DataGene
Solutions for Herd Development

Annual Update 2023

DataGene is an independent, industry-owned organisation that delivers world-class herd improvement products and services to Australian dairy farmers and their service providers. Our members include leading herd improvement service providers, genetics suppliers, breed associations and peak dairy industry organisations.

Contents

Abbreviations

ABRI	Australian Business Research Institute	FVI	Forage Value Index
ABV	Australian Breeding Value	HWI	Health Weighted Index
ADF	Australian Dairy Farmers	iDDEN	International Dairy Data Exchange Network
AGBU	Animal Genetics and Breeding Unit	IT	Information technology
BPI	Balanced Performance Index	MIR	Mid infrared
CDCB	Council on Dairy Cattle Breeding (USA)	NASIS	National AI Sire Identification System
CDR	Central Data Repository	NHD	National Herd Development
DPC	data processing centre (e.g. herd test centre)	NHIA	National Herd Improvement Association of Australia

Chair's Report

Graeme Gillan
Chair
DataGene

The 2023 financial year has seen many positive outcomes and some challenges though, importantly, continued progress across many projects.

The release of the Sustainability Index represented a very important milestone, both for DataGene and the wider industry. Based on extensive research and road testing with stakeholders through the Genetic Evaluation Standing Committee, the index is an important tool for farmers and industry to support methane reduction. We look forward to further initiatives supporting the efforts of dairy farmers to foster greater sustainability.

Not that long ago three evaluation runs per year in addition to periodical private releases was seen as a great service. We continue the three public releases, though now supported with 41 weekly releases. How quickly the world changes.

Taking a moment to reflect, we celebrated 40 years of Australian Breeding Values in March, marking four decades of progress. The contribution of so many has benefitted Australian dairy farmers. Built on the initial work of ADHIS and now being fast tracked by DataGene, the rate of genetic gain in Australia is surpassing the efforts of many countries that we previously considered the leaders. Congratulations.

Perhaps not four decades in the making but there is one very important industry project which ticked over 10 years: Ginfo. Perhaps one of the most significant investments the industry has made, Ginfo has increased reliability, increased data to generate new breeding values and encouraged stronger industry engagement. Many thanks to the dairy farmers who are in Ginfo.

During the year DataGene staff have been active both with delivering ABVs, providing services to overseas counterparts and commencing new non-dairy projects that are data intensive. These activities reflect positively on the skill set that has been developed at DataGene and the collaboration opportunities being sought.

There is one important topic we have yet to master: connecting data pipelines to enable single entry, multi-use. This topic has been a key focus for staff, Board and wider industry. There is no straightforward answer to how we improve our data connectivity as there are many commercial interests that need to be considered. In recent times we believe that significant progress has been made both within Australia and overseas.

To support data connectivity we have made a significant investment in Dairy Up, a NSW initiative, and commenced another project bringing in new technology to connect data from on-farm systems. This is only the beginning of the circular economy of data, next steps include quality assurance, development of breeding values and how best to return the data in a value-add format to the point of origin, the dairy farmer.

The 2023 Financial Report provides some important messages for DataGene and wider industry. In the 2022/23 budget, we had foreseen a breakeven EBITDA, but a loss after amortisation and depreciation. However, during the year, a decision was made to invest additional resources into work with DairyUp and in internal developments, including the complicated implementation of the new genomic analysis. This investment came from the reserves built up in previous years. Without these items, the EBITDA would have been positive, exceeding the budget."

The Board and Management constantly reviewed the financial position and determined that while, not ideal, there are at times 'industry good' projects we need to invest in. During 2022/23 this was the situation.

As we plan for the future, Board and Management fully understand that the loss of 2022/23 is not sustainable and that planning for the current year was based on a breakeven outcome, ensuring we live within our means.

DataGene is the sum of many parts with people at the heart of the organisation. We are very fortunate to have such a dedicated staff who regularly go above and beyond. On behalf of all members and Board, thank you.

To the industry representatives who sit on the Standing Committees, again thanks for the incredibly important contributions you make.

To my fellow Directors, I would like to recognise your significant contributions and wonderful support.

At this AGM two Directors will finish their terms. On behalf of all DataGene members, staff and fellow Directors I would like to acknowledge the contributions of Lucinda Corrigan and Anthony Shelly.

I would like to acknowledge Dairy Australia's invaluable financial support on behalf of all dairy farmers and your year-in, year-out support for DataGene.

CEO's Report

Matt Shaffer
Chief Executive Officer
DataGene

Every day, the DataGene team is working to solve problems for farmers and our stakeholders using animal and, increasingly, plant data. I am pleased to report some of the year's highlights of this work in this Annual Update.

Herd performance data came alive for most farmers who herd test who now have access to Herd Platform on DataVat. This dynamic and interactive web app was developed in collaboration with herd test centres and the Agricultural Business Research Institute (ABRI). It is now available to customers in Western Australia, Victoria, New South Wales and Queensland. Herd Platform also includes a Selective Dry Cow tool and world-first MIR Conception tool. By providing both a high-level view of the herd and individual cow-level performance, Herd Platform substantially changes how herd-recording farmers can identify opportunities for improvement that will help them achieve their business goals.

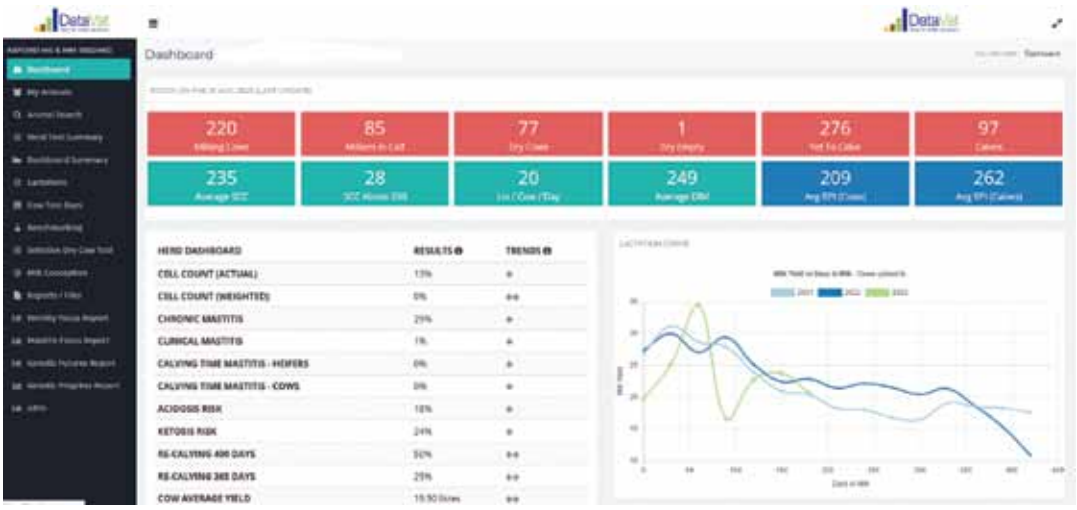
The recent rate of genetic gain for Balanced Performance (BPI) in Australian Holsteins exceeds the international average, according to an independent analysis of nine key dairy countries. This result is a testament to the collaborative research, development, extension and communication activities undertaken over the past decade with you, our stakeholders. It is a result we can be proud of.

It has been a year of celebration. At Herd '23, farmers, industry and researchers gathered to mark the 40-year anniversary of Australian Breeding Values and 10-year anniversary of Ginfo, our national genomic information nucleus. These two services are integral to the sophisticated data and genetic evaluation infrastructure that reliably supports herd improvement decisions season after season. One example is higher ABV reliability thanks to our teams at DataGene and DairyBio. Compared to 2020, the BPI reliability of young sires has moved up 1% for Holsteins and a massive 5% for Jerseys. And this in only a few years!

