

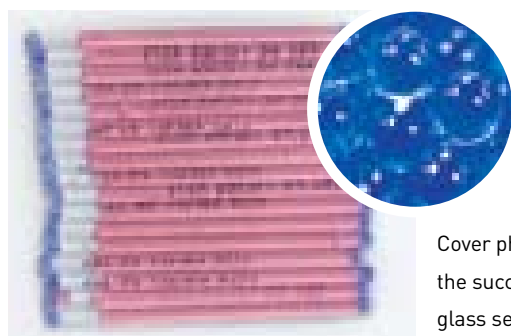
INSIDE LIC

A CLOSE UP VIEW OF LIVESTOCK IMPROVEMENT



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Cover photograph: A close-up of something which has been integral to the success of New Zealand dairying and familiar to most dairy farmers – glass sealing balls used to seal straws of Long Last Liquid semen

Financial Performance 2002 to 2008

	2004	2005	2006	2007	2008
Revenue (\$M)	98.32	104.04	110.47	118.32	132.35
Profit/NPAT (\$M)	4.78	5.30	7.57	19.03	15.63
ROCE	4.89%	5.56%	7.83%	10.64%	7.62%
Value of Assets (\$M)	111.33	111.30	116.14	178.85	205.10
Dividend (\$)	0.163	0.198	0.245	0.25	0.225
Share Price (\$)	1.48	1.46	1.30	1.80	3.30

NPAT - Net Profit After Tax ROCE - return on capital employed



Editorial

Inside LIC is a response to shareholder request for more meaningful information about your co-operative.

A change in legislation enabled companies, for the first time, to think creatively about the best way to communicate financial and operational results to shareholders. Previously we produced a formal Annual Report but talking with shareholders confirmed that tended to be seen as a 'spin' document and wasn't widely read. The change in legislation opened the opportunity to deliver better value into shareholders' hands, with an abridged summary of the financials, full copy on the LIC website and a magazine which opened the doors to LIC - all for the same, or less, cost than the original formal Reports.

Inside LIC gives you the big picture, previously unpublished insights to what's happening inside LIC – the projects, research, challenges and successes as we work to bring you innovations which will make your farming business more productive, profitable and enjoyable.

There are a number of things you won't see, and (probably) won't miss –

- Advertisements
- Spin

What you will see are articles that provide an objective critique of some of the topical issues in farming – like the state of fertility in the New Zealand herd, and what's being done to help you breed cows which convert feed more efficiently to milk. There's also a look at A2, at how LIC genetics are performing in the UK and how we measure and respond to what you tell us.

The Chairman challenges a topic dear to shareholders' hearts – does the co-operative structure underpin or restrict our commercial success and CEO, Mark Dewdney, fronts-up with some blunt answers to shareholder-focused questions.

These are just a few of several articles that will give you more insight than you've had access to before.

The style and content of this magazine is a first. But that's not surprising. This is LIC. We know your time is precious and we believe the content and format of this magazine will make good use of that time.

Happy reading.

Clare Bayly
Editor



CO-OP STRUCTURE

– impediment or accelerant?

Stuart Bay, Chairman of LIC, talks candidly about where the company is going with its share structure, and whether its co-operative structure underpins, or restricts, its commercial success.

“The co-operative structure is as much part of agricultural New Zealand as No 8 wire – it was there in the early days, with the farmer involvement it fostered contributing to this country punching above its weight in the international farming community.

But over recent times, the structure has been under pressure and many of the co-operatives in place 20 or 50 years ago, have either gone out of business due to market pressures, or are part of larger amalgamations.

Co-operative principles have guided LIC’s development for nearly 100 years, even though the early structures were incorporated societies with members, not shareholders.

Back in the early days New Zealand had 28 herd test co-operatives which subsequently amalgamated into six herd improvement associations, then becoming the Livestock Improvement Associations. In 1988

members voted to form a single entity - Livestock Improvement Corporation Limited – a company with NZ Dairy Board holding the shares in trust.

The early 2000s were significant for the dairy industry and for LIC. Kiwi and Dairy Group merged into what is, today, Fonterra, and the Government responded to farmer demand and LIC was created as a dairy farmer owned co-operative under the Dairy Industry Restructuring Act 2001.

Farmer involvement has always been critical to LIC’s success, and having a commercial focus won’t stop that – in fact that connection with our farmer owners is even more important as farming continues to diversify and intensify.

Staying in touch with farmer sentiment is a prerequisite and no easy matter and is why we have a range of channels – farmer Directors on the Board, the Shareholder Council, our Sales team (a member of

which drives up every farming driveway at least once a year) and our AB and Herd Test technicians, not to mention numerous contacts with Management. We also conduct a number of farmer surveys each year on a range of topics - general in relation to perceptions of customer service and product provision, and specific to product development.

Interestingly, the annual farmer survey provides a somewhat contradictory picture.

On the one hand, some farmers believe LIC should be providing products and services at the lowest possible price, while on the other hand others want an above-average return through dividends and share value and increased investment and research, with the sustainability of the co-operative safeguarded through diversification.

LIC's commitment to being a customer driven organisation underpins our co-operative status and requires us to deliver on both expectations - great products and services for a fair price, and great returns to our shareholders.

Customer satisfaction surveys and anecdotal feedback suggest we're delivering on the first, and the recent evolutionary changes to our share structure have been greeted as a way of delivering on the second.

Share structure adds \$100 million to balance sheets

The fact that the Co-operative share structure (introduced in 2002 then modified in 2004 and again this year) has put nearly \$100 million onto shareholders' balance sheets could not have been anticipated a decade ago. And I predict this will pale in comparison to what we will deliver over the next decade.

Right from the start, we were not forced by legislation to move into the 'fair value' space, and as a co-operative decided in favour of a steady journey forward which would take shareholders, in small meaningful steps that were not disruptive, to a share value which more fairly represented LIC's value.

When we first listed on the NZAX back in 2004 two independent parties valued the shares at around \$1.39 each. Over ensuing years shareholders' perception of the value LIC generates is evident in the gradual rise in the value of shares to (as I write this) \$3.15.

The revaluation of LIC under the International Financial Reporting Standards puts the co-operative's value at \$164 million, which equates to \$5.54 on a net asset basis per Investment Share.

On-farm, of course, is where value is most evident and LIC's on-farm programme to widen our strategy has been extraordinarily successful and is delivering real returns.

There is no other integrated herd co-operative in the world that has done what LIC has - delivered an innovative share structure which vests ownership with our users, provides incentive for investment and wealth for shareholders while maintaining control for our farmers and rapidly increasing the range of products and services.

Growth a given

Back in 2002 when LIC became a user owned co-operative, its revenue was \$90 million. Today it's \$132 million (2007/2008). This represents an increase in revenue of around 45% in just five years.

If the company continues to grow at this rate - what will we look like in five and ten years out?

Growth is a given; LIC has never stood still but the new wider strategy will see a growth rate earlier generations couldn't have predicted.

New opportunities are plentiful but we have to remain grounded, bedding in each step of the journey, and always checking that each step adds value where it must - on-farm, for our shareholders.

This is where the strength of the co-operative becomes obvious - it is a glue which binds us to our shareholders, and them to us. It's a connection, a commitment and a dialogue that must be ongoing.

Growth has a number of faces - one comes via research and development of innovative new products, another is acquisition of companies whose brand-mix adds value to our business.

LIC is well positioned for growth at a faster rate than before. It has a very strong balance sheet which means we can consider acquisitions that will meet our objectives. And the closer the share value gets to fair value, the more opportunity exists to raise further capital through the issue of additional shares.

Today's operating environment is more competitive than it has ever been with greater customer choice than previously existed. This is good because it means companies cannot sit on their laurels and take customer loyalty for granted.

We take nothing for granted and are committed to continually earning our place on-farm through the delivery of products and services which take farming to the next level.

Innovation

Back in the 1950s, LIC was one of the first organisations in the world to deliver a commercial AB service. More than half a century on, we've delivered the next quantum leap - DNA Proven genetics that will accelerate the rate of genetic gain in the national herd more than anything else has in the past. What is even more significant is that this advance is not an end in itself; it's the beginning of a whole new era.

The speed of change and innovation this reflects is so great that I will not limit myself by second-guessing the innovations around the corner, but we can already appreciate the potential for gene marker research to enable farmers to breed animals for specific purposes which will make farming more profitable, and sustainable.

THE CEO INTERVIEW

It's what every shareholder wants – pragmatic answers to pragmatic questions about financial and operational performance, without spin. Here is that interview.

LIC CEO, Mark Dewdney, answers shareholder-focused questions.



FINANCIAL PERFORMANCE

LIC is cash-rich with a very strong balance sheet – what is it going to do about it?

We're going to continue to invest in new products, services and building internal capabilities to allow us to meet the growth opportunities we are currently pursuing.

We will also continue to look for acquisition opportunities that fit our strategic plans, and which we have the capability to pull-off in a way that enhances the products and services we offer our customers, and which increase the value of LIC for our shareholders.

LIC is asset rich (current valuations of land, bulls, software, database, bull and deer teams valued at \$205 million compared to \$156 million last year, and \$94 million in 2002). Does the co-operative need to own all these assets and if it does, what's the return on assets and is this at the level you want?

LIC currently owns all its assets, and has built these over many years. This strategy has been very successful as it has allowed LIC to determine and control its destiny to the maximum extent possible. Looking forward we don't see any major departure from this strategy.

We will always own our bull and stag teams as these are absolutely critical to our business.

Controlling the land on which we run our business is also critical although we anticipate we will reduce our holdings of farmland in the future as the use of genomic selection technologies improve.

Ownership of other assets, however, like IT systems, vehicles and buildings, are more optional. We could lease a number of these, but invariably when you lease something you pay more than it would cost to own it yourself. It all depends on the nature of the asset, and the overall strategy for using available funds.

LIC is paying tax for the first time – how did you manage to get away with no tax for so long – and why are you paying it now?

When LIC was first separated from the NZ Dairy Board it had a large amount of tax losses. These tax losses have been used up over the past five to six years; they're now all gone so we now pay tax on all profits.

What is LIC's level of investment in R&D – as a percentage of revenue?

Broadly speaking we invest between 20% and 25% of our total turnover in research and development activities, over a wide range of areas.

This level of investment is significantly higher than most NZ companies – do you plan to continue this level, and why?

I expect we will always have high levels of reinvestment into R&D. Our future products and services rely heavily on continuous innovation, and we're increasingly moving our focus into more technologically advanced areas.

You have just changed the way you report financial results to the International Finance Reporting Standards (IFRS) – why?

IFRS reporting became mandatory for all New Zealand companies in the 2007/08 year. The 2007/08 year was therefore the first time we prepared our accounts under the new standards and making the changes was a major undertaking, because the new regime is so different.

What's the impact of going to IFRS?

IFRS accounting gives a much more complete and detailed view of how a business has performed, which is great for shareholders.

One of the major changes we face is the requirement to put a value on our biological assets (bull and stag teams) each year. Historically these assets were valued at cost but now, under IFRS, they must be valued at the market worth (which is a function of the future profits that will be generated from the asset).

PRODUCTS AND SERVICES

LIC has, over recent years, introduced a number of new products and services – e.g. Protrack and DNA testing. Have these delivered as you expected and what lessons have been learned in the process?

Dairy farming is changing dramatically and quickly. Farms are getting larger, labour is getting more difficult to hire, and farmers are responding by seeking technology and tools that help them run their farms more efficiently and profitably.

Developing new products and launching them into new markets is never an easy exercise, and we've had our challenges as we have tried to keep up with rapid growth in both Protrack and GeneMark.

In both business areas there have been times when we did not fulfil our customers' expectations 100%, or meet our own standards of excellence. However, we learn from each situation and take steps to improve as issues emerge.

One area of improvement is the focus we now apply to planning processes, and the exhaustive bench and customer testing which takes place before new products are launched to market.

Protrack and GeneMark are cases in point where demand at times exceeded our ability to deliver. Protrack is now performing well with high levels of customer satisfaction, but there is still room for improvement with GeneMark and I'm committed to ensuring that happens, quickly.

Does every product/service have to stand on its own feet, or is there a degree of acceptance that some will be supported for a defined period of time?

It is unusual to launch a new product or service in any business and have it achieve instant profitability.

In our case, the most important things we look at when considering any new product or service are 'what is the value delivered to customers', and 'is there sufficient demand for us to be able to supply the product profitably'.

Ultimately all products have to be profitable for LIC.

How do you measure product performance and how do you know when a product is successful?

Product performance is measured by the value the product gives farmers (e.g. genetic gain), the uptake by customers, annual usage growth rates, customer satisfaction, operational performance and profitability.

Really successful products are those that achieve all the above and it's pleasing that the vast majority of our products score strongly on all these measures.

Is LIC as good as it needs to be with 'new business'?

We are extremely innovative and have a long, proven track record of developing products and services that provide real value to our customers. Protrack, Long Last Liquid™ semen, DNA proven genetics, EZ Link, MINDA, GeneMark, FarmKeeper are all examples of our focus on innovation.

Where we need to improve further is in the roll-out and scale-up of new businesses as sometimes we're too slow in getting new products to customers, and new business up to critical mass and profitability.

How high is the bar in terms of delivering excellent customer service – how do you encourage that, and how do you measure it?

We are continuously striving to increase our total customer service, and improve our customers' experiences dealing with LIC.

We have a programme underway across the business to be more customer driven which means putting the customer at the centre of everything we do, from our strategy right through to how we deliver the smallest of our products and services. Sounds obvious but it's easy with any task to become focused on that task, not on the end user, so we've formally set the expectation that every outcome has to benefit the customer. It's not an option, it's a given.

We measure our customer performance throughout the year both formally and informally. On an annual basis we carry out a major customer research survey, where we measure customer perceptions of LIC across all our product offerings. The ratings in this survey have improved each year over the past three years.

(Read more about how LIC stays in touch with customer perceptions in 'No Room to Presume' on page 14 of this edition of *Inside LIC*).

STRATEGY AND GROWTH

What impact has the dairy industry's record payout had for/on LIC?

As everyone knows, New Zealand dairying is enjoying positive times with growth in cow numbers and farm sizes, coupled with strong payouts. Industry buoyancy has resulted in strong growth and increasing profitability for LIC.

The 'invest in good times so you're prepared for the bad times' logic which is so strong on-farm, is applied in our business. We know how important it is to see these strong market conditions as an environment for reinvestment to build and strengthen the business for the future.

