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## Industry Significance

The benefits to the Australian cotton industry will accrue through the availability of alternatives to the currently used chemical insecticides. Such alternatives will not only have value in their own right but will also assist in the further refinement of *Helicoverpa* resistance management programs, thereby extending the useful life of chemicals such as pyrethroids.

## 1. SUMMARY

The Division of Entomology initiated its program "Genetic Engineering of *Helicoverpa* nuclear polyhedrosis viruses" in 1988. The program aims to modify the genome of *Heliothis* NPVs (HaNPVs) to generate more rapidly acting viruses for use as biological insecticides in *Helicoverpa* control strategies. Towards these ends the program can be divided into three distinct phases, with timescales shown in parentheses:

- 1) Research and development of recombinant viruses (1988-1992)
- 2) Pre-commercial development of recombinant viruses (1992-1995)
- 3) Commercialisation of recombinant viruses (1995-1999)

The overall program is carried out in collaboration with Zeneca Agrochemicals (UK) and Crop Care Australasia. The initial research and development phase of the program ended in March 1992. This CRDC funded project (CSE 29C) formed part of the second pre-commercial development phase of the program.

During this second phase of the program it was anticipated that there would be six major activities:

- 1) Optimisation of the design of recombinant HaNPVs to allow for the development of faster acting strains
- 2) Selection and optimisation of the genes to be inserted into a commercial product
- 3) Toxicological studies on the products of the genes selected for insertion into a commercial product
- 4) Development of suitable production systems for the recombinant viruses
- 5) Assessment of the potential environmental impact of these recombinant viruses and,
- 6) The development of suitable formulations for the delivery of these viruses.

All of the work to be undertaken in activities 3 and 6 was to be undertaken solely by Zeneca with CSIRO solely or jointly responsible for the four other activities.