The way in which DataGene is solving problems for dairy farmers is now having an impact on other agricultural industries. We are extending our reach by providing targeted advice and solutions to commercial partners where DataGene has specific expertise that can benefit their producers and growers. We benefit by bringing back to dairy the experience and knowledge we gain through working across agriculture.

While maintaining a high level of current service delivery, we are taking this opportunity to look forward to the next five-year business plan and have already commenced consultation with stakeholders. I encourage you to take this opportunity to be involved in contributing to our future direction.

In closing, I would like to thank the Directors of DataGene for the care with which they guide our organisation. Individually and as a group, the Directors challenge DataGene to be innovative and effective in delivering even more data-driven solutions for our stakeholders. I would also like to thank our staff who continue to do amazing work towards achieving our vision.



Most farmers who hard test now have access to Herd Platform on DataVat which provides interactive tools for using herd test data.

Solutions for herd development

About DataGene

DataGene is responsible for driving genetic gain and herd improvement in the Australian dairy industry. Its key activities are research, development and extension. DataGene performs many pre-competitive herd improvement operations, including genetic services, software development, herd testing, herd recording and data systems. DataGene also provides software and strategy services to deliver solutions for Australian and international customers across dairy and agriculture.

Vision

DataGene enables farmers and industry to maximise profit through data-driven decisions.

Mission

DataGene delivers world-class genetic evaluation, software and decision-making tools to enable Australian farmers to improve their herds and maximise their profit through data-driven decisions and innovative industry services.

How we work

DataGene plays a fundamental role in the pathway between research outcomes and on-farm application. With many others also having a role in this process, collaboration is vital.

DataGene has a long standing collaborative relationship with DairyBio which provides the research pipeline for genetic evaluation, new traits, improved reliability and novel applications (see page 26).

DataGene performs the development and delivery roles to implement new traits and applications created by DairyBio. The development phase may involve implementing models into DataGene's genetic evaluation system and developing new software, tools or Apps. Ginfo – the industry's genomic information reference herd has an important role for both research and development. DataGene's expertise in development is increasingly recognised and valued by other organisations within the dairy industry and more widely across agriculture who are commissioning the services of DataGene's IT advisory and strategy team.

DataGene's routine delivery services include genetic evaluation (ABV releases, genomics which are published via DataVat.com.au), software services such DataGene Centre for herd test centres and a range of extension resources.

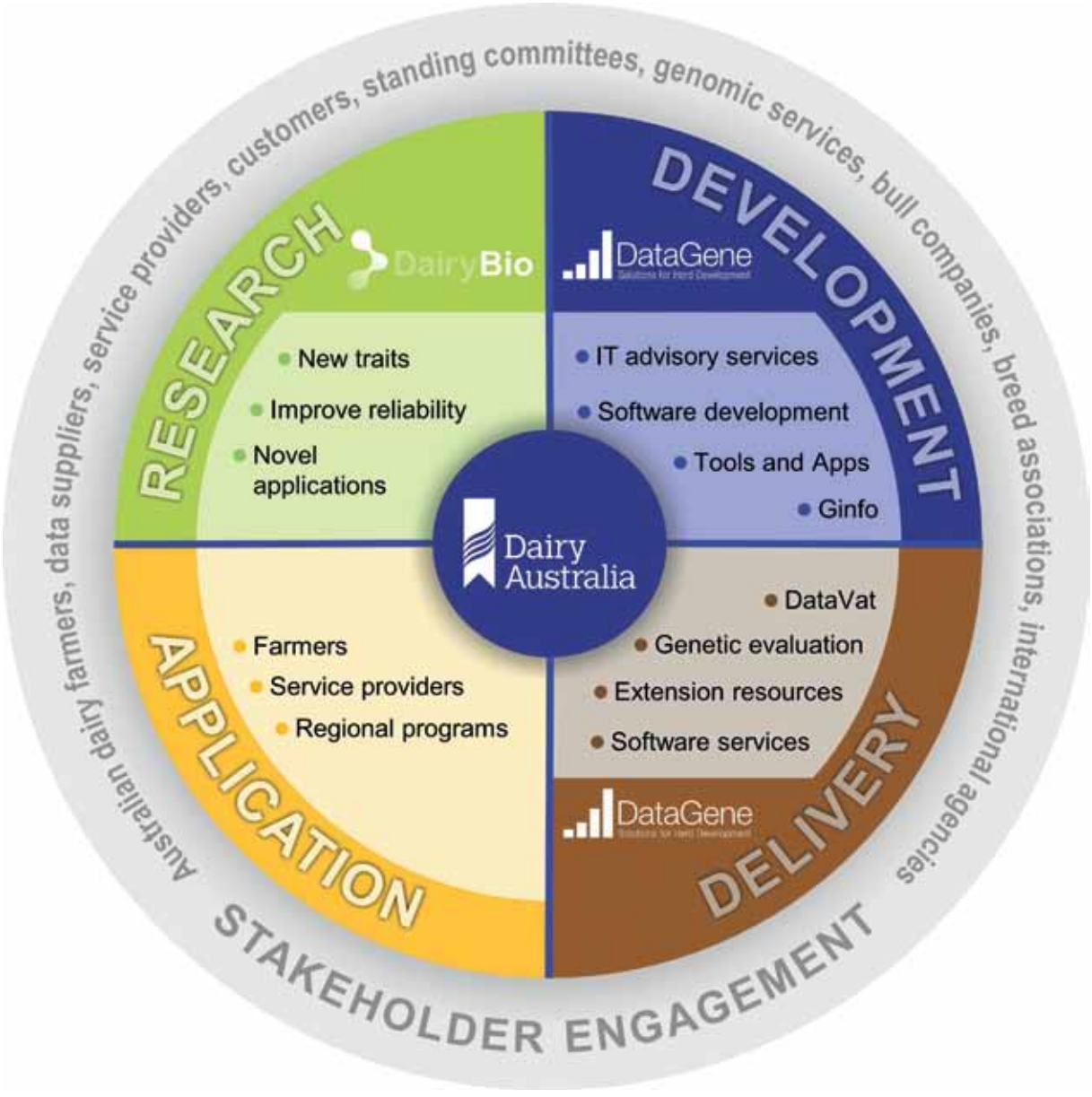
Dairy farmers are the reason for DataGene's existence. They are the end-users of most of our products and services and the focus of our vision and mission. We recognise that many players have an influence on the application of herd improvement on farm. To ensure farmers have access to the information and tools they need, DataGene works with a broad range of service providers including herd test centres, software companies, bull companies and genomic service providers. We can also reach farmers through a diverse range of advisers, including Dairy Australia's regional programs.

Solutions for herd development

DataGene works closely with international agencies such as the International Committee for Animal Recording, Interbull, iDDEN, the Council on Dairy Cattle Breeding and Lactanet.

DataGene is owned by industry. Its foundation members are Dairy Australia, Australian Dairy Farmers and the National Herd Improvement Association of Australia (NHIA). Our members include herd test centres, genetics companies, genomic service providers, breed associations, and animal health companies (see inside front cover).

Dairy Australia is a major funder of DataGene and is also a client in the development of software solutions such as the Clinical Mastitis App.



Products and services

DataGene products and services are delivered to Australian dairy farmers either directly or via third parties. Fees are charged in specific cases where there is a direct economic benefit to the individual customer. Some products and services are not charged.

