2022 FLYSTRIKE RD&E

TECHNICAL FORUM

Modelling of blowfly chemical resistance

Narelle Sales – NSW DPI

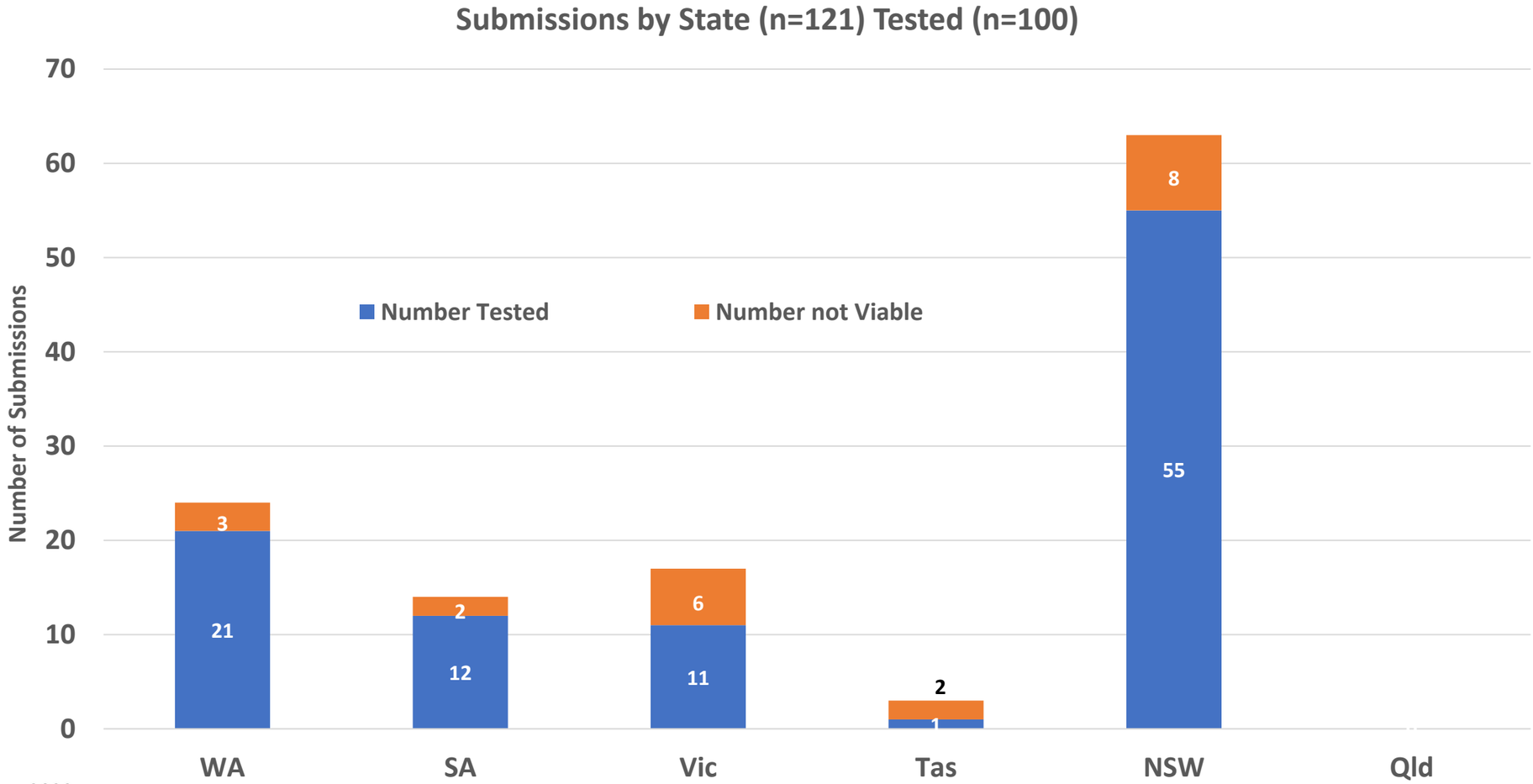
10 August 2022

Department of Primary Industries
Department of Regional NSW

