

the BULLETIN

LIC 2017 | WINTER



Is the herd you're building today,
the herd that you want in five years time?





Geoff Corbett
LIC Biological Systems general manager

The recent announcement of \$6.15 per kgMS for 2016/17 and a dividend of \$0.40 per share would have been welcome news to our battle-weary farmers from the past couple of years. Fonterra is also expecting a strong fourth quarter that will further lift confidence in the sector. The forecast of an improved Farmgate Milk Price of \$6.50 per kgMS for the 2018 season will be another much-needed shot-in-the-arm.

In the past couple of years we have seen less herd testing, along with significant reductions in length of AB in favour of lower-cost bulls – merely a handful of the products and services farmers needed to reconsider through the tough period.

As payout returns to profitable levels, the ways in which our customers use our products could well see a sea-change. Farmers are looking to consolidate, and in doing so have been looking to the herd improvement practices LIC recently presented at its Herd Improvement Roadshow.

Already we are seeing a move to Forward Pack, producing higher rates of genetic gain and extensive use of our alternative AB products (discussed in the next paragraph). We have often talked about the effect of genetic gain being cumulative and compounding – that means that the gains made in any one year compound on the gains made the previous year. Because of this, latest industry statistics show the average New Zealand cow produces 100 kgMS more milksolids than she did 20 years ago (i.e. 372kgMS compared to 271 kgMS). The impact to the farm's bottom line is huge.

During the roadshow we also talked about the opportunity for improvement. Our research tells us that the difference between production of the top quartile of the average individual herd and the bottom quartile is a staggering 160 kgMS. While it is true the bottom quartile cows are unlikely to improve to perform at the level of the top-quartile, the opportunity obviously exists to at least remove the worst performers, and bring the overall herd closer to the top performing cows.

AB practice is changing, and we're now seeing extensive use of alternative AB products such as SGL and Wagyu. Both these products provide alternate means of income for farmers, but also provide opportunity for improvement: If the bottom 10% to 20% of the herd (i.e. the poorest performing cows) is mated to SGL or Wagyu, this has the effect of lifting the herd BW by preventing the rearing of replacements from the lower-end cows. Along with using the best bulls LIC has on offer through Premier Sires, this strategy of

mating to non-replacement AB products is an excellent means of making good strides in genetic gain.

We are also seeing farmers inevitably return to herd testing, as key data is eventually critical to key decisions. I recently came across the January edition of the New Zealand Dairyman – from 1924!

In it was an article outlining the basics of herd improvement: It recommended using the best bulls available, but it also implored farmers to know who their worst performers were. There is possibly more at stake in knowing who your worst performers are: With this knowledge, you'll know who not to breed from, and who to remove from the herd when the time comes. Just as good cows are likely to produce good daughters, poor cows are likely to produce poor daughters.

At LIC we are constantly trying to keep ahead of where the industry is going, and incorporate these aspects into our breeding scheme before the change in Animal Evaluation is made. For example, we are keeping a sharp eye on the recent changes in the increasing value of fat (which only a few years ago was seen as highly unlikely). Also in the news recently has been milk urea nitrogen. Arguably the largest impact on urinary N output of cows will be dictated by diet (we await some interesting Lincoln research into plantain, for example). In the meantime, LIC urges farmers to stick to breeding more-efficient cows, because improved productivity per cow (BW) equates to reduced environmental impact.

How do we know this? When comparing a high BW animal with a low BW animal we see the following:

Measurement	Cow group	
	High BW/PW	Low BW/PW
Feed N intake (gN/cow/d)	388	360
Milk N output (gN/cow/d)	85	66
Faecal N concentration (%)	2.2	2.2
Faecal N output (gN/cow/d)	129	117
Urine N concentration (%)	0.57	0.65
Urinary N output (gN/cow/d)	154	165
Distribution of dietary N intake (%)		
Milk	22	18
Faeces	33	33
Urine	40	46
Retained	5	2
Apparent N digestibility (%)	66.7	67.6

Source: (Woodward et. al. 2011, Dairy NZ, Lye Farm.)

While the higher BW animals have a higher intake, there is greater N output in the milk and lower urinary N output and waste: Overall less N is available to leach through the soil.

Our R&D team are continuing to improve our genomics tool with a view to provide improved prediction accuracy and the improved ability to predict the top bulls.

There is no doubt that the current genomic tool allows us to pick a far better SPS team and higher genetic gain that we would based on parent average alone. This is what allows us to drive the 11-13 point increase in BW per annum and the improved production per cow.

Where will genetics take your cows over the next five years?

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Is the herd you're building today, the herd that you want in five years time?

The fundamental principles of herd improvement haven't changed, so if a significant increase to genetic gain is the goal you must pay close attention to: **The bulls you use. The calves you keep. The cows you cull.**

by Greg Hamill, LIC Genetics business manager



Greg Hamill

The New Zealand dairy industry has seen a huge amount of growth in the past 20 years, moving from 2.9 million cows in 1995 to nearly 5 million cows at the end of the 2016 season (New Zealand Dairy Statistics, 2015-2016), which equated to an average increase of 100,000 cows each year over two decades.

For many farmers who chose to grow their asset base through this phase this meant the quality of stock was at times compromised in the pursuit of fulfilling required cow numbers.

The flow on effect of 'animal numbers growth' was that little or no selection pressure was applied to a cow's AB mating eligibility, and the breeding fundamentals of 'the calves kept' and 'the cows culled' were overlooked.

During this phenomenal phase of industry growth, the upshot was

that New Zealand farmers became collectively guilty of rearing too many replacements from poorer-producing cows.

Earlier this year LIC genetics experts 'hit the road' in a series of 46 separate farmer meetings throughout New Zealand to remind farmers of the importance of breeding and the advantages that good breeding plans can deliver to an individual's business.

Many farmers agreed the golden days of cow growth were likely to be limited,

if not over, as tighter environmental standards and associated land use restrictions are progressively introduced.

There was also little dispute that farmers wished to continue to protect New Zealand agriculture's clean-green image, which export markets continue to value so highly.

For context, farmers on the roadshow were also challenged to consider the financial climate of the last few years; lower payouts had seen a decrease in the rate of farm conversions, while land sales remained fairly stagnant, along with land prices.

If that's true, and growth and prosperity in the industry is to continue, the importance of cow quality is more important than ever when it comes to efficient milk production: In other words, an animal that farmers stand behind twice a day, for 300 days a year, has to be pulling her weight.

"Over the past 20 years, the average cow has increased her milksolids output by an additional 100kg (271kg milksolids to 372kg milksolids). Extrapolated over an average herd size of 419 cows, today's modern girls are producing, on average, 155,868 kg of milksolids."

With an impressive track-record, genetic gain offers a solid solution when it comes to the need to produce more from less.

The artificial breeding bulls that farmers have used over the past few decades has seen enormous changes to the efficiency of cows today, particularly when compared to the cows of 20 years ago. For example, gone are the days where you had to wash every cow to stimulate her to let down her milk, and; gone are the days with weights at the end of the pit to ensure cows milked out properly.

But we welcome the days where the average cow (grown and fed to her genetic potential) promises to produce more than 400kg of milksolids per 5 tonne of dry matter consumed (5 tonnes is what the average cow can consume on a grass based diet in a standard lactation).

Over the past 20 years, the average cow has increased her milksolids output by an additional 100kg (271kg milksolids to 372kg milksolids). Extrapolated over an average herd size of 419 cows, today's modern girls

are producing, on average, 155,868 kg of milksolids.

Compare this to 113,549kg of milksolids (for the same herd size) 20 years ago: Industry studies, based on NZAEL data, cite 60% of that productive increase is attributable to genetic gain (the remaining 40% of the production increase is attributed to better feeds, better grasses, and better overall farm management).

There is ample room for further improvement, however.

While genetic gain continues to 'tick away in the background', the lack of selection pressure applied at the front end of mating means within-herd variation (between good and poor cow milksolids production) has in most cases widened.

LIC recently researched millions of herd test results, taking out 2 & 3-year-old cow information (these animals have not reached mature production) and 9+ year old cow information: Information among all 4 to 8-year-old cows was split into quarters.

Results showed the variation between the 'top-quartile' and 'bottom-quartile' of the production engine room, 4 to 8 year-olds, was a staggering difference (on average) of 160kg of milksolids.

On the roadshow, the above point provoked many farmers to ponder their own herd situation; attendees formed an appreciation for their top-producing (top-quartile) cows, but the point stirred a good degree of contempt toward their poorer producing (lower-quartile) animals.



"With the opportunity for capital gain diminishing, it is perhaps a fair judgement to say that the New Zealand dairy industry is facing an new era of 'cow population equilibrium'."

Perhaps unsurprisingly, the animals in the top quartile were also on average the highest breeding worth (BW) animals within the Herd Test dataset (BW is the expected ability of an animal to leave an efficient and profitable replacement).

Therefore, it could be said the quickest way to increase genetic gain and get higher-producing replacements is to combine the following two practices:

- use a high genetic-merit bull team, AND
- do not mate replacement-quality semen to low-BW animals within the herd (i.e. to avoid bringing through replacement stock from poorer genetic merit animals).

A good rule-of-thumb is that for every 10% of lower-BW animals mated to an alternative AB straw (for example Hereford), the herd's BW should increase by \$10 BW points (i.e. only replacement quality straws go to high genetic merit sires): Half this (\$5 BW) will be passed on to the progeny.

For every 10% of the herd excluded, the farmer should increase the mating length by five days (to get the same number of replacements previously). This scenario assumes a standard 80% submission rate and a 55% conception rate (see table 1, the red lines indicate the bottom 10%, 20%, and 30% of the herd).

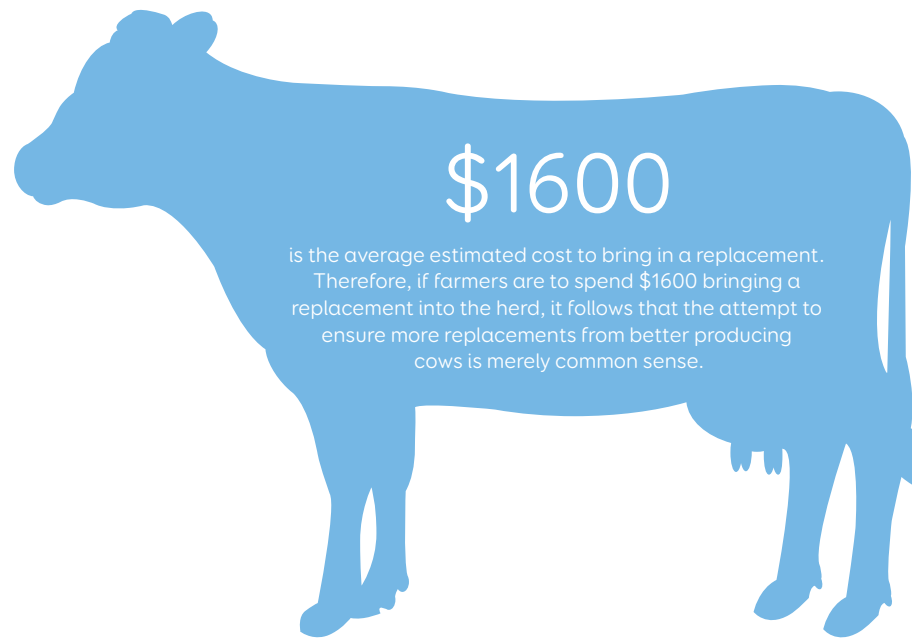
The average cost to bring in a replacement is estimated at \$1600.

Therefore, if farmers are to spend \$1600 bringing a replacement into the herd, it follows that the attempt to ensure more replacements from better producing cows is merely common sense.

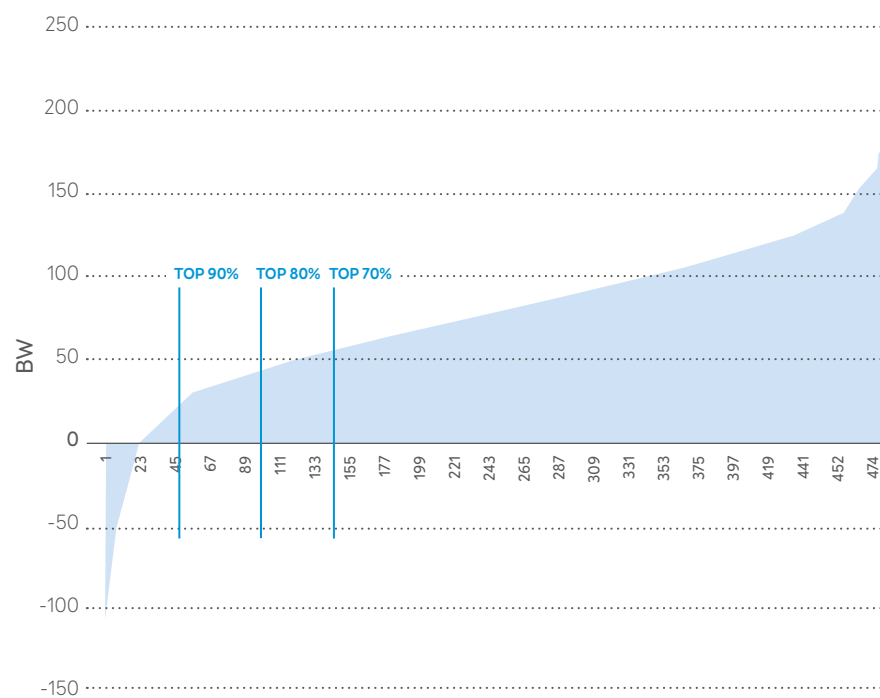
Keep in-mind that an animal that is in the bottom 10% of the herd (on milksolids production) is more than likely to leave a replacement that will also end up in the bottom 10% of the cohort that she is born in to.

Ultimately, the individual farmer is responsible for shaping the herd they're milking today, together with the herd they wish to milk in five to 10 years' time.

To get the best out of genetic gain, and on-farm profitability, progressive farmers need to ensure they are using the highest genetic merit bull team they can, and they should be careful not to be artificially breeding from their low-BW cows.



Typical Herd BW spread



Herd	483 cows
Replacements 20%	100
Av. Herd BW	76
PS Team BW	200
Av. Progeny BW	138

% Herd Mated to Replacement	Matable Herd Size	Av. Herd BW	Av. Progeny BW	Av. Extra BW	Extra Days Mating
All	483	76	138	0	0
Top 90%	435	86	143	5	3.5 days
Top 80%	387	93	147	9	9 days
Top 70%	339	99	150	12	14 days

*If SMR is 80% and CR is 55%



Inspirational Kate:

- Quad-bike helmet on, most afternoons Kate milks her 28 Jerseys in a herringbone shed, and she also helps out with Herd Testing.
- Every Tuesday Kate attends Riding for the Disabled followed by a pilates class.
- For the past 13 years Kate has regularly helped out at Otamarakau School as a volunteer teacher aide.
- Three times a week at 6am she gets on her 'happy trainer' (cross trainer) for 30 minutes: "It's to help my core strength - if you don't use the core, you don't walk."
- Kate names all her cows after fashion labels, people, or brands: Dior, Prada, Chanel, Cooper, Cartier, Royal, Poker, Apple, Daffodil, Spice, Flash, Sapphire: "Designer cows deserve designer names," she says.