Products and services delivered directly	Fee for service
Good Bulls Guide and App	×
Website (information and data)	×
ABV(g) reports to genomic service providers	✓
Bull proofs to bull companies	✓
Project management services to industry organisations	✓
Centre and inventory software to service providers	✓
Software development services to industry	✓
NASIS	✓
Export heifer	✓

Products and services delivered through third parties	Fee for service
HerdData App (via herd test centres)	✓
HerdPlatform (via DataVat / herd test centres)	✓
Selective Dry Cow Tool	✓
Genetic Progress Report / Genetics Futures Report	×
Extension messages	×

Performance metrics

DataGene monitors a range of metrics to track performance. This report highlights six of the key performance metrics: Genetic trends, numbers of females genomically tested, number of cows in the Central Data Repository (CDR), numbers of bulls genomically tested, National AI Sire Identification Scheme (NASIS) bull registrations and workability records.

Genetic trends

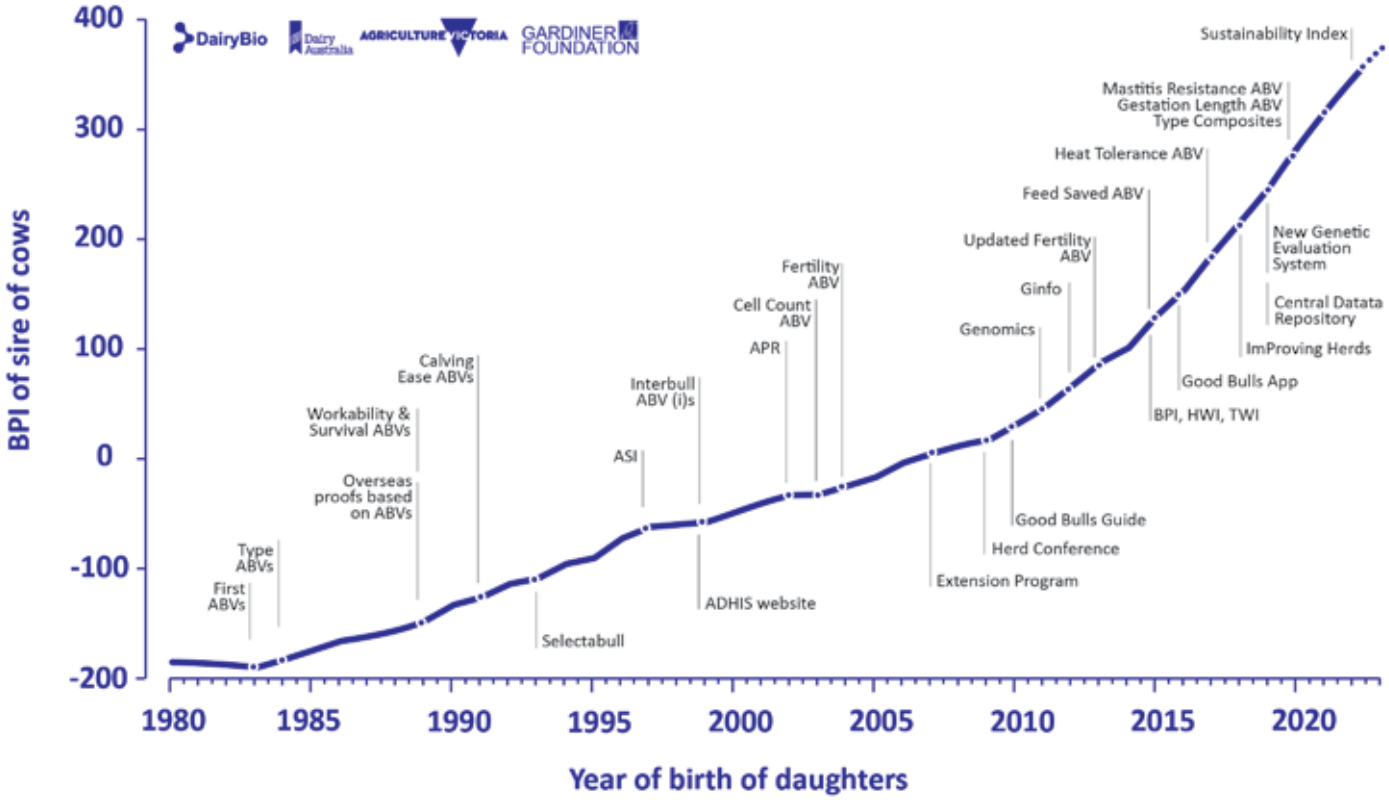
One of DataGene's key purposes is to provide tools and services to improve the rate of genetic gain in the Australian dairy herd. Genetic trends are tracked through the rate of genetic gain of sires of cows for Balanced Performance Index (BPI).

Target: long-term (10 years) average $30/year

Current: For Holsteins, the average rate of genetic gain for BPI in sires of cows over the past 10 years (2012-2022) is $28.82/cow/year. However, progress has accelerated in the most recent five years ($32.62/cow/year).

For Jerseys, the 10-year trend is $15.76/cow/year, with the most recent 5-year trend at $16.54/cow/year.

Australian genetic trends (Holstein)



Performance metrics

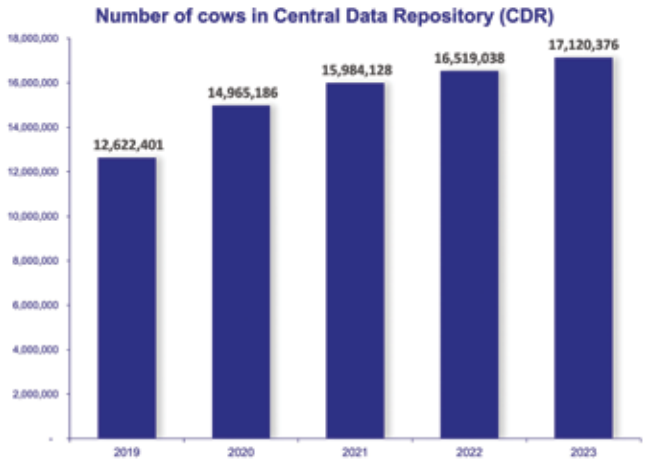
Number of cows with phenotypes in the CDR

DataVat's value will grow by expanding data sources beyond information from herd test centres. Tracking the number of cows in the CDR gives an indication of additional on-farm data sources connecting to DataGene.

Target: increasing annually by 5%

Current: 17.1 million (3.6% increase)

The number of cows with phenotypes in the CDR is continuing to increase as new cows enter the milk-recorded herd. This metric will be a leading indicator of progress as other on-farm packages are connected to the CDR from non-milk recorded herds.



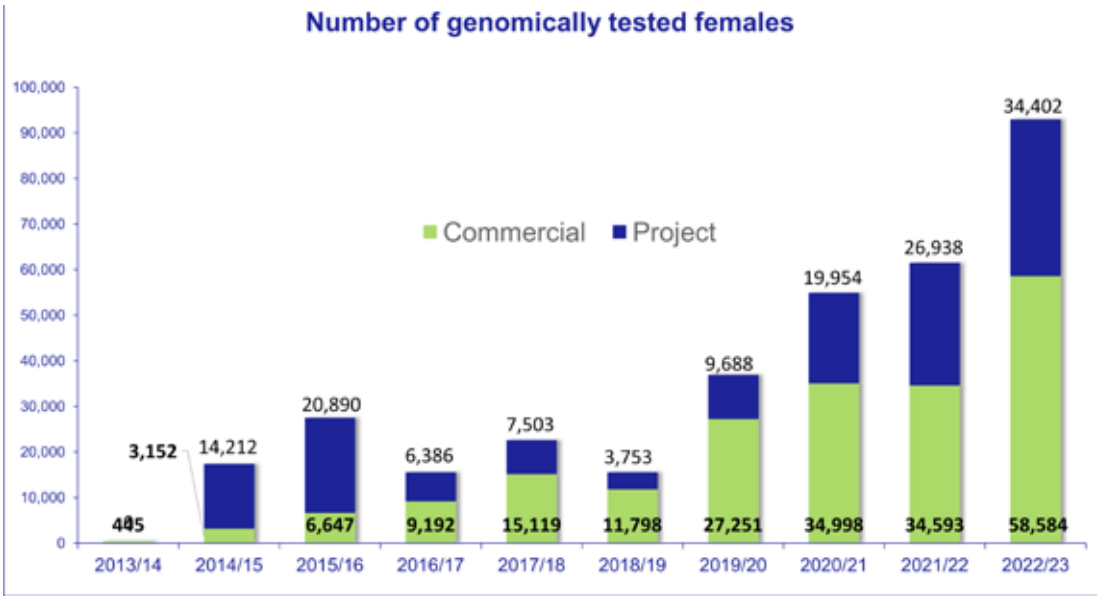
Female genomic testing

Female genomic testing is a game-changing opportunity for Australian dairy farmers because it allows them to accurately identify the most profitable replacements soon after birth. By quantifying the invisible, genomic testing creates opportunities to fast-track herd genetic gain and productivity as well as diversifying income streams and enhancing business agility.

