

Project Title : **Resistance Monitoring of *Helicoverpa armigera* in the Macquarie Valley**

Project Number: DAN 78C

Research Organisation: NSW Agriculture

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SUMMARY

1. INTRODUCTION

Industry Significance

The Macquarie Valley is a southerly cotton growing area in NSW. Located some 250 Km south of the Namoi Valley, it is both climatically and ecologically distinct from the more northern cotton growing regions. Over recent years, there has been a great expansion in the area of irrigated cotton grown in the Macquarie Valley. However, insecticide resistance levels and *Helicoverpa* ecology in the Macquarie Valley are not well understood. Insecticide resistance in *H.armigera* is one of the largest threats to the profitability of the Australian cotton industry and a management strategy is used to control resistance. Regular monitoring of resistance levels is required to evaluate the impact of the insecticide resistance management strategy.

2. OBJECTIVES

1. To establish *Helicoverpa* species composition in the Macquarie Valley and to relate the data to that from other cotton growing areas in NSW and Queensland.
2. To determine insecticide resistance levels in the Macquarie Valley and to relate the data to that from other cotton growing areas in NSW and Queensland.
3. To trial biochemical resistance detection methods in *H. armigera*.

3. RESULTS AND DISCUSSIONS

Helicoverpa species composition in the Macquarie Valley comprises *H. punctigera* during early and mid season (Stages 1 and 2) with *H. armigera* appearing in considerable proportions in Stage 3. The *H. armigera* occurrence in the Macquarie happens later in summer than in more northerly cotton districts.

The frequency of pyrethroid resistant *H. armigera* from the Macquarie Valley is increasing and is similar to that found in the Namoi and Gwydir Valleys. However, Macquarie endosulfan, and organophosphate resistance frequencies are higher.

4. DISCUSSION

All objectives of this project, namely to determine the *Helicoverpa* spp. species composition and *H.armigera* resistance status in the Macquarie Valley, have been met. This project is complementary to resistance monitoring programs in the Namoi /Gwydir, Emerald and at St George. Information from the Macquarie monitoring project will assist in developing an understanding of *Helicoverpa* ecology and behaviour on cotton in Australia.

5. CONCLUSIONS

H. armigera resistance monitoring in the Macquarie Valley has shown that in some

ways, this region is distinct from the cotton growing areas of northern NSW and central Queensland. While *H. armigera* pyrethroid resistance frequencies are similar, a considerable proportion survived pyrethroid synergism with piperonyl butoxide. Endosulfan resistance frequencies in the Macquarie Valley are unusually high and as well, the area is host to populations which are strongly resistant to organophosphates. It is possible that a specific regional resistance management strategy may be needed to manage these problems. It is recommended that insecticide resistance levels in the Macquarie Valley continue to be monitored.

6. COMMUNICATION OF RESULTS

Results of this project have been directly communicated to the growers and other cotton industry personnel in the Macquarie Valley. Dr Gunning has presented talks and demonstrations about biochemical resistance detection to growers and consultants in the Macquarie Valley. In addition, results have been published in scientific papers.

7. APPENDIX

Budget

Total funds contributed to DAN 78C by the Cotton Research and Development Corporation were \$5,000. During 1992 - 94, NSW Agriculture provided approximately \$200,000 per year to support this and DAN 51C.

8. SPECIAL CONSIDERATIONS

This project would not have been possible without the help and collaboration of Mr D. Clark, Mrs W. Clark and Ms A. Wheeler (all of D.Q. Clark and Associates, Warren); Mr A. Mc Alary and Mr C. Hogendyke (both of the Macquarie Cotton Growers Association) and Mr A. Kay (NSW Agriculture). Thanks are also due to Ms M.E. Balfe, Miss N.A. Colman, Mr R.V. Hall and Mr B.C. Craswell (all of NSW Agriculture) for technical support.

ADDENDUM

Abstract

H. armigera resistance monitoring in the Macquarie Valley has shown that in some ways, this region is distinct from the cotton growing areas of northern NSW and central Queensland. While *H. armigera* pyrethroid resistance frequencies are similar, considerable proportions survived pyrethroid synergism with piperonyl butoxide. Endosulfan resistance frequencies in the Macquarie Valley are unusually high and the area is host to populations which are strongly resistant to organophosphates. It is possible that a specific regional resistance management strategy may be needed to manage these problems. It is recommended that insecticide resistance levels in the Macquarie Valley continue to be monitored.