Grabbing life by the **BULLS!**

Kate Natusch is a young farmer who doesn't let cerebral palsy get in the way of her life passion, let alone life in general.

"I love my Jerseys, I love following dairy genetics, and I nominate as many of my 28 cows to Jersey as possible," she says, a distinct glint in her eye.

Then, tongue firmly-in-cheek, she adds that her "life goal" is to convert her Dad and Mum's 600-strong crossbred herd to the Jersey breed.

She is adamant Jersey is the breed of the future.

Kate is 34-years-old and was born with her disability which restricts her ability to walk and impedes the flow of her speech,

although her quick wit and sense of humour clearly indicate her mind is not to be underestimated.

Kate's mother, Jenny, reflects on her own early realisation that Kate was never going to be a Silver Fern, a Black Fern, or a Rhodes Scholar: "Turns out none of us ever made it," interjects Kate, referring to her two sisters, Fiona and Claire, who have left home.

The Natusch family farm is a high-input system operation, and Kate's parents are members of LIC's Sire Proving Scheme (SPS), meaning most of the 600-odd cows get mated to young bulls that the co-operative is seeking daughter proofs for.

But Kate's cows are not part of SPS, and she has developed and improved on her own 'micro-herd' by caring for, and regularly milking, her personal set of more than two dozen Jerseys.

"When I was about 12, Dad bought a group of crossbred cows at an auction, but one of them was a Jersey and I remember seeing her up by the woolshed and I took a liking to it.

"She was in-calf to Jersey, she was quite low-BW, and I'm not sure she had any records: As far as Dad was concerned she was heading for the truck but he soon lost control of that decision."

Thanks to eight separate surgical procedures when Kate was 18 - which involved breaking and repositioning

her femur - Kate is able to stand and slowly move with the assistance of crutches, but getting around the farm is surprisingly easy.

She makes her way to her small quad bike, stashes her crutches in a holder, starts the engine, and takes off ahead to check out her cows.

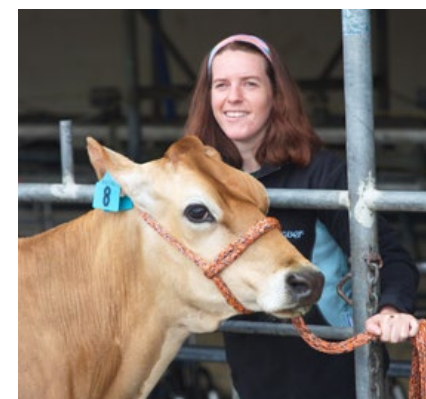
Kate speaks knowledgeably about what she wants to achieve with her girls:

"I try to look at temperament and teat placement when I select bulls to go to my cows. I notice with some Jerseys they have quite close teat placements. I also look for size, because a smaller cow getting knocked around the herd is no-good, and fertility is important to me too.

"I look over the Alpha™ Catalogue when it comes out, but I keep in-mind that traits and breeding values and BW can change as new proofs come in during the year. The rankings can change between when the catalogue comes out and when you need to use the animal in spring."

"I like to tap in to the genomically selected bulls because I like to try something different, and they're slightly ahead in BW and I don't mind a gamble. The younger bulls are the latest genetics and that's a way of getting ahead."

"I've always like the Jersey markings, especially the white around the muzzles and the eyes. They've got a lovely nature but you do get the odd grumpy one, just like us humans, you do get the odd one."



Kate with one of her favourite Jerseys.

Udderly Fantastic. A Myth Buster

by Simon Worth, LIC livestock selection manager

The black and whites are clearly in great shape. What's also clearly obvious is that you, our shareholders, own the very best!

The sire selection team is proud of LIC's performance on the DairyNZ-published Ranking of Active Sires list, which sees the co-operative's bulls reigning supreme.

The supremacy is all the sweeter when we take in to account that although LIC has only progeny tested 47% of the bulls in the industry over recent years, LIC bulls number 9 out of 10; 23 out of 25; and 44 out of the top 50 Holstein-Friesians.

And of the 50 Holstein Friesian bulls on the RAS industry list, all but three are sired by LIC bulls.

These rankings are a tremendous result and the culmination of much effort by our breeders, sire proving farmers, and LIC.

However, gone are the days where bull teams were selected solely on the basis of an index.

Breeding Worth, which reflects the national breeding objective, is well recognised as a fantastic tool in the drive to breed efficient and profitable cows. That said, farmers have been asking for many years that they want their cake and to eat it too: That is - 'give me BW and assist me in breeding cows that are easy to milk and have udders that I am proud to milk'.

We've heard the adages - 'Breeding is a long game'; 'Good things take time'; 'It won't happen overnight'.

Well, given LIC's strong focus on a balanced breeding approach over time, we are now releasing Premier Sire and Alpha Nominated bulls that reflect this focus in resounding numbers.



Simon Worth

Our shareholders can indeed have their cake and eat it too.

Here's an interesting observation that may surprise those who believe 'LIC are the index company whereas the others provided better conformation':

"Efficient cows with great udders - we have been listening!"

Take a review of the top-500 Holstein Friesian bulls that been proven in New Zealand, an extensive list that takes BW down to a level of 80 - far below where the vast majority of farmers would ever consider going, and which incorporates many other company's bulls.

If you take those 500 bulls and re-rank them on Udder Overall, LIC has proven every single bull in the top 15.

If we undertake the same analysis on the top 100 bulls (given this is a more realistic BW range that farmers would be willing to work with), LIC have proven the top-10 and 14 of the top 15.

The myth that LIC bulls do not provide quality udders is exactly that - a myth.

The fantastic deal for our farmers is (given LIC dominates this space) that by 'taking the udders' they get BW with it!

A healthy breeding programme utilises a team of bulls, however in order to demonstrate the dominance LIC has in udder conformation, the table below (Table 1) highlights merely eight of the bulls that are available to the market this year.

The column named 'Superiority' shows how much better the bulls are than all other bulls' progeny tested (some minimum criteria exists around number of daughters).

For example, 113014 BOSS, is more superior in Udder Overall than 98% of all other Holstein Friesian bulls progeny tested.

Black and white enthusiasts will be encouraged in reviewing both the Daughter Proven and Forward Pack Premiers Sires teams this year.

Even though 20 bulls are named in the Daughter Proven team (compared to just eight in the Jersey and 12 KiwiCross), Holstein Friesians clearly govern in transmitting quality udder conformation.

Efficient cows with great udders - we have been listening!



Daughter of LIC sire 113086 Maire IG Gauntlet.

Other quick facts:

- LIC has graduated the top-three protein BV bulls in history
- Re-rank the industry's top-500 BW bulls for fertility, and LIC have 19 of the top 20
- Undertake the same review on total longevity, and LIC grab the top-14 places and 19 of the top-20
- And the same review for capacity again sees LIC with 19 out of 20, along with the top-17 straight!

In fact when it comes to capacity the number one ranked bull 113086 GAUNTLET (at 1.51) is simply off-the-charts! The next best bull for this appealing trait sits at 1.27 and he was born 30 years ago with a current BW of -143.

Gauntlet is actually a tremendous note to finish on as he exemplifies a balanced approach to breeding. Not only does this outcross sire

transmit capacity, he sits among a handful of bulls with a farmer overall opinion at such a level. His proof demonstrates exceptional udders, positive fertility, and very low somatic cells. He also happens to be the second highest protein bull ever (the first being another of Craig and Chantelle Rowe's in 112080 MAIRE FIRE-UP).

Simply exceptional!

AB code	Name	Breeding Worth	Breeding Worth Reliability	Protein BV	Fertility BV	Herd tested dtrs	Capacity BV	Udder Overall BV	Dairy Conformation BV	Superiority	TOPdtrs	Name of Sire
111037	SAN RAY FM BEAMER-ET S2F	220	86	37	2.2	89	0.48	0.88	0.52	92%	72	FAIRMONT MINT-EDITION
110080	MOURNE GROVE HOTHOUSE S2F	187	99	34	5.7	2836	-0.03	1.12	0.26	98%	61	SRC GLENMEAD ROCKSOLID-ET
113086	MAIRE IG GAUNTLET-ET	183	81	48	2.2	87	1.51	0.94	1.39	95%	79	INVERNIA TGF IGNITION S3F
113117	GREENWELL SH BOMBER S1F	166	82	27	3.0	97	0.07	0.97	0.16	95%	85	SAVANNAHS HF HAMMER S1F
113120	BOTHWELL WT MAXIMA S2F	154	97	26	4.5	1301	0.43	1.04	0.63	96%	97	WAI AU MAX TOMMO S3F
113014	SPRING TRALEE BOSS-ET S3F	150	98	27	5.0	2801	0.48	1.17	0.54	98%	112	EDWARDS BANQ OVATION S3F
110006	BAGWORTH PF GRANDEUR S1F	145	85	25	2.4	76	0.57	0.95	0.55	95%	68	PUKETIRO FROSTMAN S1F
112080	MAIRE MINT FIRE-UP	138	89	50	0.4	187	0.69	1.09	1.01	97%	96	FAIRMONT MINT-EDITION

The rise of the Crossbred

by Taylor Connell, LIC sire analyst



Taylor Connell



The 'best of both worlds' combines production efficiency and health traits of the parent breeds to deliver a cow that farmers simply love to milk.

Farmers' commitment to crossbreeding is clear, with 70% of Premier Sires inseminations in the 2016 season expected to produce a crossbred calf come calving time.

It's clear the majority of farmers now prefer the 'strong black cow'.

That's why the 2016 season was the first time the Kiwicross Daughter Proven Premier Sires team contained bulls with a breed mix of F7J9 or above. With the majority of the team being above F8J8, F7J9 bulls are only included if they sire daughters competitive on liveweight.

It's important to note that variation is part of breeding, irrespective of breed. True, crossbreeding has more variation

- this is due to various combinations of genes from the two different parent breeds. However, the Kiwicross Premier Sires Daughter Proven team, with high Friesian content sires, aims to reduce this and is set to deliver a more uniform animal.

If pushing genetic gain is a priority on your breeding agenda, then Premier Sires Forward Pack is your go-to. This is a BW team- it provides the top Daughter Proven, Spring and Genomic bulls irrespective of breed mix or size. You simply get the best of the best.

This year we are able to celebrate the fantastic graduation rate of our 13-code Kiwicross bulls to both Premier Sires & Alpha Nominated.

Without a doubt, among the most exciting graduates this year is 513098 ARKANS BOUNTY.

Bounty comes from a cow family that certainly needs no introduction - the famous Beauty family from the Arkans stud of Stewart & Kathryn Anderson.

Backed by three generations of more than 300 PW, this family have given rise to current Premier Sires 511026 ARKANS BEAUT - sired by recent Hall of Fame inductee Nevron Showman; and 513007 ARKANS BEST BET sired by Beaut himself!

Bounty - an Okura Integrity son provides the perfect balance of production and conformation. This, combined with a BW of 194, really does make him the complete package.

With plenty of relatives in the pipeline such as current Forward Pack sires 516029 WAIARI ARKANS BAZOOKA and 516043 ARKANS BOOMBOX, as well as being used as a sire of sons himself this year, I'm sure there are plenty more 'Bountys' to come from this family.

It's always exciting to see a high number of bulls graduate in any given year, but it's particularly special when a number of these were used in Premier

Sires Forward Pack prior to receiving their daughter proof.

Farmers lucky enough to be milking daughters of sires such as 513098 ARKANS BOUNTY and 513067 COLFOLS CRIKEY are effectively four years ahead of the game!

Crikey - the first of three bulls purchased from an absolute powerhouse Scotts Northsea dam - boasts fertility, conformation, and a BW of 180.

Thanks to the use in Premier Sires Forward Pack previously, we see a staggering 1921 production daughters in his proof to give his BW a 97% reliability.

"Farmers lucky enough to be milking daughters of sires such as 513098 ARKANS BOUNTY and 513067 COLFOLS CRIKEY are effectively four years ahead of the game!"

Given how incredible this cow family is, LIC is excited to track the progress of Crikey's half-brother - 516014 COLFOLS CONVINCER, sired by Krakmans Jaydie.

Convincer is available through both Premier Sires Forward Pack and Alpha Nominated, and was used as a sire of sons in contract mating.

Now and then we get a bull who's a bit special, and in 2008 we saw one of the most influential sires of recent times graduate - Fairmont Mint-Edition.

While Mint-Edition sires incredibly productive and well-rounded daughters, he also sired a number of fantastic sons, three of which are currently sitting in the top half of the

Kiwicross Premier Sires Daughter Proven team.

At a BW of 205, new graduate 513054 BURGESS TRICKSHOT is simply a workhorse. With huge production clearly coming from his Hancocks Ladysman's dam and Gloaming SS Forever grand-dam - Trickshot daughters are sure to do the goods!

Meanwhile, 511011 PRIESTS SIERRA is certainly no stranger to many, given that he was the number one BW bull in the Daughter Proven team last season.

The bloodlines of his dam (a full sister to Priests Solaris), combined with Mint-Edition, give Sierra daughters' size, fertility, conformation, and best of all farmers love to milk them! At 218 BW Sierra will certainly be a crowd favourite for the season to come.

Much like Trickshot, 512037 GREENMILE GAME-DAY brings production and efficiency. With BW of 199 combined with a high farmer overall opinion

score, Game-Day is another one to keep an eye on. I think it's pretty clear Mint-Edition certainly has some sons to be proud of.

While the following sire was highly ranked last year - it seems as though his three-year-old daughters have really come out of their shell! 512048 ATHLIAM PACEMAKER, yet another sire used before he received his daughter proof, is now the top crossbreed bull in the country at 221 BW. Sired by Nevron Showman - Pacemaker has certainly got production in his pedigree. His dam (a Scotts Northsea) is sitting at 185 BW and 284 PW, while his Gloaming SS Forever grand-dam has a BW of 161 - even though she was born five years before the base cow!

Pacemaker sires productive, fertile daughters and seems set to be the top Forward Pack bull this season.

As one season comes to an end, we can start looking forward to the next!

No doubt we will see some exciting 14-code bulls emerge as they begin to receive their proofs in October.

I look forward to updating you on these guys in the spring edition of The Bulletin.

"If pushing genetic gain is a priority on your breeding agenda, then Premier Sires Forward Pack is your go-to. This is a BW team- it provides the top Daughter Proven, Spring and Genomic bulls irrespective of breed mix or size. You simply get the best of the best."



