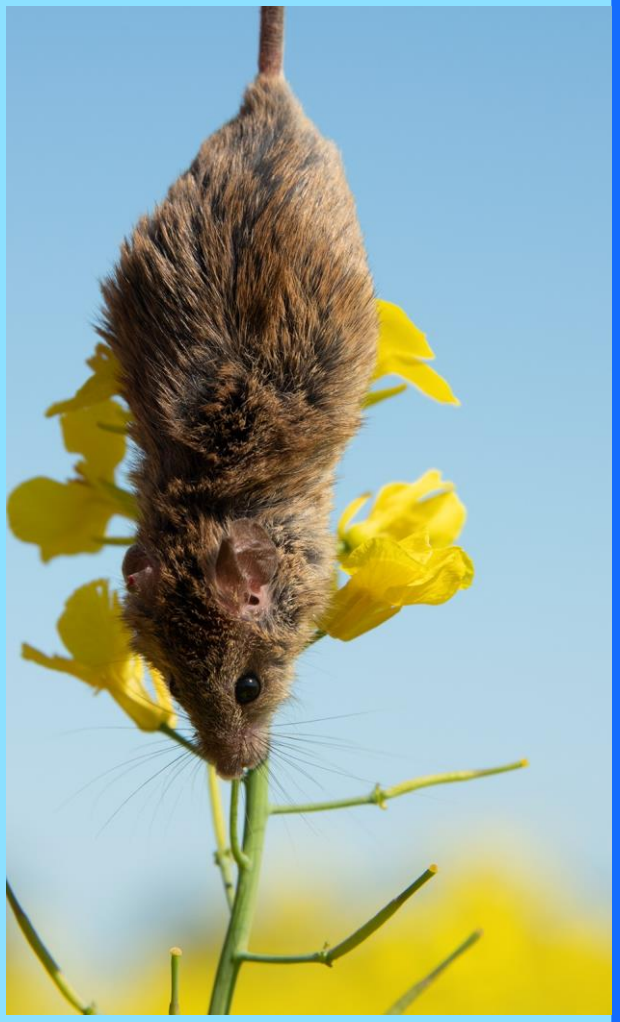
Department of Regional NSW
Department of Primary Industries

Population dynamics and behaviour of house mice (*Mus musculus*) in NSW pasture–cropping systems

