interactions (Schellhorn)
Cotton and heat stress (Lei)
Waterlogging effects on cotton (Thongbai, Milroy and Bange)

Photo 2. Plants growing in the new glasshouse for an experiment to examine the effects of simulated versus real pest damage, ACRI, 1999.

An assessment of the likely impact of the results and conclusions of the Research project for the Cotton industry, and where possible a statement of the costs and potential benefits to the Australian Cotton Industry and future research needs?

Reduced reliance on insecticides requires greater understanding of the response of cotton to pest damage and greater use of natural sources of pest mortality such as predation / parasitism. Projects addressing these problems often require access to glasshouse space to conduct controlled experiments to help understand / interpret the results of field experiments. There is currently no provision of glasshouse space for snch research so provision of a new glasshouse alleviates this problem to some extent, by increasing the availability of glasshouse space. This will ultimately help the cotton industry to reduce reliance on insecticides by (1) developing a better understanding of factors limiting yield, especially the effects of insect pests and responses of plants to insect damage (2) better understanding the role of predators in pest management and (3) developing management recommendations for industry.

Final Report - Plain English Summary – CSP100C

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Aim: To build a new glasshouse to provide a facility for basic research into plant / herbivore interactions.

Project Supervisors: Dr Lewis Wilson (CSIRO Plant Industry) and Dr Robert Mensah (NSW Agriculture)

The cotton industry remains highly reliant on insecticides / acaricides to manage key insect or mite pests. This incurs problems such as selection for resistance, reduction in natural enemy populations, secondary pest outbreaks and environment and human contamination. A number of research project aim to help reduce reliance on insecticides through a better understanding of the cotton plants capacity to recover from damage, thereby identifying situations in which pest damage is non-economic, and by studies of the effects of beneficial insects on pests and the evaluation of new more selective and environmentally benign means of control. Such research often requires access to glasshouse space to conduct controlled experiments. However, glasshouse space at the Australian Cotton Research Institute is at a premium, especially through winter when glasshouse experiments are often done as field work takes precedence through summer. Funding was sought to build a new glasshouse at ACRI. This has been successful and the large glasshouse has been constructed and is now in use for a range of projects.