Daughter of 513098 Bounty.

2013-14 Forward Pack Teams delivering great results

by Ariane Bailey, Genetics product specialist

It's been a fascinating decade to be involved in dairy genetics, with this year marking the 10th season of genomically selected bulls being used by New Zealand dairy farmers.

Both the science, and the way the bulls are selected for teams, has evolved as more continues to be learnt about genomic technology.

Genomic science has been hugely enhanced, and LIC continues to invest significant time and funding toward improving the technology for our shareholders.

To date, more than \$75million has been invested - with contributions from the NZ Government and Fonterra included. The genomic dataset now contains more than 140,000 animals (both bulls and cows). The dataset is primarily 50k single-nucleotide polymorphisms (SNPs), but a large number of animals have been sequenced in addition.

Sequencing maps out every single one of the sequenced cows' or bulls' 3.2 billion base pairs (SNPs). Having this

information means the scientists can drill down on markers that make a big difference to animal performance.

While the science continues to improve, so too does the way LIC delivers genomic bulls to farmers.

Forward Pack

2013 saw the introduction of the Forward Pack concept, offering farmers 'the best of the best'.

The teams consists of the very best of the Daughter Proven bulls, the new-graduate spring bulls (mid-October onwards), and the very best genomically-selected sires - packaged up to deliver a Premier Sires team with outstanding genetic value.

The genomic sires of the 2013 and 2014 Forward Pack teams are now all fully Daughter Proven and results provide



Ariane Bailey

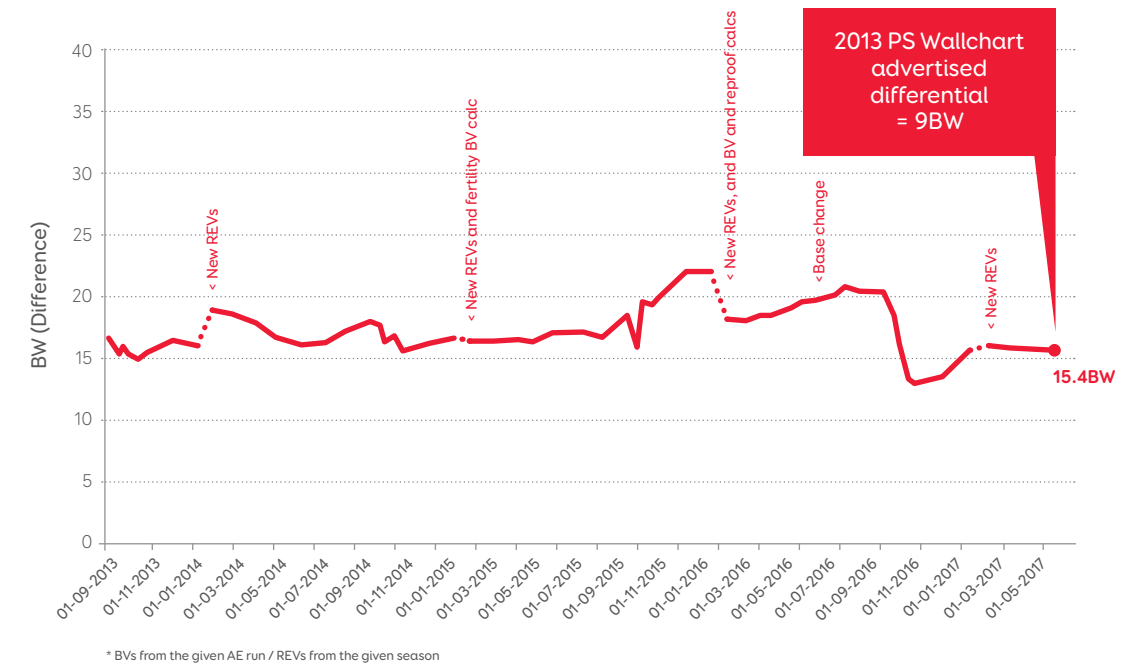
a great boost in confidence that the Forward Pack concept is delivering on the genetic value advertised at the time.

The 2013 Premier Sires team results are displayed on the following graphs. If you would like to also see the graphs for the 2014 teams, contact your LIC sales rep who will email/post them to you.

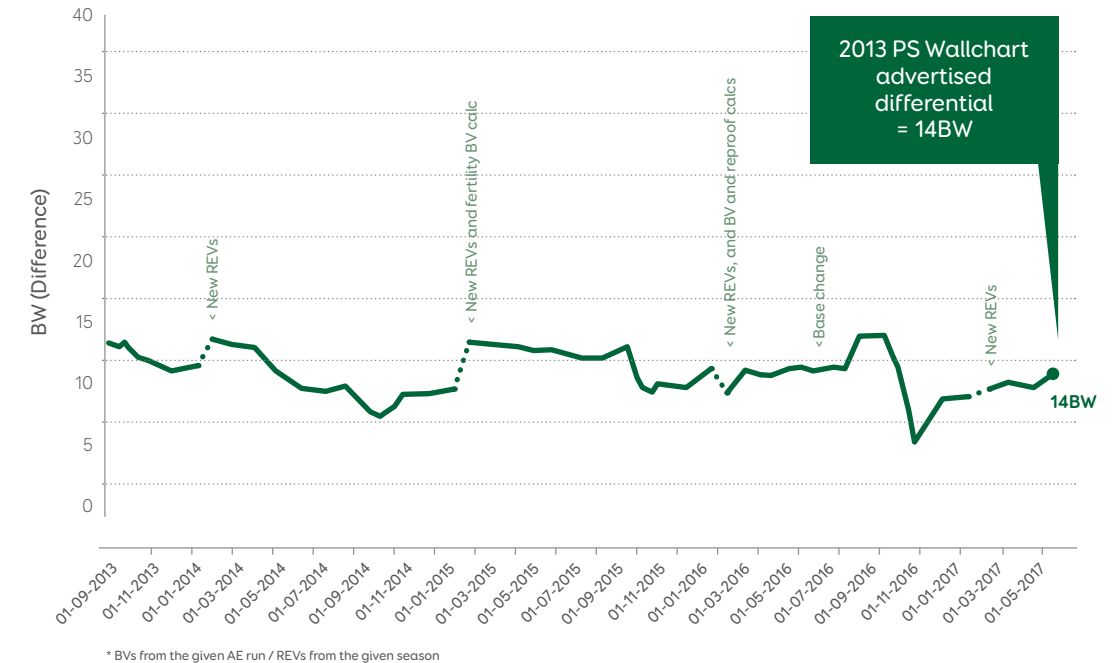


To date, more than \$75million has been invested - with contributions from the NZ Government and Fonterra included. The genomic dataset now contains more than 140,000 animals (both bulls and cows). The dataset is primarily 50k single-nucleotide polymorphisms (SNPs), but a large number of animals have been sequenced in addition.

2013 Premier Sires - Weighted BW Difference between Daughter Proven and Forward Pack - Holstein Friesian teams

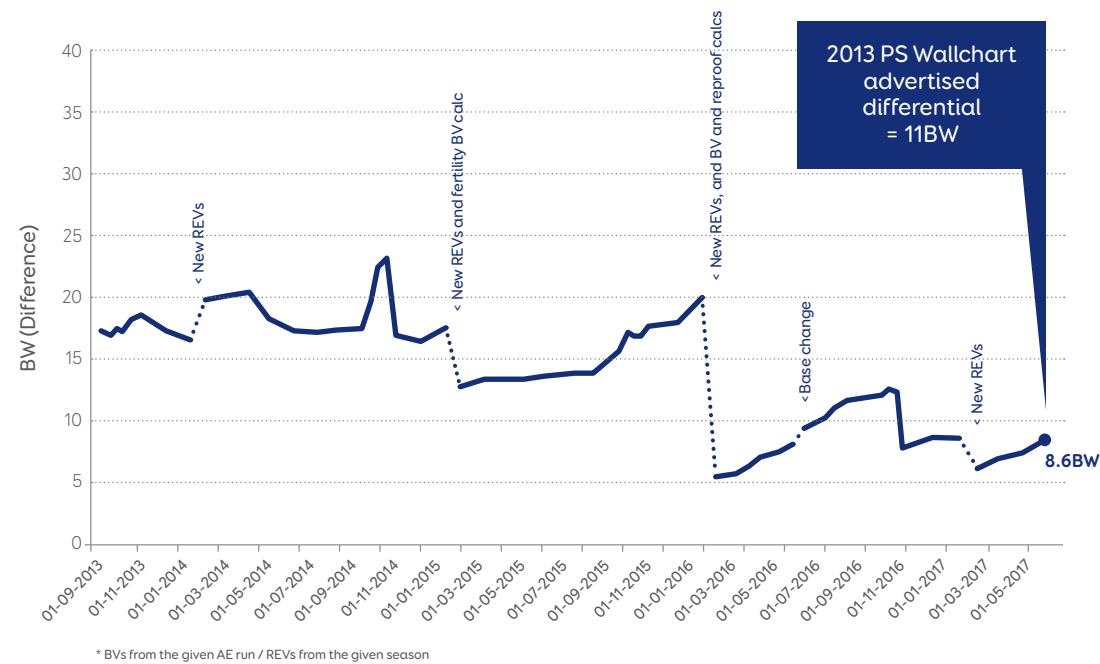


2013 Premier Sires - Weighted BW Difference between Daughter Proven and Forward Pack - Jersey teams



Continued next page...

2013 Premier Sires - Weighted BW Difference between Daughter Proven and Forward Pack - KiwiCross teams



The Kiwicross team has been more heavily affected in the 2015 and 2016 Feb economic updates due to a decrease in the value of protein. The value of protein in BW fell from \$9.17 (2014) to \$8.18 (2015) to \$7.25 (2016) and then again to the current \$6.63 (2017). This calculates to be a difference of \$2.54 between 2013 and 2017. The 2013 Forward Pack team currently has a team protein BV of 16.8kg compared to the 2013 Daughter Proven team at 11.2kg - a difference of 5.6kg. \$2.54 multiplied by \$5.6kg is a difference of 14BW, which closes the gap between the teams. Holstein-Friesian and Jerseys aren't affected nearly as much due to difference in protein between the Daughter and Forward teams for these breeds being 0.8kg and 1.1kg respectively.

INDUSTRY NOTICE: Changes to timing of release of bull proofs by NZAEL

Prior to the transfer of animal evaluation operations to New Zealand Animal Evaluation Limited (NZAEL, subsidiary of DairyNZ), bull and cow evaluations were released to the industry relatively at the same time, meaning MINDA and the DairyNZ website showed the same results at the same time.

Now the national index and related system is managed NZAEL, DairyNZ is in a position

to publish bull proofs prior to all evaluations (including LIC's genomic evaluations and proprietary indexes) being updated on LIC's database, including MINDA records.

It is for the above reason that, for a maximum period of five days, bull proofs visible on MINDA and MINDA reports will be different to those displayed on the DairyNZ website.

Messages will be placed on the MINDA home page during this period to reflect

this change and will be effective from June 2017's Animal Evaluation (AE) run.

The full AE schedule is available on the DairyNZ website, www.dairynz.co.nz/animal/animal-evaluation.



Ice cool, toasty, or good to go?

By James Mills, LIC Genetics product specialist

With a single missed heat costing an estimated average of \$189* in lost on-farm production, the stakes can be high during spring mating time.

And human error and fatigue appears to play a significant role in lost (heat) opportunities, with research confirming that heat detection rates are higher in herds that utilise heatmount detectors (The InCalf booklet, DairyNZ, p88).

But LIC is this year helping to front-foot potential for disappointing submission and conception rates by introducing a premium heat detection aid, specially-designed for ease of use, better visibility, and a more-accurate indication of how heavy heats might be across individual cows.

The LIC Heat Patch Plus gets 'activated' when sustained pressure from a standing heat causes the central chamber to release a bright dye; with new pressure events, the dye progressively spreads through the 'built-in chambers and channels', indicating the path of a cow's heat.

'The chamber and channel technology' is unique among LIC's suite of heat detection devices: The innovation allows the dye to spread to the edges of the patch, making visual identification far easier in the shed and from a distance.

"The best heat detection starts with careful planning, good observation and the effective use of detection aids." (InCalf, Dairy NZ p82).



James Mills

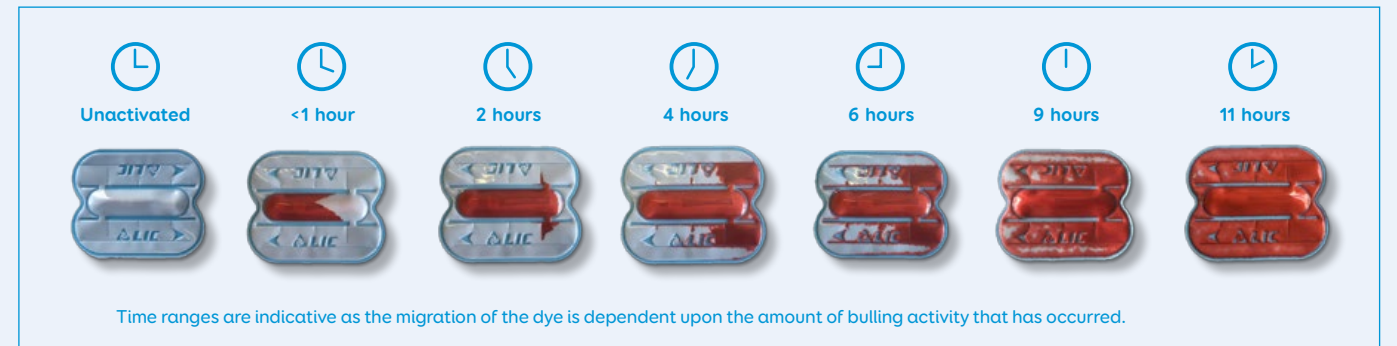
The progressive migration of dye through the patch (see illustration) can also assist with prioritising artificial insemination, and this should be particularly useful among DIY customers (who might inseminate twice a day, for example).

Note that all heat detection aids are merely tools for identifying when a cow is on heat.

If there is any uncertainty of whether the cow is on heat, visual checks should be carried out to confirm the indication from the heat detection device.

All farm staff should be sufficiently educated in how to check for other signs of heat.

* (21 days less in milk X 1.5kgMS/day in peak lactation = 31.5kgMS lost) X \$6 = \$189



Time ranges are indicative as the migration of the dye is dependent upon the amount of bulling activity that has occurred.

GOOD TIMING IS EVERYTHING

Too Early	Best Time to Inseminate	Too Late
<ul style="list-style-type: none"> Will not stand to be ridden Smells other cows Attempts to ride other cows Vulva moist red and slightly swollen Restless and bellows 	<ul style="list-style-type: none"> Stands to be ridden Nervous and excitable Rides other cows May hold milk Vulva moist and red Clear mucus discharge Mud marks on flanks 	<ul style="list-style-type: none"> Will not stand to be ridden Smells other cows Clear mucus discharge from vulva

"In around one-quarter of seasonal calving herds, heat detection errors are likely to be limiting reproductive performance." (InCalf, Dairy NZ, p78).

