
Welcome to LIC
Hosted by LIC International
There's always room for improvement
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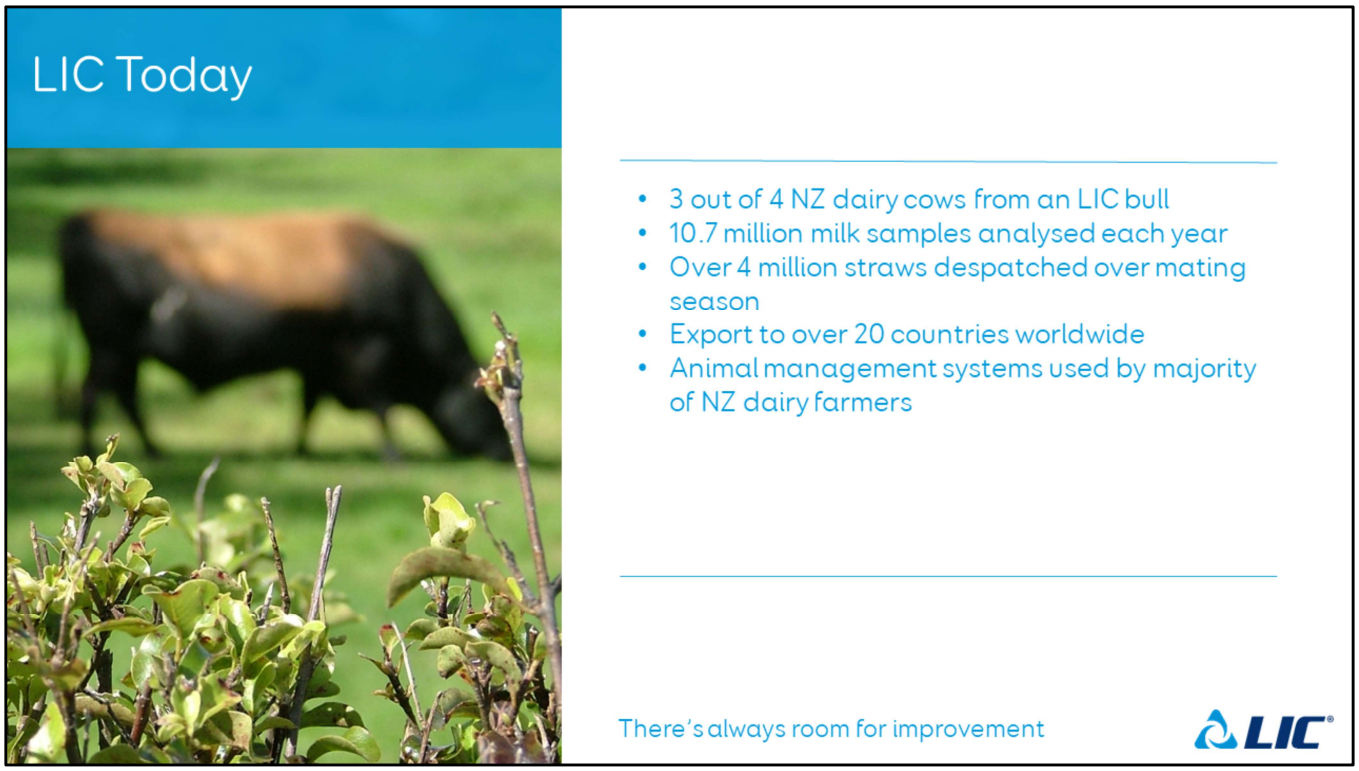
**LIC Overview**
Commercially focussed
12,000 shareholders
Head office in Hamilton with International subsidiaries in UK, Ireland, & Australia
**Staff**
LIC employs 700 FTE (Full time equivalents)
1700 seasonal staff to deliver it range of products and services in New Zealand and abroad.

**Locations**
Main Bull centre is on 260 hectares in Hamilton
2nd centre of 130 hectares, collect for EU

Export through Distributors to over 20 countries worldwide

Over 10% of revenue is invested annually in product R&D
25% goes to Sire Proving Scheme (SPS)
Over 20% to biotechnology (Genomics)




**LIC Overview**

Three out of four NZ dairy cows are sire from an LIC bull

10.7 million milk samples analysed each year – from 8100 herds

Export through Distributors to over 20 countries worldwide

Animal identification & information management systems used by majority of NZ dairy farmers

The company has a proud history, having pioneered several key initiatives that today provide New Zealand dairy farmers with their competitive edge on the world stage. Examples include the systematic herd testing of milk quality, the distribution of Long Last Liquid (fresh) semen, and the introduction of DNA technology to Genomically identify, and select, elite sires.