NSW Vertebrate Pest Symposium 2023



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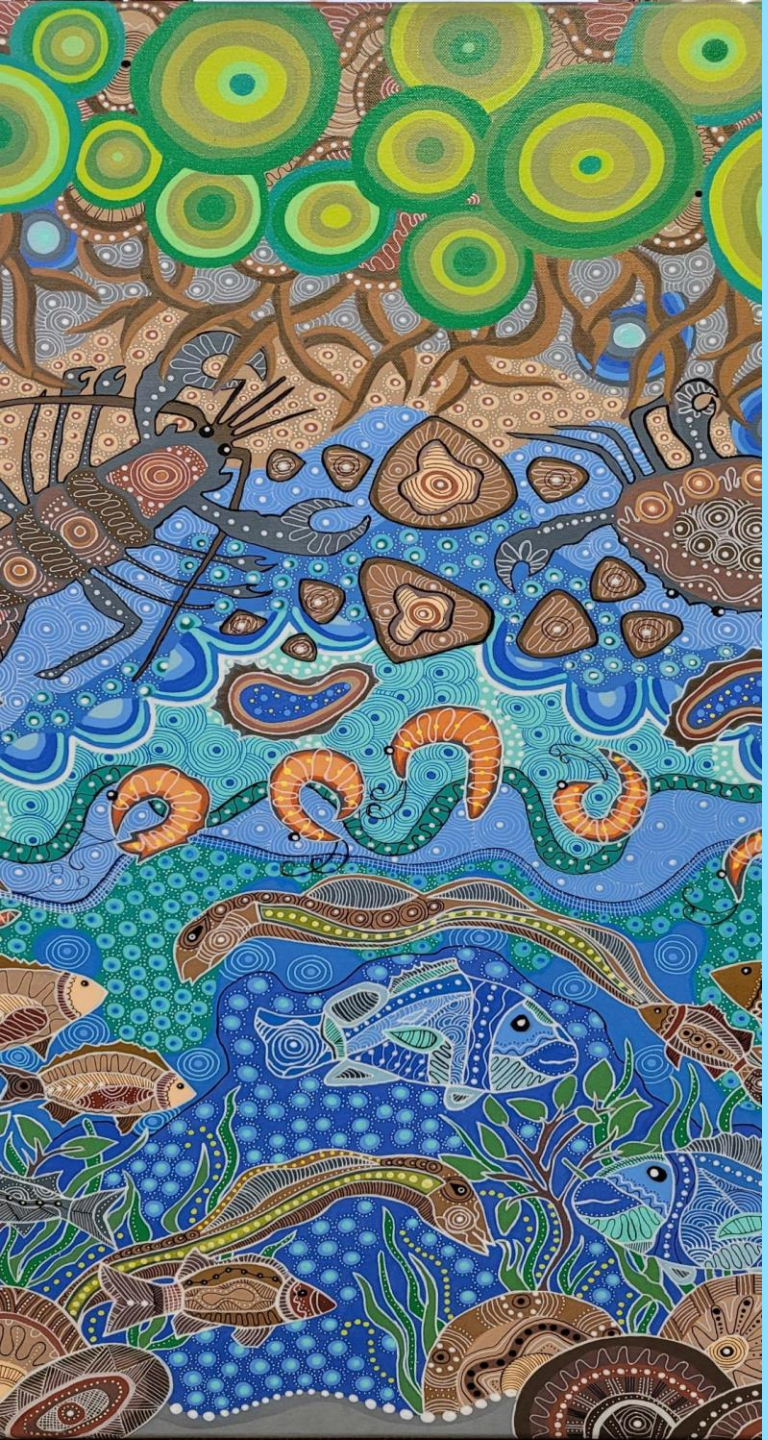
17 October 2023



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The Department of Regional New South Wales acknowledges that it stands on Country which always was and always will be Aboriginal land. We acknowledge the Traditional Custodians of the land and waters, and we show our respect for Elders past, present and emerging. We are committed to providing places in which Aboriginal people are included socially, culturally and economically through thoughtful and collaborative approaches to our work.