We've done a number of things to that end - increased our investment in people, and in redeveloping our business infrastructure (e.g. IT systems) and business support processes, and have increased our re-investment in research and development and brand promotion.

Two years ago, you set out to double the size of the company in five years (by 2011) - is that realistic, and where will growth come from?

In the 2005/06 year our revenue was \$110 million. In the 2007/08 year our total revenue was \$132 million; this represents a compound annual growth rate of 9.6%, without any significant revenue from new acquisitions.

As our Genetics, Software, Automation, GeneMark, Other Species and International growth strategies gain critical mass and momentum I expect the revenue growth rates to increase further.

DIVERSIFICATION

LIC has gone into new markets/species - what is the timeframe before these deliver a profit?

There is no prescribed timeframe for any new venture to be profitable, but we want to reach that position as quickly as possible. The most important thing, when going into a new area, is to have a plan right from the start and to routinely check that progress is on-track to achieving the goals defined in that plan.

Sometimes, of course, things happen beyond your control which throw the best-laid plans out of kilter; if that happens you have to have the courage to make the right decision for the business even if that means pulling out of a product or market.

What are your plans for other industries/species?

Our primary focus is to keep developing better products and services for our New Zealand dairy farmer customers and shareholders. As we're doing this, however, opportunities open up where we can add value which advantage dairy farmers in other parts of the world.

There are also significant opportunities to leverage the expertise we've worked so hard to develop into other livestock industries, primarily deer, goats and beef.

What is LIC's strategy in relation to acquisitions?

We maintain an active programme looking for acquisition, or partnership opportunities. It takes a huge amount of time, resource and cost to develop a new business and occasionally it makes better sense to either acquire a company which has what you want, or form a partnership with others to access what you need.

Some acquisitions which illustrate this include :

- Investment in Eurogene in Ireland to improve our distribution of semen to a much larger customer base than we could reach ourselves.
- Acquisition of the proven farm-mapping and feed budgeting software program, FarmKeeper, enabling us to deliver a quality product more cost effectively than if we developed it ourselves.



LIC is one of the great agricultural businesses in New Zealand, and it is our commitment to do everything we can to enhance this further over the coming years.

INTERNATIONAL

Why have an international presence?

It's essential that LIC's focus is wider than New Zealand because :

- It allows us to diversify our earnings beyond our core New Zealand dairying base providing protection when times are tough at home.
- It widens the potential for product development – we learn from what's happening in offshore markets enabling us, where appropriate, to translate international innovations and new ideas back home.
- We can support the increasing number of New Zealand customers who are growing their farming businesses overseas – customers who want to grow in new markets using the tools that served them well in New Zealand.
- International growth generates profits for investment into our New Zealand business, our development programme or as dividends to shareholders.

LIC has a growing presence overseas – how do you determine where, when, what and how to grow new markets?

The fundamental criteria is strong demand for our products and a sustainable market. The second critical aspect is having a strong distribution channel to customers, both for the sale and subsequent servicing. The third critical factor is the ability to manage the risks inherent in doing business overseas.

Invariably, this comes down to adapting the farming systems that work in New Zealand and in which our product range has been developed.

We have selected a number of key markets where we believe we can satisfy the above criteria, and that's where we are focusing – Australia, United Kingdom, Ireland, United States, South America and South Africa.

STAFF

The New Zealand labour market is tight – what is the company's staffing strategy?

We simply could not provide the products and services we do without the commitment and focus of our staff. Every role we have in the business plays an important part in bringing the products and services to our customers. We place a major emphasis on attracting staff, training them, focusing them on our key objectives and rewarding them fairly for what they do for LIC, and for the individual and team successes they generate.

The employment market has been tight, but LIC has a strong employment brand as a business that is performing well, and is a good place to work.

There are always a lot of cars parked at Newstead – does this mean that staff numbers are growing? How tightly do you control staff numbers?

We often get comments about the number of cars in the carpark at Newstead but that's more to do with the relative isolation of the site and the need for staff to drive, often individually, from all parts of the Waikato. We also need to remember that the Newstead site is now home to DairyNZ, some breed societies and LIC.

Staff growth at LIC is driven by business growth. As we grow the size of the business and launch new initiatives we need to ensure we have enough staff to run the company. If we don't have enough resources we won't be able to deliver the innovation that customers need or the operational performance they expect.

Having said that though, each and every new position has to meet a very tough justification criteria requiring my approval.

THE FUTURE

What are the big challenges of the future for LIC?

The biggest challenges for LIC in the future will be :

- Prioritising the large number of opportunities we have throughout our business. In every product and market we are in, there are opportunities for innovation, improvement and growth.
- Pace of change. Technology is moving very quickly, and our customers' requirements are evolving at a similar pace. We have to do everything better, and quicker, and this combination places pressure across the business.
- Remaining customer driven at all times and in everything we do. We exist for our customers and our shareholders and must never lose sight of that fact.
- Ensuring that LIC remains a great place to work for staff. We cannot achieve what we do without the whole team being focused on the same goals, and being motivated to succeed and rewarded when we do.

LIC is one of the great agricultural businesses in New Zealand, and it is our commitment to do everything we can to enhance this further over the coming years.

FERTILISER AND PROFIT

As the world appetite for food resource increases, more demand is being placed upon the inputs that go into food production, such as fertiliser.

This is having a severe impact on farmers' profits globally, and looks likely to intensify in the short to medium term.

New Zealand dairy farmers are no exception, and it is generally accepted they face increases in the price of fertiliser - one in September this year and another predicted for December.

Fertiliser prices for staple ingredients such as Superphosphate and DAP have nearly tripled (or worse) in price in the last two years - with some of the other blended ingredients for our common mixes increasing nearly ten-fold.

Significant planning needs to be undertaken to mitigate the worst of these projected increases.

This year is certainly not the year to follow the same old fertiliser programme from past years, and farmers should make it a priority to get their fertiliser plan checked and updated by their FarmWise Consultant.

PHOSPHOROUS

Phosphorous is still the most expensive nutrient, so wherever practical, farmers should limit its application to maintenance only.

If Olsen P levels are above the biological optimum (refer your Overseer Nutrient Budget), then farmers should consider reducing (not eliminating) their phosphorous application.

Due to its high price, and potential increases, FarmWise recommends that farmers bring forward some or all of their anticipated Phosphorous applications for the season.

However much they plan to apply, FarmWise is recommending that at least 60%, if not

100%, of planned fertiliser application is applied before the predicted price increases really bite.

POTASSIUM AND SULPHUR

It is important that Potassium and Sulphur applications are maintained at optimum levels throughout the season. Both can be readily leached in heavy rainfall situations; or may not be stable in soils with low clay or organic matter content.

Farmers using Nitrogen at any stage through the season should consider utilising Potassium (K) and Sulphur (S) at the same time.

USE OF FERTILISER BLENDS

The use of Urea, Ammonium Sulphate and Potassium blends (at various ratios), has become an increasingly widespread practice in the last eight years.

On-farm trial observations have shown strong visual responses where the presence of K and S have been low or limited. Some familiar blend names are Ammo, Ammo 33 and Ammo 36, Urea Pot and Ureammo Pot.

This recent practice of using 'little and often', when applying K and S, has meant more use of the lower percentage Potash Supers. For example, using 10% or 15% Potash Super with, say, a Ureammo Pot blend to follow the cows rather than applying fertiliser in the traditional way - using 20-30% Potash Super with straight Urea as a follower.

Farmers need to remember that fertiliser is applied to feed the plant.

NITROGEN

Nitrogen has increased significantly in price as well compared to two to three seasons ago (the current price is now at around 20c/kgDM, up from the previous level of 10c/kgDM).

Surprisingly, compared on a cents per kgDM basis, the margin between the cost of nitrogen and the payout has actually

improved slightly. Two years ago the difference between N/kgDM (10c) and MS/kgDM (40c) was just on 30c. Now it is getting close to 32c/kgDM margin (20c vs. 52c). At 20c/kgDM, nitrogen is the next cheapest feed after non-N grass and heifer grazing.

ATTENTION TO PH

Farmers are warned to pay particular attention to ensuring the pH is at its optimum for the property. Lime is still realistically priced and critically it helps ensure the nutrients applied are readily available to the plant.

A suitable analogy to lime is if to consider the farm business as a vehicle, like a big grunty SUV, the farmer is the driver, the cows the engine, the land the chassis and the NPKS fertilisers the wheels on the farm vehicle. Lime is only a very small part of this vehicle - just the tread on the tyres, so no matter how flash or powerful the vehicle is, without tread there can be no forward motion. The remedy is to get the pH levels into the optimum range.

SOIL AND HERBAGE TESTS

A regular regime of Soil and Herbage tests is critical for getting an accurate picture of fertiliser requirements. Herbage tests are particularly important for determining the micronutrients status such as Molybdenum and Boron. These (and others) can be added to the fertiliser if necessary.

The important thing with fertiliser this year is getting good independent advice from your FarmWise Consultant. They don't sell the fertiliser products, and will listen to your business goals and objectives. At FarmWise, the team understands budget constraints and cashflows, and can change or tailor a fertiliser plan so it meets expectations.

The final message to farmers is this - don't blow unnecessary dough this year. Drag out fertiliser plans, get them checked by your FarmWise Consultant, and make the changes that will ensure production is optimised, and profit maximised.



Getting to A2

In September 2007 Keith Woodford's book, *Devil in the Milk*, hit the stands, creating a burst of publicity about the link between milk containing A1 beta-casein and a range of serious illnesses, including heart disease, Type 1 diabetes, autism and schizophrenia.

The beta-casomorphin, BCM-7, which Woodford linked to these illnesses, is present in the A1 milk that makes up the bulk of milk supply in New Zealand, but is not present in A2 milk,

Originally all milk was A2 until a mutation affecting some European cattle occurred some thousands of years ago.

Herds in much of Asia, Africa and part of southern Europe remain naturally high in A2 cows.

In October last year, just after Woodford published his book, the New Zealand Food Safety Authority (NZFSA) announced its intention to conduct a review into the science behind the A1/A2 milk debate, but when, in February this year, the European Food Safety Authority

(EFSA) announced it would carry out a comprehensive review of existing scientific research on the safety of A1 milk, NZFSA announced that it no longer needed to commission its own review.

Food Safety Minister Lianne Dalziel said the EFSA's review "will be conducted independently and the outcome will resolve the current debate around the science of A1 and A2 milks."

In May this year, EFSA solidified its plans, announcing it would review available evidence of a possible association, or lack thereof, between beta-casomorphins and a range of non-communicable diseases such as type 1 diabetes, heart disease and autism.



The EFSA plans to complete its review by the end of 2008, at which point, and depending on the outcome, it will decide whether any further research is needed.

Until the research has been finalised, it is up to the discretion of individual dairy farmers whether they head down the route of A2-only milk supply.

LIC's General Manager of Genetics, Peter Gatley, said, "LIC does not pass judgement on the validity of claims about the quality of A2 milk, but we can help farmers achieve A2-only milk supply by offering A2A2 sires and providing GeneMark tests to identify the beta-casein status of cows."

Peter points out that the process of creating a herd composed entirely of A2A2 cows will take time and cost money, and "the faster you go the bigger the cost".

"An A1A2 cow will produce A1 beta-casein and A2 beta-casein in equal amounts in her milk, whereas a cow that is A2A2 only will only produce A2 milk, and a cow that is A1A1 will only produce A1 milk."

Keith Woodford calculated that if farmers use only A2A2 bull semen over their herds, it will take less than a decade to make the switch to A2A2, but LIC estimates that, unless a herd has a high frequency of the A2 allele at the start of the breeding programme and has a high number of A2A2

replacements coming into the herd, this passive conversion approach would take more like 15 to 20 years.

The rate of progress slows with successive generations, so over time the A2 content of milk will increase into the mid-nineties, but just using A2A2 sires won't achieve complete A2-only status unless further action is taken.

Peter Gatley says farmers should also be mindful that adding A2 to the list of selection criteria for breeding will slow progress with other traits such as BW or type traits.

"To convert herds to A2A2 milk within a ten-year time frame, farmers would need to genotype their cows to screen out the A1 allele.

"They would also need to breed a lot more replacements by extending the AB period and mating yearlings to AB, or screen other cows with a view to buying in A2A2 cows which may attract a premium if many farmers pursue this option.

"There would likely be significant cost attached to achieving an entirely A2A2 herd in five years or less because of the need to genotype large numbers of cows for both selling and buying.

"But if the results of the EFSA's review are such that all New Zealand dairy farmers are encouraged to switch to A2-only milk supply simultaneously, these A2A2 cows will be in high demand, making them harder to come by and more expensive to purchase when they are available."



MINDING THE CUSTOMER

A company-wide focus on the customer has seen vast improvements in the way MINDA develops its software.

Taking a look 'back' into MINDA highlighted a need to bring customer focus into the forefront of the product development process.

Previously, when deciding what upgrades to make to the software, MINDA staff would consider feedback received through the contact centre, the sales force and i2i (an LIC system for generating ideas from customers and staff), and brainstorm their own ideas for improvement.

Staff would then evaluate each item to determine the fit to budget, allotted project timeframe and development resources available, before deciding on a final upgrade list.

Although most upgrade ideas originated from customer feedback, the decision-making process was very internally driven.

"We had no real way of checking if MINDA was catering for the needs of our customers and living up to their expectations," says MINDA Product Manager, Olivia Derecourt.

FARMER FOCUS GROUPS

During 2006, MINDA ran a series of customer user groups to evaluate the upcoming release of MINDA software – MINDA06.

This was too close to the scheduled launch date to have a major impact on the development of MINDA06, but it saw a fundamental shift in the way the MINDA team approached its software development.

"We realised the importance of not 'assuming' what the market wants, because if you don't ask your users what they want, how can you be sure?"

When developing the latest release of MINDA software – MINDA08 - the team sought customer feedback right from the outset.

WISH LIST

A 'wish list' database was created to capture ideas from all available sources, and a first round of user group sessions took place in June and July 2007.

Attendance at the regionally held sessions included a range of farmers – farm owners, sharemilkers and managers from small to large herds – all with the common focus of continual improvement.

At the sessions, the MINDA team asked farmers to evaluate a list of potential upgrade items so these, and any other ideas, could be discussed.

"You hope to get ideas you haven't already thought of, because that's where the real value from user group sessions is gained," says Olivia.

Based on the feedback received at those user groups, MINDA evaluated each item, chose which ones to include in the software upgrade, and set to work.



MOST WANTED ITEM

“By far and away the most requested item was the ability to view the records of historic animals, those that have been removed from the herd. This function had existed in an earlier version of Animal Recording Software, and farmers wanted it back.