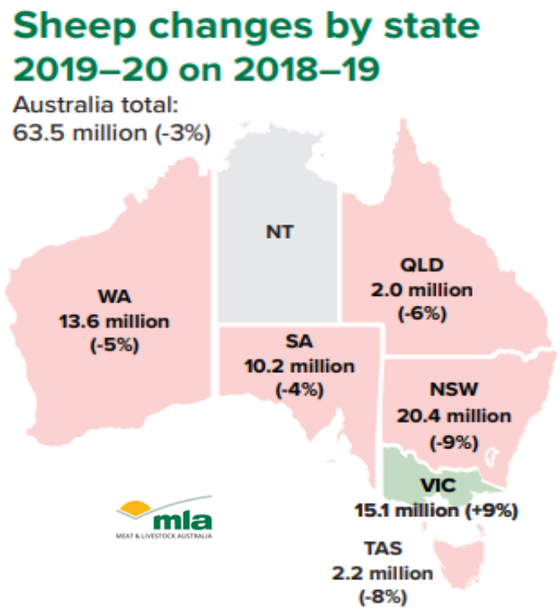
Modelling of Blowfly Chemical Resistance.

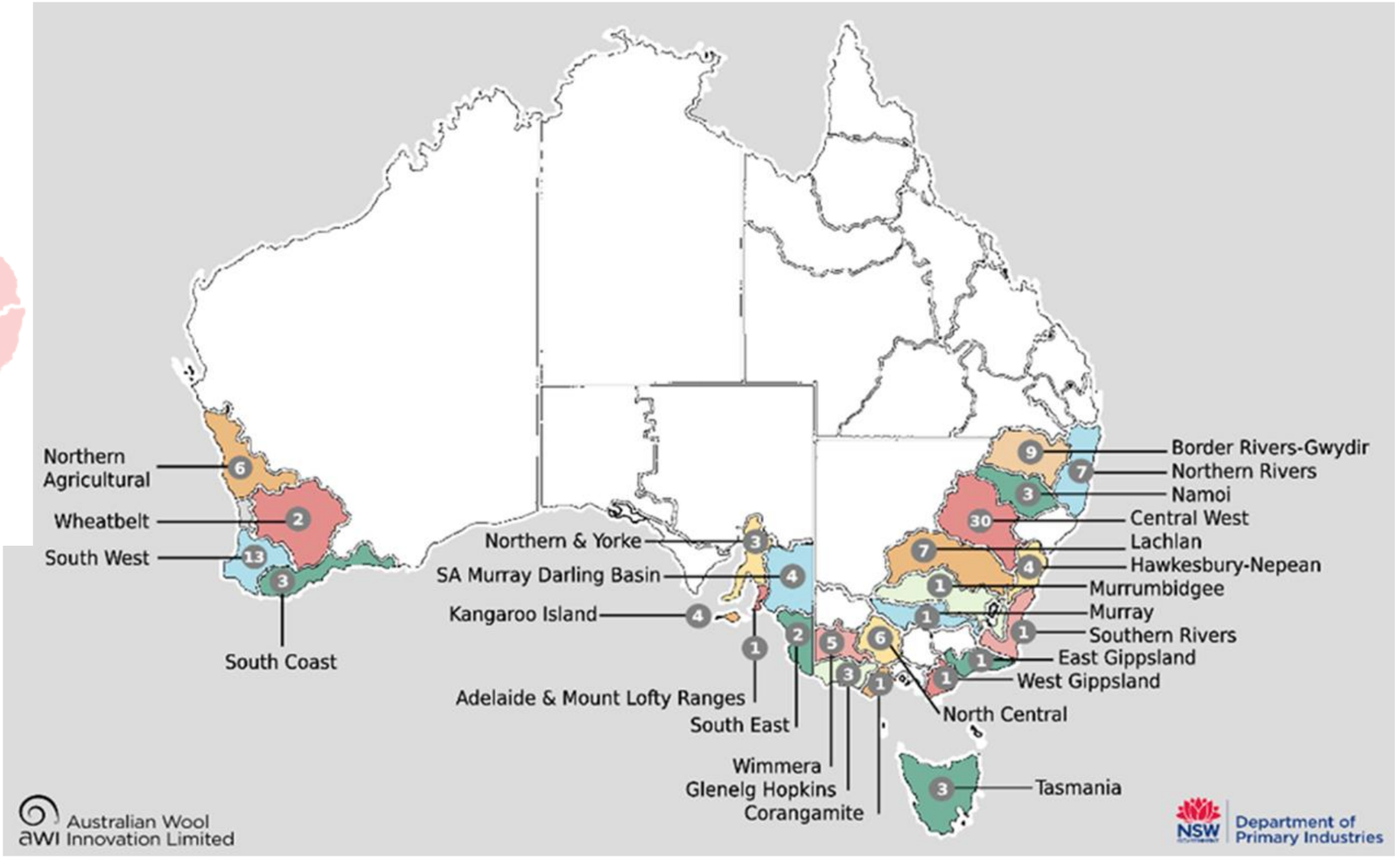
- **Ectoparasite Insecticide Resistance Update – 2018/20.**
- **Flystrike - Insecticide Multi- Resistance – 2022/24**

