Ahead of the Outbreak: Turning Field Data into Better House Mouse Outbreak Predictions

Thilina Withanage[1], Edward Green[1], Camille Buhl[1], Matthew Rees[2], Andrew Bernoff[3] , John Maclean[1]

[1]Adelaide University | [2]Commonwealth Scientific and Industrial Research Organisation (CSIRO) | [3]Harvey Mudd College, USA

AAGI Analytics for the Australian Grains Industry

" It's like a decaying body "

— Australian farmers battle mouse plague (Reported by Lana Lam, BBC News, 30 May 2026)



Figure 1. Mouse plague. *(Source: CSIRO, CC BY 3.0. Available at: http://www.scienceimage.csiro.au/image/3790)*

1. Why Predict House Mouse Outbreaks ?

Australia's grain industry faces significant economic risks from house mice, making timely predictions of their location, and severity essential for effective pest management.

AU $100 Million

Estimated losses from the 2021 NSW mouse plague (Okello et al. (2026))

2. The Research Challenge

- **Key challenges**: Incomplete monitoring data and complex pest population dynamics make outbreaks difficult to predict.
- **Research aim**: Develop a statistical framework that combines field observations, environmental data and biological processes to improve outbreak predictions.

3. How Will We Do It ?

Data Integration → Statistical Modelling → Integration with Mechanistic Models

4. Current Progress

Estimating mice abundance

↓

Live-trapping survey

Individual Marking	No Individual Marking
More Effort	**Less Effort**
Individual-Level Capture Histories (More information)	Aggregate Count Data (Less information)
Capture-Recapture (CR) models	N-Mixture (N-Mix) models
Estimate $_{CR}$ (More Accurate)	Estimate $_{N\text{-}Mix}$ (Less Accurate)

Adjustment factor between models



Figure 3 : Longworth live-capture trap

5. Simulation Results



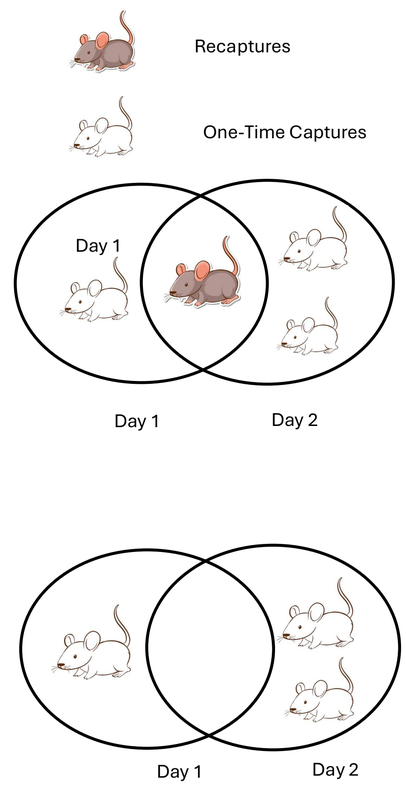
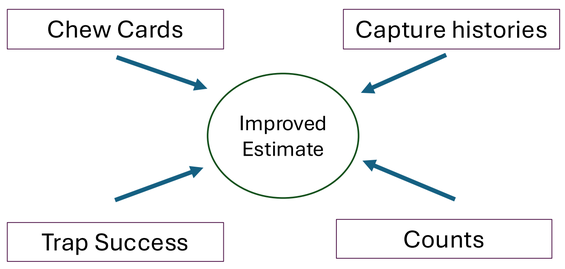


Figure 2 : Comparison between estimates (Simulation settings : Mean abundance (λ) = 300 , Maximum population size = 1000,Capture occasion = 8, Number of sites = 20**,** capture probabilities (p) = 0.1, 0.01)

No recaptures → Lower capture probability estimates → Unreliable population estimates

6. What's Next ?



7. Future Directions and Industry Impact

- **Mice:** Estimate abundance over time to examine the seasonal changes using actual data.
- **Potential extension to the Australian Plague Locust**
- Enable earlier intervention and reduce crop losses across the Australian grain industry.

References

- Lam, L. (2026, May 30). ['It's like a decaying body': Australian farmers battle mouse plague]. BBC News. https://www.bbc.com/news/articles/c794g80lw74o
- Okello, W., Collins, K., Mankad, A., Carter, L., & Brown, P. R. (2026). A multi-dimensional assessment of the 2021 mouse plague in New South Wales, Australia: Economic impacts and policy responses. PLOS One, 21(4), e0338405

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