“Also top of the wish list was a Somatic Cell Count report that would show trends over prior herd tests to provide a resource for farmers to help make management decisions.”

The next round of user groups took place in March 2008, when the core foundations of the product were in place.

Feedback was positive and the development team made only a few minor adjustments based on farmer input.

USER TESTING

It was at this time that MINDA began ‘pilot’ user testing throughout the country to put the software to the test.

“We tested MINDA08 with a variety of customers, from those using Windows 98 to those on Vista, from those using broadband to those on dial-up, and from those running small herds to those with large herds,” Olivia says.

“We basically asked the pilot group of 30 MINDA customers to try and break the product for us by putting the software through its paces, so we could be sure we had the best possible solution to roll out to the market.”

The customer pilot-phase ran for seven weeks prior to the release of MINDA08 and finished on June 6 2008 – a week out from the launch.

“The first few weeks of the pilot were the most valuable and identified issues we hadn’t been able to find in-house with various testing scenarios.”

Version one of MINDA software was tested, feedback received and a set of fixes created, then the pilot group was asked to upgrade to version two and test again.

“We asked customers to recreate the scenario that caused the issues in the first version, so we could be sure they’d been ironed out.”

Further amendments were made and LIC released MINDA08 at the National Fielddays on June 11, 2008.

LAUNCH

“When we launched MINDA08 at the Fielddays, we had farmers coming to our site saying MINDA was a great tool and they wanted to upgrade so they could use the new functionality – that was a real affirmation that we had built MINDA software with our users in mind.”

Informal customer feedback has shown that, along with the historic animals function and Somatic Cell Count report, farmers are pleased they can now access ancestry information, see a report on removed animals and record DIY matings, to name a few.

“It was wonderful to be involved with this project. The MINDA08 Software release was well coordinated from beginning to end and, as a team, we knew we were dedicating our time to a product design that was wanted, needed and desired,” Olivia says.

The next step will be for LIC to formally evaluate how successful MINDA08 has been in meeting the needs of its customers through market research, the purpose of which is to continue to guide future releases through a model of customer-driven improvement.

“We see the importance of identifying and meeting the needs of all our customers – however different they may be.

“We face a challenge in the breadth of users we have. It would be a different story if we had just one type of customer and they all used MINDA in exactly the same way – but that’s not the reality we’re in and we wouldn’t want it to be.”

NO room to presume

In today's business world, with the multiple choices on offer to customers in any range of product or service, smart businesses can't afford to 'presume' to know what their customers want.

This approach used to work.

In the 'old days' the dairy industry had what has been described as a paternalistic regard for farmers, applying both a practical and scientific approach to developing products and services farmers wanted. But as the structure of the industry, and the diversity of farming, changed so too the need for industry organisations to have greater certainty that they are in tune with farmer needs.

Gaining that insight sees LIC use a range of tactics to get farmers to share their knowledge and mindsets on existing or potential products and services. It's a blend of historical knowledge, management judgement and market research.

There's no room for presumption.

Take, for example, the development of the herd recording tools farmers will need tomorrow. It's one thing to presume these can and will be delivered via the web, but what if farmers can't access it?

To add another layer to the picture, LIC called on its market research unit to get in touch with a random grouping of farmers from all over New Zealand to find out how they use the internet, access broadband and any issues they may have around line speed which could affect their ability to synchronise information to and from the company.

The information gleaned gave a picture of farmers' likes, dislikes and frustrations when it comes to receiving information critical to their businesses, enabling LIC to incorporate these into the designs of current and future farm software and recording products.

Telephone surveys

Telephone contact is the most efficient way to speak to a representative number of farmers within a defined timeframe, and LIC has a small on-call team skilled in the art of interviewing, who are able to represent the company through their interest in farming and familiarity with the logic, language and vagaries of agriculture. One vagary is the best time to contact people who are on the go from dawn to dusk, their office more likely to be a motorbike or cowshed. Early evening, or dinnertime, has proved to be the best time to find farmers inside with time to talk.

Market research
Industry knowledge
Telephone surveys
Farmer focus groups
Data mining existing information
Historical information
Postal surveys
One on one interviews

It's a two-way conversation, each contact providing an opportunity for farmers to raise other issues they might have in their minds at the time, and each and every item is acted upon.

Predicting the future

At LIC, predicting market uptake of a product or service is market research at its sexiest.

When LIC's Protrack farm automation product was in its concept stage, a postal survey was conducted which described the concept to dairy farmers and asked how likely they would be to purchase such a system within a 12 month period.

How they answered, gave the company an indication of demand. The 'magic' of market research was worked with the application of a world proven modelling technique, and enabling an estimation of demand over a period of time based on an understanding that sales would take longer than 12 months. Like any grouping of consumers, some farmers want new things now, while others prefer to wait until the system is tested in the market.

And since its launch, LIC has surveyed Protrack users on potential enhancements so the company can rank and produce to meet that demand. The survey generated a wishlist, the clear winner being oestrus detection (which has now been developed and is due to be launched to the market over the next 12 months).

Customer satisfaction

Customer satisfaction is a measure central to success. While not all 'unhappy' customers defect, and not all 'happy' customers are retained, customer satisfaction that is trending downwards is an indicator that the bottom line may take a hit, if the trend is not reversed.

One of the largest surveys LIC undertakes is the annual customer satisfaction survey which, year-on-year, tracks customer satisfaction and a range of topics beyond 'just' products and services, which either provides a compelling call for action, or affirms the company is doing things right.

It's been proven that current customers are the most discerning when it comes to refining products or services because their practical use, combined with farming pragmatism that 'it has to work', opens new potentials for improved functionality and customer satisfaction.

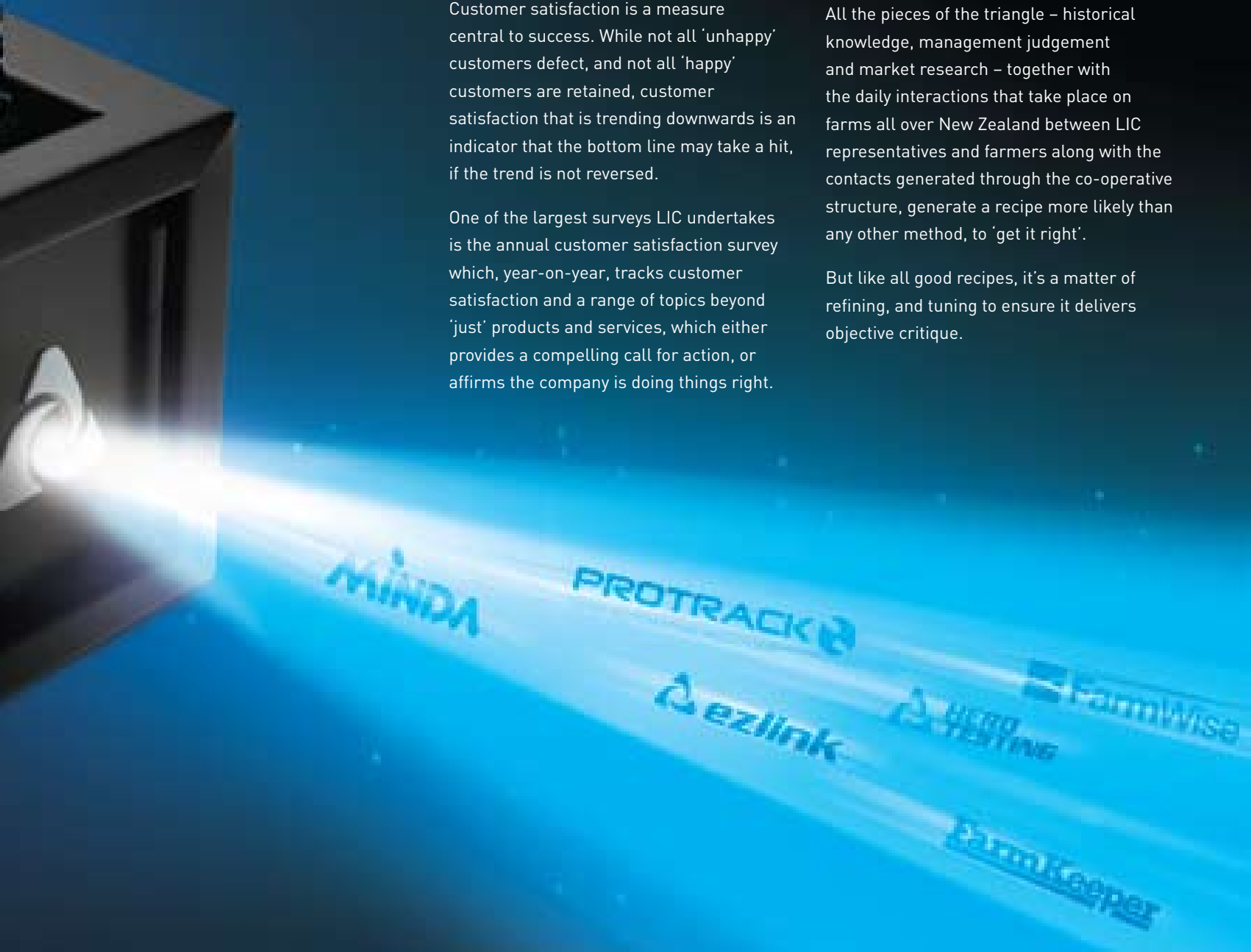
Farmer focus groups and one-to-one interviews

Focus Groups are used when the company needs to 'dig deep' and get answers to 'why' questions to gain improved understanding on any range of topics. Timing is important, and LIC is always mindful of what's happening in the farming calendar, endeavouring to conduct focus groups and interviews at off-peak times so farmers have time to attend and participate fully without having to rush back to the farm.

Pieces of a puzzle

All the pieces of the triangle – historical knowledge, management judgement and market research – together with the daily interactions that take place on farms all over New Zealand between LIC representatives and farmers along with the contacts generated through the co-operative structure, generate a recipe more likely than any other method, to 'get it right'.

But like all good recipes, it's a matter of refining, and tuning to ensure it delivers objective critique.





HALF A CENTURY OF PROVING BULLS

Few people could guess at the amount of data behind each bull identified for inclusion in one of LIC's breeding schemes and its vastness precludes even those most closely involved, putting a figure to it.

The genesis of decisions LIC makes today on which cow to use for contract mating and which bull calf to purchase, began in 1954 when young bovine geneticist, Patrick Shannon, joined the NZ Dairy Board.

The work Pat and his team did in semen biology and animal evaluation still influence the processes LIC uses today although, back then, they could never have imagined the depth of information which would amass to generate the levels of insight the industry enjoys today.

Long before computers, Pat and his colleagues worked out how to pick bulls that would best serve the needs of New Zealand dairy farmers. They designed the statistical tools needed to calculate the genetic merit of animals and many of the systems in place today still retain remnants of those original statistical models.

"In the 1950s there was one simple criteria for bull selection – butterfat. That was it.

"Over following years, milk volume and protein were added and many of the physical characteristics which farmers identified as important attributes - temperament, ease of milking with an economic value for each.

"We were constrained by the fact that, at that time, computers hadn't been invented and even when they were, in the 1970s, we could not have dreamed of the power generated by even the most average desktop PC today.



- if all the information in LIC's database was printed onto A4 paper, it would be a mountain of paper taller than Mt Everest.

50 YEARS ON

Fifty years on, LIC each year identifies the top cows in New Zealand's 4 million strong national herd.

This process involves sorting and fine-tuning detailed data from more than 25 million records containing around 50 separate pieces of information on each individual cow based on its Breeding Worth traits, secondary traits, and ancestry.

It's hard to visualize this amount of facts and figures but here's an attempt - if all the information in LIC's database was printed onto A4 paper, it would be a mountain of paper taller than Mt Everest.

All that information is needed for the calculations which are then run through software programmes to identify the top two to three cows in 10,000, which LIC then selects for contract mating to the top bulls in the country in the hope that the pairing will produce a bull calf.

BULL DAM INSPECTION

Using a set of criteria based on Breeding Worth and market requirements, LIC's Livestock Selection team, which includes John Redshaw, Simon Worth and Mark Paget, extract the information needed and, after a lot of number crunching and statistic churning, select 9,000 animals from each of the three breeds.

"In Autumn each year we hit the road and talk to the owners of around 1,000 females and inspect the cows for conformation and management traits.

"We get the farmers' opinions on how good the cows are (production and temperament) and gain an appreciation of the farming systems the animals are being managed in (e.g. grass only or high input)," says John Redshaw.

"We then go back to the LIC Database and do another selection cycle of all cows to ensure we haven't excluded animals which may have come into the mix."

MATING PROGRAMME

The next step is to use a mating programme designed and programmed by LIC's Research and Development team.

The "Optimiser" as the team affectionately call it, generates 27,000 mating combinations for each of the three breeds.

"It's an incredibly powerful tool - Optimiser can look, say, at 9,000 Jersey cows inseminated by 30 sires and tell you the best 300 mating combinations by index taking account of genetic diversity.

"By May each year we have a final list of 1,000 cows for contract matings."

John, Simon and Mark, known as the "Bull Buyers", then start looking in more detail at the three generations of performance and ancestry behind each of those 1,000 cows.

"While we are always looking for breeding efficiency (Breeding Worth) extra weighting is placed on health, fitness and conformation.

"We look at the strength of each of those cows."

"Those first computers were huge things, filling an entire room, and we were impressed with what they were able to do - it's only now with the perspective of what's on offer today in computing power, that we realise how limited we really were.

"Back then we had to tailor our evaluations to the capabilities of the computers. It was certainly not through lack of desire that we didn't use more data to make our selections - it was simply that we couldn't link into sufficient computer power to do it.

"What we did, however, was lay the platform for what is being done today."

“LIC then contacts the owners of these cows to see if they are interested in their cows becoming potential bull mothers.

“Breeding a cow good enough to be a potential dam of a member of the Premier Sires team is usually a highlight for most farmers, so it’s a call they’re pretty happy to receive.

“After acceptance, they sign a contract which states that LIC will provide semen for mating and will genomically screen the resulting calf if it’s a bull. If it’s a heifer calf, that’s the farmer’s good luck and he or she gets to keep it.”

On average, one in three of these contract matings result in a bull calf.

Farmers are also asked to contact the Livestock Selection team if they believe they have an exceptional bull calf which they believe could be good enough to be a member of the Premier Sires team - particularly if it is the result of a Premier Sire Forward Pack mating. Once approved, that calf can then be put through the screening process.