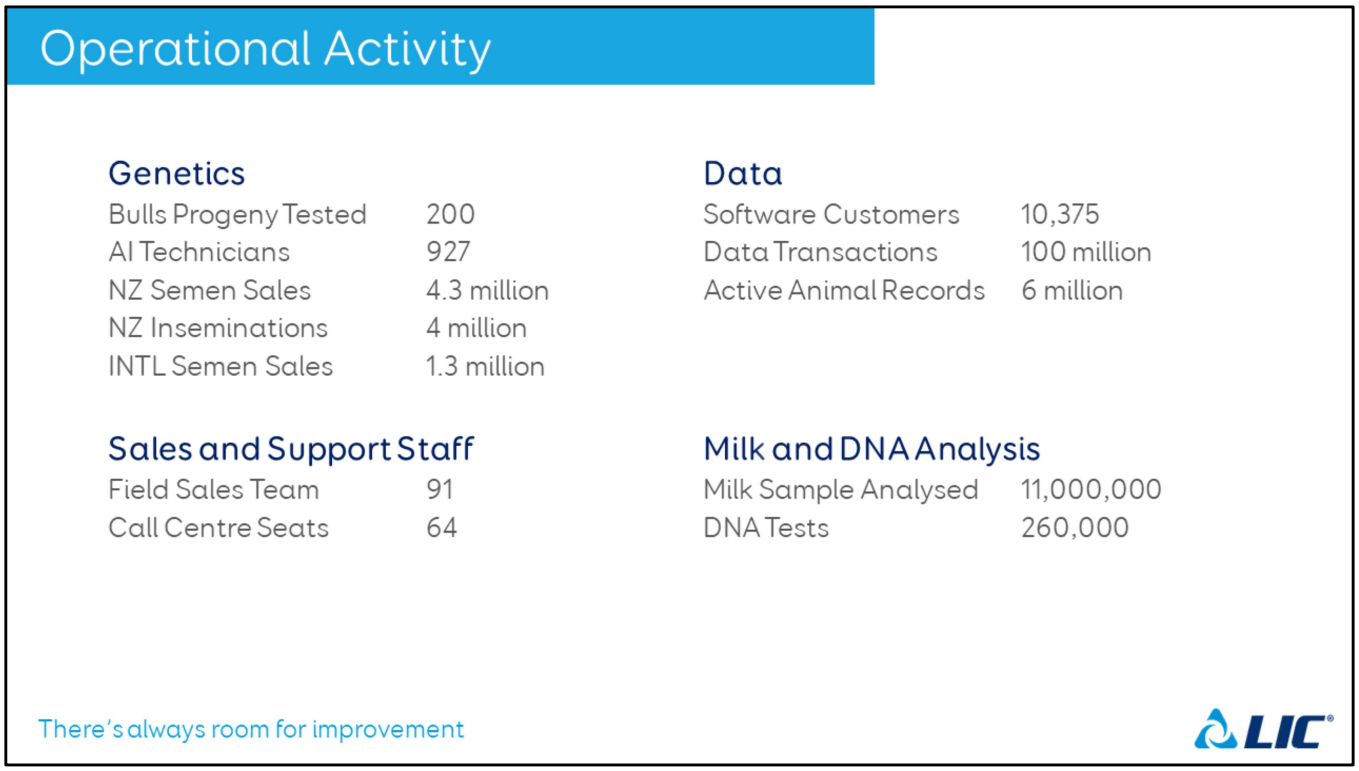
Our work to continuously improve dairy cow performance continues: A significant part of this responsibility is to provide reproductive solutions that suit the needs of individual farming customers.

Our origins, which date back to the early 1900s, lie in animal performance management tailored to an innovative and wide range of products and services that deliver profit to a wide range of livestock farmers. Including:

Dairy animal recording,

Dairy herd testing and milk analysis laboratories,

Progeny testing for the dairy and deer industries,
Artificial breeding for the dairy and deer industries.
Farm automation solutions for beef and dairy,
Animal health management,
On-farm consultancy service,
Research and development,
DNA analysis across species – beef, dairy, goats and pigs,
Industry statistics and trends,
Own a 105 hectare Innovation Dairy Farm.
Dairy Automation (DAL).