2018 - 2020 Project – Submission by State - Viable and Non-Viable



2018-2020 Project – Submissions by NR Regions

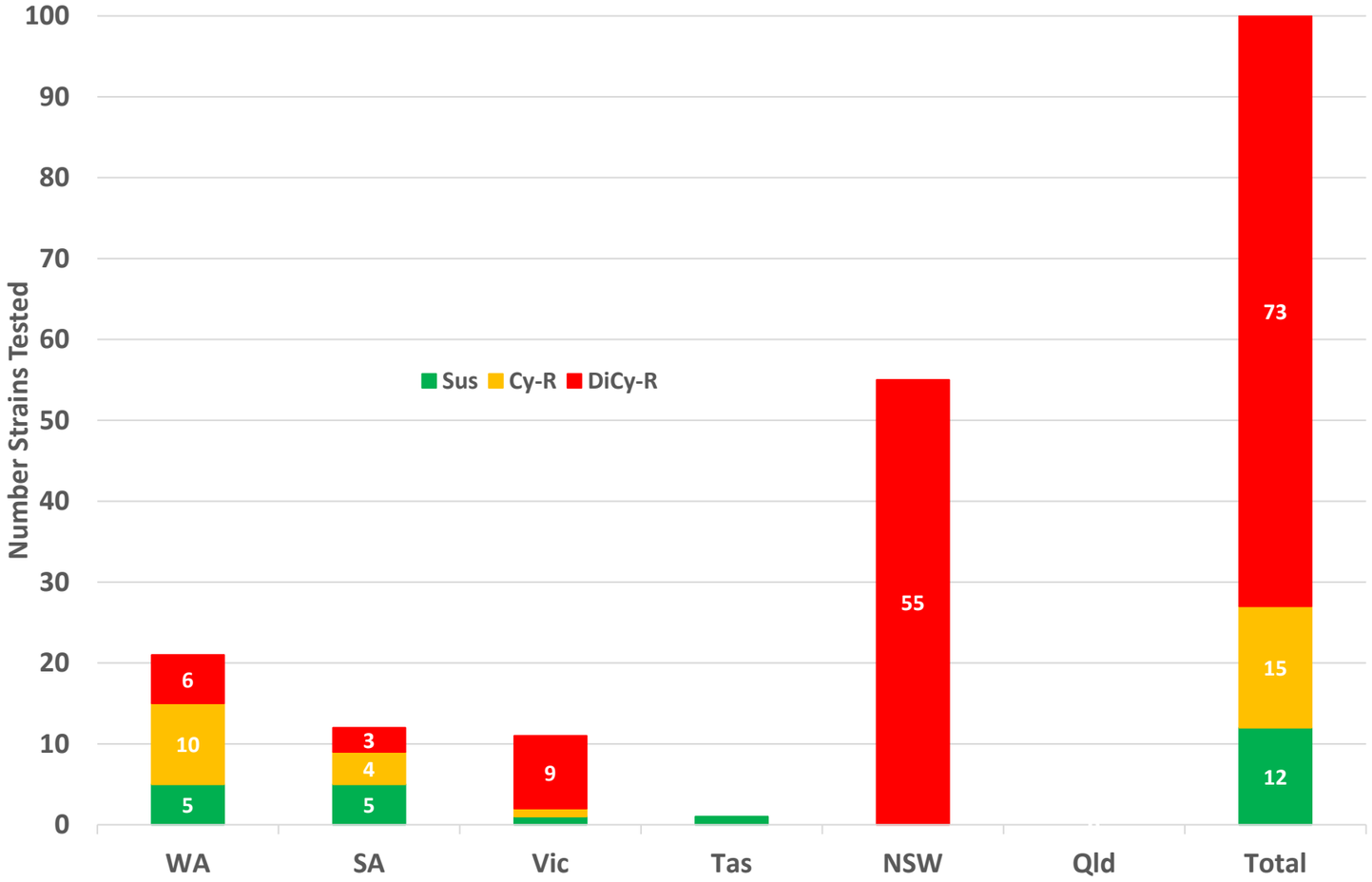




2018-2020 Project - Registered Insecticides for Flystrike Prevention and Control

N°	Chemical Group	Chemical Name	Example Product	Application Technique	Protection -Label Claim	Used against Lice	Resistance ?	
1	Organophosphate (OPs)	Diazinon	Coopers® Diazinon	**Dressing**	-	Yes Temephos (Coopers® Assassin) Dip	**YES**	✓
		Propetamphos	Young's DeadMag®	**Dressing**	-			
		Chlorfenvinphos	Defiance S®	**Dressing**	-			
2	Insect Growth Regulators (IGRs)	Cyromazine	Vetrazin®	**Spray-on** **Jetting**	Up to 11 weeks Up to 14 weeks	NO	**YES**	✓
