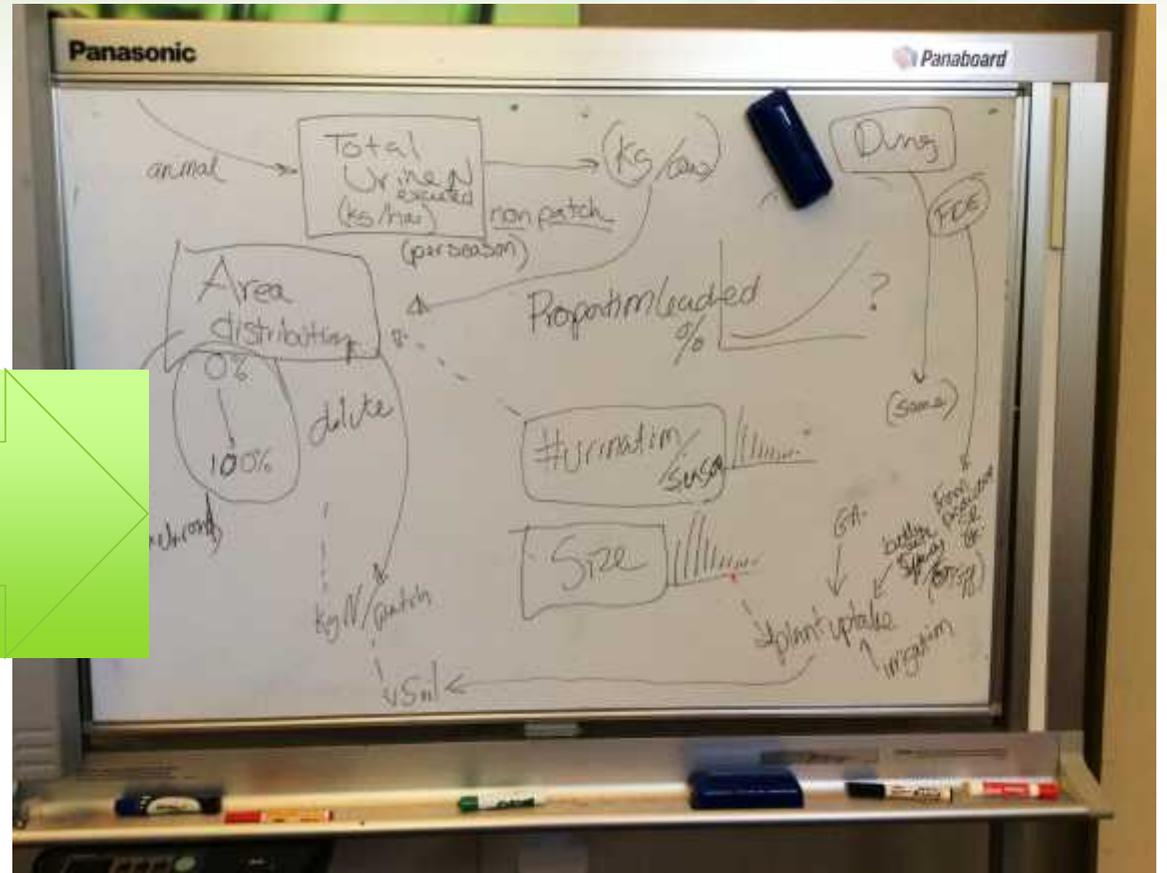




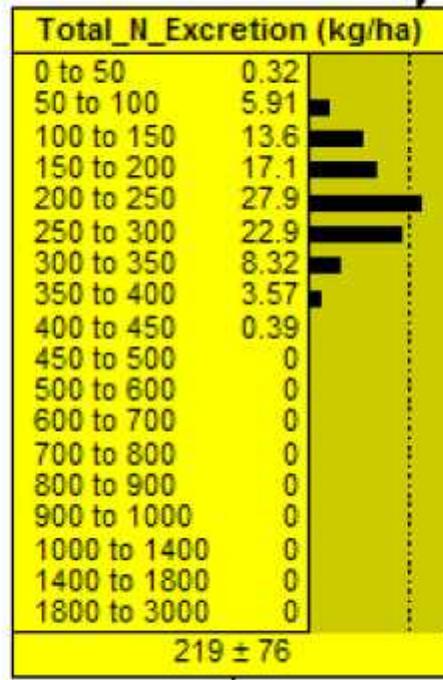
Building a Bayesian Network to Identify Key Intervention Points for Improving Nitrogen Efficiency in New Zealand Dairy Farm Systems