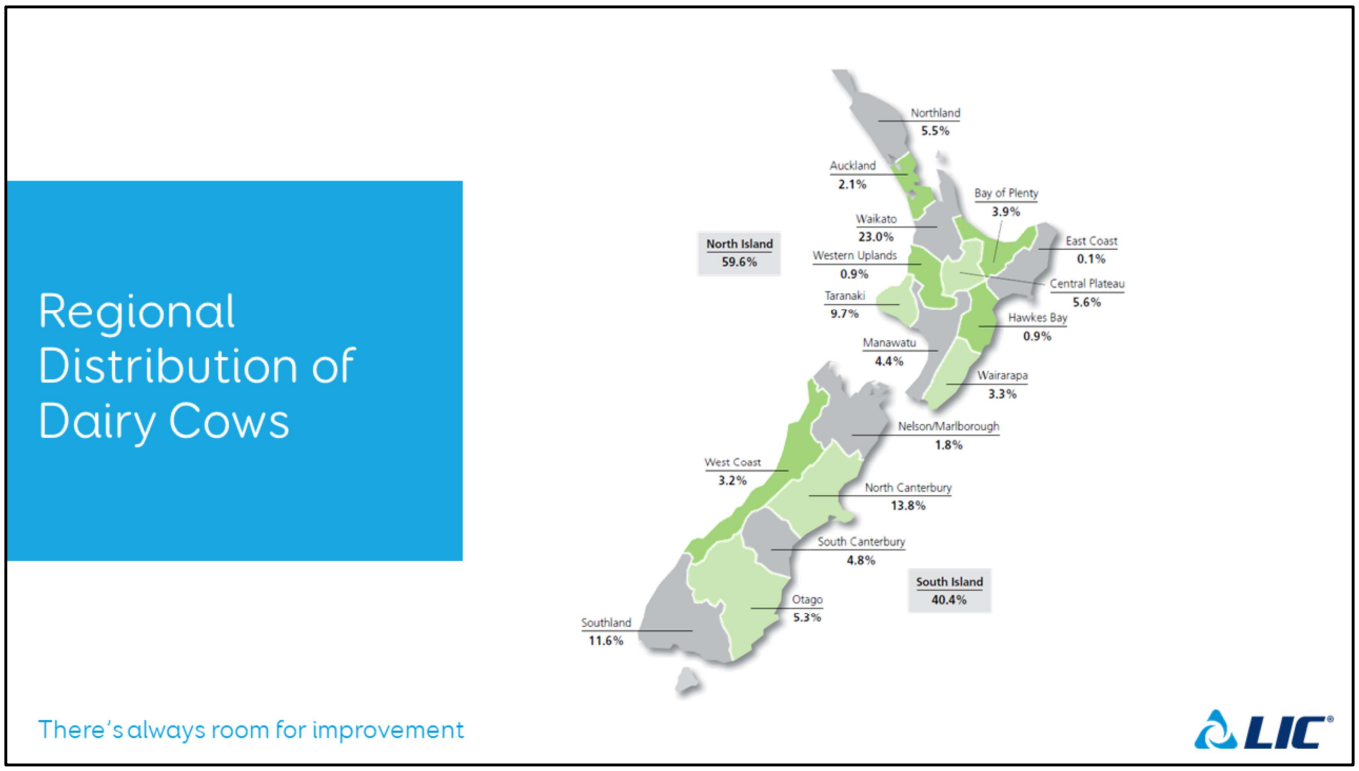

We sell approx 4.3 million doses every year (77% market share in AI)
Over 3 million inseminations are carried out every year utilising our own Fresh semen technology. For approximately 25 days we will process and distribute over 100,000 per day, from our Premier Sires teams of bulls, to our AI technicians and DIY (Do it yourself) customers. On our peak day in October 2014, LIC will process and distribute 130,000 doses.

Dairy genetics

- 2000 bulls screened (including genomics)
- Liquid and frozen semen technology
- Extensive nation-wide field service

Deer genetics (venison, antler)

| | |
|---|---|
| Inseminations – NZ | 4 million |
| Semen Sales – Intl | 1.3 million |
| Data transactions | 100 million |
| Active Animal records | 6 million |
| Software customers | 10,300 |
| Milk sample analysed | 11 million |
| DNA tests | 260,000 |
| Automation systems | 1050+ |
| AI technicians | 900+ |
| Field sales team | 91 (76 FSMs) |




**Regional Distribution of Dairy Cows**

- *73% of dairy herds located in the North Island*
- *40% of dairy cows located in the South Island*

The majority of dairy herds (72.6%) are located in the North Island, with the greatest concentration (28.8%) situated in the Waikato region.

Taranaki, with 14.1% of dairy herds, is the next largest region.

Although South Island dairy herds account for 27.4% of the national total, they contain 40.4% of all cows milked.

Twenty-three per cent of all dairy cows are located in the Waikato region, followed by North Canterbury (13.8%), Southland (11.6%) and Taranaki (9.7%).

## NZ Dairy Statistics

11,590 herds
4.99 million cows
1.75 million hectares

Average Herd
- 431 cows
- On 151 hectares

Production (all cows)
- 1.78 million litres of milk
- 158,733 kg Milk Solids

There's always room for improvement

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**NZ Dairy industry stats 2016-17**

11,590 herds
4.99 million cows
1.75 million hectares

**Average herd size 431 cows producing:**

1.78 million litres of milk
158,733kg milk solids
From 151 hectares

71.5% of all dairy cows are artificially inseminated
Nearly 100% of all replacement animals are AB bred
The average number of inseminations per cow in NZ is 1.37

## Average NZ Dairy Cow

**Produces**
- 4,217 litres milk
- 368 kg milk solids
- 4.75% milkfat
- 3.82% protein

**Consumes**
- 5 ton dry matter
- 85% grazed pasture or home grown supplement
- 15% imported feed
- Respond well to higher feed levels

**Highly Fertile**
- 370 day calving interval

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**Average New Zealand Cow (DairyNZ Stats 16/17)**
4,217 litres milk
368 kg milk solids

# 4.75% Milkfat
# 3.82% Protein

Consumes 5 ton dry matter feed
85% of feed is grazed pasture +15% conserved feed: hay, grass silage, maize silage
Some use of imported feed
Respond well to higher feed levels
Highly fertile with 370 day calving interval


LIC's breeding goal aligns with the NZ dairy industry breeding goal, in turn is aligned to the milk processor payment.

**Latest industry results have confirmed LIC has the best bulls in the country – by far**

The genetic gain and value that LIC bulls are delivering on New Zealand dairy farms is confirmed in the latest Ranking of Active Sires (RAS) list.

A phenomenal 26 of the best 30 bulls on the All Breeds list are LIC's, including the top 12 in a row of all breeds.