CHANGES TO BULL BUYING WITH DNA

In contrast to those early dams of AB sires, today’s potential dams are weighted against 30 individual traits, and across generations.

But perhaps the biggest impact on the way animals are selected, came with the ability to identify elite sires through their DNA.

Breeding Manager Allan McPherson says this technology is a major development that will change the way animals are selected “although the fundamentals remain the same.

“Genomic selection is a continuation of what LIC has done for over 50 years; in essence, we’ll continue to breed, identify and purchase better bulls.

“What genomic selection does is provide us with another way to identify the best bulls, allowing us to cast the net wider, be more selective and significantly reduce generation intervals.

“We’ll be scaling up the size of our operation because of it. We will continue to follow the same bull purchasing and contract mating process, but will now have more information about each animal. We will also look at a greater number of bulls, with DNA enabling us to whittle that number down at a faster rate than has been possible before.

“Under traditional Sire Proving, we’d start with around 360 and end up progeny testing 300 across all three breeds.

“Genomic selection saw us, this year, look at 1,000 bulls which were then whittled down to between 125 and 140 bulls – and this figure will be dwarfed in future years when the first screening will be thousands of bulls – with the final number coming down as well.

“It’s a level of genetic selection which has never been possible – until now.”

Determining each animal’s genetic merit before committing to purchase is critical to LIC as a business - it saves money.

“Previously, after purchasing bulls for the Sire Proving Scheme, we had to wait several years for daughter information to determine their merit.

“Now, with genomic selection, we can screen animals, find out how good they are and then decide which ones we will purchase.

“We take blood and tissue samples for DNA screening from bull calves born in July, August and early September, and also carry out disease and genetic defect checks. We will also take blood from the dam to check parentage.

“Shortly after the bull calf is born, a tissue sample is taken from the ear and used for initial (primary) screening involving a panel of 384 DNA markers (SNPs). If results are promising, the sample progresses to more sophisticated secondary screening using a 50,000 DNA marker panel.”

Primary screening narrows the selection down, and then secondary screening provides the more detailed information needed for final selections.

Once bull calves are selected for secondary screening, around October each year, the Livestock Selection bull buying team goes out on farm to perform a physical inspection of the bull calves and a TOP (traits other than production) inspection of the dams.

“Notwithstanding the depth of information revealed by the DNA analyses, the physical inspection is still a deciding point. Each bull calf has to be a superb example because LIC is going to invest a significant amount of money and time into it and its conformation will determine how well and long it would last in the bull team.

“We’ll fail them for any number of defects which include such things as one testicle, a hernia, or a dam with a double teat or weak jaw.”

Following secondary screening, complete results are delivered in January with bull selection a few weeks later – completing a six month process.

GENOMIC WORTH

“There is a genomic equivalent for any trait for which there is a Breeding Value – it’s not limited to production traits, but includes all TOPs like temperament, udder and body conformation traits and calving difficulty. And genomic reliability will vary a little from one trait to another.”

Allan McPherson says LIC has established a huge reference dataset of 4,500 sires with highly reliable Breeding Values as a baseline for assessing a genetic equivalent.

“These sires have all been genotyped using the 50,000 marker panel and the relationships between the Breeding Values and genotype information was used to estimate Genomic Worth for the young bulls based on their individual genotype results.



Determining each animal's genetic merit before committing to purchase is critical to LIC as a business - it saves money.

"We cannot genomically select for any trait for which we do not have a conventional Breeding Value. For example, while we can calculate a genomic Breeding Value for Somatic Cell Score (as there is an existing Breeding Value), we cannot immediately generate a genomic Breeding Value for a related but different trait like mastitis resistance.

"If we want to develop a genomic Breeding Value for mastitis resistance we would have to create a large dataset of cases of clinical mastitis on an individual cow basis, calculate Breeding Values for the sires concerned, and ensure that group of sires has been adequately genotyped.

"Once a relationship is established, we could use that to apply genomic selection for the trait concerned on, for example, a new crop of young genotyped bulls."

THE FUTURE FOR CONTRACT MATINGS

For now, LIC will continue contract mating, utilising current ancestral and herd testing information and also taking advantage of genomic screening to further differentiate between cows.

"Genomic selection allows us to significantly increase the number of young bulls under initial consideration compared with progeny testing, to ensure we identify the very best bulls we can, and to provide positive impacts on both genetic gain and genetic diversity.

"Genetically it would be unnecessary, and logistically impossible to screen every bull calf born in New Zealand.

"We are looking to screen in excess of 1,000 bulls this year and put several thousand through screening in the future. Around half of those initial 1,000 bulls will be secondary screened using the 50,000 marker panel."

The scaling-up of the operation will introduce new logistical challenges "such as getting samples off farms, and keeping bull calves, but these aren't unsolvable - we just have to tailor our current operations.

"We'll continue traditional procedures for assessing traits when buying bulls, because genomic selection doesn't have an answer for everything, so we'll continue to do on-farm dam and bull calf inspections.

"For now, we're focusing on getting genomic selection successfully implemented within the breeding programme.

"As we become more familiar with DNA technology, bull breeding processes and systems will come under the spotlight to ensure they're as efficient and effective as they need to be to continue to breed New Zealand's best bulls."



THE ART OF FARMING FOR SEMEN PRODUCTION

20

It's fair to say that LIC wrote the book and defined the art of farming for semen production.

The company is acknowledged as the pioneer of large-scale farming of bulls for commercial semen production. In the mid 1950s, when AB was a new science, no precedents existed for how to manage and farm large numbers of bulls for semen production. A blend of Kiwi ingenuity mixed with a significant overlay of science and genetic knowledge and good stockmanship delivered a system proven through the excellence of the product it generates.

There is no better proof of this than a comparison of the levels of genetic gain enjoyed by dairying nations around the world. New Zealand (with LIC bulls responsible for four out of five dairy cows) is streets ahead of the rest.

Every day, mind over muscle, psychology over instinct, coercion and training deliver bulls that 'perform' and produce 'the goods' to order, every time. That is an art.

For more than 50 years LIC has proven, trained and collected teams of bulls with proofs based on daughter performance. That all changes this year, with the launch of a team of bulls with proofs based on their DNA profile – leading to another chapter in the book on the art of semen farming.

The gates to LIC's bull farms are locked to all but a select few; their strict quarantine status and the work demands of daily semen production and farm work precluding the ability to open the doors.

Here, Newstead Bull Farm Manager, Dave Hale, talks about the art of farming for semen production and how things will change now the company has two teams of bulls – daughter proven, and DNA proven.

"In comparison to the methods employed in North America and Europe, LIC has a very hands on approach to bull farming and semen collection.

"From the time they arrive at LIC's Newstead farm, the bulls are up-close and personal with the farm staff – handled and taught to perform semen collections all at the end of a lead rope.

"It's a familiarity which draws some surprised reactions from international visitors," Dave says.

"Overseas collection centres tend to house their bulls full-time in large barns during production periods where they are fed a supplementary diet and maintain close contact with their handlers on a daily basis whereas LIC bulls spend their entire lives outside on grass with frequent semen collection. This system requires bulls to be well handled and trained to ensure efficient operations and the safest possible environment for farm staff to operate in."

DAY TO DAY FARMING

"We operate a pasture based farming system, bulls are break-fed grass on a daily basis and supplemented with hay and silage during winter and any other non-growing periods - like the major drought experienced in the Waikato this year. All hay and silage is grown and harvested on-farm and no supplements are bought-in.

"Having said that, we trialed feeding high protein supplements to our bulls, but didn't find any obvious benefits to semen production that could justify the high cost associated with it."

SEMEN PRODUCTION

The single factor that differentiates LIC's semen production from 'the rest' is its Long Last Liquid™ semen processing and distribution technology. LIC is one of the few companies in the world that produces fresh semen that lasts up to four days in the field.

"During the spring mating season in New Zealand fresh semen is collected, processed and distributed every day to our Premier Sires customers nationwide.

"In LIC's Genetics Division engine room at Newstead, it's all hands on deck as farm staff harvest semen, laboratory staff process it from its raw state into useable semen straws and our distribution centre have it ready and waiting for our teams of AB technicians to inseminate into cows throughout NZ the very next day.

"Sounds simple but it's the result of a well-oiled human machine which has been developed and fine-tuned over many, many years and is a great example of across-company teamwork.

"Daily training and handling of the bulls means our Farm Technicians understand their personalities, their libido, likes and dislikes and it's critical they're equipped with this knowledge as, during the peak of the season, we have to collect a set amount of bulls in a very narrow timeframe.

"Depending on the bull, and the day, this can see Farm Technicians spending anything from 30 minutes (for the majority of bulls) through to two hours for individuals who may not feel like working on that particular day!

“Our top bulls are in the collection barn every second day throughout the spring and are required to perform three days a week for the first nine months of the year. Sometimes they simply get tired or bored with the whole thing, and it’s on those days that the skill of the handler comes into play.

“We pride ourselves on being able to collect even the most difficult bull, and our belief is if we can’t, no-one can!

WORKING IN THE BULL BARN

Top AB bulls are the elite athletes of the bovine industry – they represent the very best genetics available at the time and have demonstrated their ability to pass this on to their offspring.

Sexual maturity across the three breeds (Holstein Friesian, Jersey and KiwiCross™) is reached at different ages, Holstein-Friesian often the slowest to mature. However, from nine months of age onwards, most bulls begin to reach sexual maturity and can produce good quality semen.

“Like cows, most bulls don’t reach their productive peak until they are about three years of age. It’s then that we get maximum semen harvest, however, semen quality remains relatively constant as this is governed by laboratory quality control measures, ensuring only the best quality semen is retained and used to ensure a standard quality is maintained from bulls of any age.”

Bulls are fully grown at around three years and from that age onwards excessive weight gain is often the most difficult problem to overcome when farming for semen production.

“A bull’s weight needs to be kept at its own individual healthy level - from spring onwards their daily weight gain can be phenomenal if left to free-graze so we manage their diets closely.”

The result of an over-weight bull is reduced libido and semen production, along with an increased risk of arthritis in the joints and other associated health problems; to this end all older proven-bulls are weighed every second week and constantly monitored.

“There’s no standard time a bull remains in the LIC bull team – its place is earned each year based on the performance of its daughters with each bull having to justify its place against new-comers - only the very best get a second chance to be in the team the following year.”

A BULL’S LIFE WITH LIC

Bulls arrive at LIC farms as weaners in December/January each year, most remaining with LIC the rest of their lives. Their life span is determined by their value to the dairy industry.

“Around 90% never graduate, because their daughters don’t make the grade, and are culled at around five years of age.

“From the time they are weaners through to when daughter proofs come in, they are run in mobs of around 20. Once the proofs have confirmed the 10% which are truly elite, those bulls are drafted from mobs and for the rest of their lives are run individually.

“Young bulls become used to being handled from a very early age (three to four months) and this early training pays dividends once they enter their formal training as potential AB sires; they’re accustomed to being lead, and to mount and be collected with decoys (castrated bulls).”

Like their equine counterparts, the lessons of ‘breaking-in’ are never lost.

“After their initial collect as yearlings, the bulls generally have a ‘holiday’ of up to three years while their daughter proofs come in and even after this period of time we find they come back into work easily, never having forgotten those early lessons.”

Familiarity is important to keeping the bulls calm – like the clothes their handlers wear.

“Right from the start they’re handled by people who wear green overalls and behave in certain ways. If we were, for example, to introduce them to people with different appearance and scent it could increase the stress factor, so we focus on keeping things the same, all the time.

“It’s comparable to cows in the farm dairy – everything’s fine until a stranger walks in.”

DNA SIGNALS CHANGE

From 2008, LIC will have two teams of bulls – those with proofs based on daughter performance and those whose proofs are based on their DNA profile– and the change will have some impact on LIC farms.

“The biggest change in terms of handling and farming the bulls is the actual total number of bulls required will reduce dramatically over the next few years and this will have an impact on the amount of farm land LIC will need to manage in the future.”

Bulls will be run/grazed as individuals from a much earlier age which will see significant subdivision into smaller paddocks.

LIC currently owns and operates three farms - 250ha at Newstead, 128ha at Awahuri, and 291ha at Feilding, traditionally wintering a total of around 1,500 bulls. Over coming years, as the future under DNA Proven unfolds, it is envisaged LIC could farm less than 500 bulls in total.

On 28 June 2008, the company’s Awahuri farm ceased semen production for New Zealand as, due to DNA technology, its full semen collection and processing centre became surplus to requirements.

“The timing of this situation was fortuitous as it coincided with the need for LIC to develop a dedicated semen collection facility for the European Union (EU) to recommence sales of semen to a growing customer base in Ireland and the United Kingdom. (EU export protocols changed in 2004, setting new standards for the collection of semen for export to the Northern Hemisphere. The temporary ban meant, in those interceding years, that LIC met customer demand from reserves collected prior to 2004, and stored



in those countries. The new EU approved collection centre means the company will be able to provide Northern Hemisphere farmers with DNA Proven semen for their spring of 2009).

“DNA Proven bulls will still be in a structured progeny test scheme for the first year of their lives and their semen use will be limited to obtaining 70 daughters – much the same as the traditional progeny test scheme.

“The big advance with genomic selection and DNA technology means DNA Proven sires will be in wide-spread use in New Zealand and around the world when they are just two year olds, a good three years earlier than they would be under traditional daughter proving.

“The DNA Proven bull team will be larger than the traditional Daughter Proven team - currently 48 bulls across all three breeds, compared to 36 for Daughter Proven.

“The top DNA bulls will also need to hold their place against new-comers so they can go on to add a daughter proof to their Breeding Worth evaluations.

“It’s a fascinating advance for farmers, and for us on the farm, adding a new dynamic with two teams to manage and collect. But the basic principles of farming bulls for semen production will remain the same.”

