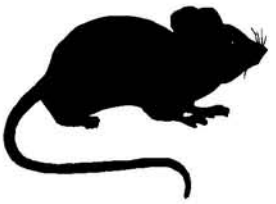
MOUSE MANAGEMENT



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Introduction

Mice are very adaptable creatures, in fact they are often referred to as a 'mammalian weed'. They are able to live on a wide range of foods and adapt to a wide variety of environmental conditions. A favourable combination of seasonal conditions and food supply can lead to a sudden growth in the usually low mouse population.

Mice are ever present in grain growing areas, though usually in low numbers and confined to refuge areas such as fencelines, channel banks and roadsides. Modifications to traditional farming systems in grain growing areas to incorporate increased frequency cropping, more diverse range of species, minimum till, and direct drilling into the farming system may provide mice with more frequent opportunities to build into plague proportions.

Mouse Population dynamics

Mice living in field conditions have a seasonal breeding pattern. Breeding generally commences in early spring and continues until late autumn. The rate at which mice breed is determined by seasonal conditions and the availability of food and shelter. When conditions are optimal mice can commence breeding at 6 weeks of age, females can remate within 3 days of giving birth and produce litters of 9-10 young, rather than the usual 5-6. With a gestation period of just 3 weeks, mouse populations can erupt into plague proportions within a short time. Theoretically, one pair of mice can develop into 500 mice in just 21 weeks.

Some Mouse Facts

- Breeding season: approx. August-May
- Commence breeding: 6-10 weeks of age
- Litter size: 5-6 but in plague build up 9-10
- Gestation period: 3 weeks
- Life span: 1-2 years
- Food intake: approx. 3gms/day
- Water intake: mice only require a diet containing 15% water

When in plague proportions mouse numbers eventually crash naturally due to a combination of factors such as declining food supplies, social stress, disease, environmental conditions and predation. This crash can occur in a matter of weeks.

Mouse prospects in 1997 - Southern Mallee and Northern Wimmera

There is a threat of high mouse numbers which may pose problems for grain growers in the lead up to sowing. In 1996, CSIRO predicted a strong chance of a mouse plague in the Central Mallee this autumn (1997) based on long term monitoring (14 years) in the area. This threat may be extended to the Southern Mallee and Northern Wimmera although little is known about the population biology of mice over a long period in areas other than the Walpeup region.

Essentially, it is a situation which should be closely monitored by individual farmers, particularly in light of mouse activity in canola crops during October and November last year in the Birchip region. Monitoring of mouse numbers in canola crops in the Birchip area during October indicating numbers of 600 Mice/ha. This monitoring was conducted as part of a small bait trial, and since that time no further monitoring has been conducted specific to the Birchip area.

Which paddocks are most vulnerable at sowing?

Mice require food and shelter. Observations from previous plagues indicate that paddocks with large amounts of grain after harvest are most vulnerable since there is an excellent food supply for mice to maintain breeding over summer.

During sowing in 1996, mice caused substantial damage in some crops on the grey clays of the Wimmera. Barley and canola stubbles tended to support high mouse numbers, thus crops sown into those stubbles were most severely damaged.

In 1996, newly sown chickpea, canola, beans and vetch crops were the most commonly affected. Mice either removed newly sown grain (particularly chickpeas and beans) or grazed the emerging plants (particularly canola and vetch). The scale of damage is highly variable. Large patches within the crop, or the whole crop, may be denuded of plants as a result of mice, or damage may be scattered along rows with a plant missing here and there.

Crop Protection

Mice require food and shelter to survive. Limiting the access of food is important in managing populations, reducing population growth and minimising damage to future crops. However, as sowing a crop provides mice with an excellent food source, this is easier said than done. In the lead up to sowing it is critical to know which paddocks have active mouse populations to ensure that damage does not come as an unpleasant surprise.

Baiting should not be relied upon as the first option for control of an increasing mouse population. Baiting has been found to be most effective when other food sources have been minimised since mice are less likely to consume bait if there is a more preferable food source.

Removal of feed and shelter in autumn plays an important role in minimising population growth. Grazing stubbles to remove grain remaining after harvest is an effective way of reducing a potential food source for mice. Burning of stubbles may not be necessary unless stubble is very heavy, since burning does not completely remove the food source (ie. grain). Options for stubble management prior to sowing also include working in crop residues particularly if large amounts of grain and straw remain. This removes the food and shelter source for mice.

Baiting is an option if mouse populations reach significant levels and pose a risk to the next crop. While re-invasion of a baited paddock may occur, baiting provides a window of opportunity for crops to get established.

