Project Update

P2f: Infectious Diseases

December 2025

Diagnosing scours and respiratory diseases in calves

This project determined the occurrence and spread of viruses and bacteria in NSW dairy herds. The findings provide a foundation for tools to help farmers and vets monitor and treat diseases such as scours and respiratory disease.

Scours and respiratory diseases are common causes of death in young calves. On-farm, calves with scours or respiratory disease are often treated on the basis of symptoms, without identifying the microbe responsible.

This project built a genetic catalogue that can be used by diagnostic laboratories to improve their capacity for diagnosing pathogens causing disease and determine the most appropriate treatment.

This project is closely linked with Dairy UP's P2b project – Early Alerts.

Unlocking the potential of cows

Dairy UP's P2 project aims to unlock the potential of dairy cows to achieve their genetic potential under NSW conditions.

P2 is a suite of seven projects that collectively explore ways to profitably increase both productivity and wellbeing in commercial settings.

P2a: Cattle Longevity: Age and Parity & Intensive Herds*

P2a: Longevity: Future*

P2b: Early Alerts*

P2c: Milk as a Diagnostic Tool*

P2d: Facility Design for Cow Comfort *

P2e: Calf husbandry*

p2f: Infectious Diseases ('Infectome')

This document provides an update on P2f: Infectious Diseases.

Benefits

Early treatment, with the correct therapy is a critical step in avoiding the unnecessary use of antibiotics and preventing antimicrobial resistance.

Although this work focussed on calf scours and respiratory diseases in NSW dairy calves, the findings have the potential for broader application. For example, the diagnostic tools developed may be relevant to dairy regions outside NSW.

The findings also enable early identification of new microbial variants or non-local variants that may have a significant impact on the industry.

This may be increasingly important in a future with extreme weather events as the ecological imbalances in the environment resulting from these weather events is predicted to further affect the occurrence of infectious diseases.

Research approach

The research team used an approach called "metagenomics" to sequence and create a reference database of bacteria and viruses found in NSW dairy cattle. They worked with 72 dairy farmers from all of NSW's dairying regions, collecting nasal and faecal swabs from sick and healthy calves. The bacteria and viruses detected in the swabs were sequenced to identify specific 'strains' of bacteria or viruses that cause more severe disease than others and therefore guide the focus for disease control.

A second part of this study was to characterise *E. coli*, one of the most common causes of infection in animals and humans. This expanded knowledge of the different genetic types of bacteria that infect calves, and the presence of antimicrobial resistance.

In early 2023, the team received an additional $434k in funding from the Australian Research Council's Linkage scheme. This funding was being used to expand the work on microbial surveillance to develop new tools for diagnosing causes of scours and respiratory disease in dairy calves.

On farm monitoring

The Dairy UP team visited the 72 collaborating farms to collect nasal and rectal samples from calves up to 7 weeks old, including all sick calves and up to 10 healthy calves. In addition, samples were collected from up to 10 cows, that had calved within the past 50 days.

Participating farmers were also asked to fill in a survey to gain insights into relevant management practices such as management of colostrum, bedding materials, nutrition, and calf rearing management. Survey responses were received form 52 of the farms.

Sequencing

About 1900 nasal and rectal swabs were collected from sick and health animals on the collaborating farms. These samples were sequenced to identify microbes present.

Key findings

The study identified viruses, bacteria and parasites in the samples collected. These provide new insights into our understanding of causes of calf diseases, better ways to diagnose the bugs involved with disease and vaccine developments.

Viruses

Rotavirus

One of the key findings was that Rotavirus A was found on almost all farms including some with vaccination programs.

Most calves were affected by genotypes G6 and G10, which are both included in currently available vaccines. We need to further investigate if there are genetic differences within the genotype that may compromise the vaccine efficacy.

New viruses

The study also identified a range of viruses that were not previously thought to be common on NSW dairy farms. Here are some examples.

- The relatively recently discovered, Kobuvirus was present on most of the farms tested.
- Adenovirus (not usually tested by labs) was present on half of all farms.
- Rhinitis A and Rhinitis B are potentially important causes of respiratory disease.
- Pestivirus was found on 17 different farms.