AKiwi

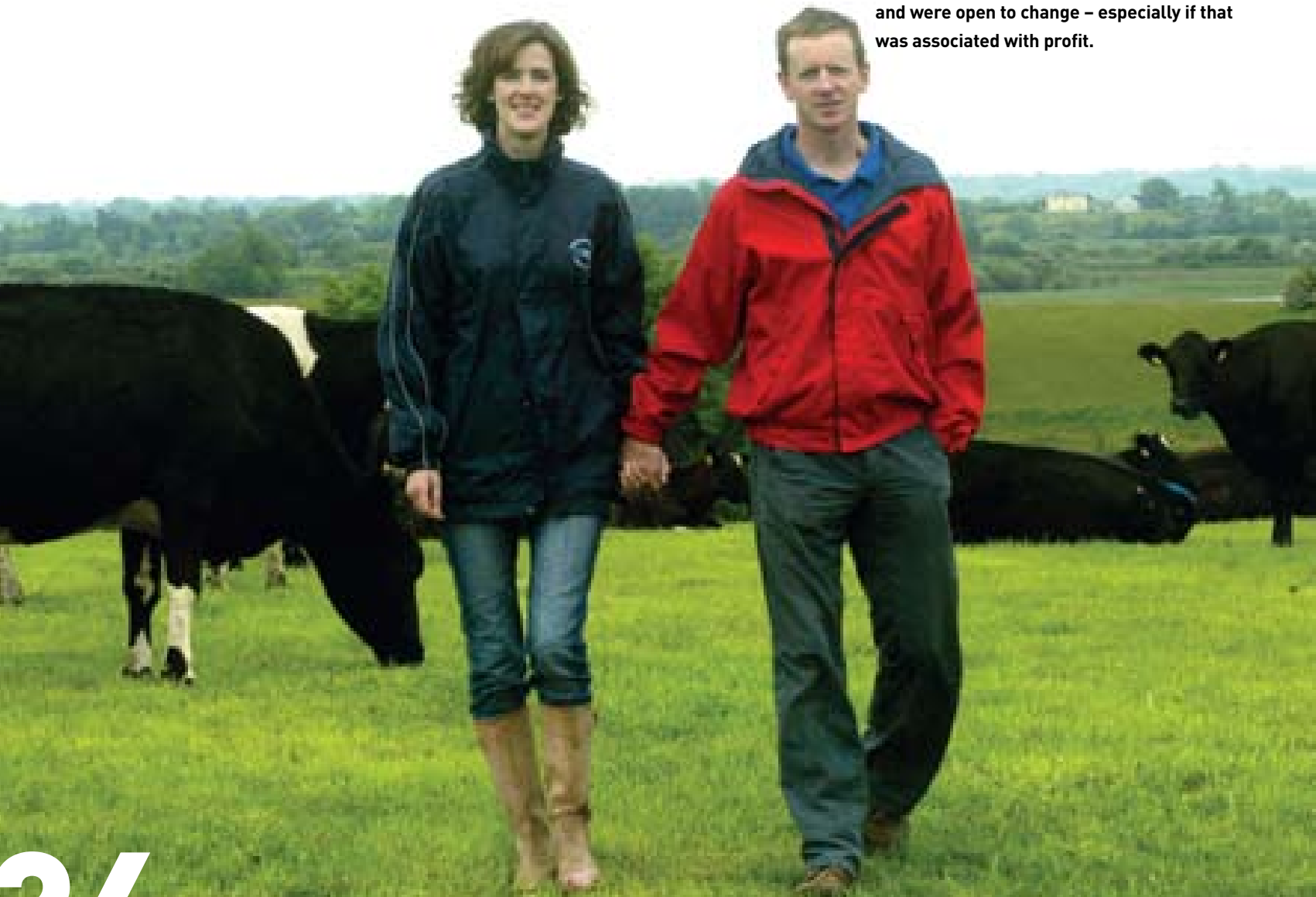
start to the day

Every morning around 220 Kiwis greet Brian Costello when he walks into the farm dairy. They are LIC bred crossbreds and he recalls the day he decided to put New Zealand Jerseys over his traditional British Friesian herd as one of the most strategic in his farming career.

It was 2002.

“I’d come home from Dublin College 12 years earlier armed with a Bachelor of Agricultural Science but thinking that the traditional pattern of dairying had no appeal.”

His parents, however, had already begun to challenge the tradition of providing liquid milk all year round with spread-out calving and were open to change – especially if that was associated with profit.



“At the time we were milking 80 mainly British Friesian cows on the family’s 67 hectare farm which is located in a heavy rainfall area in Southern Ireland.

“It was a high cost operation. The herd was housed for the extreme months of the year and that meant a huge reliance on labour, supplements, machinery and buildings.”

But the winds of change were blowing.

“Under the influence of New Zealand farm consultants working in Ireland (like former LIC Consulting Officers, Alister and Sharon Rayne and later Leonie Foster), Irish dairy farmers woke to the profit potential available from exploiting what nature provided – an abundance of grass – enabling them to extend the traditional six or seven month supply period, to 10 or 11 months.

“Leading farmers were quick off the mark, learning the skills of grass measurement and budgeting to reduce the traditional winter indoor feeding period.

“On the home farm we were constrained by capital so where today (with the benefit of hindsight) I’d adopt the ‘big bang approach’ and make changes quickly, back then we had to make the transition to seasonal, grass based, dairying more progressively.

Compact Calving

“The move from all-year-round to spring calving had already been made by the time I got home, but ‘spring’ was taking six or seven months, so that had to change.

“We clearly defined the breeding period which would deliver a narrow calving pattern the following year which saw us make some tough decisions; if a top cow came in season the day after mating stopped, too bad.

“A lot of cows were culled but we also reared as many as we could and brought them into the system.

“If you are ruthless enough you can achieve a lot in a short time and within two years we were approaching some kind of obvious calving pattern but our milk production took a hit.

Pasture rejuvenation

“If we were going to expand we had to do it cheaply, and that meant grass.

“Harvesting grass had been a huge part of our past – over the previous 20 years two to three silage crops were taken off each year leaving the swards very thin with low fertility/production grass species, unsuited to maximum growth early or late in the year.

“We had to look, as never before, at the grass species on the farm – there were parts almost overgrown because they hadn’t been needed or used with the low stocking rate we’d had until then. It was water-logged and infertile, unable to sustain grass growth. We had to turn that around through drainage, cultivation, the right species, fertiliser, and good grazing patterns.”

Brian describes the farm soil as “heavy clay, with sloping ‘drumlins’ (Gaelic word for ‘small hill’) the tops of which are dry almost all year round, but soil quality deteriorates as you move down the steep drumlins with gley or peat soil at the bottom; these areas held water, even in summer.

“In the past, the farm hadn’t been grazed in the wetter months but the new direction we were taking meant grazing cows out 10-11 months of the year, so we had to get every area of the farm capable of carrying stock, in all weather.

“Open drains, followed by combinations of mole-drains and pipe and chipping shore drains, were put in on the lower slopes of the drumlins, meaning grass grew on all parts of the slopes.”

Effective grazing also demanded the right-sized paddocks.

“The paddocks were too small but, because the farm can be quite wet on the shoulders of the season, we just opened wide gaps in the fences, giving flexibility so we could alternate the size of the paddocks, easily.

Access to and from the farm dairy and paddocks also required attention.

“Existing roadways only reached about 30% of the potential grazing area and weren’t in good condition; if we were serious about grazing cows over a 10 month period, we had to get new roadways in, and improve existing surfaces, so we could walk the cows to and from the paddocks.”

Cow numbers

Four years into the programme, the herd was up to around 100 cows and Brian saw the opportunity to start expanding.

“That realisation brought a whole new range of issues because if we wanted to get more cows on the farm, we had to be careful we didn’t slip back into the old bad habits, like feeding supplements.

“We were servicing a heavy debt, capital was limited and prices weren’t good, so we had to grow herd numbers organically by rearing every heifer calf and reducing culling.”

Then, in 1998/99, Peter Daly, began importing semen from LIC in New Zealand.

“For the first time, Irish farmers had easy access to bulls proven in grass-based systems, siring daughters which would produce and reproduce under those systems. We bought our first straws in the second year of Peter’s agency.

“Until then, the bulls available in the Irish market were mostly either American or Dutch Holstein types evolved from herds kept inside for 10 months of the year and fed high concentrate diets. In LIC bulls, such as Flemings Egan, Lloyds Excellency and McHardy’s Birch, I saw the type of cow we visualised for this farm.”

Through organic growth the herd now stood at 120 cows, but the urgency to grow numbers and increase production demanded something quicker, so Brian had to buy-in cows.

“The closest we could get to a Kiwi-style cow was the traditional Irish/British Friesian. We bought around 60, building the herd to 180.”

By this time the larger numbers were severely affecting the old eight unit herringbone parlour – but again ingenuity was at hand, with Brian buying a second-hand 12 unit and joining the two together, making a 20 unit herringbone parlour.

Make or break time - 2002

2002 was, Brian recalls, a turning point.

“Just as we were beginning to congratulate ourselves that the worst was over and the farm was poised for growth and prosperity, we were hit with the worst summer on record.

“It started raining on 17 May (our peak production growth week) and continued to rain for eight weeks.

“The farm didn’t have a chance to dry-out, and became virtually ungrazeable. We struggled to get 3-4 hours of grass into the cows each day, standing them off in the old yards.

“But talking to other farmers, who were 3-4 years ahead of us in the transition to pastoral farming, made us realise that, despite the tough conditions, they were growing and, crucially, utilising more grass than we were. It made us realise the job had just begun and there was a lot more we could do.”

2002 was also the year Brian made ‘that’ decision’.

“In the midst of all that bad weather, I made a leap of faith which brought us to where we are today and began putting LIC Jersey semen across the herd.

“We started breeding smaller, 450kg, animals which were more aggressive grazers, which milked for longer and got in calf every year.

“Initially we put Jerseys (Parkwood Casper, Charlies Lad) over our maiden heifers, but once we saw the calves on the ground, we used it with the older cows.

The herd progressively became more crossbred and Brian started back-crossing the Jerseys to more LIC Holstein Friesian bulls, in particular, Hugo and Jordanaire.

14 years on

Fourteen years on from Brian’s arrival home from University, the herd has grown from 80 to 220 cows and is in the top 1% in the country on EBI (Irish BW).

Half the herd are Jersey-cross, the other half predominantly New Zealand Friesian. Crucially all the young stock on the ground are Jersey cross. All are LIC.

AI is used over the first seven weeks with crossbred bulls for four weeks.

Calving begins in mid-February with around 80% calved in six weeks. The cows go outside at calving and remain there until November when the milking parlour shuts down.

The herd is wintered on an outdoor woodchip pad, fed a diet of silage, and also grazing brassicas in-situ grown on a 22 hectare out-farm.

The stocking rate is 3.2 cows p/ha and milk solids production currently sits at 1 tonne ms ha (compared to national average of 660 ms ha) with a target of 1200 ms ha by 2010.

Cow lameness has been an issue, with the cows having to walk long distances on the two-mile long farm, but Brian believes this can be culled out.

“We now have surplus animals and are culling more heavily than before so lameness shouldn’t be a problem in the future.”

Staff numbers remain the same as they were 14 years ago, with three-times the cow numbers.

The future

Brian believes it’s never possible to say the job is done. The targets he set 14 years ago have been met and exceeded but, in the process, he has become ‘addicted’ to extracting optimum production from cows and land.

“At this stage, it’s a matter of fine-tuning the operation. With pasture rejuvenation, for example, finishing one paddock just shows up the potential next door, and so it goes on.”

But it won’t be Brian’s hands or vision which will steer that fine-tuning.

Seeing and realising the farm’s potential is what he set out to do and with that achieved, he and his wife, Angela, are considering new horizons and fresh challenges.



Being in more than one place at one time



The commercial farming of cows creates a problem when it comes to handling individual animals. Because they are herd animals, and once in their social grouping, they are disinclined to be singled out – as anyone who has ever tried to will tell you; passionately.

So it was that the introduction of Protrack automated drafting in 2003 was greeted with of relief on a number of New Zealand dairy farms. At last there was a potential for peace and calm where, currently, there were often people in varying stages of disarray and frustration (shouting, waving, running) often to no avail as the female in question gave the big thumbs-up as she displayed the sidestepping ability of an All Black No 11 and rejoined her mates.

The argument for automated drafting didn't need arguing – it was already established in farming logic and within months the demand for Protrack units had stretched the fledgling businesses' ability to deliver to the standard it had set.

That was then.

Now, in 2008, Protrack has established itself as the market leader in farm automation solutions. That simple premise of 'automatic drafting' has widened to an offering which includes:

- The ability to draft today, tomorrow, next week or next month – meaning farmers can log in the animal identification issues they want to address at any time and leave it to the Protrack unit to draft them out so they can get on with other 'stuff'.

- Easy monitoring of individual cow performance with a link to MINDApro making herd records live and working in the farm dairy.
- The ability to record animal events once – as cows enter the farm dairy any events are entered once into the Protrack unit, linking immediately to MINDApro – no duplications, no omissions, just one record and it's there – in the farm dairy or back pocket.
- The ability to feed supplements strategically – no more 'one size fits all'. You're able to specify feed levels to different individuals, or groups of cows.
- Integration with other peripheral devices like walk-over weigh systems

In 2003 it was thought that farm automation would appeal more to large (800+ cows) than to smaller but experience has confirmed that, proving the business case stacks up of cost v. value generated, farmers of all ages, all size herds and all types of farm dairy, 'get' the numerous value propositions to be had from reducing stress (on animals and humans), saving in labour costs, animal health, milk quality (reduced penalties), herd records and individual management.

The LIC Protrack range of automation systems and the support structure behind them have grown in response to farmer need. Today there are three systems – an entry level drafting option, Vector Intelligent Drafting for Rotary and Herringbone sheds and top-of-the-line Vantage that delivers Full Automation for sheds.

Farmer experience has influenced the options on offer and the enhancements available – and in the pipeline.

Substantial improvements have been made to product robustness as farmers test it to its full potential and significant improvements have been made to the reliability and accuracy of the RFID system that drives Protrack by allowing for easy identification of individual cows.

The business has grown in line with demand and there are now nationwide sales, service and engineering teams with technical backup available on 0508 Protrack.

Innovations roll off the production line at regular intervals – one of the most anticipated being Automatic Oestrus Detection which will significantly improve heat detection and conception rates. The launch of this product is within sight and will be made available to all clients with an interest in heat detection.

And it doesn't stop there. Where once the farm dairy was the place cows were milked, today it is the heart of the dairy farming business delivering levels of efficiency, effectiveness and peace of mind that couldn't have been anticipated even 10 years ago.

One can only guess at the enhancements that will be developed over the next five or 10 years.



Making the right connection

We've all been there. You need to talk to a large corporate about your account (or whatever). You tentatively pick up the phone knowing this isn't going to be easy or quick – you call will be greeted by a range of options most posed by a presence which isn't human. But you're prepared. You've set aside 10 minutes and have mustered all the patience you can.