Target: Minimum of 15% increase in numbers of females tested.

Current: 92,986 (51% increase)

This year was another record year for female genomic testing, though short of our aggressive goal of 150,000. Increasing Australian testing rates is a high priority for DataGene in the coming years through a major extension project in collaboration with Dairy Australia.



Performance metrics

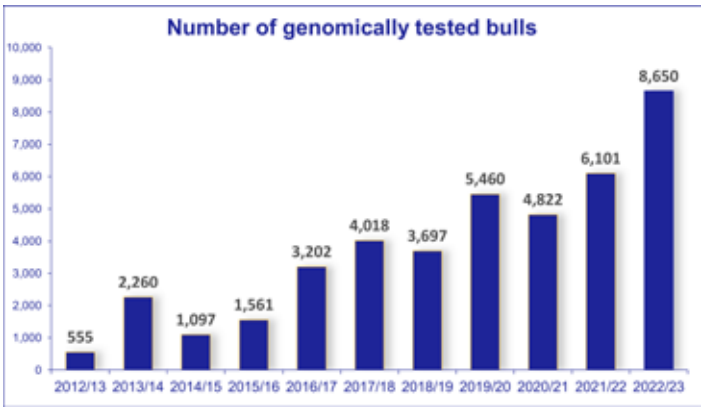
Genomically tested bulls

Increasing the number of bulls that are genomically tested in the Australian genetic evaluation system gives farmers access to the best genetics available. By testing more bulls, the industry can find the best bulls, with the best combination of traits possible.

Target: >3,000/year

Current: 8,650 (42% increase)

It was another record year for the number of genomic test results for bulls. This demonstrates the considerable effort by industry supported by DataGene to find the best bulls from around the world for Australian dairy farmers.



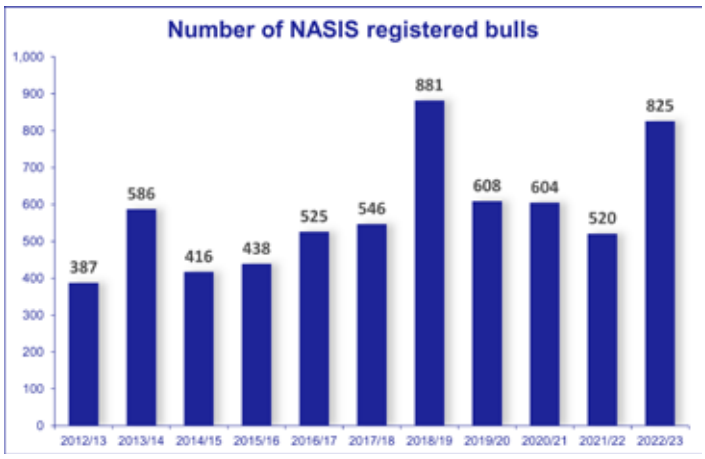
NASIS-registered bulls

The NASIS bull registry is a collaborative industry effort that underpins high quality animal recording in Australia.

Target: Maintain a minimum of 500 new bulls registered on NASIS each year.

Current: 825

NASIS registrations this year were consistent with long-term average levels. In coming years, the number of new dairy NASIS registrations each year is expected to taper off as companies select fewer young bulls for their programs. Genomics enables them to accurately target young bull selection to their market needs. The number of beef NASIS registrations is expected to increase to enable the accurate recording of matings and pedigrees that include beef sires.



Workability

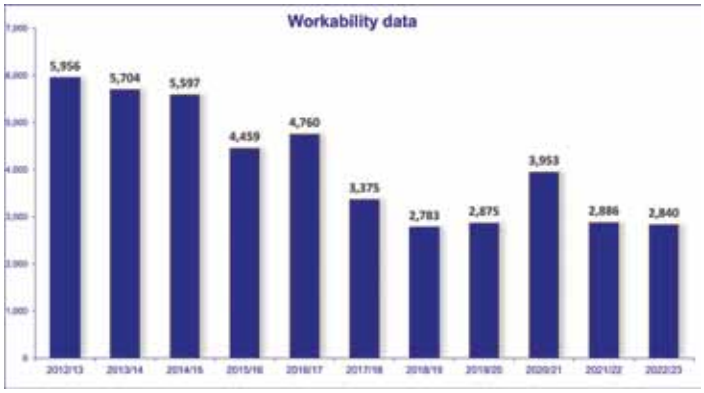
DataGene needs a minimum number of workability reports to calculate reliable ABVs for Milking Speed, Temperament and Likeability ABVs (these traits are included in the breeding indexes).

Farmers are asked to report workability scores on all 2-year-old heifers via their herd management software (Easy Dairy, Mistro Farm) or their herd test centre.

Target: 3,000/year

Current: 2,840

This year's workability numbers are consistent with long term trends. The peak in 2020/21 was a result of changes in Easy Dairy to automate the transfer of workability data to herd test centres.



Highlights 2022/23

Strategic Pillar 1: Data-driven decisions

Strategic Pillar 1: Data-driven decisions

DataGene manages the Central Data Repository (CDR) and DataVat on behalf of the Australian dairy industry. Combined, they offer new opportunities for improved decision-making based on data.

Priorities for 2019-2024 include:

- Develop and support new decision tools
- Expand and secure data from a variety of sources
- Drive and support industry innovation.

Key deliverables

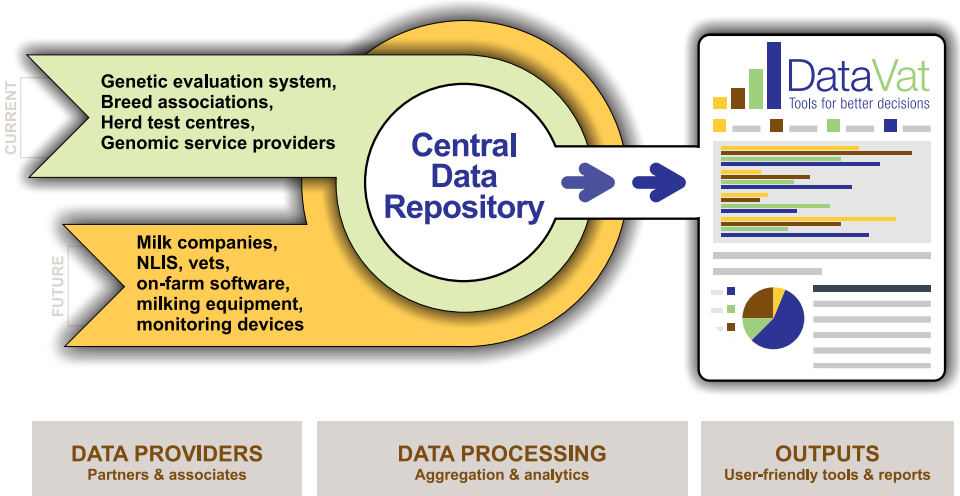
- ✓ Datavat enhancements
- ✓ HerdPlatform
- ✓ iDDEN
- ✓ Good Bulls App

DataVat

DataVat is a web portal that allows customised, secure access to various reports, tools and resources that draw upon data in the Central Data Repository (CDR), including information in the genetic evaluation system. DataVat is home to a diverse range of tools and reports, some of which are publicly accessible, while others are available only to herd owners, or fee-paying customers of DataGene services (such as bull companies, and genomic service providers).