Gina Lucci, **Cecile DeKlein**, Vicki Burggraaf, Diana Selbie and David Pacheco



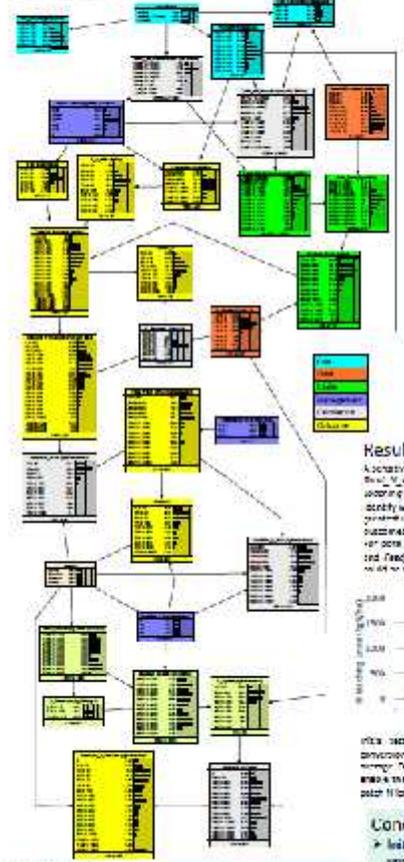


Poster #81



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Introduction

- One of the main goals of dairy systems is to increase nitrogen (N) efficiency and reduce N loss, requiring integration of component research into the whole farm system.
- AgResearch has been a leader in research in this area, generating a large body of research evidence on various models and whole system level research.
- The dairy farm system is a complex system, and the challenge is to integrate the various research outputs into a model that can be used to guide the development of future strategic and technological.

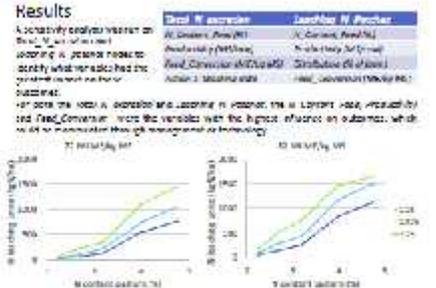
Methods

Network Development (based on a review of 1000)

- Identified key variables and relationships, and generated a preliminary network.
- Used the data and developed the structure and nodes, and identified relationships and controlling factors, and identified the key variables.
- Used the software NCTICA (New Zealand Dairy Research Centre) software. Where possible, deterministic relationships (i.e. equations) were used to develop the network, probability tables and nodes were used for the 'Discrete Table' function in NCTICA.

Network description

The network is a causal model, showing the relationships between variables, and the flow of information from the variables to the outcomes. The network is a causal model, showing the relationships between variables, and the flow of information from the variables to the outcomes.



Initial testing of the model showed that the influence of feeding rate (kg DM/cow) and feed conversion (kg DM/kg liveweight) on total N excretion (kg/ha) was significant. The model showed that a 10% increase in feed conversion (kg DM/kg liveweight) would result in a 10% decrease in total N excretion (kg/ha). In fact, there would likely be a decrease in N excretion from 100 to 120 kg/ha.

Conclusions

- Initial results show that this model can be a valuable tool for understanding how elements of the dairy system fit together and their relative importance to overall N loss.
- While the outcomes of the model may not be surprising, the modeling approach allows for accuracy and variability, inherent to a pastoral system, and presents the outcomes as a distribution of probable values.

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