And then it begins – your call is answered with a list of options and numbers, you choose well and go into a waiting pattern, listening to elevator music as you are told, repeatedly, that your call and patience are appreciated. Your relief at finally talking to a human is often short-lived when you find that person is unable to solve your query, and you are routed on to another, and another...

It's a familiar tale and not one LIC wanted to repeat in its Contact Centre appreciating that farmers' are a pragmatic lot; you make a call, you get a connection, problem solved.

The LIC Contact Centre answers 97% of calls, 80% within 20 seconds, putting it ahead of the industry standard. And each call is answered by a 'real person' – one who understands farming and is able, in the majority of cases, to answer your concerns on the spot.

More than 93% of New Zealand dairy farmers use LIC herd recording services and each one will at some stage, talk to one of LIC's customer service representatives.

Not surprisingly, calls peak to around 1500 per day when it's raining because farmers are inside attending to paperwork – and the volume of calls means you sometimes have to endure a short delay before your call is answered.

The Contact Centre is open for business Monday – Thursday 7am – 9pm and Friday 7am – 6pm with 23 Customer Service Representatives fielding calls. Monday (aside, from wet days) is the most popular

day for farmers to ring-in to discuss herd records meaning the representatives can expect to have conversations with around 75 different people in the space of the day. Calls tend to ease off as the week progresses.

The number and length of calls are measured so the Contact Centre can anticipate and meet demand. Currently, call duration averages 5 minutes 40 seconds; a quick call to order transfer certificates takes maybe two minutes, where a complex technical software support request can take up to two hours in extreme cases.

Activity in the LIC Contact Centre tends to mirror the New Zealand dairy farming calendar – when farmers are quiet, the contact centre is quiet. The seasonal, weekly and daily peaks and troughs, on-farm, have a direct relationship to the volume of calls and, as a consequence, the time it takes to respond.

“Our peak season for incoming calls is June/July,” says LIC Contact Centre Manager, Janine Gibb, “when we can get up to 5,000 calls a week.

“Typically Mondays and Tuesdays are our busiest days, when we receive 50% of our weekly calls. Daily peaks are in the mornings after milking and breakfast (9am-9:30am), at lunch time; (11am-1pm) and after the 6 o’clock television news in the evening.

“We expect a real reduction on Thursday NPC evenings”.

Janine has some advice for farmers in the rare event that their calls are not answered straight away – “there is a very handy, and under-utilised call-back function available which allows you to reserve your place in the queue so the next available Customer Service Representative will call you back.

“I’d like to encourage more clients to make use of the function,” says Janine, “rather than the inconvenience of waiting on the line, hanging up and ringing back five minutes later.”

The aim of the Contact Centre is to resolve 100% of all calls and this is achieved in part due to its call escalation process when complex calls (usually to do with software issues) go to Customer Service Representatives who have a more advanced knowledge of the software and are able to apply their technological expertise to solve the issue or escalate to the specialist area, for example herd testing.

“We’re the birth, deaths and marriage register of the bovine world,” says Janine, “and where we once were ‘just’ MINDA, we’re now so much more.

“Today, LIC’s Contact Centre offers support for a wide range of products and services - MINDA, Protrack and GeneMark and over the next year we plan to provide front line support for other areas of the business, such as accounts, FarmWise and EZ Link.

“Our goal for the next 12 months is to manage and communicate with our customers and develop web-based question and answer and facts pages so farmers have an easy source of information on those common questions.”

Janine said the majority of the Contact Centre’s staff do not come from a farming background.

“We hire on attitude and customer service experience and the focus is then on getting them up to speed with farming because they can’t do this job unless they have a real affinity, and understanding of farming.

“Upon joining LIC they undergo an intense six week training programme which includes a comprehensive overview of the industries we serve from a technical and practical perspective, spending time out on-farm with our District Managers, on an AB run and herd testing.

“They also go to the bull barn and learn about semen collection, learn about the database, life cycle of a cow, all LIC core products and LIC business areas.

“Where, some years ago, Customer Service Representatives used to provide support to specific regions, today – on any day – they can answer calls from across New Zealand, and indeed, internationally.

“LIC has a range of 0800 numbers, but farmers tend to remember just one – ours, so we get calls on a huge range of farming issues and have to become ‘jacks of all trades’ so we can resolve most enquiries and refer-on those we’re not equipped to handle, like farm consultancy etc.

The ability to respond immediately to farmer concerns is crucial and Contact Centre Representatives now operate two computer screens “one screen has the customer details and the other has the requested field of information. It gives us more visibility of what’s happening and helps us respond more quickly to farmer queries.”



“We encourage feedback, people can email us at minda@lic.co.nz and we love hearing from them – we want to hear any suggestions on our services – good, or bad, so we can make improvements where necessary, take on board ideas and include those in our strategies for the future so we can keep on doing the right things for our clients.”

“For example, the Contact Centre used to be open on Sundays but the volume of calls was low (as it is between Christmas and New Year) so, without feedback, this is our only indication of demand. We invite farmers to share their views so we can more accurately measure demand.”

“At the end of the day customer service isn’t a static thing – we listen to our clients and want to provide the level of service they require; we’re there to add value, and are always looking at ways we can lift customer satisfaction levels.”



Putting ease into **EZ LINK**

A moment of 'pure genius' back in 2000 gave rise to an innovation which would add a new dimension to a time consuming, frustrating (but necessary) chore on-farm – herd testing.

The dimension was novel – ease – and it was an outcome of a conversation between two LIC herd test stalwarts, Kevin Southey and Robyn Yearbury, as they hit another wall in the quest to develop electronic herd test meters.

Seems simple now but back then the question, "Why don't we just put barcodes on the herd test flasks?" was radical and led to the development of EZ Link.

EZ Link is a barcode scanner that takes away the need for farmers to hand-write a cow's tag number on the side of a herd test flask.

The flask is identified by a barcode, so farmers just enter the cow number into the EZ Link handheld device, scan the flask, then place it anywhere in a standard tray, without having to use a numbered tray card.

Gone are the days of farm dairies littered with pre-numbered trays demanding the correct placement of herd test pottles containing milk samples from morning and evening milkings.

Space, and frustration, wasn't the only winner. Because the system is electronic and links to the herd's MINDA profile, it also identifies duplicates and discrepancies during milking, making it especially useful for farmers managing large herds.

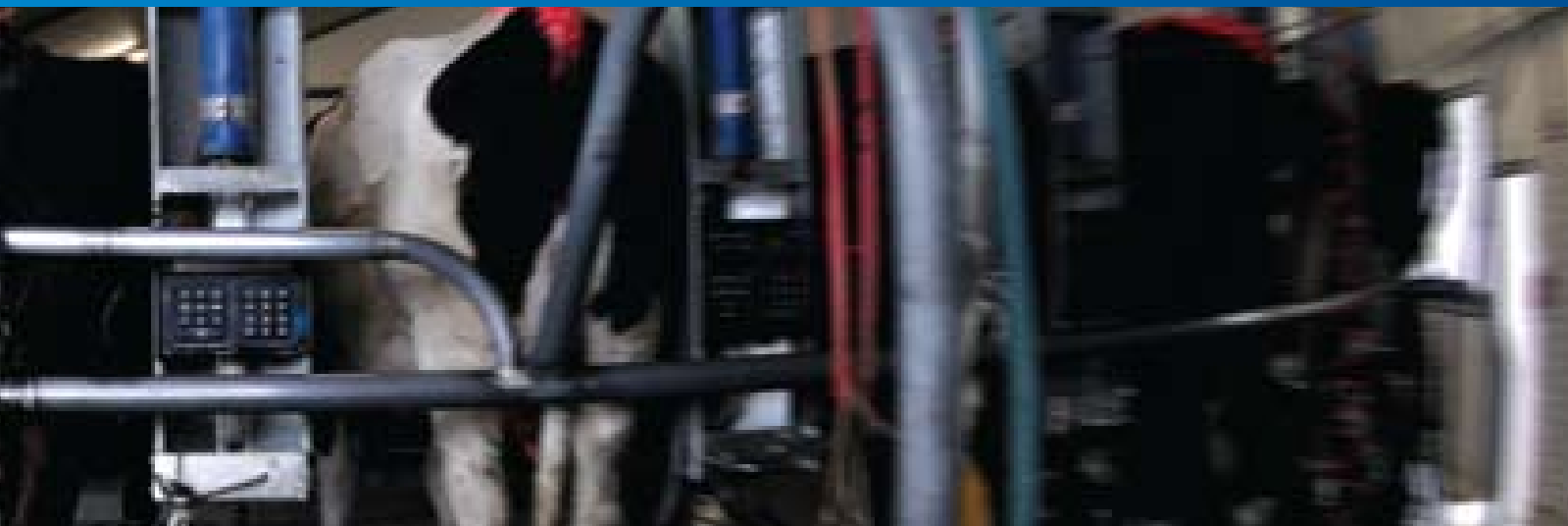
FROM IDEA TO CONCEPT

LIC developed the EZ Link concept relatively quickly, but had to park it in 2002 while the company replaced its 20-year-old weigh station and laboratory operation system.

Work resumed and by the spring of 2004 EZ Link had reached a point where it could be tested in the field on a Dolphin handheld scanner.

Farmers testing the product liked it, and many indicated they would use it when it came onto the market.

"Those keen to use the product tended to be milking larger herds through rotary sheds, so EZ Link offered a significant reduction in hassle for them and also reduced the number of staff needed for the herd test," says Herd Testing Manager, Craig Bell.



“Instead of needing to manage rows of perfectly ordered herd test trays, these farmers could now just maintain a pile of empties and a pile of fulls.”

For them, EZ Link also offered integrity and accuracy of records as it flagged if a cow being herd tested was not currently in the MINDA profile, or alternatively if a cow in the MINDA profile had been missed.

Based on responses from the trial, LIC launched EZ Link on a limited basis to 280 customers in the Waikato and Canterbury in 2005.

The following year the company purchased more scanners to meet growing demand, while still capping supply to 1,000 customers so it could build its capability in line with demand.

The 2006-2007 season and the new EZ Link era began well – but just as it was revving up LIC received news that the original Dolphin scanners were being discontinued.

The company had to come up with a new plan so it could offer EZ Link to its growing customer base and a decision was made to redevelop EZ Link onto a platform that would be there into the future – Windows Mobile.

Achieving this called on external expertise and there followed some frustrations as the first contractor committed, but failed, to meet targets causing time lags and loss of impetus as a contractor, who would stay the distance, was selected.

Resumption of work, unfortunately, coincided with the introduction of NZ Test Day Model and the ‘revolution’ this posed taking herd testing from a ‘twice a day’ function to an optional ‘once in 24 hours’.

“On one hand we were training field staff in the NZ Test Day Model, and on the other introducing and supporting EZ Link to staff and farmers,” Craig says.

“August 2007 saw EZ Link on the Windows Mobile platform go live but, within weeks, a few ‘bugs’ were uncovered in the new software.

“We had changed the screens and processes in the Windows version but, in hindsight, it would have been more effective if we’d stuck to what had proved popular when it was first trialled.

“The priority was supporting farmers who were using the new tool so we released several bug fixes to stabilise the product, issued credits for any retests caused by problems with the product, and provided a practical and phone support service.”

Herd Test Operations Manager, Rob Young, admits it was a tough time. “We’d raised expectations and the entire Herd Test team took it on the chin when the new EZ Link didn’t deliver to promise. We had people taking calls from farmers at 4am, but the team remained committed to getting it right.

Fortunately some regions were unaffected by the new software, as Herd Test Depots in Northland, Taranaki and Wellington/Hawke’s Bay were using the original software to make use of LIC’s investment in the Dolphin scanners.

PERSISTENCE AND PATIENCE REWARDED

The persistence of the Herd Test team and the patience of farmers has been rewarded this year with the launch of EZ Link2 in late September.

For this new version, the EZ Link software has been enhanced, simplified and undergone strenuous bench testing.

“We’re going to make sure we get it right,” says Rob. “If we’re not confident in the new product, we’ll delay release until we are.

“The product we launched last year is stable now – all the bug fixes are there, it just wasn’t as user friendly as we’d like so we’ve redeveloped it and sent it out to a group of farmers to trial. Their feedback has enabled us to enhance it even more.”

Despite the issues last year, demand for EZ Link has continued to climb, especially in the Canterbury region.

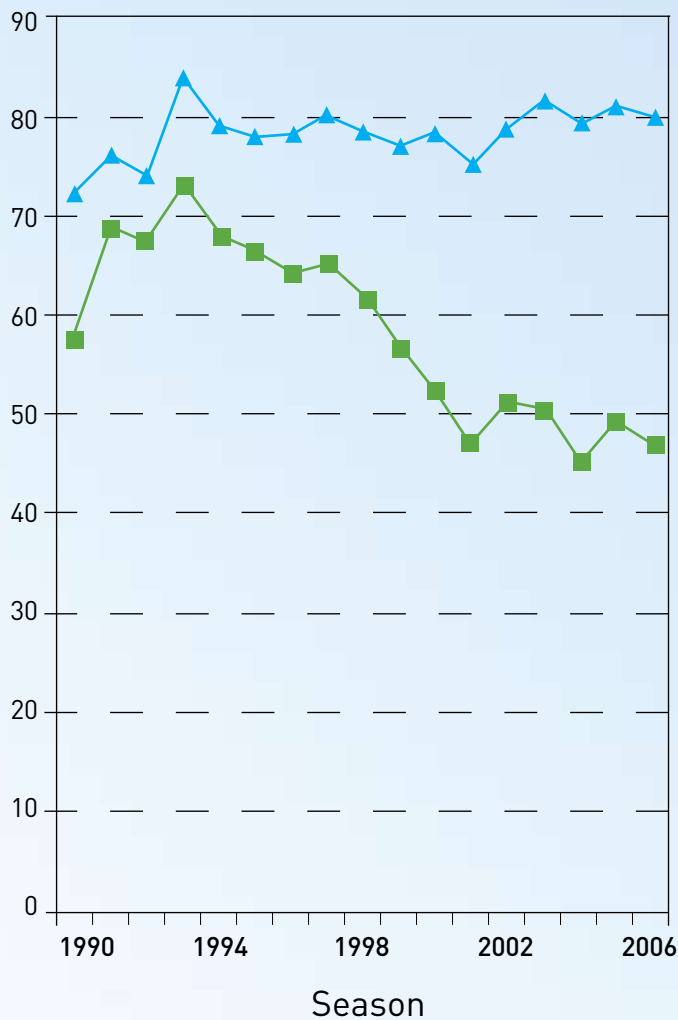
The number of large herds in the South Island means farmers there have the most to benefit from this labour-saving herd testing product.