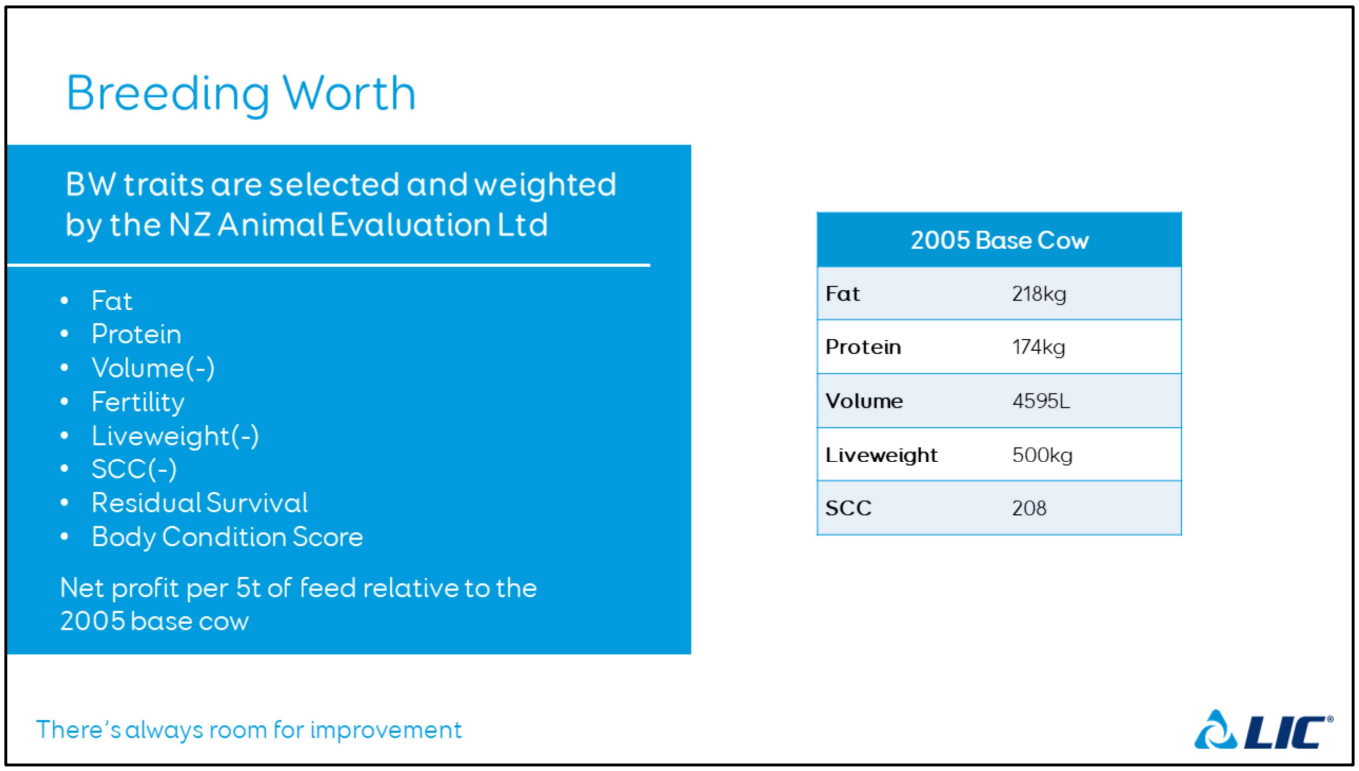
## Breeding Worth (BW) is the New Zealand Dairy Industries breeding goal

The Breeding Worth ranks male and female animals for their genetic ability to breed replacements. BW is use to make decisions on:

AI bulls

Herd replacements

Purchasing animals

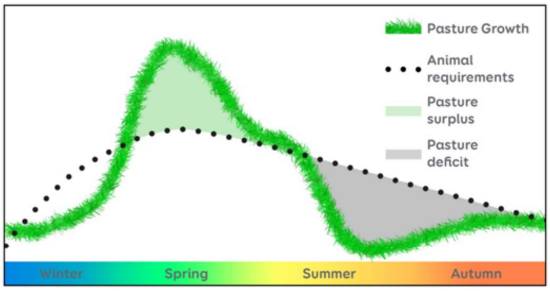



Economic values (EVs)
Economic values are calculated using farm economic models which take into account milk production, historical, current and forecast milk prices, income from culls, surplus cows and bobbies, cost of generating replacements and dairy farm expenses.

These are updated in February every year. In February 2019, the Economic Values used to calculate Breeding Worth will be updated. This update reflects changes on the world market where there has been a significant increase in the value of fat and a decrease in the value of protein.
EVs as at Feb 2019:

| | |
|---|---|
| **Milkfat** | $3.45 |
| **Protein** | $4.34 |
| **Milk Volume** | -$0.092 |
| **Liveweight** | -$1.30 |
| **Fertility** | $5.84 |
| **Somatic Cell** | -$37.2 |
| **Body Cond Score** | $95.7 |
| **Residual Survival** | $0.111 |

## Seasonal NZ Dairy System




*Source: http://www.ruralnewsgroup.co.nz/item/11027-fertilising-on-a-budget - written by Dr Ants Roberts, Chief Scientific Officer, Ravensdown*

In order to maintain a low cost system, calving and lactation peak need to match NZ seasonal spring grass growth.

Cows calve in July/Aug and come into milk prior to the Oct/Nov grass growth peak.