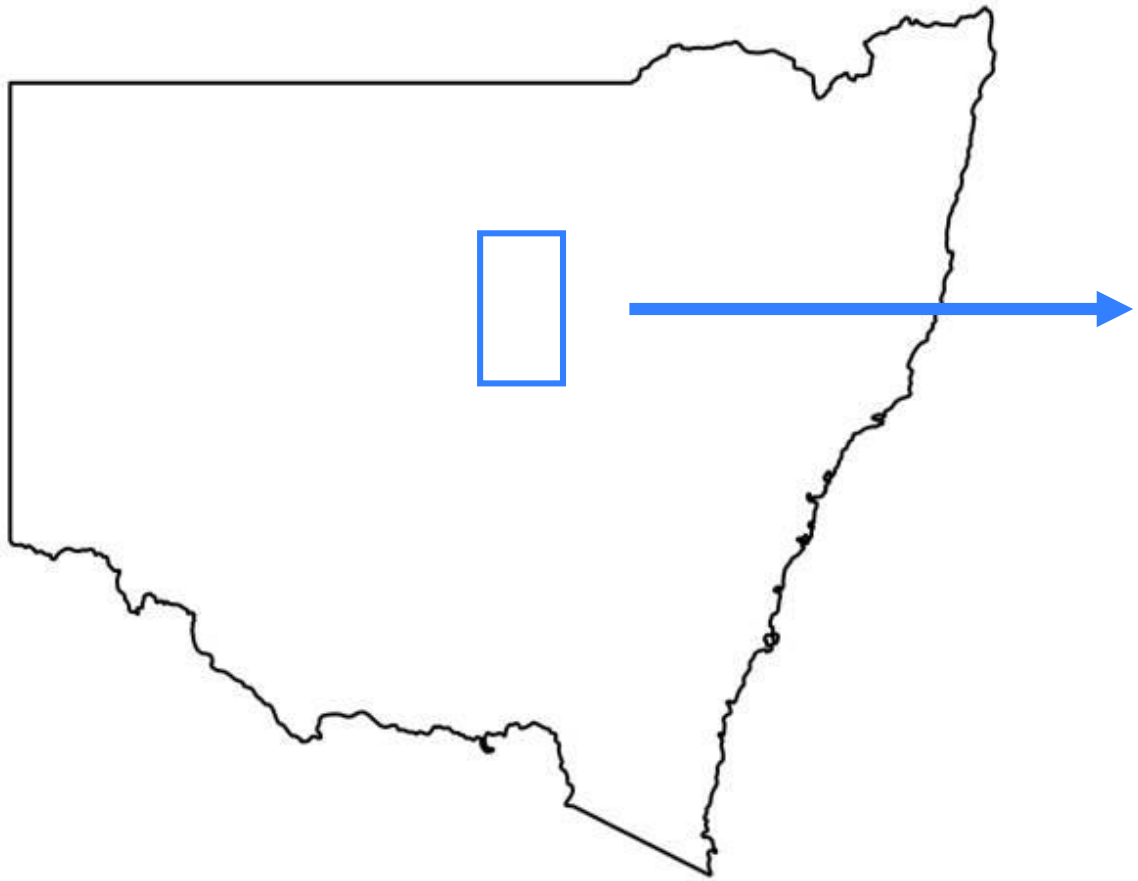
Background

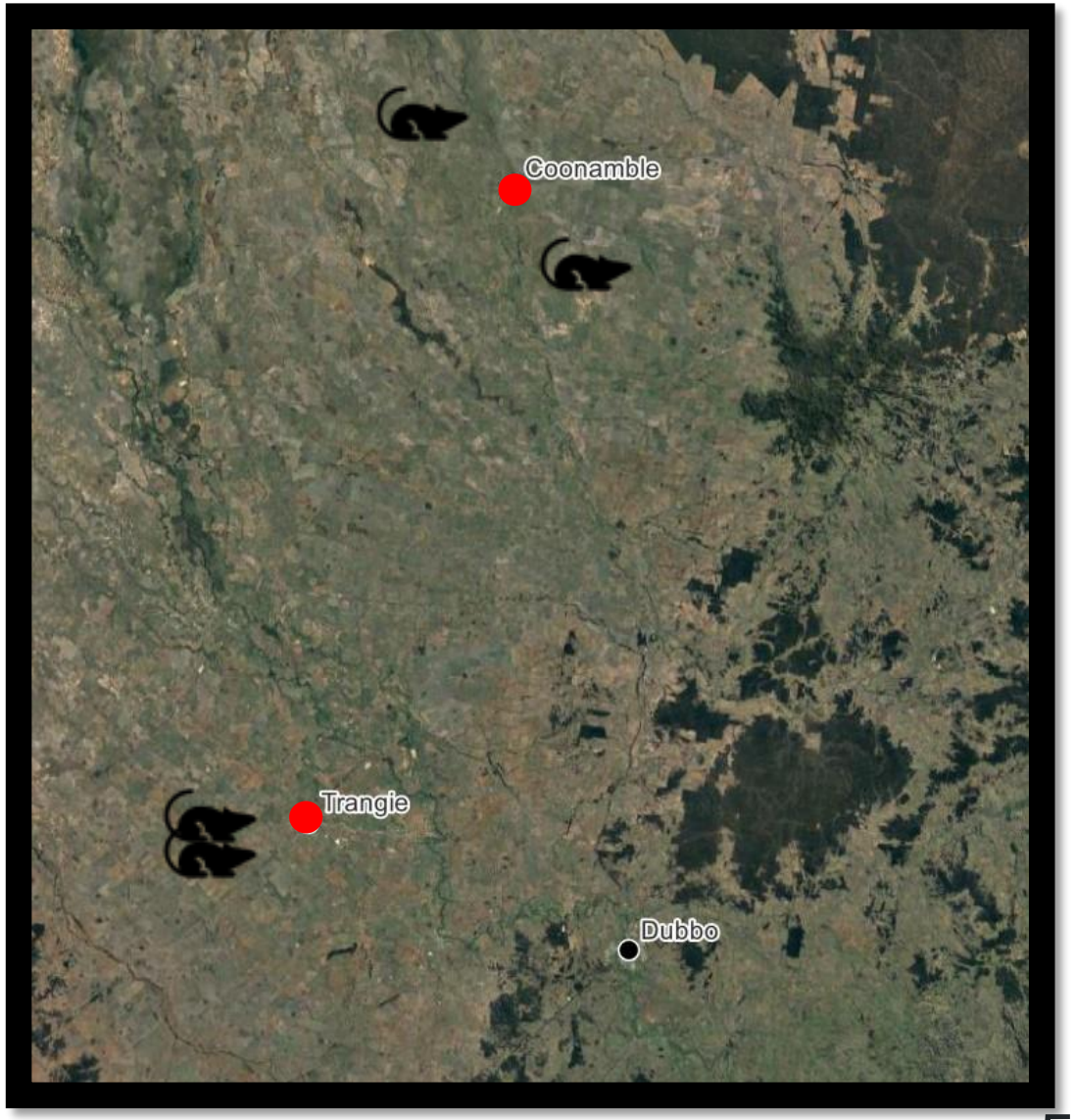
- House mice (*Mus musculus*) have economic and social impacts in Australia's grain-growing regions
- Observations during the 2021 NSW mouse plague suggested that pasture could be an important source of mice that subsequently spread into crops
- Native and mixed pastures grazing is a significant component of farming systems in northern and western NSW
  - 68% of land
  - remainder mostly dryland agriculture
- No information on the extent to which mice use, and move between, pasture and crop habitats in NSW