PREMIER SIRES®

20/05/2017 

2017 PREMIER SIRES HOLSTEIN-FRIESIAN TEAM - DAUGHTER PROVEN

AB Code	Bull Name	BW	Winter Team	Reliability %	Breed Split	Protein BV (kg)	Milkfat BV (kg)	Milk BV (litres)	Live-weight BV (kg)	Fertility BV %	Somatic Cell Score BV	Total Longevity BV (days)	Protein % BV	Milkfat % BV	Calving Difficulty BV %	BCS BV	Gestation Length BV	Overall Opinion BV	Capacity BV	Udder Overall BV	Beta Casein	Sire
111037	SAN RAY FM BEAMER-ET S2F	221	W	86	F14J2	37.2	39.7	807	38	2.2	-0.03	465	3.9	4.8	1.8	0.00	-4.6	0.14	0.47	0.88	A1A2	FAIRMONT MINT-EDITION
110042	MORRIS TF LAMONT S1F ^	201		93	F15J1	39.6	26.4	882	25	1.6	-0.17	181	3.9	4.5	0.3	0.17	-4.0	0.02	0.53	-0.12	A1A2	TELESIS EUON FIRENZE
113009	HAZAE SH DISTINCT-ET S1F	196	W	84	F16	27.3	23.9	560	20	4.6	-0.32	387	3.9	4.7	1.1	0.05	-3.2	-0.07	-0.11	0.20	A1A2	SAVANNAHS HF HAMMER S1F
111011	ASHDALE FM KELSBELLS S1F	194		87	F15J1	36.0	25.1	752	50	2.1	-0.19	451	3.9	4.5	2.7	0.09	-1.8	0.15	0.27	0.38	A1A2	FAIRMONT MINT-EDITION
111036	ARKAN FM BUSTER-ET S2F	187		84	F14J2	27.5	38.9	493	34	2.5	-0.16	350	4.0	5.0	-0.4	0.03	-2.5	0.19	0.36	0.30	A1A2	FAIRMONT MINT-EDITION
110080	MOURNE GROVE HOTHOUSE S2F	186	W	99	F16	34.1	16.4	996	31	5.9	-0.10	460	3.7	4.2	3.0	0.09	-4.9	0.06	-0.03	1.12	A2A2	SRC GLENMEAD ROCKSOLID-ET
113086	MAIRE IG GAUNTLET-ET	179		81	F16	47.3	38.4	1583	87	2.4	-0.44	426	3.6	4.2	4.4	0.29	-0.4	0.76	1.51	0.94	A2A2	INVERNIA TGF IGNITION S3F
110052	GYDELAND EXCEL INCA S3F	175	W	87	F16	34.8	28.3	723	71	2.2	-0.08	491	3.9	4.6	3.5	0.19	4.0	0.23	0.23	0.37	A1A2	WHINLEA NAUT EXCEL-ET S3F
110049	SAVANNAHS HF HAMMER S1F	170		99	F15J1	22.4	20.2	611	22	6.1	-0.41	403	3.8	4.6	1.8	0.09	-3.4	0.14	0.25	0.57	A2A2	HIGGINS FORMAT
112034	CARSONS FM CAIRO S3F	170		97	F16	28.6	37.0	814	44	4.6	-0.51	257	3.7	4.7	1.7	0.22	-4.5	0.33	0.54	0.44	A2A2	FAIRMONT MINT-EDITION
112063	PADRUTTS GB TOPNOTCH S2F	170	W	87	F15J1	32.5	17.4	1014	34	5.2	-0.20	421	3.7	4.2	-0.5	0.10	0.3	0.45	0.57	0.41	A1A2	MAIRE PF GOLDEN BOY S2F
113114	RIVERHEIGHTS GB ROGUE S3F	170		85	F16	30.4	23.9	844	35	2.5	-0.76	325	3.8	4.4	-1.0	0.05	1.9	0.07	0.12	0.12	A2A2	GREENWELLS HF BONZA S3F
113056	LANGEVELDS FI PIN-UP S2F ^	170	W	83	F16	32.1	38.3	873	64	3.8	-0.51	363	3.8	4.7	3.0	0.16	-8.0	0.47	0.35	0.18	A2A2	FARSHIDE M ILLUSTRIOUS S3F
111067	BYREBURN PF ETERNAL S2F *	166		98	F16	23.5	28.8	714	37	2.6	-0.43	449	3.7	4.6	-0.5	0.35	-0.4	0.11	0.34	0.04	A2A2	PUKETIRO FROSTMAN S1F
112054	BAGWORTH SH KEEPSAKE S2F	166		84	F16	36.1	28.0	1282	19	-0.8	-0.57	356	3.6	4.2	2.2	-0.08	-0.6	0.19	-0.18	0.40	A1A2	SAVANNAHS HF HAMMER S1F
113117	GREENWELL SH BOMBER S1F	166	W	82	F16	26.8	18.3	637	18	3.1	-0.34	333	3.8	4.5	1.5	-0.03	0.2	0.11	0.07	0.97	A1A2	SAVANNAHS HF HAMMER S1F
113046	MEANDER ROCKETMAN-ET S1F	162		83	F16	23.4	32.1	523	35	2.8	-0.20	402	3.9	4.9	0.3	0.05	-0.9	0.16	0.32	0.45	A1A2	SAVANNAHS HF HAMMER S1F
113070	GREENWELL FI BLADE S3F ^	160		88	F16	33.7	24.5	822	49	3.1	0.06	304	3.8	4.5	3.3	0.21	-4.6	0.08	0.60	0.75	A1A2	FARSHIDE M ILLUSTRIOUS S3F
113120	BOTHWELL WT MAXIMA S2F	154	W	97	F15J1	25.7	31.2	708	18	4.9	-0.12	163	3.8	4.7	1.3	0.03	-1.9	0.25	0.43	1.04	A1A2	WAIU MAX TOMMO S3F
113014	SPRING TRALEE BOSS-ET S3F #	150		98	F15J1	26.6	12.7	691	20	5.1	-0.29	258	3.8	4.4	0.9	-0.01	-1.3	0.05	0.48	1.17	A2A2	EDWARDS BANQ OVATION S3F
Expected team weighted average		182		99		32.4	28.2	827	39	3.2	-0.28	375	3.8	4.5	1.5	0.11	-2.3	0.19	0.35	0.47		

* Small Calf Syndrome carrier ^ Recessive Fertility Gene carrier # Red Factor carrier

2017 PREMIER SIRES HOLSTEIN-FRIESIAN TEAM - FORWARD PACK

AB Code	Bull Name	gBW / BW	Winter Team	Reliability %	Breed Split	Protein BV/gBV (kg)	Milkfat BV/gBV (kg)	Milk BV/gBV (litres)	Liveweight BV/gBV (kg)	Fertility BV/gBV %	Somatic Cell Score BV/gBV	Total Longevity BV/gBV (days)	Protein % BV/gBV	Milkfat % BV/gBV	Calving Difficulty BV/gBV %	Body Condition Score BV	Gestation Length BV/gBV	Overall Opinion BV/gBV	Capacity BV/gBV	Udder Overall BV/gBV	Beta Casein	Sire
111037	SAN RAY FM BEAMER-ET S2F	221	W	86	F14J2	37.2	39.7	807	38	2.2	-0.03	465	3.9	4.8	1.8	0.00	-4.6	0.14	0.47	0.88	A1A2	FAIRMONT MINT-EDITION
110042	MORRIS TF LAMONT S1F ^	201		93	F15J1	39.6	26.4	882	25	1.6	-0.17	181	3.9	4.5	0.3	0.17	-4.0	0.02	0.53	-0.12	A1A2	TELESIS EUON FIRENZE
113009	HAZAE SH DISTINCT-ET S1F	196	W	84	F16	27.3	23.9	560	20	4.6	-0.32	387	3.9	4.7	1.1	0.05	-3.2	-0.07	-0.11	0.20	A1A2	SAVANNAHS HF HAMMER S1F
111011	ASHDALE FM KELSBELLS S1F	194		87	F15J1	36.0	25.1	752	50	2.1	-0.19	451	3.9	4.5	2.7	0.09	-1.8	0.15	0.27	0.38	A1A2	FAIRMONT MINT-EDITION
111036	ARKAN FM BUSTER-ET S2F	187		84	F14J2	27.5	38.9	493	34	2.5	-0.16	350	4.0	5.0	-0.4	0.03	-2.5	0.19	0.36	0.30	A1A2	FAIRMONT MINT-EDITION
110080	MOURNE GROVE HOTHOUSE S2F	186	W	99	F16	34.1	16.4	996	31	5.9	-0.10	460	3.7	4.2	3.0	0.09	-4.9	0.06	-0.03	1.12	A2A2	SRC GLENMEAD ROCKSOLID-ET
113086	MAIRE IG GAUNTLET-ET	179		81	F16	47.3	38.4	1583	87	2.4	-0.44	426	3.6	4.2	4.4	0.29	-0.4	0.76	1.51	0.94	A2A2	INVERNIA TGF IGNITION S3F
110052	GYDELAND EXCEL INCA S3F	175	W	87	F16	34.8	28.3	723	71	2.2	-0.08	491	3.9	4.6	3.5	0.19	4.0	0.23	0.23	0.37	A1A2	WHINLEA NAUT EXCEL-ET S3F
Spring Bulls																						
116037	ARKAN ML BABYLON-ET S1F ^	212	W	60	F15J1	41.6	37.7	1038	31	1.2	0.00	312	3.8	4.4	1.1	0.07	-3.7	0.18	0.35	0.14	A2A2	MORRIS TF LAMONT S1F
116065	DICKSONS BG MANDATE S1F	200	W	58	F16	25.6	37.0	557	24	3.2	-0.26	444	3.9	4.8	-0.5	0.08	-2.9	0.14	0.36	0.40	A2A2	BAGWORTH PF GRANDEUR S1F
116036	ARKAN MGH BACKDROP-ET S2F	199	W	63	F15J1	30.9	29.9	697	44	6.1	-0.08	455	3.9	4.5	1.6	0.15	-2.8	0.07	0.25	0.66	A1A2	MOURNE GROVE HOTHOUSE S2F
116122	SPRING TRALEE BASS-ET S2F	195		65	F15J1	32.1	30.6	897	24	5.2	-0.03	397	3.8	4.5	2.0	0.06	-2.4	0.03	0.28	0.74	A1A2	MOURNE GROVE HOTHOUSE S2F
116016	GALATEA MGH REGIMENT S1F	194		62	F16	36.3	29.3	1002	40	4.7	-0.10	423	3.8	4.4	2.3	0.05	-5.2	0.16	0.12	0.73	A2A2	MOURNE GROVE HOTHOUSE S2F
116035	ARKAN MGH BESTSELLER S2F	192	W	63	F15J1	30.6	20.8	768	23	5.4	-0.05	423	3.8	4.5	1.5	0.10	-2.5	0.05	0.19	0.60	A2A2	MOURNE GROVE HOTHOUSE S2F
116124	SPRING TRALEE BEAT-ET S1F ^	192		63	F15J1	34.2	32.7	765	31	3.1	0.00	286	3.9	4.6	0.6	0.10	-3.2	0.05	0.51	0.30	A2A2	MORRIS TF LAMONT S1F
116002	RIVER HEIGHTS DUDE-ET S2F ^	188		63	F16	33.7	25.4	935	25	2.4	-0.16	408	3.8	4.5	1.7	0.07	-3.6	0.06	0.11	0.50	A1A2	MOURNE GROVE HOTHOUSE S2F
116064	BERAKAH MGH SIMON-ET S2F	172		61	F16	29.3	24.0	805	28	4.8	-0.03	406	3.8	4.4	2.0	0.03	0.2	0.06	0.15	0.64	A2A2	MOURNE GROVE HOTHOUSE S2F
115021	GORDONS AM LANCELOT S3F	165	W	64	F16	31.8	31.2	789	37	3.0	-0.02	287	3.8	4.5	1.8	0.04	-2.1	0.12	0.20	0.28	A1A1	ALJO TEF MAELSTROM-ET S3F
Expected team weighted average		194		98		34.7	29.8	823	40	3.1	-0.16	392	3.9	4.6	1.8	0.10	-2.5	0.15	0.36	0.48		

■ Shaded bulls are Daughter Proven with AE BW and BV's 20/05/2017. ^ Recessive Fertility Gene carrier

□ Non shaded bulls are genomically selected with LIC gBW's and gBV's.