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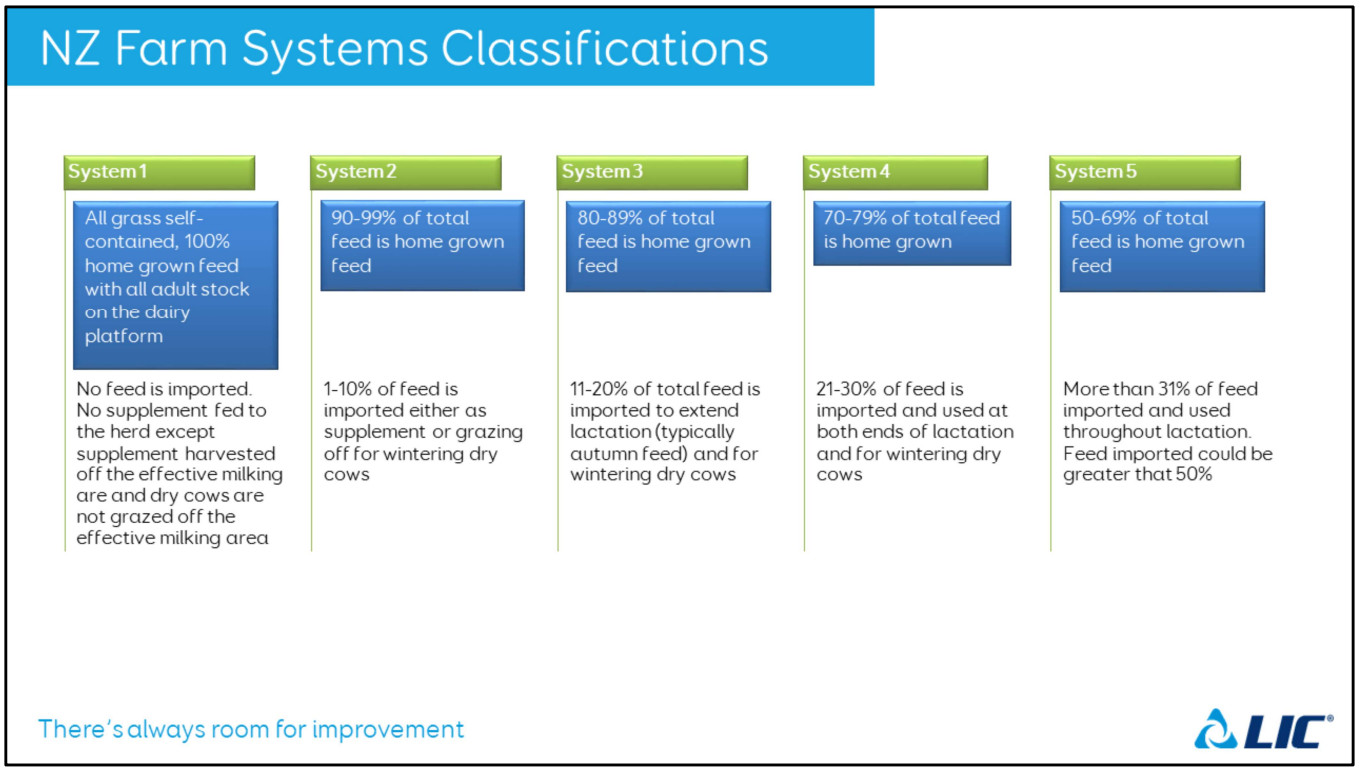
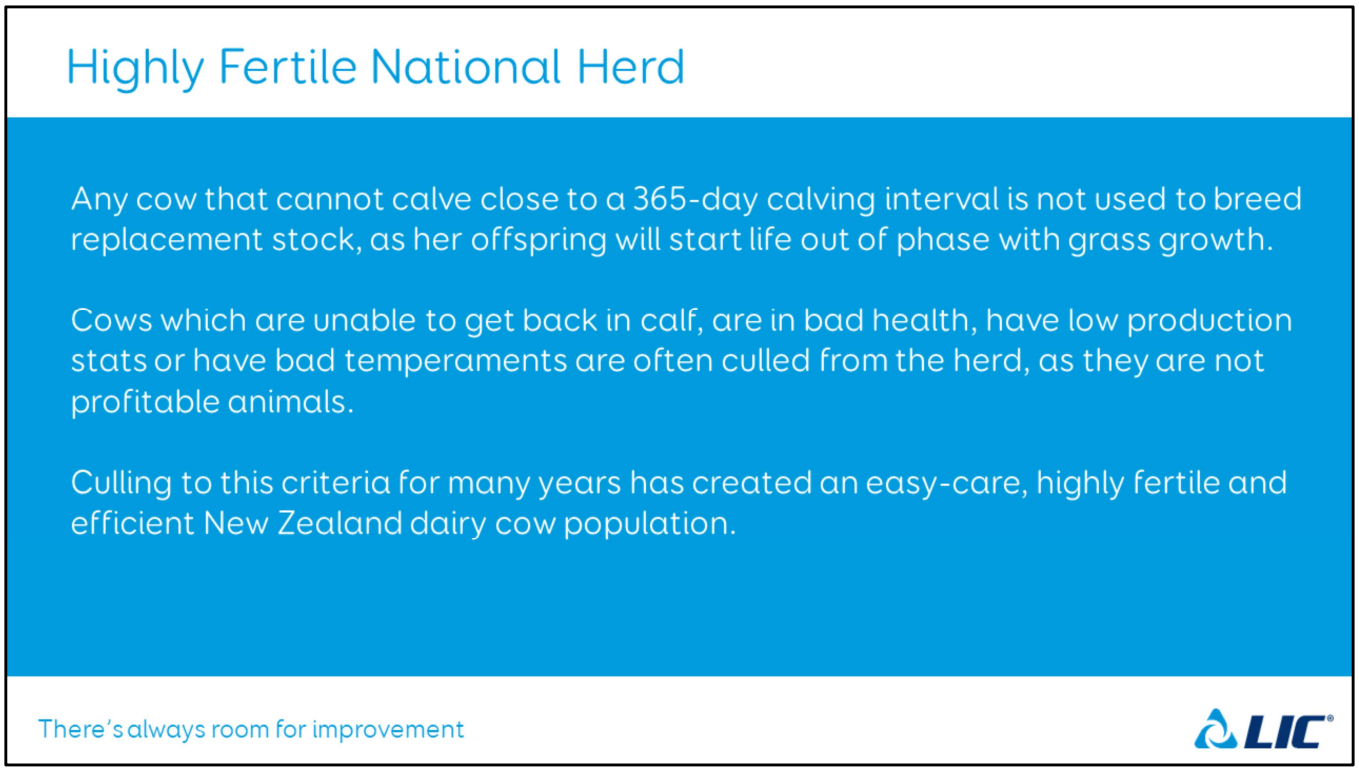
Cows calve in **July/Aug** and come into milk prior to the **Oct/Nov** grass growth peak.




The Five Production Systems are a way to group farm production systems by allocation of imported feed.

As New Zealand pastoral farming is about profitably balancing feed supply and demand, five production systems have been described by DairyNZ primarily on the basis of when imported feed is fed to dry or lactating cows during the season and secondly by the amount of imported feed and/or off farm grazing. The definitions do not include grazing or feed for young stock.