		Dicyclanil	Clikzin® Clik® ClikExtra®	**Spray-on**	Up to 11 weeks Up to 18-24 weeks Up to 29 weeks	NO	**YES**	✓
3	Macrocyclic Lactone (MLs)	Ivermectin	Coopers® Blowfly and Lice	**Jetting/Dip** **Dressing**	Up to 12 weeks	YES	**NO**	✓
4	Spinosyn	Spinosad	Extinosad Eliminator™ Extinosad™	**Jetting/Dip** **Dressing** **Aerosol**	Up to 4-6 weeks -	YES	**NO**	✓
5	Neonicotinoid	Imidacloprid	Avenge + Fly®	**Spray-on**	Up to 14 weeks	YES	**NO**	✓
6	Synthetic Pyrethroid (SPs)	α- Cypermethrin	Vanquish®	**Spray-on**	Up to 10 weeks	YES	**NO**	✗

2018-2020 Project - Cyromazine and Dicyclanil Resistance Status by State



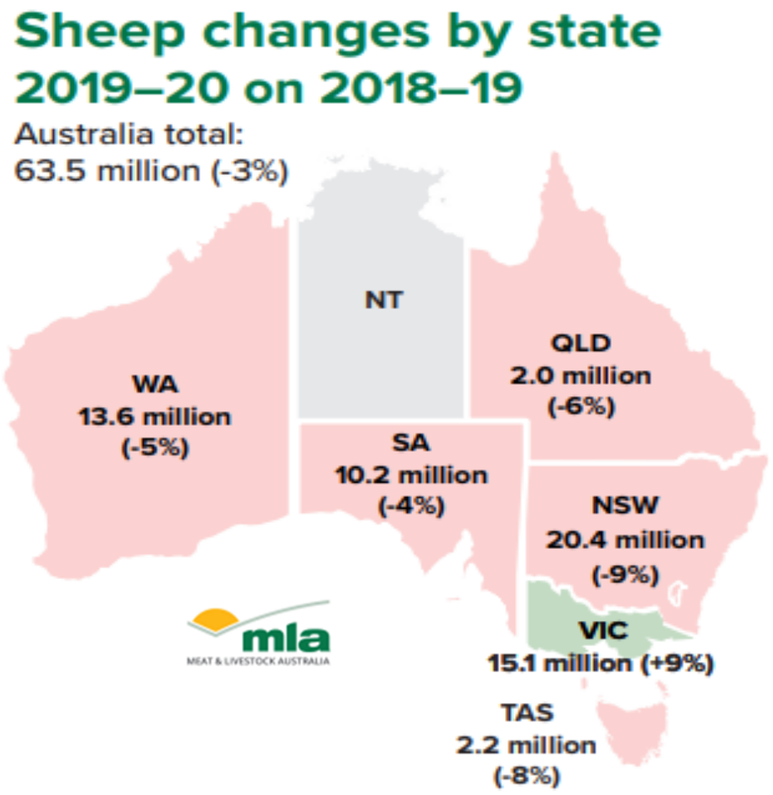
2018-2020 Project - Highest Levels of Associations between Insecticides by Cyromazine and Dicyclanil Resistance Status.

