2017

Monitoring mice in Australia

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Key Messages

- Mouse numbers are currently moderate across most regions of southern New South Wales, South Australia and northwest Victoria. There is potential for economic damage at sowing in 2018.
- Current efforts to monitor mice are not sufficient to detect variations in mouse abundance between and within cropping regions. Farmers need to stay informed about potential increases in mouse numbers from the mouse monitoring updates that the project publishes at the end of each monitoring session. https://www.feralscan.org.au/mousealert/pagecontent.aspx?page=mouse_news
- Farmers should conduct their own monitoring to ensure they know what is happening in their own paddock in the lead up to sowing each autumn. Farmers should follow the recommendations outlined in the *GRDC GROWNOTES™, Tips and Tactics, Better Mouse Management* page at https://grdc.com.au/resources-and-publications/all-publications/publications/2017/07/tips-and-tactics-better-mouse-management
- Broad-scale application of zinc phosphide bait is the only method available to farmers to control mice in their paddocks. Timely application of mouse bait at the prescribed rate is paramount for reducing the impact that mice have on crops at sowing. Strategic use of bait is more effective than frequent use of bait.

Background

Surveillance and forecasts for mouse outbreaks in Australian cropping systems is a GRDC-funded study to monitor and model mouse populations across the grain-belt of Australia. The project started in October 2012 as a collaboration between Landcare Research (New Zealand), CSIRO and the Invasive Animals Cooperative Research Centre.

A key element of the project is to publicise the results of the monitoring and predictions to farmers and industry through GRDC and other communication networks to enhance awareness of increases in mouse activity.

Mouse populations are monitored in typical grain farming systems in Western Australia, South Australia, Victoria, New South Wales and Queensland at three key times each year, coinciding with important crop stages (e.g. at sowing of winter crops) and critical times in the build-up of mouse populations (e.g. commencement of breeding in spring). The monitoring is used to collect information about the population size, breeding status and overall activity of mice. This information is used in predictive models to determine the probability of changes in mouse abundance. These models were developed at long-term monitoring sites in the northern Adelaide plains in South Australia, the northwest Mallee in Victoria and the Central Darling Downs in southern Queensland.

About the trial

The monitoring of mouse populations occurs at three levels of intensity on 110 transects across 11 sites (Figure 1):

(1) **Benchmark sites** in the Adelaide Plains (SA), Northwest Victoria, and the Darling Downs (Qld), where long-term trapping has been conducted for more than 20 years and where forecast models have been developed. Live trapping data is collected at three key times per year and the data is used in the models to predict the likelihood of outbreaks for those regions.

(2) **Quantitative rapid-assessment sites** in Geraldton and Ravensthorpe (WA), Horsham and Walpeup (Vic), Riverina, Central West and Moree (NSW), Mallala and Yorke Peninsula (SA) and the Darling Downs and Goondiwindi where there are two types of monitoring: mouse chew cards set out overnight (ten chew cards at 10m spacing along 100m survey lines), and active burrow counts along 4 X 100m survey lines. Monitoring is conducted three times a year.

(3) **Qualitative monitoring networks** in all the areas with rapid-assessment sites where key farmers and agronomists are contacted to collect information about mouse activity in the region as well as any reports of the use of rodenticides.