Project Aim

To improve mouse management in mixed agricultural settings by understanding population dynamics and movements of mice in adjacent pasture and crop habitats.

Site Locations





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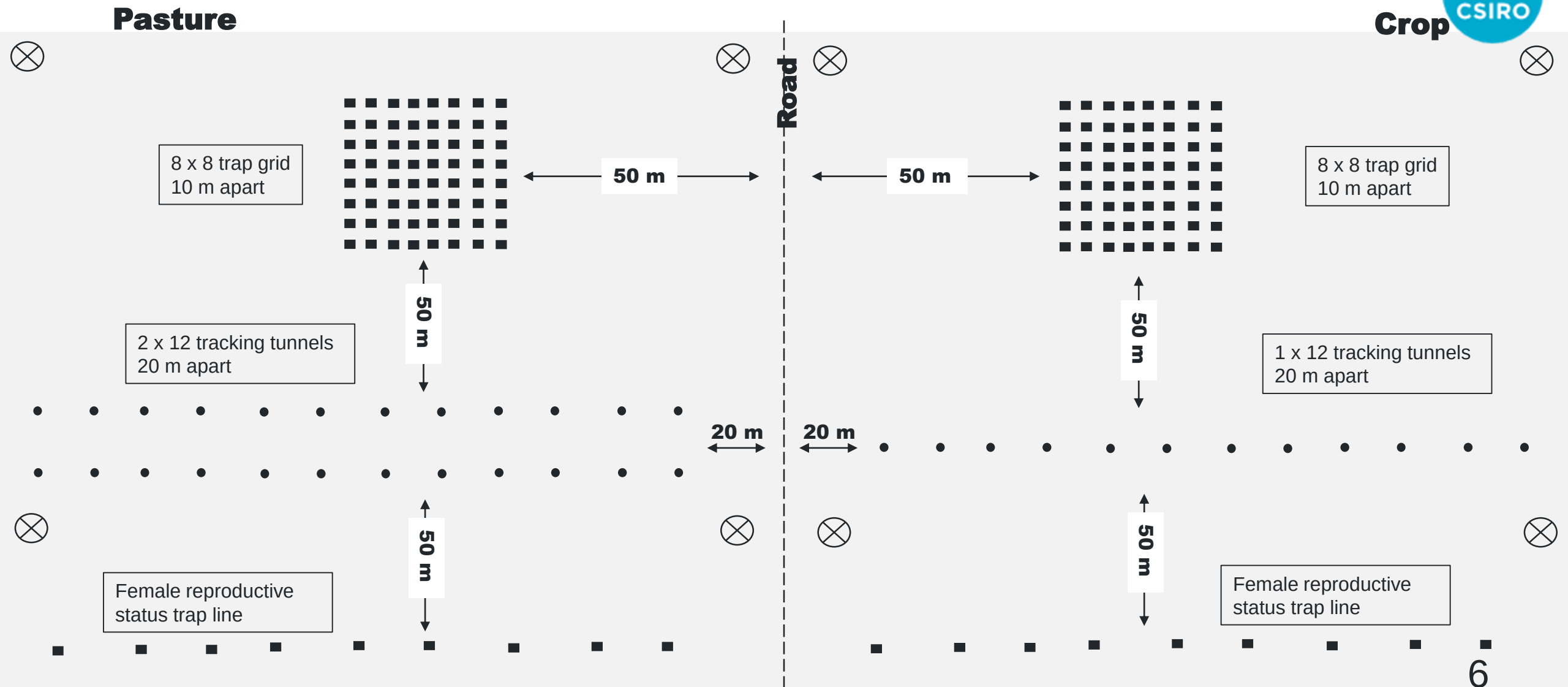
Site Set Up - Coonamble



Methods – Capture-Mark-Recapture

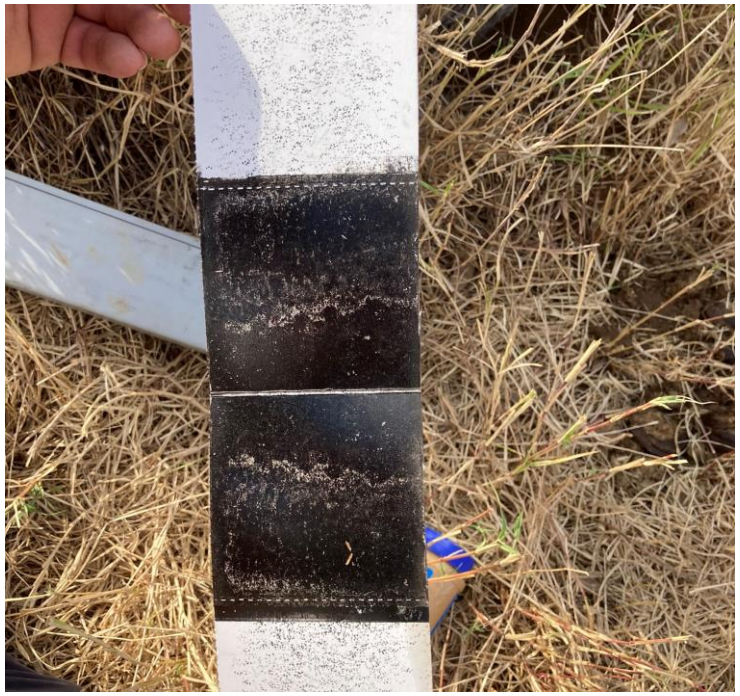
- provides a population estimate
- 1 grid of 8 x 8 Longworth traps 10 m apart in both the crop and pasture
- 5 nights in a row
- PIT tagged
- sex, weight and length recorded