Central Data Repository (CDR)

The CDR is an IT platform to connect data from a variety of external sources, such as herd test centres, breed associations, on-farm equipment and software, vets, milk companies, monitoring systems such as NLIS and the genetic evaluation system. Information and data from the CDR feeds into tools and resources delivered via DataVat.



Highlights 2022/23

DataVat enhancements

Enhancements implemented on DataVat this year included a bull look up tool, MIR conception tool and the ABV reporting tool.

The bull look up tool gives farmers access to view their herd bulls' genomic results. It also facilitates the transfer of bulls between herds as they are sold. A group of 8,500 bulls were matched to their herds to create a starting point that will be built on over time.

The MIR Conception Tool is a decision support tool that helps farmers with mating decisions. It uses MIR data from herd recording to identify cows that are sub-fertile. Drawing on MIR data and additional indicators, the tool also determines a cow's likelihood of conceiving to first service. This can be useful in identifying candidates for sexed semen. The tool was released into production for Dairy Express and HICO to roll out to their customers. Work is continuing to provide functionality for other herd test centre customers.

The Customised ABV Reporting Tool is a simple tool that allows the user to select fields of interest and generate a report in Excel format. For example, a report can be created by selecting for bulls' names, overall type ABV and BPI. Bull companies are the main users of this tool and extra functionality has been added in response to user feedback.

The MIR conception tool determines a cow's likelihood of conceiving to first service.

HerdPlatform

HerdPlatform gives dairy farmers access to their herd test results in an interactive format. Accessible through datavat.com.au, HerdPlatform is a set of tools and reports that draw upon a farm's herd test data. Each herd's information on HerdPlatform is updated within a few days of herd testing. HerdPlatform was a collaborative development, involving DataGene and participating herd test centres (Dairy Express, NHD, HICO and Farm West). HerdPlatform became the central portal for Dairy Express customers to access their herd test results from 30 June 2023.

HerdPlatform gives dairy farmers access to their herd test results in an interactive format.

Highlights 2022/23

iDDEN

DataGene is a member of the International Dairy Data Exchange Network (iDDEN), which is negotiating data exchange between on farm equipment and software systems and national databases, including Australia's CDR. This will provide the pipeline to dramatically expand the number of data suppliers connected to the CDR. It will also create access to new types of data, offering opportunities to develop new breeding values and decision support tools.

iDDEN now has signed agreements with six international companies that have projects in various stages of development to enable data exchange/integration exchanges with iDDEN members. Many companies elect to pilot their data exchange systems in a single country with a broader roll out once teething issues are addressed.

The most notable progress for Australia is with DeLaval. DataGene has completed development on its connection to iDDEN and has identified a test farm to begin moving data.

iDDEN uses the Animal Data Exchange (ADE) standards set by the International Committee on Animal Recording (ICAR) to enable easy transfer of common data. In January 2023, iDDEN implemented version 1.3 of these standards. This adds specifications for calving events, herd-level milk recording statistics, group events, a streaming data synchronisation application programming interface (API), and overall quality improvements. These standards make the implementation of data transfer in Australia simpler across a range of data providers.

iDDEN has agreements with the following companies:

- DeLaval and its affiliates UNIFORM-Agri and Dairy Data Warehouse
- GEA
- Afimilk (produces cow behaviour sensors, farm management software and milk meters)
- SmaXtec (a rumen bolus sensor company)
- Qualitas AG (provides IT and quantitative genetics services for Swiss livestock)
- Lely

Good Bulls App

The Good Bulls App is an interactive tool that allows farmers to sort, filter, short list and export bulls that meet breeding objectives. It is updated three times a year with public releases of Australian Breeding Values in April, August and December. During the year refinements were made to the Good Bulls App based on user feedback. The app has about 1000 users, who spend an average of 25 minutes per session with an engagement rate of 91%. While the vast majority of users are Australian, there are small numbers of users in 10 other countries including New Zealand Pakistan, the US and the United Kingdom, suggesting these users consider Australian Breeding Values and indices have some relevance to their systems.

Feature Project: DataConnect

DataConnect is a new initiative that explores ways the industry can work, pre-competitively and collaboratively, to tackle the challenges farmers experience when exchanging and integrating data. This is the next step towards the vision of enabling farmers to optimise their business through data-driven decisions and builds on DataGene's work over the past few years to develop a modern and fit-for-purpose Centralised Data Repository.

The starting point for this work was to hear directly from farmers at a workshop held in March where participants generously shared information about how they interact with data, software and the stumbling blocks that they faced.

Participants came from nine businesses using equipment and software (inline meters, robots and sensors) from a range of suppliers. We are spending time, on-farm, to explore the complexities of varying systems and their interaction. We are working with trusted advisors to explore opportunities where this project can make a real difference and exploring how we can work with software providers to increase data exchange efficiency.

In parallel, DataGene continues to progress its work with the International Dairy Data Exchange Network that is building better pipelines with overseas equipment manufacturers.

Highlights 2022/23

Strategic Pillar 2: Increased farm profitability through herd improvement

Genetics contribute about 30% of production gains on Australian dairy farms. DataGene's genetic evaluation system underpins these gains. A key goal is to increase the number of farmers breeding replacements from bulls carrying the Good Bulls icon and keeping the best genetic animals in their herds by using Australian Breeding Values and indices to make breeding decisions.

Priorities for 2019-2024 include:

- Increase reliabilities
- Improve service delivery
- Increase farmer and industry service uptake
- Increase the number of genomically tested females.

Key deliverables

- ✓ Good Bulls strategy
- ✓ Heifer genomics
- ✓ Fertility haplotypes

Good Bulls Strategy/ heifer genomics

One of DataGene's key roles is to support farmers to breed higher performing, more profitable and sustainable dairy herds. The two core elements of DataGene's extension strategy are the Good Bulls Strategy and the Genomic Acceleration Project. Combined, they offer a pathway for fast-tracking genetic gain in dairy herds.

The aim of the Good Bulls strategy is to encourage farmers to breed all dairy herd replacements from sires that carry the Good Bulls icon. To qualify for Good Bulls status, a bull must meet DataGene's minimum requirements for Balanced Performance Index (BPI) and reliability and be available for purchase. DataGene offers a range of tools to help farms identify Good Bulls that meet their breeding priorities, including the Good Bulls Guide and the Good Bulls App, which are both updated with the public release of Australian Breeding Values in April, August and December.

The Genomic Acceleration Project encouraged farmers with surplus calves to genomic (DNA) test them at a young age so that they can make informed decisions about which to keep to enter the milk herd and what to do with the rest. When they are ready to be joined the information can also be used to make breeding decisions. For more information, refer to pages 17-18.

Genomic testing calves at a young age enables farmers with surplus replacements to make informed decisions about which to keep to enter the milk herd and what to do with the rest.