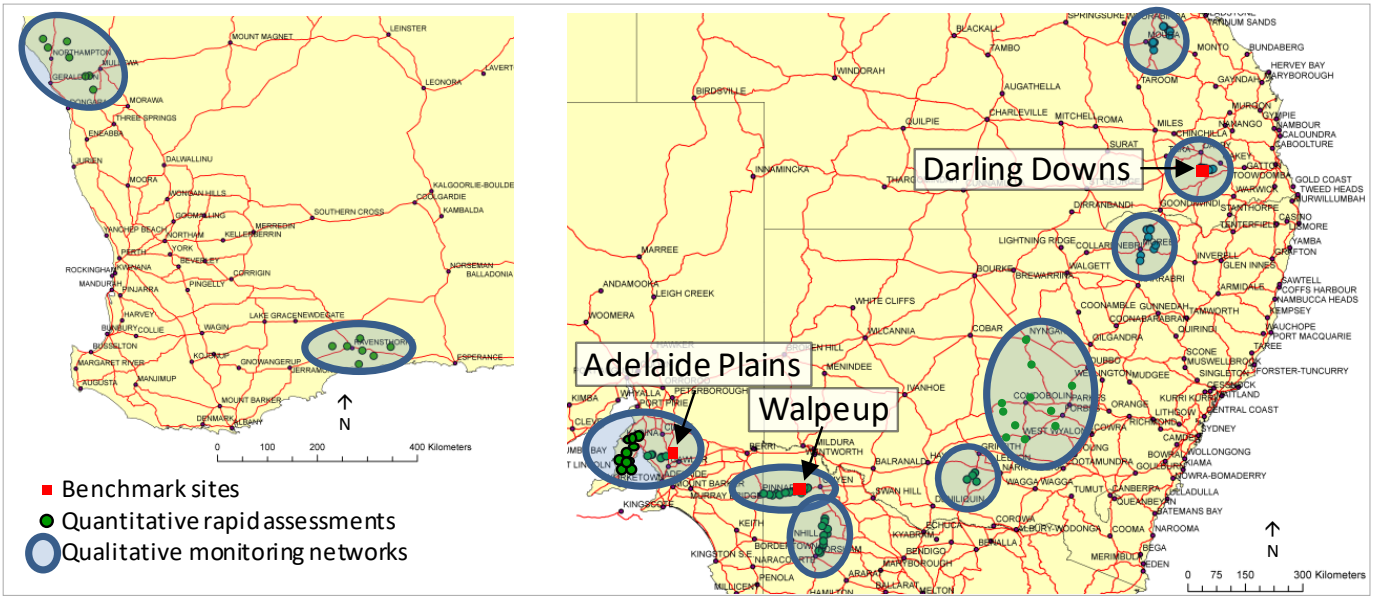

Figure 1. *Location of monitoring sites across western, southern and eastern Australia.*

Results & Discussion

Over the five years that the monitoring project has been running, mouse numbers have fluctuated at all of the monitoring sites, on one occasion in Queensland mouse numbers were significant and damage was recorded on the Darling Downs.

In the spring of 2016, based on the trapping data at Walpeup and Mallala, the models predicted a high likelihood of an outbreak in autumn 2017 (Figure 2). Through the summer numbers of mice in southern New South Wales, Central and western Victoria and most cropping regions of South Australia continued to rise and as a result farmers had to undertake significant baiting programs to reduce damage from mice at sowing in 2017. Despite warnings about the potential for significant increases in mouse numbers many farmers were caught unprepared. This was probably the result of high stubble loads after an exceptional 2016 harvest masked the signs of mouse activity.

Mice continued to be a problem throughout the 2017 crop. Monitoring early in the spring showed little or no sign of activity associated with active burrow counts or crop damage but a significant level of activity was recorded on the chew cards. Adjusted trap success in north western Victoria was significantly higher than expected for the spring trapping, indicating that breeding had started early.

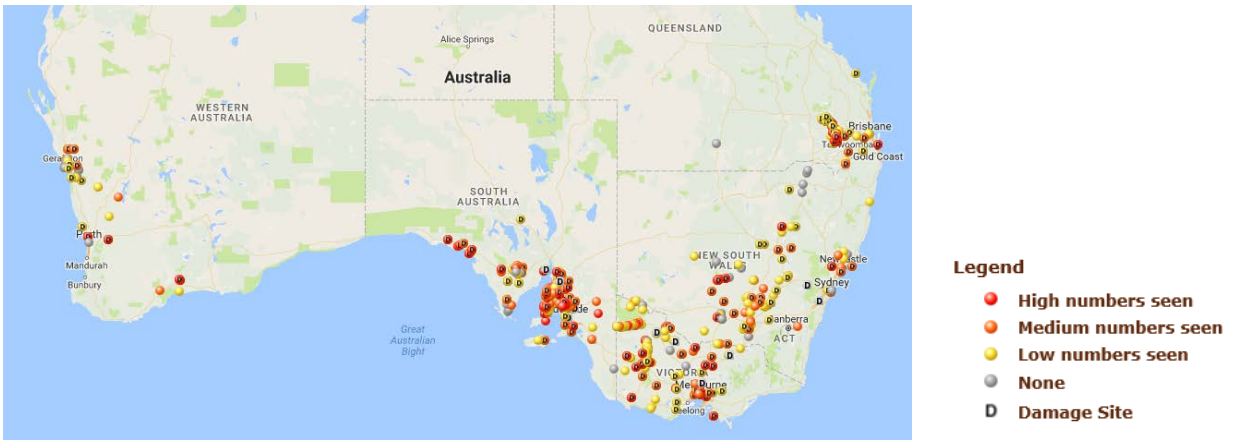

***Figure 3**. Records of mouse observations in MouseAlert web site/phone app (www.mousealert.org.au) since 2014 (containing > 500 records).*

Later in the spring significant amounts of damage were recorded in many of the developing crops. Anecdotal reports of damage to all types of crops continued to be reported right up to harvest and reports of higher than expected numbers of mice through the harvest were not uncommon. Severe weather events during the 2017 crop resulted in significant crop losses in some areas due to dropped grain or frost damage resulting in a greater than normal supply of food for mice.