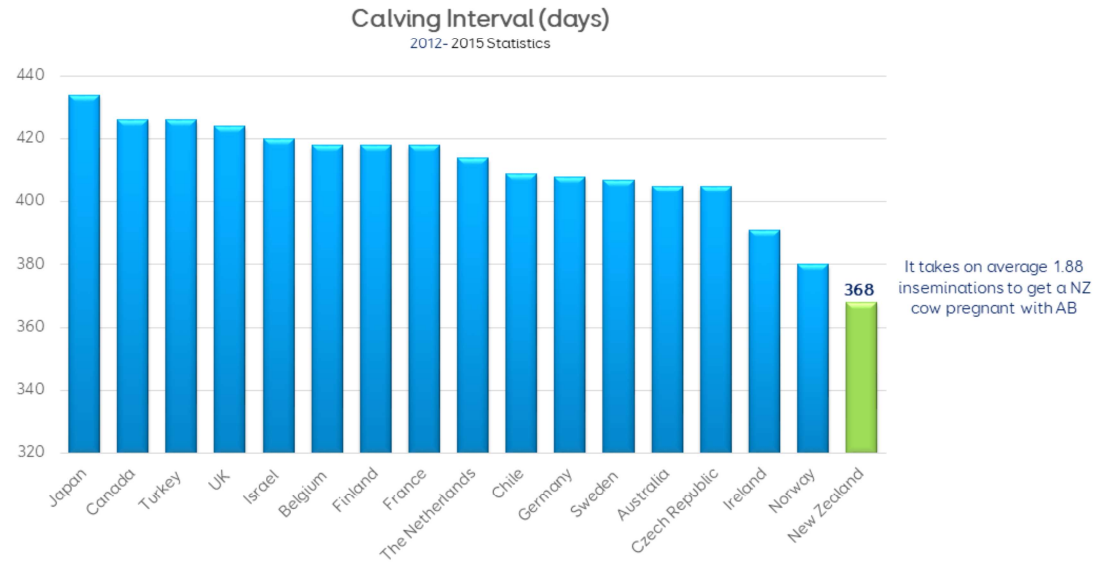

Any cow that cannot calve close to a 365-day calving interval is not used to breed replacement stock, as her offspring will start life out of phase with grass growth.

Some farmers utilise Short Gestation Length [SGL] semen to shorten cows' calving intervals up to 10 days so they are back in-milk when feed is abundant.

Cows which are unable to get back in calf, are in bad health, have low production stats or have bad temperaments are often culled from the herd, as they are not profitable animals.

Culling to this criteria for many years has created an easy-care, highly fertile and efficient New Zealand dairy cow population

# Highly Fertile National Herd




It takes on average 1.88 inseminations to get a NZ cow pregnant with AB

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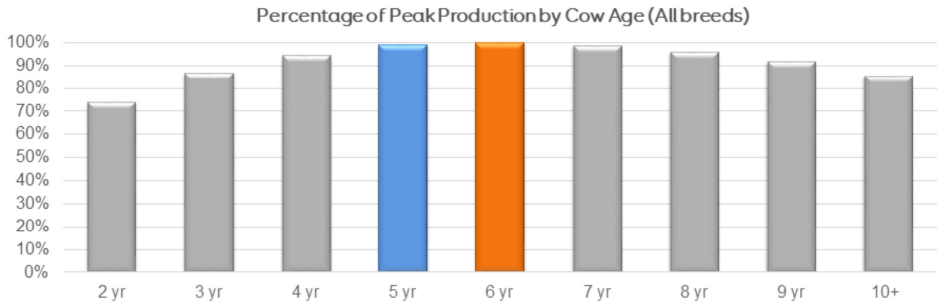
Any cow that cannot calve at close to 365 day calving interval has traditionally been culled from the herd. This is due to her own lactation (and any offspring) getting out of phase with grass growth and the rest of the herd.

## Longevity and Production

The average cow in New Zealand completes 5 lactations (a cow's lactation peak is 5-7 years).

This is very significant economically, because the cost of rearing a replacement animal is high.

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The importance of breeding objectives, focusing on Longevity & production

The production of the New Zealand cow peaks in the fifth lactation with an average production around 400kg of milk solids. Compare that against a two year old that averages around 300kg of milk solids, and it is clear that a six year old cow is over 30% more productive than a two year old.

The New Zealand dairy cows have an average productive life of 4.5 lactations, or live for an average of 6.5 years, therefore requiring a replacement rate of 22% of heifers entering the herd.

Economically this is significant due to the substantial cost of rearing a replacement animal.

## The Ideal Cow

The ideal cow for a forage based system is one that will efficiently deliver high milk solids, with little fuss and continue to go back in calf year after year

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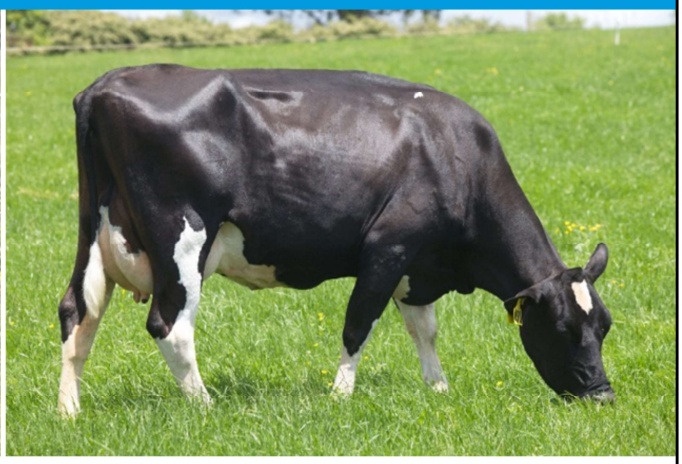
**New Zealand Cow**
When we talk about a cow we probably have a different picture in our head.
This is what we view as an ideal cow. She is a Crossbred too.

