

## Maintaining profitability in retained stubble systems on upper Eyre Peninsula

A joint EPARF and GRDC funded project.



### Guideline 3: Mice and stubble management on upper EP

Changes in farming systems with increased stubble retention, continuous cropping, reduced tillage and reduced livestock numbers have provided a more favorable environment for certain pests within current farming systems. Maintaining stubbles within crop rotations may increase potential pests on upper Eyre Peninsula, especially snails and mice as the stubble provides shelter and a feed source.

Mice plagues are a part of farming and have occurred throughout the cereal growing regions of southern Australia about once every four years, in South Australia once every 5-6 years and on Eyre Peninsula once every 10 years. The house mouse, *Mus domesticus*, was introduced as a stowaway into Australia by the first colonists. Factors which increase supply of seed available in paddocks after harvest, such as higher screenings or no livestock grazing after harvest, will increase mouse numbers and damage in the following year<sup>1</sup>.

Mice generally begin breeding in spring and increase in numbers until the last of the grain in the paddock after harvest is consumed or germinates over summer. The initial rise in population over spring-summer often goes unnoticed until issues arise due to population numbers in the following autumn-winter<sup>1</sup>, often at seeding. Mice may over-summer in refuge areas such as windrows or crop perimeters, then move into paddocks<sup>2</sup>.



Photo: Michael Nash

Figure 1 House mouse *Mus domesticus*

#### Conditions that encourage mice<sup>4</sup>

Mice are always present in crops in low numbers, but numbers can increase rapidly and cause economic damage under favourable conditions, including:

- Prolonged availability of high quality feed
- High crop yields
- Grain left in paddocks at harvest
- Rains that produce early seed set of winter weeds or summer weeds
- Heavy crop stubbles
- Intense wind events that damage mature crops

Mice numbers tend to be limited by low survival over winter; however environmental conditions may lead to population increases such mild winter conditions and less disease<sup>1</sup>, easy digging and nesting opportunities<sup>2</sup>, high crop and grain production levels which leave greater food source in paddocks, lower temperatures over summer which allow juveniles to survive, and early autumn rains which germinate volunteer cereals and weeds to allow the population to survive and reach peak populations, causing plagues<sup>1</sup>.

Mouse plagues occur in seasons with high populations and due to changes in modern farming systems these are now harder to predict. Historically cultivation was used for weed control so mice populations had to survive periods with lower food supply. Mice are now causing issues at different times of crop growth (tillering and head emergence), in different crop types like canola, and in regions that historically did not have issues<sup>1</sup>.

#### Control options

##### Monitoring

Farmers are encouraged to use the Invasive Animals Cooperative Research Centre's (IACRC) mobile phone and computer-based reporting tool MouseAlert, [www.mousealert.org.au](http://www.mousealert.org.au) which uses farmer-sourced data to improve the ability to predict

mouse plagues. This is part of an IACRC research program to develop a more reliable national mouse monitoring program and plague prediction model, with funding support from the Grains Research & Development Corporation (GRDC)<sup>3</sup>.

### Baiting

Bait is available from commercial mouse bait suppliers servicing South Australia which can provide both locally prepared and nationally produced bait products that are registered or permitted for use in crops, intensive animal operations, industrial, commercial and domestic situations<sup>3</sup>. Bait can only be used if a mouse monitoring program had justified its use<sup>2</sup>. Baiting will cost between \$8-15/ha<sup>1</sup>. The rodenticide products that are commercially registered for field use are; Bromadiolone, an anticoagulant poison which is grain based and used for perimeter baiting only; and Zinc phosphide, commercially produced as Mouseoff, a toxic phosphine gas which is released on ingestion for in-crop baiting<sup>2</sup>.

Apply baits within six weeks prior to sowing or on disturbed soil after sowing. Allow four to six weeks before reapplication to minimise the chance of bait aversion or consuming a non-lethal dosage. Baiting over large areas (at the same time as neighbors) will lower the chance of reinvasion. Bait must not be laid within 50 m of the crop perimeter or native vegetation. Grain eating birds feed in crops and may be at risk if bait is laid on bare ground or patches of bait are spilled. Bee hives should be moved away from areas that will be baited. Small native mammals mostly feed on insects and are seldom found in crops so are at little risk<sup>4</sup>.

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### Management

- Monitor mice numbers if a potential issue to identify areas on the farm that are most problematic
- Paddock and farm hygiene are important to keep numbers down, including access to stored grain<sup>3</sup>
- Reduce grain losses at harvest
- Graze stubble with livestock to reduce grain and stubbles, which will reduce both food and favourable environmental conditions
- Spray summer weeds and self-sown cereals to reduce over summer and early autumn feed sources
- During plague conditions other agronomic practices may be required to increase crop establishment such as;
  - tillage before sowing
  - timely burning of windrows to maximise temperatures
  - burning stubble/whole paddock burn
  - sowing at the maximum depth
  - increasing seeding rate
  - removing furrows after seeding by tillage/prickle chaining
  - perimeter baiting or whole paddock baiting.

### References

1. Mouse damage in Eyre Peninsula Farming Systems, Greg Mutze, Eyre Peninsula Farming Systems Summary 2006
2. Managing Mice in Stubble Retained Systems in Central West, NSW, Central West Farming Systems, 2016
3. PIRSA Potential for mouse outbreaks in regions, Greg Mutze, 2015, [pir.sa.gov.au/alerts\\_news\\_events/news/.../potential\\_for\\_mouse\\_outbreaks\\_in\\_region](http://pir.sa.gov.au/alerts_news_events/news/.../potential_for_mouse_outbreaks_in_region)
4. GRDC GrowNotes Tips and Tactics Better Mouse management. National Mouse management Working Group, July 2017

This guideline has been developed for the Eyre Peninsula Agricultural Research Foundation as part of the Maintaining profitable farming systems with retained stubble - upper Eyre Peninsula (EPF00001), funded by the Grains Research and Development Corporation (GRDC). The initiative involves farming systems groups in South Australia, Victoria, southern and central New South Wales and Tasmania collaborating with research organisations and agribusiness to explore and address issues for growers that impact the profitability of cropping systems with stubble, including pests, diseases, weeds, nutrition and the physical aspects of sowing and establishing crops in heavy residues.