2017 PREMIER SIRES JERSEY TEAM - DAUGHTER PROVEN



AB Code	Bull Name	BW	Winter Team	Reliability %	Breed Split	Protein BV (kg)	Milkfat BV (kg)	Milk BV (litres)	Live-weight BV (kg)	Fertility BV %	Somatic Cell Score BV	Total Longevity BV (days)	Protein % BV	Milkfat % BV	Calving Difficulty BV %	BCS BV	Gestation Length BV	Overall Opinion BV	Capacity BV	Udder Overall BV	Beta Casein	Sire
313006	KAIMATARAU INDY GOLLUM	205	W	79	J16	-3.3	9.7	-659	-77	3.2	-0.37	332	4.3	5.8	-2.2	0.10	-3.6	-0.03	0.16	0.19	A2A2	UPLAND PARK TS INDY S3J
312034	OKURA GOLDIE INDEX	201	W	83	J16	10.0	33.7	-6	-70	-2.8	-0.21	190	4.0	5.5	-2.5	0.07	-2.0	0.12	-0.02	0.04	A2A2	PUHIPUHI CAPS GOLDIE S3J
313045	OKURA 5-STAR INNES	200		82	J16	4.8	7.5	-324	-73	-0.4	-0.36	313	4.2	5.3	-3.6	0.14	-2.4	0.50	0.17	0.29	A2A2	HILLSTAR TERRIFIC 5-STAR
313040	FICHTL 5-STAR SULTAN S3J	199	W	80	J15F1	2.5	11.3	-400	-51	4.3	-0.50	315	4.2	5.5	-0.7	0.16	-3.3	0.21	0.70	0.79	A2A2	HILLSTAR TERRIFIC 5-STAR
312057	BELLS CM CONRAD S2J	197	W	85	J15F1	6.7	20.2	-192	-15	9.9	0.10	404	4.1	5.4	-3.4	0.23	-6.2	-0.19	0.34	0.38	A2A2	CRESCENT AMC MARVEL
313016	BONACORD MURMUR BOLT	197	W	97	J16	4.7	18.9	-224	-69	3.3	-0.54	178	4.1	5.4	-2.1	-0.04	0.2	-0.16	0.10	0.40	A2A2	OKURA LIKA MURMUR S3J
313046	OKURA OLM KAINO ET	195		95	J16	-0.3	11.2	-361	-71	4.0	-0.42	294	4.1	5.4	-0.8	0.16	-2.4	0.34	0.63	1.19	A2A2	OKURA LIKA MURMUR S3J
311013	OKURA LT INTEGRITY	190		99	J16	1.9	26.6	-430	-46	2.0	-0.08	261	4.2	5.9	-2.1	0.29	-0.6	0.25	0.84	0.55	A1A2	LYNBROOK TERRIFIC ET S3J
Expected team weighted average		199		99		3.7	17.2	-316	-59	2.9	-0.30	287	4.2	5.5	-2.3	0.13	-2.7	0.11	0.32	0.43		

2017 PREMIER SIRES JERSEY TEAM - FORWARD PACK

AB Code	Bull Name	gBW/BW	Winter Team	Breed Split	Reliability %	Protein BV/gBV (kg)	Milkfat BV/gBV (kg)	Milk BV/gBV (litres)	Liveweight BV/gBV (kg)	Fertility BV/gBV %	Somatic Cell Score BV/gBV	Total Longevity BV/gBV (days)	Protein % BV/gBV	Milkfat % BV/gBV	Calving Difficulty BV/gBV %	BCS BV/gBV	Gestation Length BV/gBV	Overall Opinion BV/gBV	Capacity BV/gBV	Udder Overall BV/gBV	Beta Casein	Sire
313006	KAIMATARAU INDY GOLLUM	205	W	J16	79	-3.3	9.7	-659	-77	3.2	-0.37	332	4.3	5.8	-2.2	0.10	-3.6	-0.03	0.16	0.19	A2A2	UPLAND PARK TS INDY S3J
312034	OKURA GOLDIE INDEX	201	W	J16	83	10.0	33.7	-6	-70	-2.8	-0.21	190	4.0	5.5	-2.5	0.07	-2.0	0.12	-0.02	0.04	A2A2	PUHIPUHI CAPS GOLDIE S3J
313040	FICHTL 5-STAR SULTAN S3J	199	W	J15F1	80	2.5	11.3	-400	-51	4.3	-0.50	315	4.2	5.5	-0.7	0.16	-3.3	0.21	0.70	0.79	A2A2	HILLSTAR TERRIFIC 5-STAR
312057	BELLS CM CONRAD S2J	197	W	J15F1	85	6.7	20.2	-192	-15	9.9	0.10	404	4.1	5.4	-3.4	0.23	-6.2	-0.19	0.34	0.38	A2A2	CRESCENT AMC MARVEL
Spring Bulls																						
316033	RUANUI TERRIFIC DALAS S3J	212	W	J16	65	1.4	16.2	-448	-62	4.5	-0.21	327	4.2	5.5	-1.8	0.23	-1.4	0.22	0.50	0.83	A2A2	LYNBROOK TERRIFIC ET S3J
315059	BONACORD AND BERNARD S2J	212	W	J16	67	0.6	21.0	-615	-63	3.8	-0.15	300	4.4	5.7	-2.3	0.03	-1.0	0.11	0.04	0.48	A2A2	ARRIETA NN DEGREE ET
316003	CAREYS THOR LIMERICK S2J	204	W	J16	56	5.1	18.8	-220	-61	3.9	-0.20	290	4.1	5.5	-2.3	0.10	-4.9	0.07	0.31	0.38	A2A2	THORNWOOD OLM THOR
316035	FOXTON LT FIXATION S2J	201	W	J16	65	1.7	20.2	-512	-59	1.6	-0.11	294	4.3	5.8	-0.7	0.22	2.5	0.20	0.42	0.57	A2A2	LYNBROOK TERRIFIC ET S3J
314012	KAITAKA OI LEOPARD ET	201	W	J16	67	4.6	27.5	-356	-55	1.2	-0.19	276	4.2	5.7	-1.7	0.06	-4.1	0.27	0.41	0.40	A2A2	OKURA LT INTEGRITY
315008	PUKEROA AND BARATONE ET	197		J16	68	1.7	15.6	-574	-56	3.4	0.02	276	4.4	5.8	-0.9	0.16	-5.6	0.26	0.27	0.30	A2A2	ARRIETA NN DEGREE ET
315029	THORNWOOD DEGREE TRIGGER	190		J16	67	2.1	25.9	-481	-48	2.7	0.00	287	4.3	5.7	-2.3	0.06	-4.5	0.25	0.35	0.53	A2A2	ARRIETA NN DEGREE ET
314025	GLANTON DEGREE BALKAN ET	189		J16	67	4.4	21.1	-406	-51	2.7	0.05	217	4.3	5.7	-1.0	0.15	-1.7	0.16	0.39	0.19	A1A2	ARRIETA NN DEGREE ET
315001	LITTLE RIVER LT MOZART	186		J16	65	1.5	13.4	-462	-49	3.6	-0.03	334	4.3	5.6	-2.3	0.18	-2.3	0.39	0.33	0.80	A2A2	LYNBROOK TERRIFIC ET S3J
316038	DEEP RIVER PCG FAVOUR	183		J16	64	4.2	26.8	-263	-39	2.9	-0.14	284	4.1	5.7	-1.0	0.15	-0.6	0.34	0.51	0.32	A2A2	PUHIPUHI CAPS GOLDIE S3J
Expected team weighted average		204			98	3.6	19.1	-342	-54	3.5	-0.22	305	4.2	5.6	-2.1	0.13	-3.5	0.07	0.30	0.37		

■ Shaded bulls are daughter proven with AE BW & BV's 20/05/2017.

□ Non shaded bulls are genomically selected with LIC gBW & gBV's.

2017 PREMIER SIRES KIWICROSS™ TEAM - DAUGHTER PROVEN



AB Code	Bull Name	BW	Winter Team	Reliability %	Breed split	Protein BV (kg)	Milkfat BV (kg)	Milk BV (litres)	Live-weight BV (kg)	Fertility BV %	Somatic Cell Score BV	Total Longevity BV (days)	Protein % BV	Milkfat % BV	Calving Difficulty BV %	BCS BV	Gestation Length BV	Overall Opinion	Capacity BV	Udder Overall BV	Beta Casein	Sire
511011	PRIESTS SIERRA ^	218	W	98	F11J5	23.4	37.1	416	42	8.5	-0.31	534	3.9	5.1	0.3	0.15	-6.8	0.26	0.38	0.16	A2A2	FAIRMONT MINT-EDITION
511026	ARKANS BEAUT ET	207	W	99	F9J7	25.8	22.0	431	5	3.1	-0.33	372	4.0	4.8	-0.9	0.09	-7.2	0.07	0.40	0.26	A1A2	NEVRON SHOWMAN
513054	BURGESS TRICKSHOT ET ^	205		78	F8J8	28.5	38.9	783	-17	1.0	-0.10	323	3.8	4.8	1.3	-0.18	-6.6	0.13	-0.05	0.05	A2A2	FAIRMONT MINT-EDITION
513015	HORIZON CONSCRIPT ET	200		82	F7J9	18.3	19.7	452	-20	6.3	-0.24	347	3.8	4.7	-1.3	0.20	1.6	-0.01	0.39	0.36	A2A2	OKURA LIKA MURMUR S3J
513016	HORIZON BLAZER ET	191	W	84	F8J8	17.2	23.4	393	-8	5.2	-0.32	340	3.8	4.8	-0.9	0.29	-4.9	-0.04	0.85	0.54	A1A2	IL VERO AMORE POWER
512050	ARKANS PERSPECTIVE-ET	188		92	F10J6	14.5	22.8	117	-22	4.7	0.00	349	4.0	5.1	-0.9	-0.03	-3.6	0.04	0.06	0.63	A1A2	FAIRMONT MINT-EDITION
512024	WERDERS PRELUDE	188	W	83	F9J7	26.6	10.8	465	21	5.0	-0.11	413	4.0	4.5	0.9	0.20	-4.1	0.20	0.75	0.51	A2A2	NEVRON SHOWMAN
513074	SCHRADERS TUSK	185	W	81	F9J7	13.8	18.3	238	-23	4.7	-0.16	418	3.9	4.9	-2.4	0.03	-9.9	0.38	0.02	0.40	A1A2	WAIWIRA WARLORD
512005	JUST ONCE COOPER ^	179	W	84	F8J8	10.2	26.8	-9	-29	4.2	0.09	296	4.0	5.3	-0.5	0.01	-9.6	0.38	0.11	0.42	A2A2	ST PETERS OBSIDIAN
513007	ARKANS BEST BET	173		83	F8J8	21.0	26.9	280	22	1.8	-0.04	424	4.0	5.0	0.5	0.11	-7.2	0.23	0.36	0.47	A1A1	ARKANS BEAUT ET
511051	DRYSDALES SOVEREIGN ^	171		86	F7J9	13.7	18.6	148	-2	0.6	-0.45	378	4.0	5.0	-1.7	0.34	-5.5	0.11	0.90	0.44	A2A2	PRIESTS SOLARIS-ET
513004	ARKANS COMRADE	167		79	F7J9	19.4	16.2	298	11	4.1	-0.30	322	4.0	4.8	-2.6	0.14	-4.4	0.20	0.37	0.25	A1A2	ARKANS BEAUT ET
Expected team weighted average		195		99	F9J7	20.3	25.0	382	-3	4.5	-0.19	379	3.9	4.9	-0.5	0.10	-5.5	0.14	0.35	0.35		

^ Recessive Fertility Gene carrier

2017 PREMIER SIRES KIWICROSS™ TEAM - FORWARD PACK

AB Code	Bull Name	gBW / BW	Winter Team	Breed Split	Reliability %	Protein BV/gBV (kg)	Milkfat BV/gBV (kg)	Milk BV/gBV (litres)	Liveweight BV/gBV (kg)	Fertility BV/gBV %	Somatic Cell Score BV/gBV	Total Longevity BV/gBV (days)	Protein % BV/gBV	Milkfat % BV/gBV	Calving Difficulty BV/gBV %	BCS BV/gBV	Gestation Length BV/gBV	Overall Opinion BV/gBV	Capacity BV/gBV	Udder Overall BV/gBV	Beta Casein	Sire
512048	ATHLIAM PACEMAKER ^	221	W	F6J10	98	10.4	16.0	-80	-42	6.6	-0.02	450	4.1	5.2	0.3	0.09	-7.4	-0.03	0.08	0.19	A1A2	NEVRON SHOWMAN
511011	PRIESTS SIERRA ^	218	W	F11J5	98	23.4	37.1	416	42	8.5	-0.31	534	3.9	5.1	0.3	0.15	-6.8	0.26	0.38	0.16	A2A2	FAIRMONT MINT-EDITION
513066	MOURIES LUIGI ^	215	W	F6J10	80	15.1	11.6	56	-29	2.0	-0.46	460	4.1	4.9	-0.7	0.16	1.9	0.03	0.07	0.81	A2A2	SCOTTS BRITESTAR
511026	ARKANS BEAUT ET	207	W	F9J7	99	25.8	22.0	431	5	3.1	-0.33	372	4.0	4.8	-0.9	0.09	-7.2	0.07	0.40	0.26	A1A2	NEVRON SHOWMAN
513054	BURGESS TRICKSHOT ET ^	205	W	F8J8	78	28.5	38.9	783	-17	1.0	-0.10	323	3.8	4.8	1.3	-0.18	-6.6	0.13	-0.05	0.05	A2A2	FAIRMONT MINT-EDITION
513015	HORIZON CONSCRIPT ET	200		F7J9	82	18.3	19.7	452	-20	6.3	-0.24	347	3.8	4.7	-1.3	0.20	1.6	-0.01	0.39	0.36	A2A2	OKURA LIKA MURMUR S3J
Spring Bulls																						
516015	HYJINKS SNAPPER	215	W	F7J9	63	16.0	32.2	144	-16	3.9	-0.07	388	4.0	5.2	-0.1	0.18	-0.5	0.40	0.52	0.77	A1A2	LYNBROOK TERRIFIC ET S3J
516024	ARRIETA BRANSON-ET	210	W	F7J9	62	20.9	31.2	174	-12	2.5	0.10	326	4.1	5.1	0.2	0.08	-5.2	0.28	0.31	0.43	A2A2	SAN RAY FM BEAMER-ET S2F
516025	ARRIETA BREW-ET	207		F7J9	62	21.2	26.8	266	-15	2.5	0.07	351	4.0	5.1	0.2	0.08	-4.0	0.21	0.28	0.46	A1A2	SAN RAY FM BEAMER-ET S2F
516055	BRAEMARK BATTLE AXE	207		F11J5	60	23.5	34.8	292	-2	1.7	0.01	345	4.0	5.1	0.2	0.01	-3.1	0.02	0.27	0.31	A2A2	SAN RAY FM BEAMER-ET S2F
516019	BURMEISTERS EROS-ET	205	W	F9J7	63	25.6	24.6	575	11	3.2	-0.53	363	3.9	4.6	-0.2	0.27	-4.3	0.28	0.83	0.22	A2A2	PRIESTS SOLARIS-ET
516014	COLFOLS CONVINCER-ET	202	W	F9J7	60	18.6	24.3	304	-7	5.2	-0.34	349	3.9	4.8	-1.7	0.15	-2.8	0.02	0.30	0.32	A1A2	KRAAKMANS JAYDIE
516074	CROSSANS CRITICAL-ET	202	W	F10J6	57	21.4	21.9	504	-20	4.4	-0.09	376	3.8	4.7	-1.2	0.05	-4.1	0.12	0.19	0.38	A2A2	KRAAKMANS JAYDIE
516029	WAIARI ARKANS BAZOOKA-ET	199		F11J5	60	23.4	18.7	405	-7	3.2	-0.02	388	4.0	4.7	-0.5	0.11	-2.6	0.19	0.29	0.51	A1A1	KRAAKMANS JAYDIE
516043	ARKANS BOOMBOX-ET	198		F11J5	58	23.1	22.4	630	-13	3.9	-0.19	414	3.8	4.7	-0.5	0.04	-0.8	0.12	0.24	0.57	A2A2	KRAAKMANS JAYDIE
516069	SPRING TRALEE BEAUDEN-ET	197		F13J3	61	21.9	19.4	471	-4	6.0	-0.17	390	3.9	4.8	-0.6	0.08	-0.5	-0.02	0.42	0.57	A1A2	KRAAKMANS JAYDIE
Expected team weighted average		210		F8J8	98	20.3	24.5	337	-9	4.5	-0.22	410	3.9	4.9	-0.2	0.09	-4.0	0.09	0.24	0.33		

■ Shaded bulls are Daughter Proven with AE BW and BV's 20/05/2017.

□ Non shaded bulls are genomically selected with LIC gBWs and gBVs.