The ideal cow for a forage based system is one that will Efficiently deliver High Milk Solids, with little fuss and continue to go back in calf year on year.

## Holstein-Friesian

| Age | Milk (Litres) | Milkfat (%) | Protein (%) | Milksolids (%) |
|---|---|---|---|---|
| 6 | 5,001 | 4.47 | 3.71 | 8.18 |



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*Holstein-Friesian cows produce highest litres and milksolids (kg) production*

Herd test statistics by breed category include cows herd tested four or more times during the season.

On average, Holstein-Friesian cows produced a higher volume of milk than other breeds. This season they also produced the highest protein (kg) and milksolids (kg).

## Jersey

| Age | Milk (Litres) | Milkfat (%) | Protein (%) | Milksolids (%) |
|---|---|---|---|---|
| 6 | 3,518 | 5.61 | 4.14 | 9.75 |

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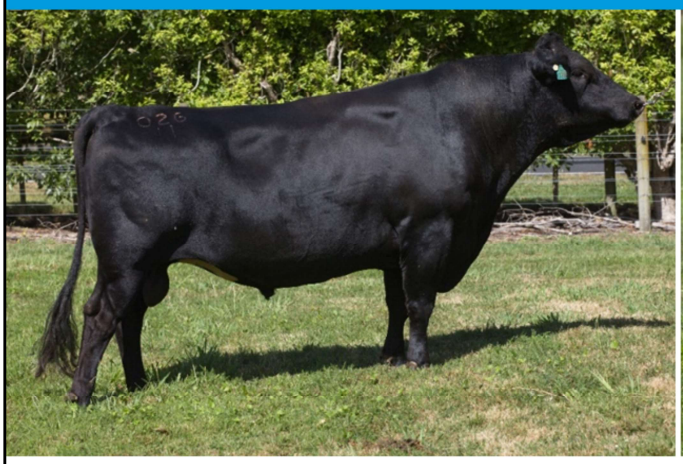
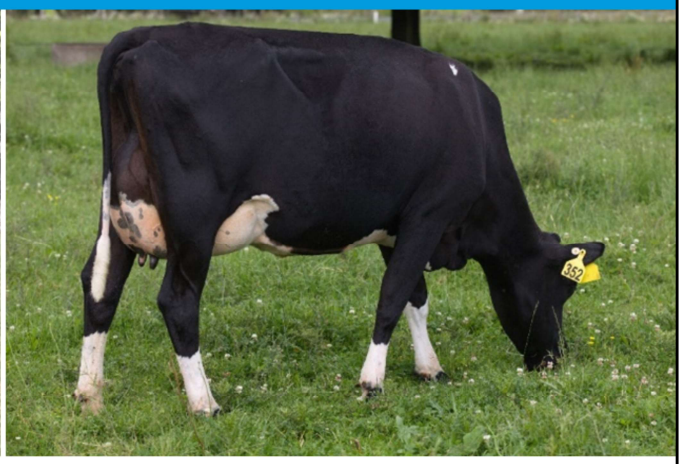
Jerseys have the highest milkfat and protein percentages. For all breeds except Jerseys, six-year-old cows produced
more milksolids (kg) than any other age group.

## KiwiCross

| Age | Milk (Litres) | Milkfat (%) | Protein (%) | Milksolids (%) |
|---|---|---|---|---|
| 6 | 4,558 | 4.94 | 3.91 | 8.85 |





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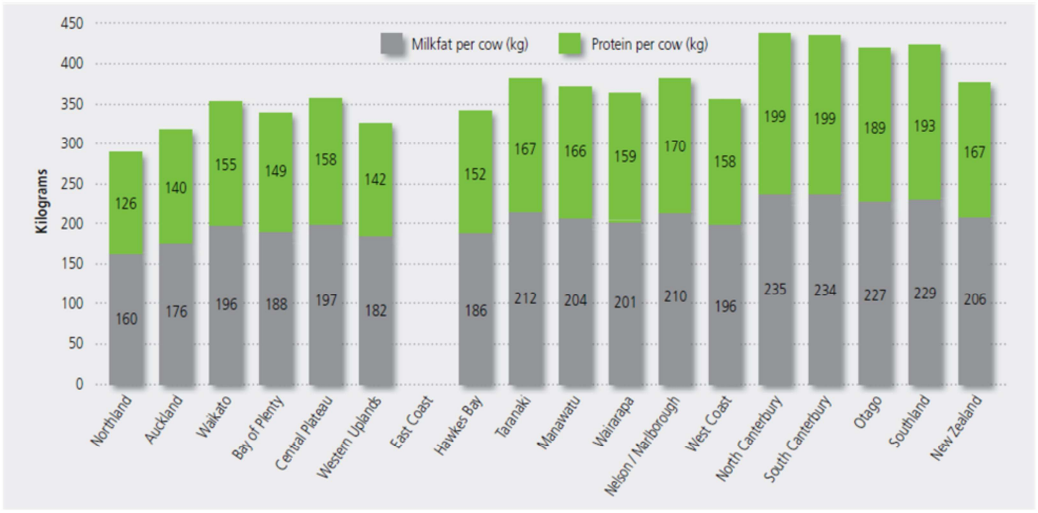
A crossbreed is defined as having at most 13/16 of any one breed. For example, a Holstein-Friesian/Jersey crossbreed may be 13/16 Holstein-Friesian, 2/16 Jersey and 1/16 Ayrshire.

## Average Production of Milk & Protein

*Graph 4.2: Average milkfat and protein production per cow by region in 2016/17*

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The 2016/17 milkfat and protein lactation regional averages for herd-tested cows (Graph 4.2) show some variability in figures among regions, with milkfat production ranging from 160 (Northland) to 235 kg per cow (North Canterbury) and protein production from 126 (Northland) to 199 kg per cow (North and South Canterbury).

