VET- line

Winter 2022

There's always room for improvement

1,000,000 Samples!

New Zealand farmers on the attack against Johne's Disease as LIC's laboratory surpasses 1 million samples in one season!

JD testing demand is clearly increasing year-on-year, suggesting the prevalence (or at least the awareness) of the disease is at an all-time high. Testing through LIC has increased by more than 300 percent since 2016, with 60% of submitted samples coming from South Island farms.

Of the samples tested in the year to 31 May 2022, more than 30,500 sub-clinical Johne's-positive animals were identified.

And an incredible 98% of the herds processed by LIC's Riverlea laboratory returned positive cases this season (i.e. just 2% of herds returned no JD-positive cows at the time of the test).

Identifying subclinical animals, and removing them from the herd, is an important first step in the toolbox for managing JD on farm.

The JD test is done on herd test milk samples, with results categorising cows based on the level of JD antibodies detected in the milk. Categories include:

i) high-positive;

ii) positive;

Heads-up: JD is perhaps more prevalent on New Zealand farms than many in the dairy industry might think.

iii) suspect;

iv) no antibodies detected.

LIC data suggests that farmers who have tested their herds routinely for a minimum of three seasons may have a lower prevalence of infection than farmers who have tested for the first time.

This indicates that the test, in conjunction with other on farm management practises, helps successfully reduce the level of JD infection on farm.

JD is caused by the bacteria Mycobacterium avium subspecies paratuberculosis (MAP), and is a chronic, contagious disease that affects ruminant animals.

Symptoms include wasting and diarrhoea, which can eventually lead to death.

As well as testing for JD in herd test samples, LIC offers a test of the farmer's effluent to determine whether MAP exists on-farm; if so, there may be subclinical animals within the herd spreading high numbers of bacteria.

For more information on JD tests contact LIC's Animal Health Advisor team on 0800 436 362.

SELECTION ACCURACY!

Farmers Can Now Better Their Breeding Odds by Getting the Low-Down on Their Heifers' Genes

The chances of farmers keeping the best-possible replacements to breed and milk from just got better.

LIC's recently launched *Genomic Evaluation Service* for female animals allows farmers to capitalise on the most-reliable picture to date of a cow's lifetime performance, by including its own DNA information within the animal evaluation calculation.

The science provides a significant boost to the reliability of the animal's predicted breeding and production values, making for better-quality herd management decisions – which can be made earlier in the cow's life.

For example, the leading-edge technology allows the opportunity to breed from high genetic merit animals earlier, helping the farmer to increase the rate of on-farm genetic gain. The genomic evaluation service is also likely to be used as a key tool by farmers wanting to produce more milk from fewer cows.

Until now, animal evaluations have relied upon an assumption that a calf will receive an average set of genes from each parent.

In reality, however, new-borns will possess a random mix of genes from both parents – some genes will be better, but some genes will be worse.

By adding an animal's DNA information to its evaluation, the reliability of its breeding values increases from an average of 30-35% (parent-average assumption) to approximately 60%.

The higher the reliability, the closer the breeding value will be to the animal's true genetic merit.

The inclusion of the animal's genotype in its initial evaluation therefore provides a more-robust understanding of which genes the animal has inherited from its mother and father, and the animal's likely performance can be better-assessed prior to it entering the milking herd.

The table at the bottom of page three (opposite page) shows how an animal's breeding values can deviate from its parent average once its DNA information is added to the evaluation.

In this case, the animal's DNA information indicates that, overall, she is significantly better than her parent average.

Some breeding values will go up and some will go down, but it's the increase in reliability that is key (note the difference in trait reliabilities in this example).

LIC uses the same technology to select elite young bulls for its breeding programme, and has spent a number of years developing and fine-tuning the genomic science; this includes investment of advanced in-

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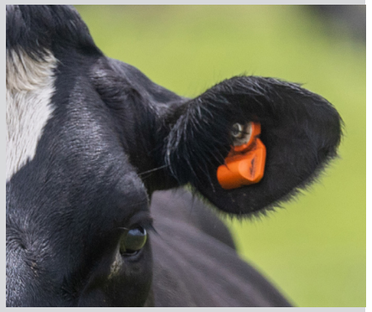
Cow wearable technology

bringing Kiwi farmers closer to their cows



Northland farmer Terence Brocx states there are only a few things he wouldn't farm without: a front end loader, a motorbike, and now, his CowManager wearable device.

This seems to be the view echoed around the country as the interest and on-farm use of cow wearable devices continues its rapid growth.

The rich source of real time cow data being picked up by wearables such as collars, smart tags and boluses is now feeding back into MINDA thanks to recent development allowing the integration of such devices. This has opened a whole range of new opportunities on farm, with greater data allowing for more evidence-based decisions in the palm of the user's hand.

With a shrinking pool of skilled farm labour, picking and maintaining heats can become increasingly difficult towards the end of mating as fatigue starts to set in. Missed heats, poor submission rates and a decreased 6 week in calf rate being the ultimate price of this.

Cow wearables allows a farm to extend or to go all AB which can lead to more precise breeding choices without the need to bring bulls onto the farm at the end of AB.

The new MINDA integration which can be easily set up on farm via the MINDA App enables heat alerts coming from wearable devices to be received as notifications within LIC's MINDA App. From these notifications heat-based groups can be set up to enable drafting via Protrack.

More features and improvements to functionality and two-way data flow are planned which promise to deliver greater insight into farmer's herds and individual animals via MINDA.