^ Recessive Fertility Gene carrier

2017 PREMIER SIRES HOLSTEIN-FRIESIAN YEARLING TEAM - DAUGHTER PROVEN



AB Code	Bull Name	BW	Reliability %	Breed Split	Protein BV (kg)	Milkfat BV (kg)	Milk BV (litres)	Liveweight BV (kg)	Fertility BV %	Somatic Cell Score BV	Total Longevity BV (days)	Protein % BV	Milkfat % BV	Calving Difficulty BV %	BCS BV	Gestation Length BV	Overall Opinion BV	Capacity BV	Udder Overall BV	Beta Casein	Sire
111036	ARKAN FM BUSTER-ET S2F	187	84	F14J2	27.5	38.9	493	34	2.5	-0.16	350	4.0	5.0	-0.4	0.03	-2.5	0.19	0.36	0.30	A1A2	FAIRMONT MINT-EDITION
112063	PADRUTTS GB TOPNOTCH S2F	170	87	F15J1	32.5	17.4	1014	34	5.2	-0.20	421	3.7	4.2	-0.5	0.10	0.3	0.45	0.57	0.41	A1A2	MAIRE PF GOLDEN BOY S2F
113114	RIVERHEIGHTS GB ROGUE S3F	170	85	F16	30.4	23.9	844	35	2.5	-0.76	325	3.8	4.4	-1.0	0.05	1.9	0.07	0.12	0.12	A2A2	GREENWELLS HF BONZA S3F
111067	BYREBURN PF ETERNAL S2F *	166	98	F16	23.5	28.8	714	37	2.6	-0.43	449	3.7	4.6	-0.5	0.35	-0.4	0.11	0.34	0.04	A2A2	PUKETIRO FROSTMAN S1F
111057	OAKLINE DI LEGACY S2F	155	87	F15J1	34.9	17.4	1290	42	3.3	0.00	482	3.5	4.0	0.5	0.30	-1.8	0.35	0.50	0.28	A1A2	DELTOP IDOL IGNITE S2F
Expected team weighted average		170	98		29.8	25.3	871	36	3.2	-0.31	405	3.7	4.5	0.2	0.16	-0.5	0.23	0.38	0.23		

* SCS carrier

2017 PREMIER SIRES KIWICROSS™ YEARLING TEAM - DAUGHTER PROVEN

AB Code	Bull Name	BW	Reliability %	Breed Split	Protein BV (kg)	Milkfat BV (kg)	Milk BV (litres)	Liveweight BV (kg)	Fertility BV %	Somatic Cell Score BV	Total Longevity BV (days)	Protein % BV	Milkfat % BV	Calving Difficulty BV %	BCS BV	Gestation Length BV	Overall Opinion BV	Capacity BV	Udder Overall BV	Beta Casein	Sire
513066	MOURIES LUIGI ^	215	80	F6J10	15.1	11.6	56	-29	2.0	-0.46	460	4.1	4.9	-0.7	0.16	1.9	0.03	0.07	0.81	A2A2	SCOTTS BRITESTAR
511026	ARKANS BEAUT ET	207	99	F9J7	25.8	22.0	431	5	3.1	-0.33	372	4.0	4.8	-0.9	0.09	-7.2	0.07	0.40	0.26	A1A2	NEVRON SHOWMAN
513015	HORIZON CONSCRIPT ET	200	82	F7J9	18.3	19.7	452	-20	6.3	-0.24	347	3.8	4.7	-1.3	0.20	1.6	-0.01	0.39	0.36	A2A2	OKURA LIKA MURMUR S3J
513076	KAMAHI KING ^	198	97	F5J11	5.1	13.5	-210	-40	5.3	-0.46	359	4.1	5.3	-1.6	0.19	0.7	-0.01	0.28	0.67	A2A2	OKURA LIKA MURMUR S3J
513016	HORIZON BLAZER ET	191	84	F9J7	17.2	23.4	393	-8	5.2	-0.32	340	3.8	4.8	-0.9	0.29	-4.9	-0.04	0.85	0.54	A1A2	IL VERO AMORE POWER
512050	ARKANS PERSPECTIVE-ET	188	92	F8J8	14.5	22.8	117	-22	4.7	0.00	349	4.0	5.1	-0.9	-0.03	-3.6	0.04	0.06	0.63	A1A2	FAIRMONT MINT-EDITION
Expected team weighted average		200	98		16.0	18.7	206	-19	4.4	-0.30	372	4.0	4.9	-1.1	0.15	-1.9	0.01	0.34	0.54		

^ Recessive fertility gene carrier

2017 PREMIER SIRES HOLSTEIN-FRIESIAN SEXED TEAM

AB Code	Bull Name	BW	Reliability %	Breed Split	Protein BV (kg)	Milkfat BV (kg)	Milk BV (litres)	Liveweight BV (kg)	Fertility BV %	Somatic Cell Score BV	Total Longevity BV (days)	Protein % BV	Milkfat % BV	Calving Difficulty BV %	BCS BV	Gestation Length BV	Overall Opinion BV	Capacity BV	Udder Overall BV	Beta Casein	Sire
116008	AZREEL MGH JOVIAL S2F	190	62	F15J1	34.1	26.6	946	30	3.9	-0.06	430	3.8	4.4	2.6	0.06	-2.6	0.07	0.17	0.69	A2A2	MOURNE GROVE HOTHOUSE S2F
115004	ARKAN EO BIGSHOT-ET S3F	180	64	F15J1	28.0	16.6	583	18	3.6	-0.05	365	3.9	4.5	0.2	0.12	2.5	0.04	0.16	0.39	A2A2	EDWARDS BANQ OVATION S3F
116077	MEANDER ML RAMPANT S1F	178	60	F16	32.9	29.0	797	30	2.3	-0.25	273	3.8	4.6	1.0	0.07	-1.6	0.05	0.45	0.09	A1A2	MORRIS TF LAMONT S1F
116019	WERDERS DE OVERTIME S1F	178	53	F16	31.5	40.0	710	36	3.6	0.20	276	3.9	4.7	3.3	0.05	-6.3	0.27	0.30	0.24	A2A2	DICKSONS SHADE EMPIRE S1F
116013	STOUPES BG TRIUMPHANT S1F	172	59	F16	32.9	42.1	912	45	1.1	0.01	390	3.8	4.8	0.1	0.07	-3.9	0.06	0.49	0.54	A2A2	BAGWORTH PF GRANDEUR S1F
Expected team weighted average		180	92		31.9	30.9	790	32	2.9	-0.03	347	3.8	4.6	1.4	0.07	-2.4	0.10	0.31	0.39		

Bulls are genomically selected with LIC gBW & gBV's data.

2017 PREMIER SIRES KIWICROSS™ SEXED TEAM

AB Code	Bull Name	gBW / BW	Reliability %	Breed Split	Protein BV/gBV (kg)	Milkfat BV/gBV (kg)	Milk BV/gBV (litres)	Liveweight BV/gBV (kg)	Fertility BV/gBV %	Somatic Cell Score BV/gBV	Total Longevity BV/gBV (days)	Protein % BV/gBV	Milkfat % BV/gBV	Calving Difficulty BV/gBV %	BCS BV/gBV	Gestation Length BV/gBV	Overall Opinion BV/gBV	Capacity BV/gBV	Udder Overall BV/gBV	Beta Casein	Sire
515050	RHANTANA OPTIMIST ET	203	53	F12J4	30.1	33.9	634	16	2.0	0.01	374	3.9	4.8	-0.4	0.07	2.2	0.15	0.44	0.21	A2A2	CASTLEGRACE DAREDEVIL
513098	ARKANS BOUNTY	194	82	F5J11	20.1	27.4	364	-16	0.9	-0.15	311	3.9	4.9	-0.4	0.05	-3.5	0.11	0.18	0.37	A1A2	OKURA LT INTEGRITY
516075	CROSSANS CASPIAN-ET	191	57	F10J6	22.9	24.0	599	-14	3.8	-0.03	357	3.8	4.7	-1.4	0.10	1.6	0.19	0.28	0.38	A1A2	KRAAKMANS JAYDIE
516059	MANGAHEI BOUNTY HUNTER	190	58	F7J9	18.2	25.5	113	-17	0.4	0.00	301	4.1	5.1	0.3	0.21	0.5	0.28	0.64	0.98	A2A2	ARKANS BOUNTY
516028	WAIKORIRE GORDON	188	63		13.0	19.2	-30	-19	3.3	-0.03	348	4.1	5.2	0.0	0.16	-2.7	0.32	0.47	0.97	A2A2	LYNBROOK TERRIFIC ET S3J
Expected team weighted average		193	92		20.9	26.0	336	-10	2.1	-0.04	338	4.0	4.9	-0.4	0.12	-0.4	0.21	0.40	0.58		

Shaded bulls are Daughter Proven with AE BW and BV's 20/05/2017.

Non shaded bulls are genomically selected with LIC gBW's and gBV's data.

ET a bolt of lightning?

Dairy cattle genetics remain among the most powerful tools to improve herd performance and efficiency over the long term, but evolving technologies can bolster the genetic gain process.

Among the most high-profile technologies for driving the selection of potential dairy bull genetics is the emergence of genomics (DNA), and good progress continues to be made on the accuracy front.

However, for many years LIC has worked with breeders to utilise embryo transfer methods across their top contract mate cows, from strong cow families, to produce more desirable male and female progeny.

When successful, embryo transfer (ET) ultimately boosts genetic gain by increasing the pressure on selection intensity within the genetic gain formula (Genetic gain = (selection intensity x heritability x phenotypic variation x accuracy of selection) divided by the generation interval).

“40% of bulls entering LIC’S sire proving scheme are the result of embryo transfer work carried out by New Zealand farmers, as increasing numbers of breeders recognise the benefits of using TVR and MOET technologies.”

-Simon Worth, LIC livestock selection manager

Put another way, when multiple eggs from the very best cows can be fertilised with the very best bulls, the selection intensity gets driven up and faster rates of genetic gain can be expected.

Both parent breeds, and particularly Jersey, face genetic diversity challenges in New Zealand, and ET work provides



Embryo Transfer process takes place using the TVR method at Animal Breeding Services.

the chance for multiple bulls to be used across a single cow within weeks, thereby providing outcross opportunity.

With LIC involvement in programmes (such as the Discovery Project and Jersey Future), young animals get genomically screened before ET takes place; this assists in selection of the most appropriate animals (for example, in the case of choices between full siblings), but it also helps eliminate the risk of progeny passing on undesirable genetic variations such as small calf syndrome.

What does embryo transfer entail?

ET is the transfer of a fertilised egg, or embryo, from one (donor) cow to another (recipient); doing this combines the donor cow’s superior genetics with the elite genetics of the selected sire.

The true advantage is that, generally, multiple eggs get produced by the donor cow within weeks - meaning the number of progeny produced by the cow in one season can go from one (or zero) to 10, or more.

Two main methods of embryo transfer are used in New Zealand:

- Trans vaginal recovery (TVR). This involves the extraction of multiple oocytes (microscopic, unfertilised eggs) from the cow’s uterus. Oocytes are subsequently mixed with elite bull semen in a laboratory to produce fertilised embryos. The embryos are used either fresh or frozen for transfer to a recipient cow. TVR involves farmers sending their donor cows

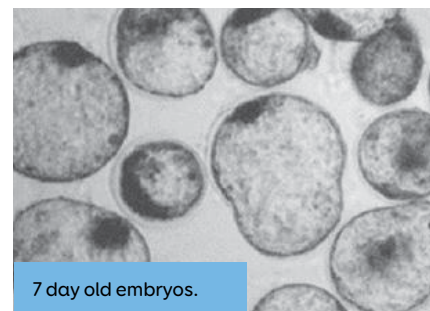
to specialist providers of TVR, or performing the process on-farm.

- Multiple Ovulation Embryo Transfer (MOET). Work is carried out on-farm or at the provider’s premises. The donor cow is given hormone injections to increase the incidence of ovulations, and, once the cow is on heat, AB semen is used for fertilisation. About a week later the ‘flushing’ technique is used to extract the fertilised eggs from the cow’s uterus. Embryos are either frozen (for later transfer to a recipient cow) or are implanted direct in to a recipient.

Using ET processes LIC’s bull acquisition team work with breeders of elite female dairy progeny as a way of ‘super-charging’ genetic gain in the industry.

Resulting female progeny from ET work can be kept as high-powered milking replacements and potential future bull dams. Alternatively, the animals can be sold at a premium market price.

Should the calf be born a male, significant payments can be made for the young sire by LIC.



7 day old embryos.

Strong Parent Breeds, Strong Future

LIC is proud of its strong partnerships with both Holstein NZ and Jersey NZ breed societies, designed to encourage collaboration between LIC, the breeding fraternity, and dairy farmers. Highlighted below are two examples of projects LIC’s sire selection team works on with the respective breed societies, Holstein-Friesian NZ and Jersey NZ.

Discovery

Working with Holstein-Friesian NZ, up to 300 (registered) rising one-year-old heifers are genomically screened by LIC annually, with as many as 50 potential dams selected to participate in the Discovery programme.



The objective of the programme is to support the opportunity for breeders, through advanced breeding technologies, to develop top cow families and breed bulls for the artificial in semination industry.

Heifers are invited to Animal Breeding Services (ABS) in early-July to enter the embryo transfer programme over six sessions. Embryo transfers take place using the trans-vaginal recovery method.

Wendy Harker, chair of Holstein-Friesian NZ, said LIC brought expert knowledge of genetics technology, including genomics, to the table.



Wendy Harker, Holstein Friesian NZ chair

“We can reduce the generation interval by tapping in to genomics, because we’re able to recognise promising genetic merit animals much earlier in the process, and the result is that quality bulls can hit the market earlier,” Wendy said.

“Through the Discovery programme LIC offers our breeders a great understanding of the trans-vaginal recovery process - the programme is about increasing the quality of both female and male dairy cattle on the ground.”

The relationship between LIC and Holstein-Friesian NZ was supportive and strong, Wendy said, with LIC’s sire selection manager Simon Worth providing regular, clear, updates to members: “We recognise what each other can do and what we each offer. It’s a good example of excellent collaboration between our organisations.”

Holstein-Friesian was the industry’s dominant breed in terms of the semen market, “and from the breed society’s point of view we’d like to see as many F16s on the ground as possible,” Wendy said.

It was vital to the industry that both parent breeds, Holstein-Friesian and Jersey, remained as strong as possible, she said.

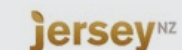
In the Discovery programme, LIC and the breeder mutually agree on matings, with the breeder given the option to implant the embryos in to the owner’s recipient cows; pregnant recipients are sent home, or owners may elect to take the ‘live calf’ option, in which weaned calves are sent home.

The breeder pays for the service, with ABS guaranteeing 50% hold rate for fresh implants. Genomic evaluations of selected heifers are done as part of the service, as are parentage and defect testings. There are no breeding restrictions on heifers screened or on resulting female progeny.