Are we there yet?

For many years dairy farmers watched fertility rates drop in their herds; now statistics from New Zealand Animal Evaluation Ltd show these rates have been stable for the last few years, levelling off at around 48% of the national herd calving in the first 42 days. Has it turned around – are we there yet?



Industry trends for 3, 4 and 5-year-olds in the 3-week submission rate and % calving with in the first 6-weeks from the herd's Planned Start of Calving date.



▲ Percentage mated in first 21 days
 ■ Percentage calving in first 42 days

By focussing on breeding for fertility, Ashburton farmers, John and Joanne van Polanen, have improved the conception rate in each successive generation they have bred.

“I think it’s possible to turn fertility rates around in New Zealand,” says John “provided we use the right genetics.”

“For a number of years on our farm we’ve excluded any bulls with negative fertility Breeding Values and only bred to Premier Sires and Alpha sires with a high emphasis on positive fertility Breeding Values.

“Our in-calf rate has improved year-on-year, with the younger cows getting in calf much more easily than the older cows and our empty rates lowering each year.”

van Polanen heifer empty rates over three seasons

Season	Heifer empty rate (%)
2005/06	9.0
2006/07	7.6
2007/08	7.1

Dr Terry Hughes, Farm Supervisor at Synlait and previously a FarmRight Consultant thinks he’s starting to see the first signs of improvement in conception rates on the farms he’s visited.

“A few years ago we were seeing people go through the mill with high empty rates – some exceeding 20% – and now we’re starting to watch that track back down. Some farmers are down to 8% and 9% again.

“I don’t know if it’s real or just chance, but certainly the careful operators selecting sires on fertility Breeding Values appear to be making progress.

“I’ve seen herds where the empty rate last season was lower in the three-year-olds than it was in the older age group.

“Normally three-year-olds are one of the more sensitive groups when it comes to reproduction, so this could indicate that younger generations are improving again on the older.



“It’s early days and it might be a chance effect, but I’ve got an inkling things are on the up,” he says. “And some local vets I’ve spoken to have also said it looks like things are on the mend.

“At Synlait we’ve got about 15,000 cows on MINDA and one of the things I want to do is investigate whether empty rates are indeed improving.”

New Zealand one of the first countries in the world to select for fertility

It wasn’t until 2001 that Animal Evaluation introduced Breeding Values for female fertility, making New Zealand the first country in the world outside Scandinavia to be able to select for this trait.

Cow numbers in New Zealand increased from 2.4 million to 3.9 million between 1990 and 2006 and the average herd size grew from 164 to 337 over the same period – all the while the industry suffered a skilled labour shortage.

Even with good staff, managing fertility programmes in large herds is difficult, and the growth in cow numbers saw more cows retained when, previously, they would have been culled if they were empty or late calving.

Thirty years ago anoestrus rates were 7%, but as breed preference moved from Jerseys to Holstein-Friesians, which take longer to cycle, this rate trebled to its present rate of 20%.

An influx of less fertile overseas Holstein genetics occurred in the 1990s and this initially had a negative impact on the fertility of the Holstein-Friesian breed in New Zealand because of key physiological differences between the two breeds.

The 2005 Holstein-Friesian strain trial showed that where North American Holsteins keep producing milk for every unit of feed given, New Zealand Holstein-Friesians reach a point where they stop producing more milk and start gaining weight, which is ideal for fertility reasons as it means they can improve their Body Condition Score (BCS) after calving, in time for AB.

Fortunately, the North American Holstein-Friesians were self-eliminating under the New Zealand seasonal system because of their poor fertility.

Animal Evaluation Manager Bill Montgomerie has observed: “The Holstein percentage in the pedigrees of black and white cows has stabilised at around 40% and the least well suited Holstein genetics for cow reproduction in seasonal dairying no longer feature in the ancestry of black and white bulls graduating from progeny testing.”

He also notes that relatively favourable genes for cow reproduction present in the Jersey breed have been dispersed more widely in the national herd.

Introducing the fertility Breeding Value was a massive achievement made possible by LIC scientific research and an advance in computing technology that allowed for thousands of complex calculations to be performed simultaneously.

Multiple trait fertility model – and DNA Proven genetics

Further refinements to the evaluation system came into effect in July 2005, after LIC scientists developed the multiple trait fertility model, which brought body condition score information and milk volume yield into the mix.

And with LIC launching DNA Proven bull teams this spring, the industry gains another method for evaluating bull fertility, sooner.

For fertility, DNA Proven is more reliable than Daughter Proven when bulls are being selected for the first time into those teams.

Daughter Proven bulls have reliabilities for female fertility of approximately 35-40% at first selection, and that increases to 60% for the second year. Whereas in DNA Proven it is estimated to be 47% for Jersey and KiwiCross™ bulls and 59% for Holstein-Friesian bulls.



The impact of management on reproductive performance

Although genetics have a significant impact on fertility, an LIC study into the reproductive performance of dairy cows in New Zealand found that management is still the single most important factor in achieving solid reproductive performance.

LIC scientists, Zhenzhong Xu and Lindsay Burton, collected reproductive performance data from 101,185 cows around New Zealand over three seasons, from 1998 to 2000.

They found the average raw submission rate for herds in the top quartile was 91%, but just 67% for herds in the bottom quartile – a marked difference considering the similarity of genetics in their study.

Because management is so vital in lifting herd reproductive performance, DairyNZ this year launched the InCalf programme, in an adapted form based on InCalf developed by Dairy Australia.

It is a learning package of tools, resources and training for both dairy farmers and their professional advisors that aims to enhance the capacity of both groups to better manage herd reproduction.

Farmers who have upgraded to MINDA08 can access the InCalf Fertility Focus report to help them assess herd reproductive performance, using 6-week in-calf rate – the best overall measure of herd reproductive performance.

“If farmers have any issues or concerns about their herds’ reproductive performance, I advise them to access the Fertility Focus report and talk it over with a trained advisor to understand what it means for their herd,” says DairyNZ Project Manager for InCalf, Mark Blackwell.

“In many cases this report can be accessed for up to the last three seasons, showing recent performance as well as trends over time.”

The report rates a farmer’s own herd performance and compares it to industry targets, so farmers can see the specific areas of herd reproductive management they are doing well in, as well as the areas to improve.

“The challenge to dairy farmers is to better involve their vets, consultants and other advisors in the InCalf continuous improvement process, and to better align their efforts towards farmers’ goals for herd fertility,” says Mark.

InCalf is rolling out advisor courses throughout the country to train advisors such as veterinarians, farm consultants and district managers to be able to work through InCalf with farmers.

“By Christmas we should have 100 trained InCalf advisors and we hope to have another 100 by the same time next year.

“Dairy farmers seeking help with herd reproduction should encourage their advisors to attend the InCalf advisor training course.”

Along with the Fertility Focus report, DairyNZ has adapted The InCalf book for New Zealand dairy farmers.

“It is the accepted knowledge base that underpins the InCalf programme,” says Mark.

“This book should be a shared resource for farmers, their farm-staff, and advisors alike.

“It’s useful as a reference and point of discussion for ongoing learning and clarification.

“Learning to use the tools, and apply the knowledge, is vital to getting the best out of InCalf.”

Dairy farmers can access their own copy of The InCalf book by registering at www.dairynz.co.nz/incalf



FEED CONVERSION EFFICIENCY TRIAL



A trans-Tasman trial is underway to develop markers to differentiate the cows that convert feed into milk more efficiently than their herd mates.

Unlike their drystock contemporaries, dairy farmers are advantaged with animal evaluation models that enable them to rank cows based on their productive ability and many elements of conformation – but none (thus far) have extended to the identification of the genetic markers that predispose feed efficiency and improved net milk yield.

The seven year trial is a collaboration between LIC and DairyNZ in New Zealand with a sister trial in Australia involving the Department of Primary Industries in the state of Victoria.

The Feed Conversion Efficiency Trail is part-funded by the Foundation for Research, Science and Technology, DairyNZ, LIC and Trade & Enterprise New Zealand's Australia New Zealand Biotechnology Partnership Fund. DairyNZ has overall responsibility for project delivery.

SCIENTIFIC JUSTIFICATION

It has long been hypothesised that dairy cows vary in the efficiency with which feed (or energy) is used for body maintenance, growth, waste and production.

Significant and heritable variation in Feed Conversion Efficiency (FCE) exists in beef cattle, pigs, poultry, and mice. The physiological and biochemical bases for variation provides compelling evidence that dairy animals will express variation in FCE.

Advances in biotechnology have enabled a trial which, until now, has not been conducted anywhere in the world because of the need for large numbers of animals and cost required to produce quantifiable results.

THE TRIAL

The first section of the trial began in June 2007 with matings identified to generate a total of 1000 high Breeding Worth heifers in each country over three years. The breed selected was not crucial to the design, but Holstein-Friesian was selected because this is the dominant breed in Australia. All matings, in New Zealand, have been to LIC Premier Sires in order to ensure the most contemporary genetics are represented in the project.

For logistical reasons, the New Zealand selection area was restricted to farms in the Bay of Plenty, Waikato and South Auckland areas.

To date, 1300 contracts have generated 690 heifers, picked-up at between four and ten days of age.

The heifers are being reared together at a professional calf rearing facility and will then progress to a grazing property until they are eight months of age when they move to the WTARS research farm in Taranaki for the first of the two DairyNZ research phases.

FEED TRIAL

The first trial measures feed intake and growth of heifers given Lucerne cubes as a sole diet. The cubes, imported from Canada, have been chosen because they have a consistent composition, their dry matter composition assisting accurate measurement.

The heifers are divided into groups of eight, housed in pens with a feeder that identifies each animal electronically and measures intakes. Intakes are measured continuously and liveweight is measured three times a week for seven weeks.

Based on a pilot trial of 160 heifers conducted in 2008, researchers anticipate a variation in the growth rate of animals (see graph below).

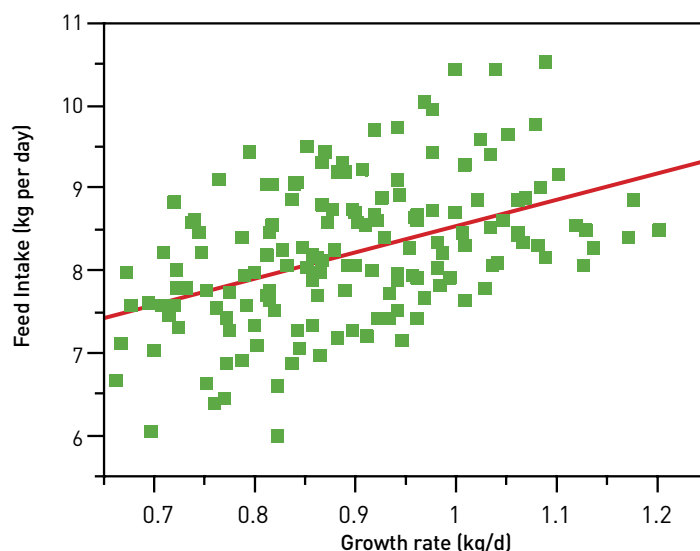


Figure: Observed variation in growth rate per unit feed intake

DairyNZ scientists calculate feed intake in relation to liveweight gained from each heifer to identify the most efficient animals (least feed/gain). Efficiencies will be related to the heifers' DNA to identify markers for the trait.

The outcome of the feed challenge will be a set of genetic markers for efficiency of feed conversion for growth rate. At this phase of the trial efficiency of conversion for growth rate is a proxy for efficiency of conversion to milk production in later life. This is based on the hypothesis that the same biological pathway that delivers efficiency of growth rate, will line-up with the same pathway for conversion of

feed to milk production. Validation of this hypothesis will be possible once the next phase of the study is completed.

Dr Steve Harcourt, who heads the LIC contribution to the trial, admits this is “one of the elements of technical risk in the project, but we have designed an experiment which gives us a cost effective means of finding genetic markers which will be as close as possible to efficiency of milk production.”

“In 2008 and 2009, the trial will identify growth efficiency markers, that will then be validated as milk production efficiency markers in a smaller trial on a subset of the calves when they enter a milking herd.”

SECOND PHASE

At the completion of the Feed Trials, the heifers will go to a grazing property where they will be mated, calve and then enter a milking herd for their first lactation.

“At the start of their second lactation, when their growth rate has almost stopped, the 10% most efficient, and 10% least efficient, cows will be selected to enter the adult trial which is essentially the same experiment as the juvenile feed trial except that milk production will also be measured as the principal production trait.”

This, according to Dr Harcourt, is the essence of the trial.

“There are so many variables (with this experiment) that influence the efficiency of production, and you try to isolate a few, like growth rate. We have to wait for them to stop growing before we go onto milk production because a lot of energy goes into growth that can't be accurately captured and which would make the modelling less precise.”

The milk production efficiency trial will take place over two consecutive years.

“We will reanalyse the genetic markers from the growth efficiency challenge to check that the markers related to the efficiency of growth rate are still prominent markers for efficiency of feed conversion for milking production.

“In essence the adult trial is a validation of the juvenile telling us if the markers stack up in milk production as they did in growth and whether the same markers have the same effect in later life as they did in early life – i.e. do they switch off as the cow gets older.”

The ideal outcome of the trial would be to integrate markers for growth and milk production into the breeding schemes in New Zealand and Australia delivering yet another mechanism for farmers to breed efficient, profitable cows. Additional applications could be the screening for more efficient animal to enhance the selection of replacement heifers.





The last word on the trial goes to Bill Montgomerie, Manager of NZ Animal Evaluation Ltd.

FEED CONVERSION EFFICIENCY

“We currently achieve annual genetic improvements in feed conversion efficiency by breeding cows with bigger appetites and better grazing ability. These cows increase overall feed conversion efficiency by eating more feed per unit of liveweight, which diverts a higher proportion of feed to production of milksolids. The outcome is more milksolids per tonne of feed.

These improvements in gross feed efficiency do not rely on more efficient chemical processes within the animals, which can be described as metabolic efficiency. In dairy cattle breeding we have not had any tools for planned improvements at this level of efficiency. We have a big handicap in this area because planned improvement would depend on accurate measures of feed intake for large numbers of animals. This is hard to achieve for cattle fed on pasture.

There has been strong evidence for some genetic variation in the metabolic efficiency of farm animals for a long time. For example, in New South Wales selection lines of Angus cattle have been developed where the lines achieve the same post-weaning growth rates, but one selection line eats less – showing its higher metabolic efficiency.