Fertility haplotypes

Until recently, DataGene relied on the reporting of haplotypes from overseas genetic evaluation services such as the CDCB. From December 2022, DataGene's updated genetic evaluation system enables Australian genomic analysis to identify one Holstein haplotype (HH6) and one Jersey haplotype (JH1). This means haplotypes can be called for both males and females, allowing farmers to avoid matings that could result in detrimental outcomes. DataGene continues to report haplotypes from the CDCB and supplements them with our own calls.

Feature Project:

Accelerating heifer genomics

The Accelerating Heifer Genomics Project aimed to significantly increase the uptake of heifer genomic testing so that it becomes a routine practice on most Australian dairy farms.

A collaboration between DataGene, Dairy Australia, and DA's Regional Programs, the project had three components of work:

- Farmer experience: Improve farmers' experience with testing by cutting the turnaround time to receive genomic results from eight weeks to four.
- Collaboration: With service providers and industry in the pre-competitive space.
- Promoting adoption: A communication and extension campaign to raise awareness of the benefits of heifer genomic testing and assist farmers to make informed decisions using their results.

This 3-year project transitioned to 'business as usual' at Dairy Australia and DataGene from 1 July 2023. Genomics extension and communication activities continue, and customers will continue to be supported.

Improving farmer experience

The average turnaround time for providing genomic results from receipt of a genotype was cut from 25 days in FY20 to 9 days in FY23. This is the result of a series of technical upgrades to DataGene's evaluation system. Technical developments resulted in:

- Faster reporting: weekly evaluations, daily loading of herd recording data, improved quality reporting.
- New services: genomics for Aussie Reds and crossbreds, Within Herd Ranking Tool, self-service to load and look up animals, haplotype reporting, automatic parent updates.
- Technical upgrades: to make it easier for service providers to load genotypes and customers to connect data, upgraded DataVat and streamlined updates, improved service performance monitoring, upgrade to latest genome build.

Genomics in Practice gives participants hands on experience with genomic sampling.

Collaboration

The project team worked with genomic service providers as a group and individually to design generic marketing campaigns, create opportunities to be involved in genomic extension activities, access the latest market information and build genomic expertise within the industry. Activities were delivered through two Herd conferences, a Genomics Discovery Day, regular Genomic Service Provider updates and individual company meetings.

Specific reports prepared by a number of specialists contributed new knowledge for genomic service providers and also filled information gaps for farmer extension activities. Reports included:

- Modelling the impact of genomics (Morton et al)
- Net present value of genotyping (Morton)
- Genomic metrics (Axford)
- Across-country analysis of genomic testing costs (Axford)
- Cost of heifer rearing (Shannon & Musson)
- Value of using genomics to correct pedigree (Newton)
- Detailed farm system case studies (Armstrong et al)
- Analysis of barriers and hurdles to heifer genomic testing (Monks et al)

Promoting adoption

An analysis of the barriers and hurdles to heifer genomic testing provided a solid foundation for a strategic communication and extension plan to support farmers through a 4-stage adoption pathway: awareness and understanding, considering and overcoming barriers, deciding and sampling and interpreting and applying the results. This was implemented through:

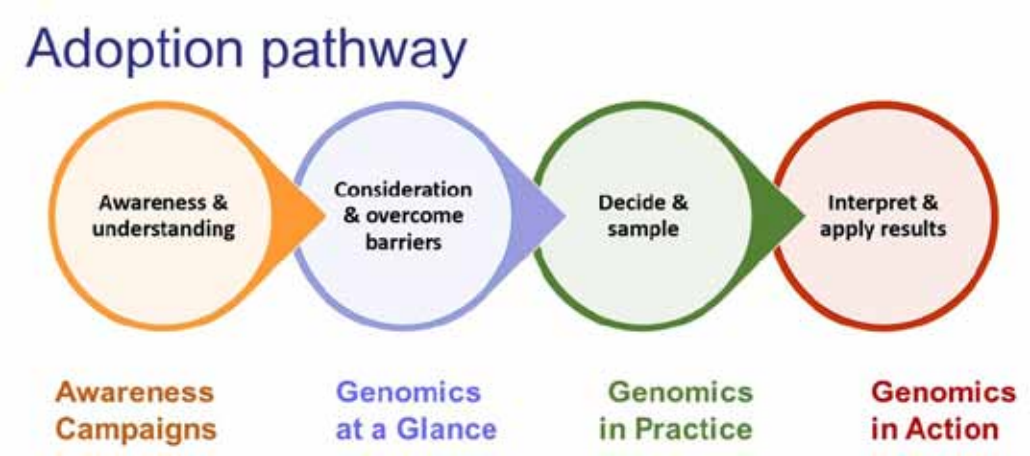
- Awareness campaigns that ran across the three years of the project
- Genomics at a Glance, an extension activity that provided a short introduction to genomics
- Genomics in Practice, an on-farm workshop that provided practical support to get started
- Genomics in Action, a webinar-based activity to support users to apply their results

Numerous resources were produced for the campaigns in a range of media, such as videos, podcasts, farmer case studies, media articles, fact sheets and technotes. Events were held at almost 40 locations, in addition to 20 online events. Most events were farmer focused but several activities were created for specific groups such as genomic service providers, veterinarians and animal performance service providers. Almost all participants (90%) indicated they were somewhat or very likely to act on what they'd heard at the event.

Outcomes

Dairy Australia's 2022 animal husbandry and genetics survey reports that 93% of respondents are aware of genomics or genomic testing with 37% either already testing or intending to test in the coming year.

To the end of April 2023, 127% more female genotypes and 40% more male genotypes were processed compared to FY20.



Highlights 2022/23

Strategic Pillar 3: Improved animal performance from R&D

Genomics and other technological advances present opportunities to improve animal performance through herd improvement R&D. The data collected by the Central Data Repository (CDR) and Ginfo enable the development of breeding values for traits that are difficult to measure, such as health traits, and enable the industry to use new technologies such as MIR (mid-infrared).

One of DataGene's main strategic priorities is to increase the rate of genomic testing of females in the Australian dairy population.

This strategic pillar also includes Ginfo, the industry's national reference data set of genetic information. Ginfo includes genotypes (genetic information) and phenotypes (performance information) which underpin the reliability of Australian Breeding Values (ABVs) and indices.

Priorities for 2019-2024 include:

- Deliver new health breeding values
- Use genomics and other technology (MIR) to predict future performance.

Key deliverables

- ✓ Sustainability Index
- ✓ Updated Mastitis ABV
- ✓ Within Herd Ranking Tool
- ✓ Red breeds bases
- ✓ Updated genomic analysis
- ✓ Removal of transport penalty from ASI
- ✓ Clinical Mastitis App

Sustainability Index

First published in August 2022, the Sustainability Index is a breeding tool to fast-track genetic gain for reduced greenhouse gas emission intensity. Breeding with the Sustainability Index will achieve greater reductions in greenhouse gas emissions and increased production, but it will result in slower genetic gains for fertility, mastitis resistance and cell count compared to the choosing bulls from the Balanced Performance Index (BPI).

A series of extension resources and activities were delivered to support the industry in adopting this new breeding tool.

Highlights 2022/23

Mastitis ABV

An update to the Mastitis Resistance ABV was implemented in August 2022 to provide more consistency of animals' values from one run to the next.

The Mastitis Resistance ABV contributes to both Balanced Performance Index (BPI) and Health Weighted Index (HWI). For most animals, this change has minimal impact on their BPI and HWI values.

Within Herd Ranking Tool

Released in April 2023, the Within Herd Ranking Tool enables farmers to compare animals of different breeds and crossbred animals within their herd. Delivered via DataVat, it is especially useful for farmers with mixed breed and crossbred herds as they can use genomic test results for decision making within their herds. The user can customise reports for several key indices and traits.

The Within Herd Ranking Tool allows farmers to compare animals of different breeds within their herd.