Meanwhile, LIC gets first right to purchase bull calf offspring (at a fixed price or through a royalty option), with an additional ET payment made by the cooperative; a rearing fee is also paid by LIC for any bulls not subsequently purchased.

To find out more about the Discovery Programme go to: www.nzholstein.org.nz/about_discovery_project.cfm

Jersey Future



This joint venture breeding programme sees LIC working alongside Jersey NZ in a quest to breed bulls that deliver genetic gain, diversity, reliability, and longevity.

Jersey NZ members can nominate elite bull calves born before 9 September, with LIC agreeing to ‘genomically test’ up to 50 member-nominated bulls annually.

Eight sires ultimately get selected to be ‘proven’ under the programme each year.

Association board member Steve Ireland said the relationship between LIC and Jersey NZ was valued, and the sort of collaboration that Jersey Future offered was “vitaly important” for the breed’s future growth, and the dairy industry’s continued success.



Steve Ireland, Jersey NZ board member

“LIC is a major player in the industry and that’s the big advantage and attraction for us,” Steve said.

“Jersey Future offers us the opportunity to prove bulls in a widespread manner which I’m certain will generate high quality animals for the industry, and that’s our way of helping with continued genetic gain within the Jersey breed.”

LIC offered the widest spectrum of Jersey animals within the industry, Steve said, which offered a great resource in terms of quality bulls and bull dams.

Members interested in Jersey Future may already have bull calves represented in LIC’s breeding scheme: Where full ET siblings have been generated, there is an opportunity to bring some of those genetics to Jersey Future.

LIC will inspect Jersey Future selected bull calves (and their dams) as part of its scheduled bull-buying round, which normally begins in early November.

The final list of bulls will be selected by 20 November, with LIC paying the breeder \$4000+GST for AI-bred bulls and \$5000+GST for ET-generated bulls.

Meanwhile, a royalty is paid to the society for any bulls that graduate as a marketable Premier Sire or Alpha bull, sold either domestically or internationally.

Jersey NZ is keen to hear from farmers interested in purchasing semen from these unproven sires.

To find out more about Jersey Future go to: www.jersey.org.nz/jersey-future/

LIC runs its own selection intensity programme (using embryo transfer methods) for its KiwiCross breed, called Accelerate.

Never mind the bobbies – here’s the Wagyu straws!



Wagyu steak and beans

There’s a big USA appetite for grass-fed, New Zealand beef – which gets marketed at an international premium thanks to the appeal of pasture-to-plate traceability.

“Wagyu fits nicely in to that demand, and coincidentally the supply of Wagyu fits nicely in to the New Zealand dairy scene,” says Neil Macdonald.

Neil is among an LIC team that manages a new Wagyu programme in conjunction with Hastings-based agri-food exporter First Light: LIC uses Wagyu semen to market to a growing segment of New Zealand dairy farmers wanting to use the breed across their non-replacements.

This year LIC aims to supply First Light with 20,000 Wagyu animals for processing and export.

First Light’s website describes the meat as “the Rolls Royce of beef, the food of Emperors and Samurai warriors...”

grass-fed wagyu is sweet, nutty, juicy, tender, and just downright delicious.”

Neil endorses this: “Wagyu beef as a richer, tastier, meat compared to other beef cuts, and international markets are receptive to the story behind it.”

First Light’s website describes the meat as “the Rolls Royce of beef, the food of Emperors and Samurai warriors... grass-fed wagyu is sweet, nutty, juicy, tender, and just downright delicious.”

A significant aspect of First Light’s marketing was its traceability and grass-fed appeal, but the company was also keen to highlight its contribution to the New Zealand economy, Neil said.

For example, Wagyu supported an entire supply chain: Companies and individuals alike were the beneficiaries, “from LIC and dairy farmers to calf rearers, vets, graziers, trucking companies, processing companies, exporters, and restaurants and retail.”

In terms of industry growth and financial spin-off, the comparison to the bobby calf industry was clear, Neil said.

Born male or female, First Light pays \$150 or \$200 respectively for spring or autumn born Wagyu calves (4-20 days of age), and \$475 or \$550 respectively

for spring or autumn born calves reared to a 90kg liveweight.

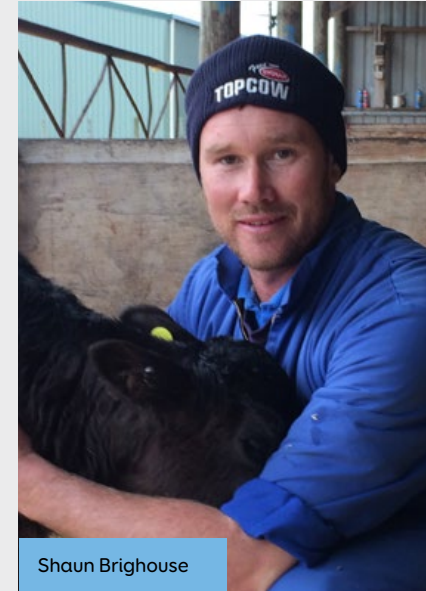
From a dairy farmer’s viewpoint, Wagyu semen was desirable during both autumn and spring mating because it was ideal for use across the bottom 20% of the herd, Neil said.

“For the past several years we’ve seen unprecedented demand for short gestation length (SGL) genetics as farmers have looked to bring their calving pattern forward... SGL is generally ideal to use at the tail-end of mating.

“But, by contrast, we think Wagyu is ideal for use at the front-end of mating – in the first three to six weeks: During that period, why should farmers be using, for example, Premium Sires straws over cows that sit in the bottom 10 or 20 percent of the herd?”

Smart farmers would “make their low-end cows work for them” by using the progeny of low-BW cows to supplement income via Wagyu (rather than taking a market price for bobby calves).

Waikato farmer Shaun Brighthouse is one such farmer.



Shaun Brighthouse

Shaun said the big attraction about Wagyu for him was the simplicity it offered in terms of calving ease, together with guaranteed income.



Wagyu calf on Shaun Brighthouse’s farm.

Shaun said the big attraction about Wagyu for him was the simplicity it offered in terms of calving ease, together with guaranteed income.

“We know we’re getting \$200 a calf (in autumn); fair enough it’s not, say, Hereford money, but I’m guaranteed that money for a heifer or a bull.

“You know, Herefords can come out red, or they might come out black, and there’s definitely a difference in price for those ones.

“You can get \$350 for a Friesian bull or a Hereford bull but you can also get \$80 or \$60 or \$20 for a rubbish one... at the end of the day if you average them all up they wouldn’t be much more than \$200 anyway.

“The Wagyu is \$200 for a calf and that’s a good amount of money – I’m happy with that for a calf. It costs us the \$16 for the semen, much the same as most other beef products.

“But the big thing for us is calving ease. If she can calve herself, she can get up, lick the calf, she can get on with being a cow, I’m happy.

“With Wagyu we don’t get the same number of paralysis cows or the rigmarole of a cow that tries to calve for three or four hours overnight: Down the track that helps – if they (cows) haven’t had issues at calving they’re more likely to get in-calf; they’re more likely to offer the production I want; and they’re more likely to be healthy and fit to milk.

“Beside giving me calving ease I know I’ve got a calf that’s actually worth

Smart farmers would “make their low-end cows work for them” by using the progeny of low-BW cows to increase income via Wagyu (rather than taking a market price for bobby calves).



Neil Macdonald

something, I could tail with Jersey, but that’s going to give me a bobby that’s worth nothing. We also use Wagyu bulls over our heifers.

“We’re doing away with bobbies, and we’re doing away with all the tension that surrounds bobbies.”



FAT IS BACK

by Casey Inverarity,
LIC bull acquisition manager

Fat, along with its shelf mate cheese - historically perceived as the bad boys of the refrigerator.

This is no more.

That's right, fat is trendy again, and it's bubbling up with golden demand.

New Zealand's dairy industry continues to enjoy a steady climb in the Global Dairy Trade (GDT) auction prices on the back of solid demand for fat products.

Butter and anhydrous milk fat (AMF) have been trending up all season, and there are no signs of these products slowing down.

Consumers in developed nations are tending toward eating more natural foods, as opposed to artificial or processed product. The world cannot get enough of milk fat products.

New Zealand is the single largest supplier of globally-traded butter and AMF.

Fast-food giant McDonald's desire to shift back to 'real dairy' is merely one clear indication of what is happening to our dairy products in the industry.

In late 2015, McDonald's shifted from using margarine to butter. This alone increased the United States national butter consumption by more than 9 million kilograms.

Kraft Heinz, Campbell Soup, and Kellogg have all followed suit by re-including milk fat as a natural food in their products.

The story of fat is good - too good not to share.

This trend toward milk fat is only beginning to be reflected in the calculations that go in to Breeding Worth (BW).



Casey Inverarity

BW works on a five year rolling average of the milk price (an annual update of the economic weightings of each trait occurs each February). It therefore fair to say the value of fat versus protein in the BW index is currently 'imbalanced', as it will take a number of years before BW fully reflects what the market is experiencing with milkfat right now.

Looking forward, we expect to see a 'correction', with the scales tipped more to fat's favour.

JERSEY and MILKFAT

But given we know what is happening with milk fat in the industry, let's start looking forward today at what will give you the most profitable cows. The question you need to be asking yourself is: How do you inject some fat efficiency into your breeding now, and wait for BW to catch up later? (i.e. as the industry awaits BW calculations to catch up?)

The answer is to consider using genetics from the Jersey breed: Put simply, Jerseys outperform all other breeds in terms of producing kilograms of milksolids per kilogram of liveweight - and this comes mainly on the strength of the Jersey's milk fat production.

Using Jersey bulls to drive fat efficiently into the farming system is the obvious choice.

Where to go from that point is up to you.

LIC is proud to offer the strongest Jersey team that it's seen for some time: This team includes two of the best fat Jersey bulls available in the industry today.

Two half-brothers from the Okura stud, bred by Luke and Lyna Beehre in Hikurangi, are absolute fat leaders.

312034 OKURA GOLDIE INDEX headlines the fat team. The industry has never seen a bull as efficient as Index. His progeny produce more milk solids per kilogram of liveweight than any other bull, across the breeds (ever!).

311013 OKURA LT INTEGRITY is the second-highest ranking fat Jersey bull available in the industry. In my opinion he has also sired some of the very best three-year-olds in the country, irrespective of breed.

Another option is the biggest Jersey bull alive today. 312057 BELLS CM CONRAD SJ2 also offers extreme fertility and milk production. Thanks go out to breeders Graham and Glenys Bell of Te Aroha.

These bulls are backed by an impressive group of new graduates helping us deliver one of our most-solid and consistent teams yet.

Sultan, Innes, Kaino, Gollum, and Bolt have daughters that are impressing within Sire Proving herds, together with farmers that have used the bulls within Forward Pack selections. The way fat is

trending now, how will they perform in the future?

If we are after even more fat, Forward Pack presents a great opportunity to capitalise.

Over recent years Jersey genomics have delivered excellent outcomes (check out the 'history of genomics' article, pp 10-12): This year features sons from the sorely-missed Terrific and bull dams and sons by the powerful Integrity. This team is offering an extra 3kgs of milk fat to

the same liveweight (compared to the Daughter Proven team).

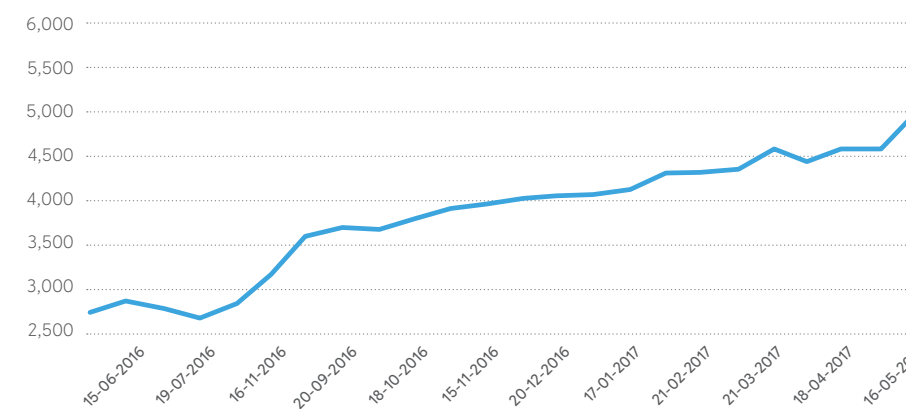
Whatever type of cow you prefer to milk, use of Jersey bulls to deliver some additional milkfat into your herd now should be a carefully-considered, strategic, move for your breeding programme.

The dairy industry must stay focused on market trends and the future has fat in it. So what are you going to do about it?

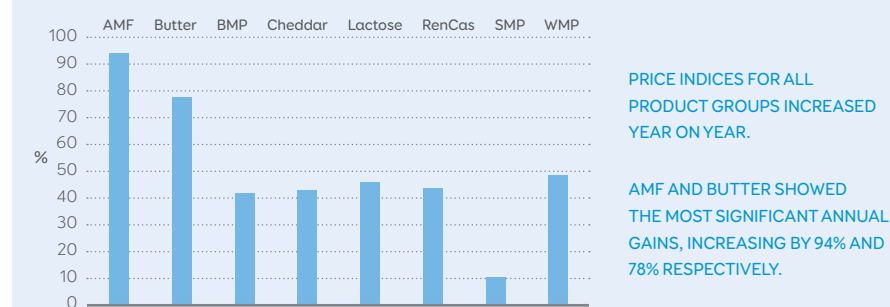


Daughter of LIC sire 312034 Index.

Butter prices | 12 months



Average percentage change | 2017 Q1 vs 2016 Q1 Index



PRICE INDICES FOR ALL PRODUCT GROUPS INCREASED YEAR ON YEAR.

AMF AND BUTTER SHOWED THE MOST SIGNIFICANT ANNUAL GAINS, INCREASING BY 94% AND 78% RESPECTIVELY.

Breeders' Day 2017 – Roll of Honour

LIC's annual Breeders' Day was held at Narrow's Landing, near Hamilton airport, in mid-May.

About 130 farmers, from throughout New Zealand, attended the day.

Breeders' Day is about recognising a special set of dairy farmers who make a significant contribution to the progression of the national dairy herd through breeding better genetics: Their cow families had contributed bulls that were used in LIC's Premier Sires teams during the 2016 artificial breeding season.

A feature of the day was the announcement that KiwiCross® bull Nevron Showman was to become the 54th animal to be recognised in LIC's 'Hall of Fame', with Neville and Sharon Adams of Tokoroa acknowledged as the breeders.

Among the highlights was the applause from the breeders toward 2017 Sire Proving Scheme Farmers of the Year, Bryan and Suzanne Jackson of Morrinsville.

Another highlight was the recognition of the contribution made by John and Liz McKercher of Shrimpton's Hill stud in South Canterbury; the McKerchers have been key to the success of LIC's short gestation Hereford programme.