Management Practices at Sowing

Management strategies at sowing essentially revolve around making the mice work harder to find seed. Some considerations at sowing include:

- sow as early as possible to get rapid germination and growth in paddocks known to have high mouse activity
- increasing the sowing rate and depth to increase the chance of seedling establishment
- cross harrow, use flexicoil packers, prickle chain etc - mice tend to work along furrows removing seed; the furrows are less obvious if cross harrowed.
- consider which crops to sow into badly infested paddocks. In the past, chickpeas have been badly damaged by mice, so consider sowing an alternate crop in its place.

Above all, start your mouse management program early - NOW!

Mouse monitoring

Mouse plague predictions are essentially based on information gathered during regular population monitoring. CSIRO utilise a live trapping monitoring technique which provides scientists with data on the size and age structure of the population, proportion of females breeding and size of litters.

A GRDC funded project is investigating monitoring techniques which may be utilised by farmers to monitor mouse populations. The method being promoted uses paper squares soaked in canola oil.

Monitoring on the farm

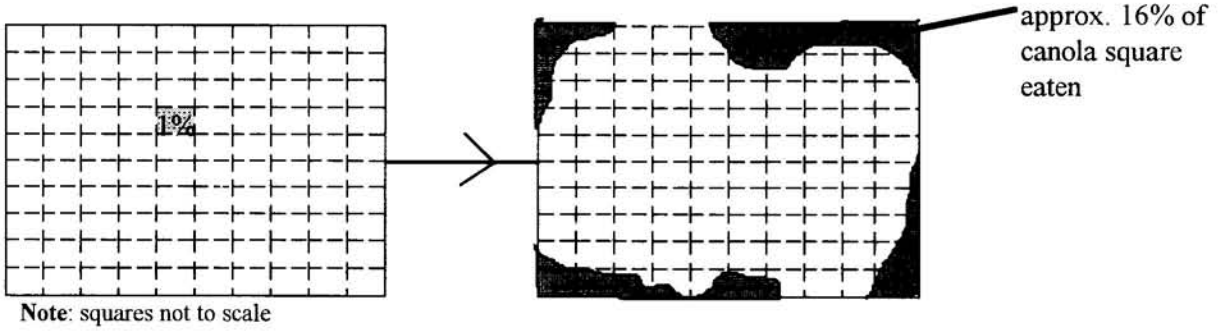
Monitoring mice can be quick, easy and informative. Monitoring enables you to keep an eye on what is happening and to prepare for population build up.

Dip 10 cm squares of paper in canola oil. Drain then peg them to the ground with wire pegs along two or more fencelines on different parts of the farm. Place 20 of the squares along each fenceline about 20 metres apart. Check and record the amount of each square eaten on two consecutive nights. On averaging the results the following may be a guide:

- 20% or more eaten in first night - active control measures are required;
- 5-20% average eaten over 2 nights - population is too high and could be a problem;
- 0-5% average over 2 nights - little damage can be expected.

Revisit monitoring sites each month to see how the population has changed over time.

Below is an example of a canola square used for monitoring mice



Note: squares not to scale

Immediate and long term solutions..

Mouse plagues in the grain growing regions have become more frequent and intensive over the past 15 years. Growers are desperate for immediate interim actions to reduce the impact of mice while more sustainable long term solutions are being developed by researchers.

There are essentially two modes of management of mouse plagues. One is early tactical intervention which requires by a combination of management techniques and tactical baiting. The other is crisis management; taking action once a plague has erupted. Both management approaches tend to require effective broadscale use of rodenticides in and around crops.

A joint project between CSIRO and Agriculture Victoria (VIDA) has been underway for the past two years investigating farm practices for mouse control. The project involves monitoring mouse numbers and potential mouse food supplies on a number of farms in the Walpeup, Nhill and Horsham districts, and investigates the

impact of farm practices on the build up of mouse populations and minimising damage when numbers are high.

Biological control based on the concept of immuno-contraception (an infertility vaccine delivered by a mouse specific virus) is being investigated by CSIRO's Rodent Research Group. This is a long term approach which is unlikely to be available for at least 8 years.

Baiting.....

Trials are being finalised into the potential mouse control agent, zinc phosphide. The current experimental trials are monitoring the exposure levels and non-target effects of the product. If the product meets the requirements of the National Registration Authority, it will be available for use in the period leading up to sowing.

Like strychnine, zinc phosphide is a highly toxic chemical but its mode of action is different. It kills by forming the deadly phosphine gas within the stomach of any animal digesting it. It is widely used in many countries to control rats, mice, other rodents and vermin.

Bromadiolone bait for use in bait stations remains available from NRE. Bromadiolone is recommended for use around sheds, perimeter baiting and baiting hotspots, but must be used in bait stations.