Highlights 2022/23

Red breeds bases

In the past, the genetic evaluations of all red breeds (Aussie Red, Illawarra, Ayrshire and Dairy Shorthorn) were reported relative to a common base (which represents the average of all red breeds). From December 2022 DataGene moved to reporting red breeds on separate bases. This means an ABV or index for say Aussie Red is no longer directly comparable to the ABV for the same trait in other red breeds, say Illawarra. This approach is consistent with all other breeds for which DataGene calculates ABVs. DataGene has analysed the genetic relationships between these breeds and while there was a small amount of commonality, the breeds can be identified as distinct entities.

The December 2022 Good Bulls Guide was the first to report Red Breeds on different bases.

Updated genomic analysis

DataGene's genetic evaluation system was updated to incorporate an expanded set of genomic markers (74k chip), the latest reference genome and other technical updates. This was the outcome of a major, long-term project by DairyBio that resulted in improved accuracy of genomic ABVs and indices. The biggest improvements were in lower-reliability traits such as Fertility, Feed Saved and Heat Tolerance. It also provided better estimates of breeding values for animals less related to our population. This work underpinned the capacity for DataGene to call fertility haplotypes (see page 15).

ASI transport penalty

The model used to calculate the Australian Selection Index (ASI) was updated to better reflect the current Australian milk pricing system. Prior to December 2022 the ASI model included a penalty for milk volume which was based on the milk cartage component of many milk payment systems. The calculation was based on fat + protein – volume. These base values were then adjusted for the energy cost to produce a kg of protein, a kg of fat and a litre of water. The volume penalty was removed in December in recognition that most major dairy companies had removed the volume charge from their payment systems.

Clinical Mastitis App

DataGene provided the IT development for a Clinical Mastitis App for Australian dairy farmers. The App provides information on suspect mastitis cases including location and point-of-care test results. It includes treatment advice tailored to the cow and case based on an artificial intelligence (AI) prediction tool developed by the University of Technology Sydney.

The App draws on herd and cow-specific data, such as herd test results, health and treatment records. As more information is captured, the AI prediction tool incorporates new data to make predictions on treatment outcomes to help with more prudent use of antibiotics while maximising animal welfare and production.

This multi-year, collaborative research and development project is nearing completion, with clinical trials occurring in October 2023.

Development of the Clinical Mastitis App is a collaboration between DataGene, Dairy Australia, the University of Technology Sydney, Charles Sturt University and the University of Sydney with support from Food Agility and Coles.

Feature Project:

A decade of Ginfo

In the 10 years since it was established, Ginfo has contributed to a doubling of the rate of genetic gain in the Australian dairy herd (see graph page 9). It has also underpinned improved reliability of Australian Breeding Values and indices. For example, the reliability of the Daughter Fertility ABV in Holstein bulls has increased from 41% to 64 since Ginfo began.

Ginfo is Australia's national reference herd for genetic information. It underpins genomic testing in Australian dairy herds by matching performance data with genetic markers (genotypes). Ginfo data is used in a wide range of DairyBio research projects that develop new breeding and herd improvement tools. As well as improving the reliability of existing ABVs and indices, Ginfo enables researchers to develop breeding values for traits that are difficult to measure such as Heat Tolerance and Feed Saved.

Ginfo wouldn't be possible without the participation of 157 commercial dairy herds with excellent records located across Australia's eight dairying regions.

The reference population currently includes about 13,000 bulls and more than 100,000 cows, thanks to a significant boost this year. More than 11,000 animals were added to the genomic reference population in late 2022. The Jersey reference population grew by nearly 20% with more than 3000 extra genotypes. And the addition of more than 8000 Holsteins lifted the breed's data pool by almost 14%. This was one of the biggest single data boosts the national reference population has ever recorded and was a result of 'catch-up' following delays in tail hair collection and processing due to COVID-19 and weather events. Adding animals into the reference population improved the reliability of breeding values for females and bulls. For Holsteins, fertility benefited the most with an average increase of 0.7% in reliability for bulls and 0.9% for cows.

Jason Webb and Leanne Summerville collect tail hair samples from first lactation heifers in some Ginfo herds.

For Jerseys, overall type was the most improved with an average reliability increase for bulls and cows of about 2%.

Managed by DataGene and funded by Dairy Australia, Ginfo is a collaboration of DairyBio, DataGene, Dairy Australia, Holstein Australia, Jersey Australia and the Victorian Government.

More than 70 people attended the Ginfo forum (either in person or online) at Bendigo on 14 March. This was an opportunity for Ginfo herds to receive an update on how their data is contributing to the genetic evaluation system.

Highlights 2022/23

Strategic Pillar 4: Service provision

Strategic Pillar 4: Service provision

DataGene needs to be continually improving and diversifying its services to fulfil its vision of enabling farmers and the industry to maximise profit through data-driven decisions.

Priorities for 2019-2024 include:

- Build and maintain DataGene and industry infrastructure
- Develop and maintain industry solutions
- Establish new revenue streams.

Key deliverables

- ✓ Herd 23
- ✓ Dairy beef
- ✓ Standing Committees
- ✓ FVIs
- ✓ Contracted projects
- ✓ Dairy UP collaboration

Herd 23

More than 200 delegates attended Herd '23 at Bendigo in March. Held every two years, Herd conferences provide members of the herd improvement industry a rare opportunity to get together, share ideas and hear updates on the latest advances in their fields. This year's conference had a strong sustainability theme with a mix of speakers from research, industry and commercial perspectives. As always there was a line up of international speakers who shared experiences of our overseas counterparts.

Herd '23 is a rare opportunity for members of the herd improvement industry to come together. Pictured: Courtney Walker, World Guernsey Cattle Federation, Lyndon Cleggett Brookleigh, Tyson Shea Semex.

Dairy beef

With the increasing role of dairy-beef in breeding programs, DataGene is taking early steps develop tools for Australian dairy farmers.

The first step was to create the capacity for accurate recording of the beef genetics used over dairy cows or heifers. By July 2023, 327 new beef bulls had been added to the National AI Sire Identification System (NASIS). Farmers using on-farm software now have the capability to add a correct beef bull NASIS code to each beef insemination that is recorded by them.

Highlights 2022/23

This is a vital step towards parentage tracking and traceability of dairy-beef calves, laying the groundwork for dairy farmers to value-add their dairy-beef operations.

Accurate genetic identification links the beef product back to the breeder offering the potential to increase the return on the investment1 in beef genetics by delivering a quality repeatable product.

Standing committees

A variety of formal and informal mechanisms give stakeholders influence over DataGene's priorities. Formal governance structures include the Board, Standing Committees and User Groups (see pages 30-31).

The Genetic Evaluation Standards Committee and Herd Test Centre Committee meet regularly and make a valued contribution to DataGene policies and activities. The Data Access and Standing Committee was established this year, as recommended by a review of standing committees undertaken in 2022 (see page 31).

Forage Value Index

DataGene routinely evaluates Dairy Australia's Forage Value Index (FVI).

Developed by Dairy Feedbase, the FVI is a tool that helps Australian dairy farmers and their advisers to make more informed decisions when selecting ryegrass cultivars. It provides an accurate, reliable and independent assessment of the potential economic value of ryegrass cultivars in different dairy regions of south-east Australia and Western Australia.

During the year work commenced on developing a new trait for forage quality based on metabolisable energy (ME) content. Preliminary predictions are being considered by industry.

Dairy UP collaboration

DataGene has been working with Dairy UP, a NSW-driven collaborative project that is working to unlock the potential of milk, cows and water to increase dairy industry profitability. Dairy UP has a network of both pasture-based and intensive commercial farms that are being intensively monitored (pasture, animal and weather data). DataGene and Dairy UP are working together to integrate the data collected from diverse sources and software systems to create opportunities for novel approaches to data storage, interrogation and analysis. The database has gone live with DataGene now providing ongoing support. This project is an important step for the industry, with significant potential benefits for Australian dairy farmers.