Neville and Sharon Adams of Tokoroa, breeders of Nevron Showman, and Murray King, LIC chair (right).

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Breeders mingle over lunch during this year's Breeders' Day event.

Roll of honour (breeders of bulls that made LIC's Premier Sires teams of 2016):

Luke & Lyna Beehre - Hikurangi, Robert & Anne Siddins - Thames, Des Hickey - Ohinewai, John & Annemiek Langeveld - Waihi, Mark & Patricia Scott - Waihi, Rowan Priest - Te Aroha, Graham & Glenys Bell - Te Aroha, Roger & Glenys Ellison - Manawaru, Brent & Cindy Morris - Morrinsville, Stu & Sarah Gordon - Morrinsville, Barry & Linda Old - Morrinsville, Bill & Michelle Burgess - Matamata, Barry & Wendy Howse - Matamata, Murray & Julie Dickson - Te Awamutu, John & Thelma Bailey - Te Awamutu, Shaun Good & Michelle Adam - Te Awamutu, John & Thelma Bailey - Te Awamutu, Malcolm, Jody, John & Ann Ellis - Te Awamutu, Stewart & Kathryn Anderson - Otorohanga, Gavin & Rosemary Fleming - Otorohanga, Jennie Elliot - Otorohanga, Gary & Sarah Carson - Putaruru, Peter, Nola & Guy McDonnell - Putaruru, Francis & Sandra Kraakman - Putaruru, James & Carolyn Houghton - Pukeatua, Tony & Ali Van der Heyden - Tokoroa, Kevin Ireland - Tokoroa, Dennis & Heather Wilks - Katikati, Alan & Anne Looney - Opotiki, Shaun & Kelly Bicknell - Murupara, Jim & Sue Webster - Waitara, Mike & Christine Gyde - Inglewood, Ed & Dianne Jenkins - Stratford, John & Jennifer Lawn - Opunake, John & Carol Lynskey - Opunake, Stephen & Kaye Mourie - Opunake, Paul & Kirsten Midgley - Hawera, Rob & Alison Thwaites - Hawera, Max & Daniela Padrutt - Hawera, Dean & Aimee Perrett - Hawera, Murray and Judith Brown - Hawera, Colin Foley - Hawera, Kevin & Sandy Tosland - Hawera, Paul & Susan England - Patea, Tom & Courtney Werder - Patea, Bryan & Jo Guy - Fielding, Bruce & Bronwyn Jensen - Feilding, John & Wendy Allen - Palmerston North, Gavin & Graeme Drysdale - Eketahuna, Graham & Julie Moody - Eketahuna, Ray & Sandra Hocking - Takaka, Brian & Mary-Anne Nesbit - Takaka, Peter & Christine Bonifacio - Temuka, Mike & Chris Moffatt - Waimate, Nathan & Amanda Bayne - Oamaru, Geoff Wilson - Outram, Peter & Raelene Allison - Outram, Jeff McCandless and Marcella Mumm - Gore, Todd & Fleur Anderson - Winton, John & Jenne Kennedy - Winton, Robert & Annemarie Bruin - Otautau, Hans & Margaret Schouten - Invercargill



John and Liz McKercher of Shrimpton's Hill Stud in South Canterbury.



Bryan and Suzanne Jackson - SPS Farmers of the Year 2017.

SPS farmers exemplify co-operative spirit

David and Barbara Hands of southern Hawke's Bay were LIC's National Sire Proving Scheme Farmers of Year in 2016.

"It feels good to be acknowledged for all those years of records we've kept, along with all the attention to detail that it takes to be an SPS (Sire Proving Scheme) member... but as far as we're concerned the recognition or awards we get are just a by-product of being part of the scheme," says David.

Ten years ago the couple applied to join the Sire Proving Scheme because they recognised the value-for-money it offered.

But today they apply to stay on because they want to "give back to the industry that's been pretty good to us over the years."

"In 2006 we had a well-recorded herd so knew we had something to offer the industry," David says.

"And we could definitely see the benefits of getting low-priced AB (artificial breeding) semen that was likely to have come from relatively good genetics."

"I had also worked as an AB Technician so I had an understanding of genetics and the process around daughter proving bulls."

David and Barbara are proud of the genetics they're bringing through. Several years ago they witnessed a bull calf, sired by an SPS straw, come close to making Premier Sires.

David and Barbara are proud of the genetics they're bringing through, and several years ago they came close to witnessing a bull calf, sired by an SPS straw, come close to making Premier Sires.

"He was the result of a contract mating and was called Hands Solo; he was certainly up there and made the Alpha Catalogue as a yearling - he did a few sales too, but unfortunately died before his time and we never got to know his true potential," David says.

At one stage, the herd was in the top-10 percent of the national BW scale, but a "neospora storm" three years ago saw their breeding worth slip back in recent years. The Hands are however determined to recover the lost ground.

The couple won the regional Sharemilker of the Year title in 2006, and the following year purchased their 100ha farm near Norsewood in southern Hawke's Bay. Today the milking platform is complemented by their 30ha runoff just 5km down the road.

"We have 310 KiwiCross™ cows, as well as 82 yearlings on the runoff grazing alongside 74 of our R1s (rising one-year-olds)," David says.

David is an LIC shareholder councillor, and Barbara is employed by LIC as a Farm Solutions Manager covering the Hawke's Bay region.

Quick Facts:

- Totara Grove Farms (2007) Ltd, owned by David & Barbara Hands: LIC Sire Proving Scheme National Farmers of the Year 2016
- Began as SPS farmers in 2007
- 310 Kiwicross® cows, 82 yearlings, 74 rising one-year-olds
- BW: 88/51 / PW: 109/72
- 99% recorded ancestry



David and Barbara Hands, SPS Farmers of the Year 2016 at their Norsewood farm in southern Hawke's Bay.



Bryan and Suzanne Jackson, LIC's SPS Farmers of the Year 2017.

Quick Facts:

- Birchlands Holdings, owned by Bryan and Suzanne Jackson: LIC Sire Proving Scheme National Farmers of the Year 2017
- Started their dairy farming career 22 years ago
- Do seven weeks AB (all heifers go to AB)
- 480 Holstein-Friesian and Holstein-Friesian-cross cows on a 128ha, system four, farm
- BW: 68/52% / PW: 84/71%
- 98% recorded ancestry

Bryan and Suzanne Jackson of Morrinsville are LIC's National Sire Proving Scheme Farmers of the Year for 2017.

In accepting the award at LIC's Breeders' Day in May, the couple acknowledged their achievement as among their farming highlights, but were typically humble.

"We didn't go out purposefully to get this kind of acknowledgement, it's been a mutually beneficial relationship with SPS and we're thankful for the valuable genetics we've been provided over the years," Suzanne said.

Bryan said he and Suzanne were pleasantly surprised to get the award.

He put the award down to the tenure they had been involved in sire proving, their responsiveness to LIC's information requests, and to their consistent record-keeping over the years.

The Jacksons have been Sire Proving farmers for 18 years, and openly admit they have never really delved in to the mechanics of genetics or the intricacies of breeding.

"We're careful about maintaining good records but we admire the people at Breeders' Day who are in to their breeding," Bryan said. "Going to our first Breeders' Day opened our eyes a bit. Since then we've had quite a few contract matings."

Bryan and Suzanne were therefore not newcomers to Breeders' Day this year - having twice attended the event previously. In 2009 (107002) Birchlands BK Caesar S2F made Premier Sires as a genomically selected bull, and in

2011 (510021) Jacksons Judicator was also a genomically selected member of Premier Sires.

The daughters the Jacksons have produced from their Sire Proving herd are top class, with Bryan and Suzanne careful about maintaining body condition score across their herd throughout the season.

Bryan says he takes great pride in the condition of his cows, which at their peak were doing 500kg milksolids a cow. That was about four years ago, and the animals now average about 480kg of milksolids.

LIC's sire photographer Neil McDonald is a regular visitor to the farm, with up to eight animals one year being halter-trained and groomed on the Jackson farm in preparation for Alpha Catalogue photography (36 of the Jackson's cows have appeared in the Alpha Catalogue over the years, with four daughters featuring this year).

"We didn't go out purposefully to get this kind of acknowledgement, it's been a mutually beneficial relationship with SPS and we're thankful for the valuable genetics we've been provided over the years," Suzanne said.

'SHOWMAN'

A name destined for fame

Nevron Showman – a bull that made LIC's Premier Sires teams for an unprecedented seven consecutive seasons – entered LIC's hallowed Hall of Fame earlier this year.

Today, Showman has more than 59,000 New Zealand-based herd tested daughters to his credit, and this number is set to further expand in upcoming seasons when his later-born progeny hit their straps in milking sheds around the country (NB: many more daughters exist in all LIC's major export markets, including Argentina, Australia, Brazil, Chile, Colombia, Ecuador, South Africa, Uruguay, and the USA).

Simon Worth, LIC livestock selection manager, said Showman was the result of a mating between Manhattan and a Euon daughter (the cow was dubbed 'Contract Girl' by breeders Neville and Sharon Adams).

"Actually that year we (LIC) had nominated two matings – Mitchells Likabull and Manhattan," Simon said. "Luckily for the industry the dice rolled the right way, and sure enough in 2005 a young Showman was born."

Showman transmitted a great balance of high protein production, Simon said.



Breeders of Nevron Showman, Sharon and Neville Adams of Tokoroa.



506104 Nevron Showman - latest inductee to LIC's Hall of Fame.

"He's got positive daughter fertility, together with a nice combination of udder and dairy conformation characteristics. His daughters are a valuable source of the next generation of young bulls into LIC's Sire Proving Scheme."

Showman's superiority made him an obvious choice as a sire of sons, Simon said.

"Across the industry 18 sons were sampled, and the first of these sons were purchased for LIC's 2010 Sire Proving Scheme."

Since then, LIC had witnessed "a simply outstanding graduation rate" of the sons, highlighted by the fact one-in-three made their way to a Daughter Proven Premier Sires team (the current number one KiwiCross™ bull, Pacemaker, is a prime example).

There were three sons in this year's Premier Sires team, Simon said, but Showman's influence went beyond this – use of Showman sons as genomic bulls had seen four grandsons make the same Premier Sires teams.

"Showman's impact on this industry has, and will be, vast."

Breeders Neville and Sharon Adams of Tokoroa said they were humbled by the recognition their bull had gained.

They didn't regard themselves as dedicated 'breeders' and felt their role in delivering Showman to the industry was "70 percent luck."

"We run a commercial dairy herd of about 700 mainly Friesian cows," Neville said. "I try to concentrate on producing great looking cows – conformation is important to me because that translates to longevity."

"I also value good udder breeding values, and a good breeding worth also has to come in to the mix."

Showman's dam, Contract Girl, was now 10 years old, Neville said, but remained the favourite cow in the herd.



Simon Worth - LIC bull acquisition manager.

Weigh stock, improve outcomes

If you've never weighed your herd, it's a good bet your annual cull list would look quite different than if you did weigh the cows.

Even being weighed once in a lifetime appears to make a significant difference to the breeding values and production values of individual animals.

That's according to recent analysis done by Rachel Bloxham, LIC Animal Evaluation Unit manager.

"Without genuine animal weight records in MINDA, culling mistakes are probably being regularly made; many farmers are likely to be getting rid of sound animals, simultaneously keeping others that, in truth, possess a higher-than-average cost of production," Rachel said.

"I guess the message right here and now is that, to make progress in your dairy operation, farmers should make every effort to regularly weigh their milking herd. Weights increase the accuracy of information about cows and will bring more focus to the overall picture of herd performance."

For instance, in December 2016, a farmer conducted a weigh-and-record session across his entire lactating herd (most of the animals had not been previously weighed). The results are shown in Table 1.

The table shows, post the weigh event, the range in movement in both liveweight Breeding Values (BVs) and

Production Values (PVs), broken down by the different age groups in the herd.

For example, of the nine 2007-born animals, the liveweight BV of one animal dropped by 26.7 kgs, while, at the other end of the range, another animal's liveweight BV increased by 4.2 kgs.

In general, the recorded weights resulted in big changes to liveweight BVs and PVs among individual animals in the herd: Some cow liveweight values shot up within the herd, as others plummeted.

Across all 593 animals, the most extreme movers equated to +\$46.60 and -\$41.22 in terms of Breeding Worth impact, and +\$93.72 and -\$93.59 in terms of Production Worth impact.

"The influence of liveweight records is greater for the calculation of liveweight PVs because production values and production worth is more about the animal herself," Rachel said, "although the impact is still visible in the liveweight breeding values."

Rachels said the above example was consistent with past research, which showed that following the inclusion of weight records, a 15% difference (on average) could be expected in animals listed in a Culling Guide.

If genuine animal weights were absent from records, Animal Evaluation 'assessed' an animal's weight using historical data: The assessment was



Rachel Bloxham, LIC animal evaluation manager.

based on ancestry records, and Rachel said this is where anomalies came in.

The Animal Evaluation system determines that a cow with a high liveweight is less efficient than a similar cow (all other things being equal) of a lower liveweight.

"When it comes to the impact of a liveweight record on an animal's indices, the expected movement is largely dependent on how much liveweight variation there is across a group of animals (of the same age), and what the initial liveweight BV was for each animal," Rachel said.

There were other positive spin-offs when farmers weighed their stock.

For example, liveweight records were a great tool for many farmers who did not use GeneMark Whole Herd parentage tests to help confirm the genetics of their herd, Rachel said.

"Weighing is a good alternative which can partially correct any potential mis-mothering issues, especially given the range in liveweight BVs that are expressed across an individual herd."

"An experienced farmer is likely to pick up on clear mis-matches between what ancestry records say the animal should be (in terms of liveweight), and what she actually is."

An Abacus Bio Ltd study of 97 farms (2011, funded by DairyNZ, Sustainable Farming Fund and Primary Growth Partnership) showed that, on average, 23 percent of calves had incorrect sires matched (DairyNZ website).

Table 1: Liveweight BV & PV movements following the recording of a liveweight record in December 2016.

Age group (birth year)	Number of cows	Range in movement			
		Impact on Liveweight breeding values, (post-weigh event)		Impact on Liveweight production values, (post-weigh event)	
2007	9	-26.7	4.2	-52.9	8.9
2008	29	-26.1	9.7	-60.7	18.2
2009	45	-27.3	15.1	-62.7	33.1
2010	64	-31.1	23.5	-65.5	55
2011	59	-30.9	18.0	-71.4	40.4
2012	89	-23.9	23.7	-46.7	46.9
2013	126	-35.5	31.4	-70.8	71.3
2014	172	-26.4	23.9	-59.4	54.9
Grand Total	593	-35.5	31.4	-71.4	71.3
\$ value in index*		\$46.60	-\$41.22	\$93.72	-\$93.59

* the economic value for liveweight BV and PV is \$1.3126



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