Methods –Predator Cameras

- measures which predators are present and when
- 8 cameras at each site, 4 in pasture & 4 in crop
- on the outside of the study site and between pasture and crop trapping grids
- deployed for 5 nights during trapping
- baited with peanut butter, oats and honey balls and fish oil every 2 nights

Methods – Tracking Tunnels

- 2 x 12 tracking tunnels 20 m apart in pasture
- 1 x 12 tracking tunnels 20 m apart in crop
- baited with peanut butter inside tunnel
- checked and rebaited (if needed) every night for 3 nights



Methods – Tracking Tunnel Cameras

- for analysing mouse behavior in association with habitat
- deployed for 1 night at each site
- 12 cameras in pasture, 6 in crop
- camera deployed on tunnels with activity
- behavior of each mouse in every photo will be analysed

Methods – Habitat Assessments

- within 2 m^2 of every tracking tunnel we record:

1. Microhabitat type
2. Distance to habitat features
3. Distance to mouse burrow
4. Litter depth
5. Height of veg
6. % ground cover (from photos)
7. % cover of canopy (from photos)

Crop January 2023

Crop July 2023

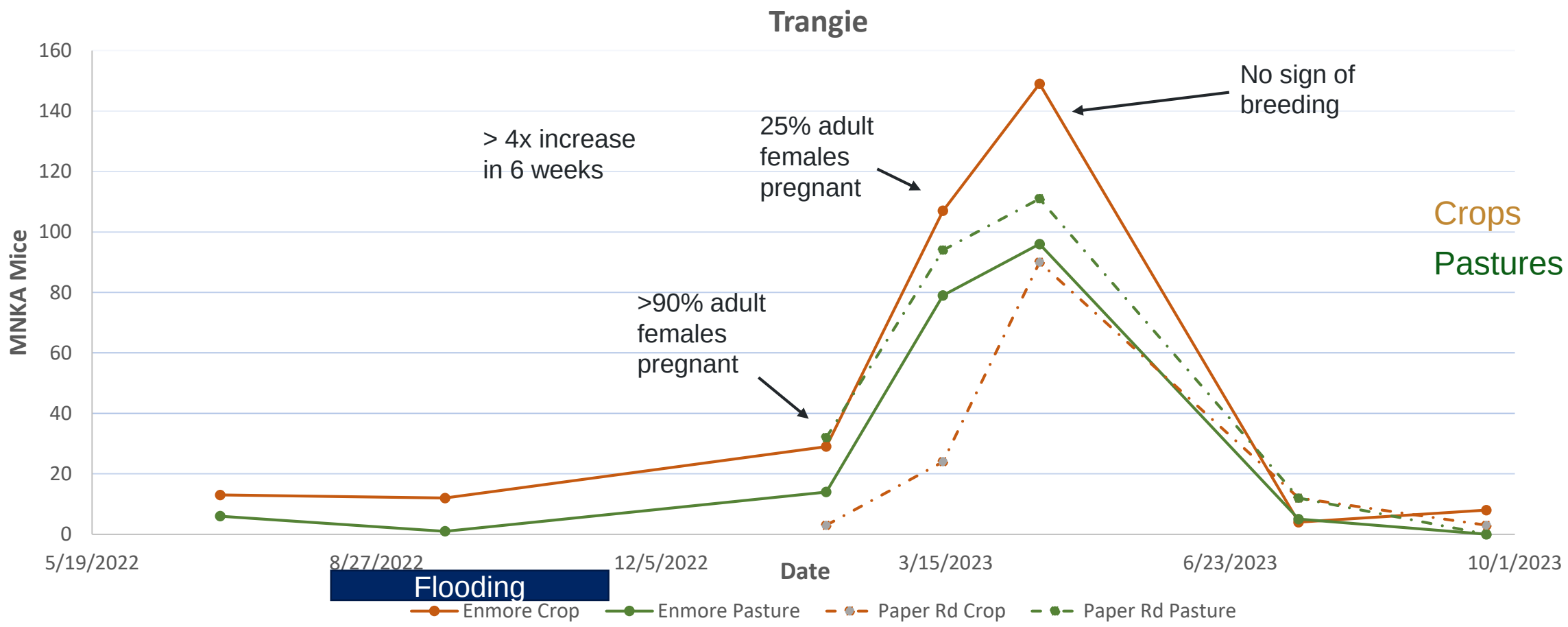
Pasture July 2023

Canopy July 2023

Methods – Female Reproductive Status

- traps are placed >100 m from our grids
- females dissected to assess reproductive status
- weight, length, uterus size, #scars, #embryos and embryo size recorded