The dominant virus was different in calves of different ages. For example, Kobuvirus was most prevalent in calves up to 2 weeks of age while rotavirus was more common in calves over two weeks old.

The team prepared a series of fact sheets, collating current knowledge about 11 diseases for farmer and vets.

Bacteria
The team often detected genes known to be used by bacteria to cause disease. These genes are commonly found in *E. coli* and Campylobacter (associated with sours).

Most farms had Mycoplasma (associated with respiratory disease) but Mannheimia and Moraxella were the ones most often associated with disease.

Parasites
The study identified several parasites associated with scours in calves: Cryptosporidium ("Crypto"), Entamoeba, Giardia and Coccidia.

Implications of findings

The results challenge some current beliefs about Rotavirus, salmonella and pestivirus.

Rotavirus
While the findings support routine vaccination for rotavirus, logistical issues can compromise its effectiveness and farmer confidence in the value of investing in vaccination.

Vaccinated cows pass antibodies to their calves through colostrum. An annual booster, given about six weeks before calving is required to ensure maximum colostrum antibody levels. This vaccine is sold in multi-dose vials with a limited shelf life once opened. This can pose a challenge in year-round calving herds where only a small number of cows calve each week. The cost per dose becomes prohibitive if the whole vial can't be used before expiry. The alternative is to use all the doses, which involves vaccinating some cows outside of the optimum timing.

Scours is recognised as having multiple causes and not all of the potential pathogens are covered by the rotavirus vaccine. Until now some vets have been hesitant to recommend vaccination, uncertain that the vaccine covered the key culprits.

Salmonella
In the past, Salmonella has been considered an important microbe in calf scours and respiratory disease but no Salmonella was detected in this study.

Pestivirus
Pestivirus A was found on 17 farms in the study, with most possessing the 1c genotype, some with the 1a and 1b genotypes. The presence of even a single clinically sick animal should not be ignored, as it may signal a persistently infected animal circulating within the herd. A single case carries the risk of significant economic losses due to reproductive failure, calf mortality, immunosuppression leading to increased respiratory disease and overall ill-thrift, resulting in chronic production losses such as reduced milk production and increased culling rates.

PhD students

Two PhD students enrolled at the University of Technology Sydney (UTS) are working on the project.
Zain Ul Abedien
Aleksandra 'Ola' Stanczak

Collaborators

The P2f project was a collaboration between researchers from Dairy UP, UTS, NSW DPI Elizabeth Macarthur Agricultural Institute, Scibus and the 72 participating dairy farms.

Read more

Fact sheets
Bovine Norovirus factsheet
Bovine Parechovirus factsheet
Bovine Picornaviruses factsheet
Bovine Rhinitis A & B factsheet
Bovine Toravirus Breda factsheet
Bovine Adenovirus factsheet
Bovine Enterovirus factsheet
Bovine Giardiasis factsheet
Bovine Hunnivirus factsheet
Bovine Kobuvirus factsheet
Bovine Nebovirus factsheet

Bovine Pestivirus infection, NSW DPI primefact sheet

Abstracts ADSA meeting, 2025

- Brito et al, The enteric and respiratory viral diversity of calves in health and disease – a state-wide study.

DairyUP
Unlocking potential

- Kida et al, Genetic diversity of Bovine Rotavirus in Dairy Calves with and without diarrhoea in New South Wales, Australia.
- Abedien et al, Microbial diversity in dairy calves: an insight of the resistome and virulome in health and enteric disease.
- Brito et al, Untargeted meta-transcriptomic methods to characterize the enteric infectome of calves with and without diarrhea.
- Brito et al, Expression of virulence factors and antimicrobial resistant genes in total RNA sequenced from rectal swabs from diarrheic calves.
- Brito et al, The respiratory infectome of dairy
- calves characterized by a total RNA sequencing approach.

Project lead

Dr Barbara Brito Rodriguez, DPIRD NSW (EMAI)
email: barbara.britorodriguez@dpird.nsw.gov.au

Delivery organisations

The University of Sydney Dairy Research Foundation | NSW Department of Primary Industries | Scibus | Dairy Australia

Partner organisations

nsw Growing the best | eastAUSmilk | Dairy NSW | Dairy Australia | AFMH | Leppington Pastoral Company Pty Ltd | NSW Local Land Services | Norco

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