

## Farm Management Practices for

# MOUSE CONTROL

*This brochure describes a new research and extension project to assess the use of farm management practices to reduce the effect of mouse damage on farms in the Mallee and Wimmera areas of Victoria.*

### *The Impact of Changes in Farming Techniques*

Over the last 10 years, farmers in the Wimmera, and to a lesser extent the Mallee, have radically changed their farming practices. Farmers have adopted “conservation farming” methods such as minimum tillage, direct drilling and stubble retention, and at the same time have increased their intensity of cropping and sown a greater diversity of crops. These changes may result in an increase in the intensity and duration of mouse plagues.

If this is correct, then farm management practices may need to be modified **in years when there is a forecast of high mouse numbers.**



Corn heads damaged by mice

### *The challenges are:*

- to develop farm management practices which will reduce the impact of mice, yet enable “conservation farming” to continue,
- to integrate these practices into the existing timetables and budgets of growers, and
- to forecast bad mouse years (this will not be covered by the current project).

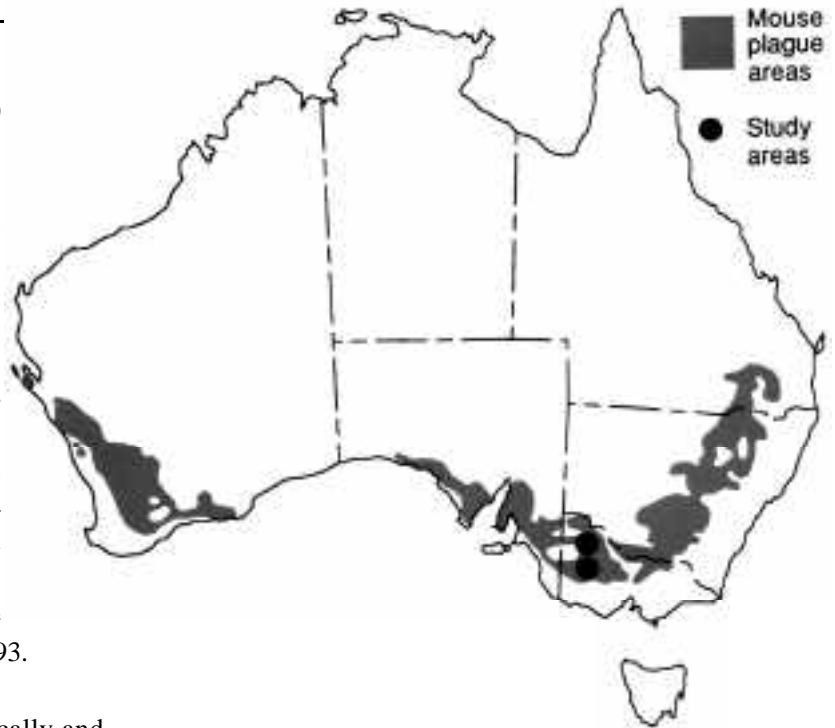
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## Mouse Plagues

Plagues of house mice (*Mus domesticus*) occur irregularly in southern and eastern Australia, on average once in four years. Plagues do not generally occur at the same time across all the grain-growing regions.

Over the past five years, plagues have occurred in the Gwydir, Macquarie and Namoi valleys in New South Wales in 1989; in southern Queensland in 1989 and 1993; across vast areas of the grain belt in South Australia in 1993; in the Wimmera, Victoria in 1993; in the Mallee, Victoria in 1994; in southern New South Wales in 1994; and in some regions in South Australia in 1994. The latter generally had low mouse densities in 1993.

Mice cause considerable problems economically and socially. In 1993, mice caused estimated losses of greater than \$100 million in southern Australia. Environmental problems also arise through heavy use of pesticides and use of unregistered chemicals to control mice. In addition, extreme management of stubbles for mouse control (e.g. burning and over-grazing) may contribute to loss of valuable top soil.



Mice are capable of transmitting a number of diseases, and cause considerable stress to rural communities. Mice contaminate stored produce which places export and domestic markets at risk. Assessments of the financial impact of mouse plagues do not address adequately the economic and social hardships generated by the stress of sharing one's living space with mice.