Research by Nicolas Lopez-Villalobos from Massey University encourages us to investigate possibilities for exploiting genetic variation in metabolic efficiency in grazing dairy cattle. Nicolas worked with Irish data from the Moorepark Production Research Centre, and reported to the New Zealand Society of Animal Production in June. He worked with records for over 400 cows with over 1,000 lactation records, and a large number of feed intake records.

His method enabled him to separate cows with high and low breeding values for metabolic efficiency. For both these groups of cows the milksolids production was 518 kilograms per lactation on average. However, the feed intake for the high metabolic efficiency group was 4% less than the feed intake for the low metabolic efficiency group. Put this the other way round. If we could breed cows with this extra metabolic efficiency (which we cannot recognise in the BW index with our current technology) then we would achieve 4% more milksolids from the same amount of feed. This would be over 4,000 kilograms of milksolids per herd per year, from the same amount of feed. What a prize that would be to help feed a hungry world!

Don't let me mislead you. The road to achieving genetic selection for higher metabolic efficiency has to cross many hazards. For example, accurate measurement of individual cow intakes is expensive. And monitoring the investigation to protect against undesirable side-effects will be essential. In the words of some of Nicolas's co-workers in Ireland: “it is clear that improvements in metabolic efficiency must be made in conjunction with other traits influencing economic efficiency”.

Overall the probability of success for this research agenda is lower than it is for many other research projects. But the prize for success is large. Success has been achieved with other species used for animal production. And if Australians and New Zealanders don't do it we cannot expect anyone else to do it for grazing cows.”

LIC Shareholder Council -

compliance
cost
adding
value

or?

It is easy to become a little introverted when immersed in your own business on farm - especially during spring when life seems to revolve around early mornings and long days when the head is down and the tail up. But underneath all that most Kiwi farmers remain excited about the new innovations and potential which are on offer within their industry.

So when you put a bunch of farmers together it's pretty much guaranteed they will talk shop.

That is one aspect of what happens when the 21 farmers who make up LIC's Shareholder Council get together three times a year. And it's this hands-on farmer and industry perspective that enables them to fulfill their role as elected representatives of LIC shareholders.

The Shareholder Council focuses on LIC both as a business and as a solutions provider and Councillors chew the cud over issues and how they affect shareholders down on the farm.

Each Councillor is a hands-on farmer and user of LIC products and services and they bring to the table a diverse range of views and experience. It's that diversity which makes the Council functional, valuable and effective.

Over the last few years the Shareholder Council has developed rapport with the Board and management based on openness and trust and shared goals - that is not to say, however, that the Council is anyone's puppet.

At each Shareholder Council meeting, held over two days at LIC's Hamilton campus, the Councillors are privy to reports and presentations from managers of various divisions and interact with the Board. This informative and interactive forum gives them the opportunity to challenge and question the processes and policies that affect the strategic direction of the company.

While it is appropriate that staff should deal with most shareholder issues and concerns, at times farmer shareholders feel more comfortable talking with other farmers and Councillors and have been able to satisfactorily facilitate solutions on a number of occasions, often highlighting areas for improvement.

The role of the Shareholder Council is defined in LIC's Constitution, its aim to contribute to the unity and strength of the co-operative by representing its 11,500 shareholders.

Council was fully involved in the review and endorsement of recent changes to the LIC share structure, challenging each recommendation to ensure it did what it was meant to do, and obtained an independent professional overview to find any loopholes before it was presented to shareholders.

There is no doubt that the unique farmer-to-farmer links evident in co-operatives throughout New Zealand's dairy industry contribute to its strength and LIC is no different.

The role of the Shareholder Council is defined in LIC's Constitution, its aim to contribute to the unity and strength of the co-operative by representing its 11,500 shareholders.

Compliance costs are becoming the bane of many farming businesses and being 'real' farmers means there's a real determination amongst Councillors not to become 'just another' compliance cost to shareholders.

Representing thousands of shareholders is a challenge and the Council needs to evolve and evaluate if the methods it is employing are reaching, informing and engaging a representative number.

Until a few years ago, LIC had a network of Liaison Farmers – small, localised groupings of farmers who met at regular intervals. When the network was disestablished, a ward based contact system was set-up in its place to maintain contact with farmer opinion. This is based on email information to shareholders with comments back to Councillors. Shareholders who are interested in taking part in the network should contact their local councillor (contact details are available on the LIC website and in the Services Catalogue).

Information received via the ward based contact system is collated so the Council has a nationwide perspective to discuss at the next meeting, and a summary is given to the Chairman of the LIC Board and CEO. Some of the feedback is used to help improve the products and services from LIC.

Having a membership of 21 farmers spread across New Zealand means the Council has its finger on the pulse and, being 'closer to the coalface' means they are able to bring a pragmatic approach to decision making.

Swapping gumboots for business clothes may not be second nature to each of these farmers but nevertheless they take their role on the Shareholders Council seriously and don't hesitate to give up sometimes quite large amounts of their time to contribute to the well-being and future strength of the company.

Councillors have an obligation to do their best and most jump-in, boots and all. Professional development and improving skill levels is part of the job and increases their effectiveness in the role.

LIC is very supportive ensuring that there are plenty of individual and group learning opportunities for Councillors and every member has completed a time management workshop and a session on understanding financial accounts which included how to get the best value from reading annual reports. All Councillors are encouraged to take on leadership opportunities and governance training.

Several Councillors have participated in the Kellogg's Rural Leadership Development programme through Lincoln University. Jenny Morrison will complete the course this year and said "growing is often uncomfortable but this not only dragged me out of my comfort zone, it stretched me physically, emotionally and professionally and extended me until I hardly recognised myself. It brought to light abilities that I didn't even know I had and certainly never dreamt I would use. If not for LIC's encouragement, I would never have thought to put myself forward for a course of this calibre."

Those on the Council all have dairy farming in common and a passion for the industry reinforcing the fact that there is no such thing as 'average' or 'ordinary' about the people behind today's record-making dairy industry.

On top of the world



Speaking at the spring LIC District Managers conference this year, Animal Evaluation Manager, Bill Montgomerie said, "I started farming in the 1960s and over the years I truly came to believe there was an economic rule that said New Zealand dairy farmers would make less money each year.

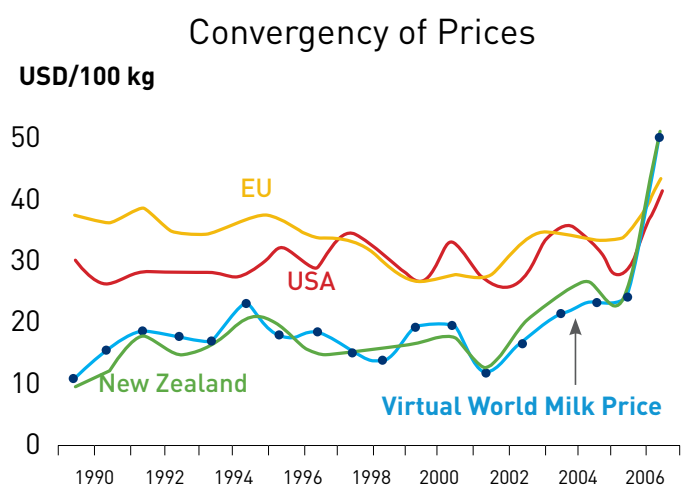
"I thought Northern Hemisphere policies of dairy producer subsidies would continue to distort world markets and lock New Zealand producers into low payouts forever."

Trends reported by the International Dairy Federation have typically shown the New Zealand producer price at a level of around half the European or USA prices.

There is a silver lining.

New Zealand dairy farmers have had to find increasingly efficient ways to run their businesses, resulting in better overall farm management. Now huge global demand for milk products means New Zealand dairy farmers are, according to analysis conducted by the International Dairy Federation, being paid more for their product than farmers in the EU or the USA.

CONVERGENCE OF MILK PRICES OCCURRING



International trends in dairy producer prices

Source: Bulletin of the International Dairy Federation – the World Dairy Situation 2007

“New Zealand dairy farmers worked out ways to share all the herd testing information sooner than most farmers overseas,” said Bill.

Not only do New Zealand farmers run more cost-effective systems, they are now reaping better payment for the milk they produce out of those systems.

One reason for the higher New Zealand milk price is that New Zealand farmers supply dairy companies with only 12 litres of volume for every kilogram of milksolids, whereas Northern Hemisphere producers supply 14 litres for every kilogram of milksolids.

This saves money for manufacturers, who can spend less on fuel costs for cartage, and on energy to dry water out of the product.

“New Zealand farmers have focused on this high concentration milk because they have always understood that milk was destined for manufacturing rather than liquid sales,” said Bill.

Because NZ Animal Evaluation calculates Breeding Worth by adding points for milk fat and protein production, but deducting points for milk volume, this encourages NZ farmers to breed for components rather than volume.

“Around two thirds of the milk supply in Europe and USA is destined for manufacturing. However, the message that less concentrated milk is not as good raw material for the manufacturing plants has not really filtered through to breeding decisions in Europe and USA.”

Helping to underpin efficiency of farming in New Zealand is the LIC database.

It enables farmers to compare their cows with the national average, which lifts competition among dairy breeders and has an ongoing effect on the quality of NZ dairy genetics.

“New Zealand dairy farmers worked out ways to share all the herd testing information sooner than most farmers overseas,” said Bill.

“This has helped breeding decisions on farm as well as the identification of elite sires. Nowadays our farmers take this for granted.”

As Professor CP McMeekan said back in 1960, “Most individuals can make maximum reliable progress by taking advantage of their national artificial breeding organisation.”

The proof is in the pudding, with the July NZ Animal Evaluation Index averages showing that 2007-born heifers have an average Breeding Worth (BW) across all breeds of 110, compared with 100 BW for 2006-born heifers and 85 BW for 2005-born heifers.

This, and data going further back, shows that every year the BW of new calves hitting the ground increases by around 10BW points.

That improvement is a direct result of farmers taking the time to herd test, and then breeding companies and farmers using that information to make good individual breeding decisions.

New Zealand’s temperate climate is another advantage for dairy farmers, as it enables profitable pasture based farming systems.

This advantage is even greater now that feed prices are so much higher than milk solid prices.

Being able to grow pasture for feed, and having cows that efficiently convert that pasture to milk, gives NZ farmers a strong competitive edge.

The 2005 Holstein Friesian strain trial found that New Zealand cows produce more milk with better components from grass than overseas dairy cows, and will continue to produce the most milk yield up to six tonnes DM per cow per year level of feeding, after which point they will start converting extra feed to body weight.

Whether farmers choose to stay wholly pasture based, or head down the high input path, New Zealand genetics are their best choice – because they have been bred over so many years to meet NZ dairy farming needs.





Simple and effective feed budget programme

Good pasture management is vital for turning grass into quality meat or milk for profitable farming and Waikato dairy farm owner, Brent McConnell, has found that using LIC's farm-mapping tool, FarmKeeper, allows him to have a better understanding of feed levels and growth, even when he's not present.

Brent and his wife, Juanita, own a 99ha effective dairy farm in Gordonton and purchased FarmKeeper in 2007 because they wanted a farm-mapping tool that would be easy for staff to use, but which would generate the reports Brent and farm manager, Sam Christie, needed to make good feed management decisions.

"It had to be user friendly, because I knew staff wouldn't use it otherwise," says Brent.

FarmKeeper is a farm mapping software program that runs on the home computer and synchronises with a portable Palm-powered handheld™ device, enabling farmers to map, record, analyse and plan their farmland from the farm or the office.

"FarmKeeper has a simple but effective feed budget programme," says Brent.

"I run it on a waterproof Palm along with MINDApro, so when staff do their farm walks to plate measure feed levels they just load the information through on the handheld, then it gets synched to the farm computer.

"FarmKeeper is a useful tool for my staff. Now when they look at a paddock to check total cover, they've always got the paddock size on hand, so they can quickly work out how much dry matter feed they have available.

"It takes my place a little bit when I'm off farm, because even inexperienced staff can just punch information into the handheld and get accurate total feed information."

The program features a farm diary, which lets staff view information in a familiar calendar format.

"It means the decisions I make from the office are more accurate.

"Staff enter information into the handheld every day and at the moment, because grass growth is under significant pressure, I'm checking FarmKeeper several times a week, mostly to look at feed and grazing history."

Brent bought his farm in 1997 and added to it in 2004 when he purchased a neighbour's property.

He knocked down the existing infrastructure, built a 32-a-side herringbone dairy and re-fenced the whole property using GPS technology.

When it came time to create a map of his farm in FarmKeeper early last year, Brent was able to use this GPS information to load information about his two kilometres of races and 39 kilometres of fences into the programme.

Staff use FarmKeeper to see which paddocks have been grazed more than others and check past and planned paddock activities like pasture cover, fertiliser application, irrigation and cropping,

A step-by-step wizard took Brent through the creation of a new farm feed budget – one of his favourite features of the programme as it takes into account supplements, animal mobs and fertiliser applications.

FarmKeeper was launched to the market in 2004 by Kiwi, Darren Bruning, and LIC purchased it in November last year.

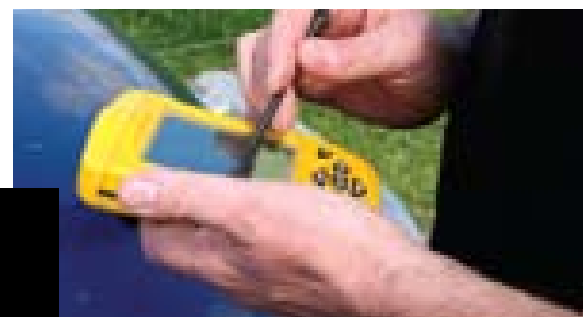
Darren has since joined the staff of LIC and continues to work on FarmKeeper as a Systems Architect.

Brent McConnell thinks FarmKeeper will only get better now that LIC is supporting it.

"I think it's good that LIC has picked it up because the programme will grow with the company and get more support.

"We're just putting in a walkover weigher on our farm, so I'd like to see FarmKeeper integrate with that and MINDA at some point.

"Integration is especially important for me as a farm owner, because I'm not onsite everyday, so the more information I can get sent back to my office, the better."



credits

Inside LIC represents not only the work, but the creativity of LIC.

All articles were researched and written by Clare Bayly, Gail Henshaw and Emma Abrahams.

The trio, along with Bevin Harris, also produced the photographs which grace the pages, the only exception (due to geographical constraints) being Ireland (A Kiwi Start to the Day) and South Island (Are We There Yet).

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