Preliminary Results



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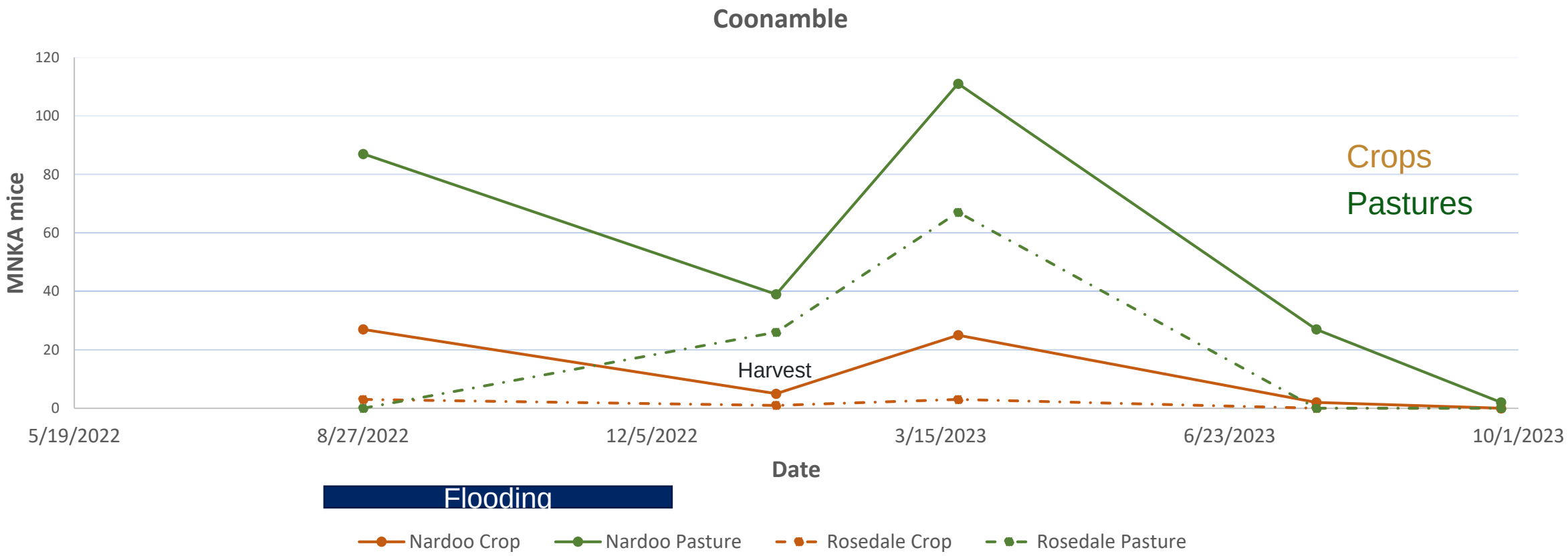

Next Steps

- Halfway through 2-year project
- Almost no mice in September
- Going into El Nino
- Where in the landscape are mice living?
  - use tracking tunnels
  - Dams, creeks, farm sheds?

Acknowledgements

- The landholders/land managers: Blake Hodgson, Fergus Lefebrve, Richard Quigley, Tim Quigley, Matt Farley, Nathan Wilson.
- Mark Lamb (Pest Lures Ltd.)
- CSIRO technicians: Freya Robinson, Cy Parker, Ryan Sarre.