## Population

*Graph 2.1: Trend in the number of herds and average herd size for the last 30 seasons*


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**Population**

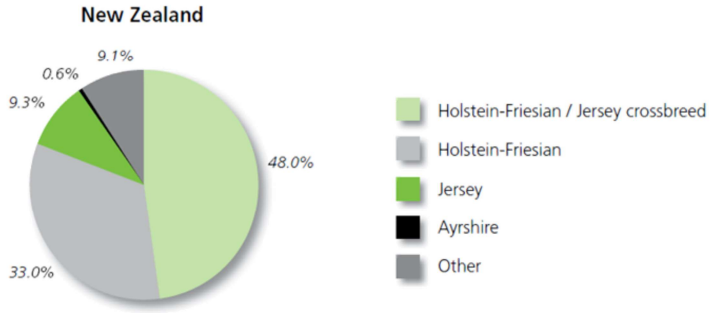
- *Another small decrease in the number of herds*
- *Fewer cows than the last two seasons*

Between 1997-98 and 2007-08 total herd numbers declined at an average rate of about 300 herds per season (Graph 2.1), before levelling off. The total number of herds in the 2016/17 season decreased by 170 to 11,748. This was the second year of easing herd numbers after seven consecutive seasons of small increases.

The average herd size was 414 in 2016/17, which was five cows lower than the previous two seasons. The average herd size has almost tripled in the last 30 seasons, and has increased by almost 200 cows in the last 20 seasons. Expansion of the dairy herd in the South Island has contributed to the increase in average herd sizes.

## Breed Breakdown

*Graph 3.2: Breed category percentages of cows for New Zealand in 2016/17*

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**Breed Breakdwon**

Three types of dairy cattle dominate the dairy cow inseminations carried out in New Zealand, as recorded on the LIC National Database:
Holstein-Friesian, Jersey, and Holstein-Friesian/Jersey crossbreed.

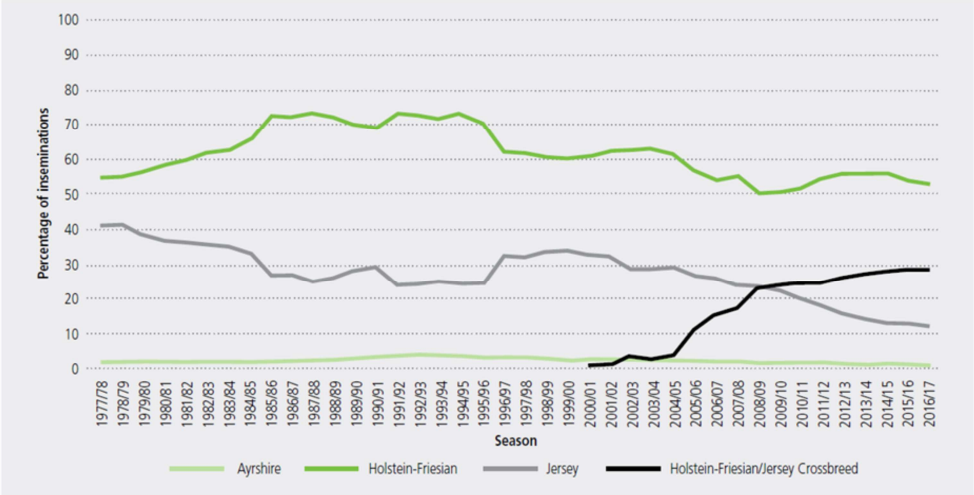
The Jersey breed dominated the national dairy herd until the late 1960s. By 1970, Holstein-Friesian was the dominant dairy breed in New
Zealand, as a result of changes in farm management practices and farmers raising larger numbers of dairy calves for beef. Of the other breeds of cattle used to inseminate dairy cows, the main beef breed currently in use is Polled Hereford. Other beef breeds used to a lesser degree include Angus, Belgian Blue, and Simmental. Other breeds of dairy cattle present in smaller numbers in New Zealand include Milking Shorthorn, Guernsey and Brown Swiss. Holstein-Friesian/Jersey Crossbreed now makes up a large proportion of the national dairy herd.

The percentages of the major dairy breed categories for New Zealand and each region are shown in Graphs 3.2 and 3.3. Percentages are given for Holstein-Friesian, Jersey, Holstein-Friesian/Jersey crossbreed and Ayrshire cows with the

remaining breeds and crossbreeds grouped into “Other”. Holstein-Friesian is no longer the prevalent breed in Northland or Bay of Plenty/East Coast, but is still the prevalent breed in Manawatu/Wairarapa. Holstein-Friesian/Jersey crossbreed is the prevalent breed category in all regions except the Manawatu/Wairarapa. The Manawatu/Wairarapa region continues to have the highest percentage of Holstein-Friesian cows (42%) followed by Bay of Plenty/East Coast (41%). Tasman/West Coast has the highest proportion of Jerseys (16%) followed by Taranaki (15%). Marlborough/Canterbury has the highest proportion of Holstein-Friesian/Jersey crossbreeds (54%), followed by Tasman / West Coast (52%) and Otago/Southland (also at 52%).

# Percentage of Inseminations

*Graph 4.10: Trend in the percentage of inseminations of each breed category for the last 40 seasons*

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**Percentage of Inseminations**

The percentage of inseminations for each breed category (Holstein-Friesian, Jersey, Holstein-Friesian/Jersey Crossbreed, and Ayrshire), as recorded on the LIC Herd Improvement Database, is shown in Graph 4.10. The percentage of inseminations for all the major breeds dropped slightly compared with the previous season.

# Questions?

There's always room for improvement


Thankyou
There's always room for improvement
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