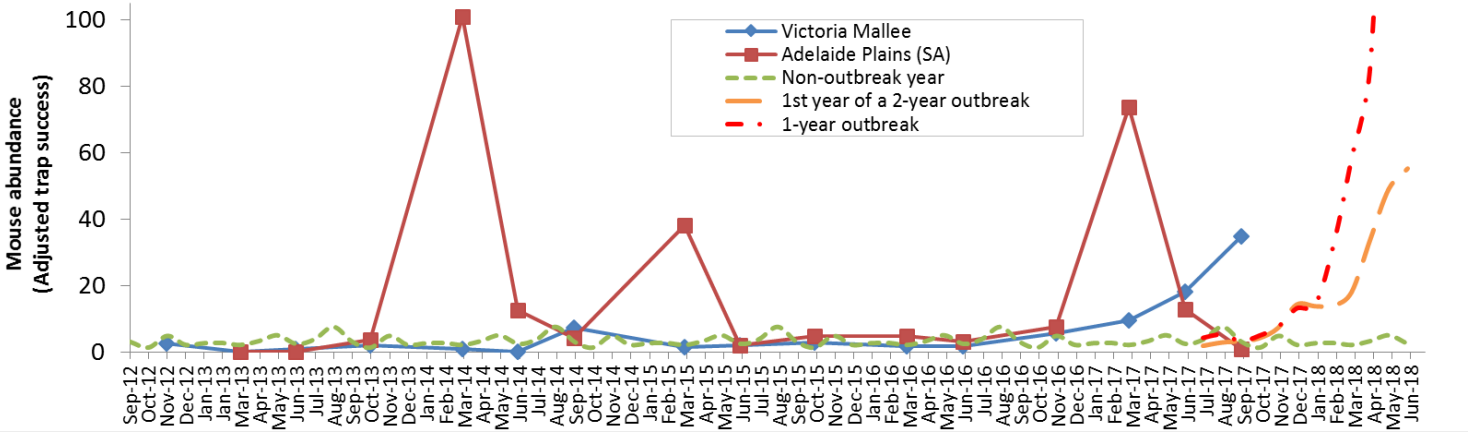

***Figure 2**. Current mouse population abundance at benchmark sites in Victoria and SA compared to outbreaks in the past.*

Implications for commercial practice

Issues with mouse monitoring

Current models are performing well, and we are monitoring mice at a large number of sites across the grain belt, but we are only gaining a snap shot of what is happening with mouse populations. We are not currently collecting data from enough locations to deal with the variability in mouse activity between regions, farms or between paddocks on individual farms. In an effort to deal with the lack of data we developed a mobile phone application MouseAlert (www.mousealert.org.au) with the idea of getting farmers and agronomists to supply data about mouse abundance on their farms (Figure 3).

Unfortunately use of the App has been low and the data collected have been insufficient to use in predictive models. The App still provides farmers with the opportunity to enter data and view observations of other farmers about the level of mouse activity in their district.

Mouse control issues

More data are needed to make accurate predictions about changes in mouse abundance across cropping regions. One way to achieve this would be to develop a remote monitoring system that could detect changes in mouse activity on a broad scale.

The current approach to bait application is to spread bait on a broad scale across entire paddocks. Our understanding of mouse ecology and behaviour is based on work undertaken in conventional cropping systems. Understanding mouse ecology in zero and no till cropping systems could lead to more strategic application of bait, potentially reducing the quantity of bait spread or increasing the effectiveness of bait by targeting high activity zones in paddocks. Testing of the palatability of different bait substrates might also result in increased uptake of bait.

Future development of new toxins for mouse control is still some time away and the development of novel biocontrol techniques has potential but is still in the very early stages of development. In the interim we need to find ways to use the tools that we have to control mice more effectively.

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