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(Above) Wheat damaged by mice.  
(Right) Mice in a piggery

### THE PROJECT

The project will run for two and a half years. Together with a farmer advisory panel, we will develop and then critically assess best farm management practice for reducing losses caused by mice. The study will pay particular attention to:

- **soil conservation and sustainable agriculture,**
- **the costs and benefits of management,**
- **possible conflict with the timing of other farm operations, and**
- **informing cereal and grain farmers how best to manage mouse plagues.**

The use of strychnine baits will be assessed to determine the economic benefits of poisoning when mouse densities are high. We are striving, however, to avoid the heavy use of poisons once a plague has developed. Our objective is to raise the awareness of growers of how mouse plagues develop and to provide them with cost-effective, sustainable and environmentally safe management practices when mouse populations are in the early stages of a plague.



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## *Why do plagues form, and what can be done to prevent them?*

Research on mice has been conducted in the Victorian Mallee since 1982 and considerable knowledge has been gained about plague formation. The build up of mice usually begins with good early autumn rains. If a wet spring and summer follows, a plague may occur within 12 months but generally it takes 18 months for a plague to develop. Predictions based solely on rainfall however, have met with limited success. Autumn rainfall provides a warning that we need to get out and monitor how mice are responding to changes in food supply. The key population processes of plague initiation appear to be changes in the social behaviour (which influence survival and movement patterns of young mice) and breeding success of mice. Therefore we monitor changes in mouse densities in key habitats, the timing of onset and cessation of breeding and the average litter size of mice. Our ability to forecast mouse plagues has been strengthened through the monitoring program. The factors leading to mouse plagues in the Wimmera are unknown as yet, however we know what indicators to examine based on our work in the Mallee.



The experiment will be conducted in two regions: the Central Mallee (an area Ouyen to Underbool) and the Wimmera (Nhill to the Warracknabeal). Previous research by CSIRO has shown that management practices will need to be implemented over areas (greater than 1,000 ha) in order to reduce the effect of re-invasion or compensatory survival and reproduction of the remaining mice. Sites have been selected so that participating farmers from adjoining properties are conducting similar management practices set down under a specific treatment.

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### **THE EXPERIMENT**

The treatments for this experiment are modified conservation farming practices (these include minimum tillage; cross harrowing; reduction of grass growth around margins of crops; grazing stubble immediately after harvest), strychnine baiting at sowing, a combination of conservation farming practices and strychnine baiting, and farming practices which continue regardless of mouse densities (our experimental control). This makes four treatments, and two sites are needed for each treatment.

At each site the population density, body condition and breeding status of mice will be monitored regularly by CSIRO. Seasonal changes in the amount of available food for mice will be measured.

The Department of Agriculture will assess economic losses to the crop at sowing, at booting, during the week prior to harvest and from yields obtained. Damage to farm machinery and stored grain, plus estimates of the likely risk of soil loss from high winds will also be estimated.



(Above) Measuring mice in the Field.  
(Left) Mouse Trap in Field use



## Extension and Advisory Panel

Progress will be reported through field days, the print media, rural radio programs and farmer newsletters. Demonstration farms are planned for the third year of the study.

There will be an Advisory Panel consisting of growers from the Millewa, Central Mallee, Western Wimmera and Central Wimmera in Victoria, and grower and State Government representatives from South Australia, New South Wales and Queensland. The panel will meet every 6 months and ensures a strong grower input into the project.

*This sheet is intended to give general information in summary form only. For further advice on particular matters, please contact:*

Grant Singleton CSIRO Division of Wildlife and Ecology,  
GPO Box 284, Canberra ACT 2601  
Telephone: (02) 6242 1658  
Fax: (02) 6241 1555

and  
John Griffiths Victorian Institute of Dryland Agriculture  
Private Bag 260, Natimuk Road, Horsham  
Victoria 3401  
Telephone: (053) 622111  
Fax: (053) 622187

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## Desired Outcomes

This project is the first attempt to critically analyse techniques used over large areas under controlled field conditions, and to provide a cost-benefit assessment of these techniques. We aim to provide farmers, wildlife managers and governments with tools for use in combating the mouse problem, and to develop a greater understanding of management options available to growers. Furthermore, the project will encourage long-term mouse control techniques that can be incorporated into normal farm management practices, not just short-term measures that reduce numbers of mice for short periods, or over small areas.



### COLLABORATORS:

Mouse Plague Research Group, CSIRO Division of Wildlife and Ecology,  
Department of Agriculture Victoria and the grain  
growers of Western Victoria.



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