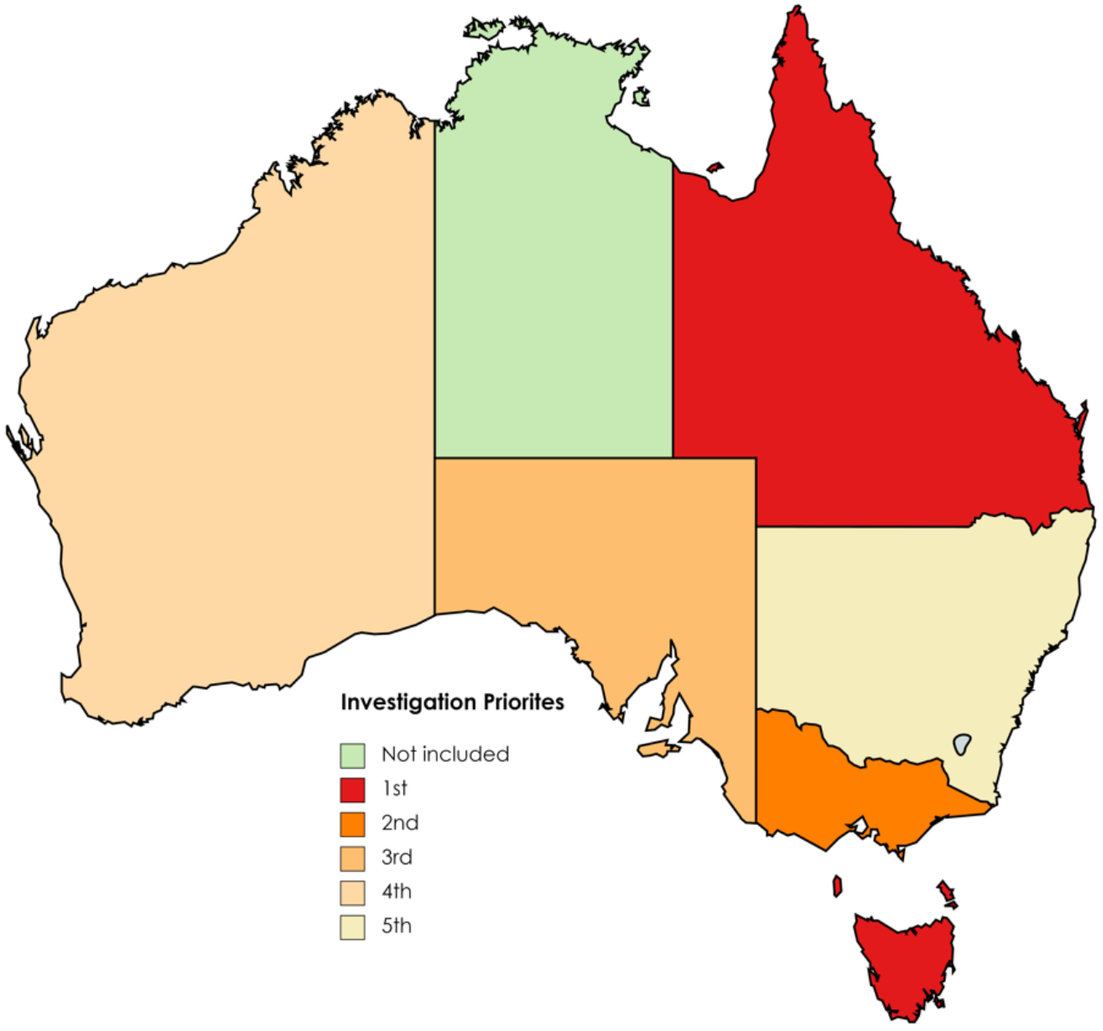
Strains	Insecticide 1	Insecticide 2	Pearson's Coefficient (r value)	Significance (p <0.05)	*n*
D&C Susceptible	Imidacloprid	Diazinon	0.64	0.009525	12
Cyromazine R only	Imidacloprid	Ivermectin	**0.87**	**0.000019**	**15**
Dicyclanil R - Low	Imidacloprid	Ivermectin	0.59	0.02178	25
Dicyclanil R - Med	Ivermectin	Diazinon	0.54	0.0142	20
Dicyclanil R - High	Imidacloprid	Spinosad	0.45	0.0150	28
Dicyclanil R -ALL	Imidacloprid	Diazinon	0.41	0.0003	73
ALL Strains	Imidacloprid	Diazinon	0.53	0.0418	100

The Pearson product-moment correlation coefficients calculated to determine associations between the susceptibility of strains to two insecticides. Results supplied for $p<0.05$.

$0 < r < 1$ as r becomes less than 1 the data is less well represented by a single linear relationship.

2022-2024 Project – Investigation Priority by State





Summary – Information required

Source: iStock

- **Information Gaps**
  - **Targeting** underrepresented states, regions and areas for submissions
    - **Determine** the presence and level of resistance

  - **Multi resistance or associations between insecticides –**
    - **Determine** toxicological response of strains to each insecticide group.
    - **Increase representation of** susceptible and cyromazine-only resistant strains.

- **History of insecticide usage and the development of resistance –** (UoM Gene flow)
  - **Metadata collection** (UTAS Modelling validation and forecasting).

- ***In vitro* investigation and effects on resistance of**:
  - **Mixtures** as commonly used in drenches – (also in UTAS Modelling)
  - **Best practice** – dressing (chemical group A) followed by prophylactic treatment (chemical group B)

Informed Integrated Resistance Management and Advice Based on Data and Modelling