Wearable suppliers integrated into the MINDA system include CowManager, Tru Test, smaXtec, as well as Allflex via Protrack.

There's also strong interest from other suppliers seeking to utilise the benefits of integration with LIC's MINDA system.

...article continues from p2.

house DNA technology, which now allows farmers to access the same benefits for their individual cows and herd.

GeneMark generates the genomic profiles required for the Genomic Evaluation Service (when samples are submitted for parentage).

Once the parentage has been completed, the animal's genotype information is transferred to the genomic evaluation team and the result uploaded to MINDA within the next Animal Evaluation run.

Actual results of a heifer calf:
Example of comparison between parent-average values vs. genomic evaluation values

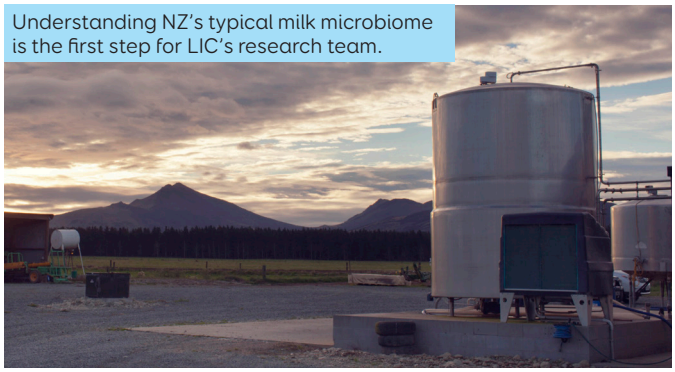
Trait (genomic breeding worth or genomic breeding value, together with reliability)	**Parent average** (half-sire + half-dam)	**Post genomic evaluation service** (half-sire + half-dam + offspring's DNA information)
gBW/Reliability	278.5/32	373.2/51
Fat gBV/Reliability	43/35	54.5/52
Protein gBV/Reliability	29.8/35	30/52
Volume gBV/Reliability	561/36	513/53
Liveweight gBV/Reliability	24.4/26	11.7/45
Fertility gBV/Reliability	-1.4/34	-2.7/52
BCS gBV/Reliability	-0.03/29	0.01/43
Functional survival/Reliability	0.9/16	1.0/24

VET- line

LIC Animal Health: 0800 436 362 testyourcows@lic.co.nz

DNA SEQUENCING & THE MILK MICROBIOME:

THE KEY TO BETTER COW HEALTH?



Understanding NZ's typical milk microbiome is the first step for LIC's research team.

LIC scientists are working on extracting information from vat samples for a range of animal health and farm status solutions, and the 'milk microbiome' project is among the most exciting developments.

LIC's *MilkOmics*™ bulk milk project utilises latest DNA technology to sequence the milk microbiome, which is present in all vat milk samples (i.e. the same type of samples used to determine payment for fat and protein by the milk processors).

All DNA within the samples is sequenced, meaning no knowledge or assumptions about which bacteria/viruses/fungi might be present is required.

The ultimate goal is to achieve an effective way for farmers to monitor the health of their herd, with minimal effort on farm.

The primary purpose is to develop 'early warning systems' that can allow farmers and vets to manage and treat animal health events more efficiently.

This can be done by identifying which pathogens are present in the animal and on-farm, how virulent the pathogens are (i.e knowing which strain of the virus is present), and whether specific pathogens are resistant to antibiotics.

To date, LIC has collected 821 bulk milk samples from 253 farms.

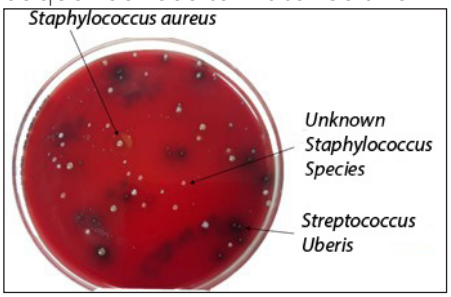
DNA sequencing of these samples has identified a total of 1944 species, with the average sample containing 206 species.

The first question asked of the sequence data is:

'Do the sequence results match bacteriology results?'

The answer to the question is a resounding YES!

Culturing bacteria from milk has been the 'gold-standard' in identifying microorganisms in milk for many years, so it's important that the DNA sequence results matches this.



The above picture is a bacteriology result from one sample.

Sequencing showed that, in this sample, *Streptococcus uberis* was the most-common bacteria, and *Staphylococcus aureus* came in at number five.

There are colonies of *Staphylococcus*, but the exact species can't be determined by culturing.

Sequence data indicated the sample had a high level of *Staphylococcus haemolyticus* (the third-most common species in the sample, together with another *Staphylococcus* species that sometimes causes mastitis).

The second-most prevalent species was *Cornebacterium bovis*, a minor mastitis pathogen that grows very slowly in the lab and can be difficult to detect (i.e. not seen in the picture).

Another important question is:

'How often is each species seen, and how much is there?'

The data allows an answer for each species detected.

But this is just the beginning.

LIC is also working on ways to identify milk samples that indicates whether a specific cow/herd health issue exists on farm (i.e. how much is too much?).

The data is looking promising for the future of animal health monitoring.

Any questions about this research should be directed to resilient.dairy@lic.co.nz.

This study is receiving financial support from the NZ Ministry of Primary Industries, SFF Futures Programme: Resilient Dairy–Innovative breeding for a sustainable dairy future [Grant number: PGP06-17006].

Johne's Disease Prices:
This season the price for Johne's Disease testing has increased to $5.49 + GST per sample.