Contracted projects

When DataGene was formed in 2016, it received most of its funding from Dairy Australia, with some income from fees-for-services through genomic testing, export heifer certification and NASIS bull registration. In recent years, DataGene has diversified its income through new services both within the Australian dairy industry and further afield where its expertise can add value, particularly in IT. For more information refer to page 25.

Feature Project:

Celebrating 40 years of ABVs

This year marked an important milestone in the Australian dairy industry's history of genetic evaluation: 40 years of Australian Breeding Values. Over that time the genetic gain in sires used to produce the next generation of Holstein cows has increased from $6 per year after the first Australian Breeding Values (ABVs) were released to $30 per year today.

And we've more than kept our own on the international stage. Twenty years ago, the average genetic gain for Australian Holsteins was 4 per cent per year, which was half the international average. Today it's 28 per cent, well above average worldwide. This a testament to the hard work and dedication for the entire dairy industry, including the world leading research team at DairyBio, DataGene personnel who apply the research findings to the genetic evaluation system and create breeding tools, the herd improvement industry and of course, farmers as the end-users.

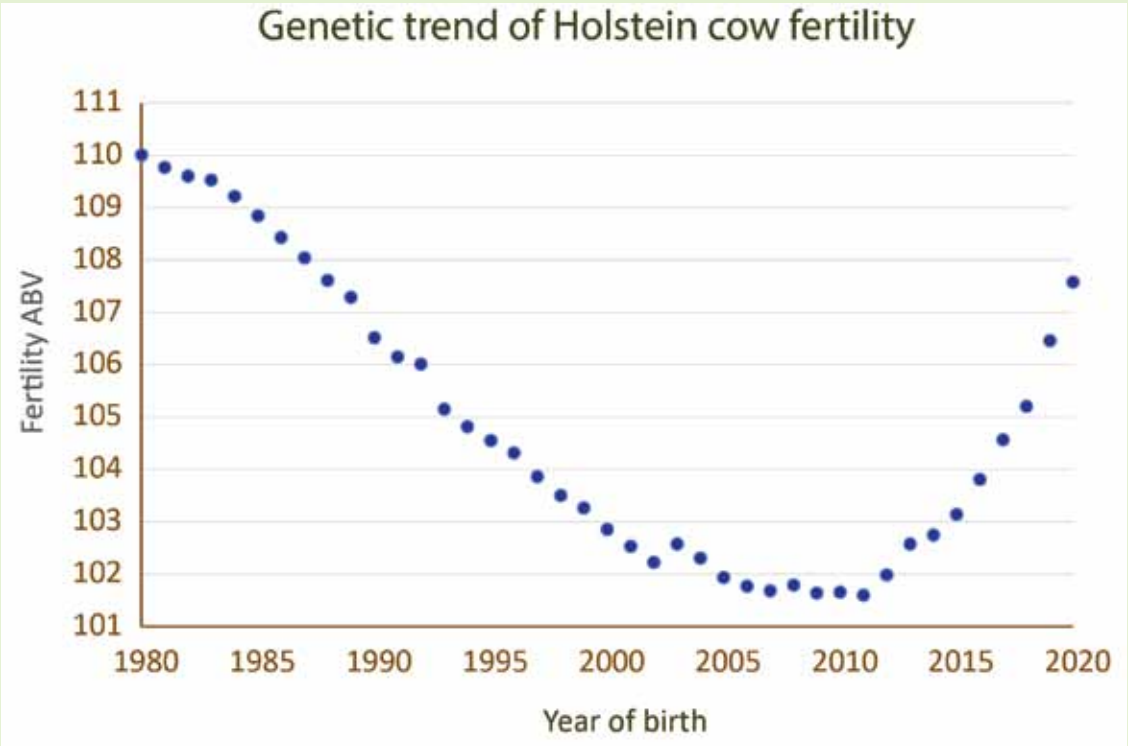
Australian Breeding Values were a game-changer when they were introduced in 1984, as was the arrival of genomics in 2011, which fast-tracked genetic gain in the Australian dairy herd. The Australian dairy industry has been at the forefront of genomic technologies, which were discovered by researchers Ben Hayes, Mike Goddard who worked closely with dairy genetics from the outset.

Our national genomic information reference population (Ginfo) has played an important role in the application of genomics, improving the reliability of genomic ABVs and enabling the development of breeding values for traits that are difficult to measure such as heat tolerance, feed saved and sustainability.

Another important achievement along the way was international collaboration through Interbull to convert breeding values of overseas bulls into Australian Breeding Values which are a more accurate prediction of performance under Australian conditions.

The release of the Fertility ABV in 2004 enabled farmers to identify bulls that were strong for both production traits as well as fertility, arresting the decline in fertility in Holsteins with a steady improvement ever since.

It's been an exciting 40 years, and we look forward to further advancements in the coming years.



Software development and IT strategic consulting

DataGene provides software and strategy services and has a portfolio of services to deliver solutions for Australian and international customers across dairy and agriculture. This suite of services has enabled DataGene to diversify its income stream and create opportunities for collaboration and learnings that benefit our stakeholders.

DataGene has a specialist team of IT and change management professionals that has built up a skillset around IT project management, working with large complex data sets, managing large-scale global projects, the ability to scale on demand and assessing change readiness. Further development of these skillsets helps to maintain DataGene's genetic evaluation and milk recording software and provide improved services to customers.

Current projects include: strategic analysis of data and technology requirements; assessment of change readiness and people capability; project scoping, design and management; data collaboration solutions; and implementation of new tools and systems. Working with our offshore development partner, DataGene uses established, proven and repeatable methods and processes to deliver projects from concept through to implementation. Examples of recent projects across several agricultural and food industries include:

- Cotton Research and Development Corporation (CRDC): developing requirements for an industry data platform.
- Council on Dairy Cattle Breeding (CDCB): providing maintenance and support services for WebConnect.
- Food Agility: a collaborative project led by Dairy Australia to develop a cow-side app, underpinned by artificial intelligence, to support farmers to make better clinical mastitis treatment decisions and more prudent use of antibiotics.
- Dairy UP: connecting data collected from DairyUP monitor farms with data from diverse sources and software systems to create opportunities for novel approaches to research, data interrogation, and analysis. And providing ongoing maintenance and support.
- Holstein Australia: providing assistance in the gathering of business requirements.

DairyBio: Developments in the pipeline

DairyBio's Animal Program provides a research pipeline for Australia's genetic evaluation system, including breeding values for new traits, improved reliability of existing ABVs and other innovations.

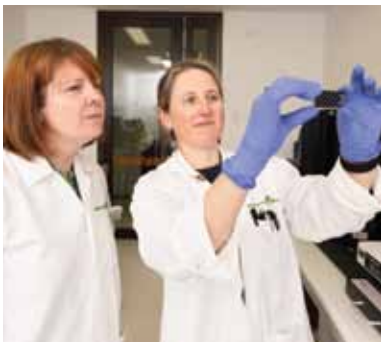
DataGene works closely with stakeholders and industry to understand farmer priorities which can be translated to research opportunities for innovative solutions.

Highlights from recent DairyBio research that will be implemented by DataGene in the near future include:

- Improved genetic evaluation for survival using multi-trait models
- Improved Heat Tolerance ABV for Jersey and Holstein cattle
- More accurate identification of recessive lethals and haplotypes
- An inventory of structural variants in Holstein and Jersey cattle
- Test the use of MIR from Foss machine for prediction conception rate.

DairyBio's research program for 2021-26 includes:

- Genetic improvement of cow and calf/heifer survival and resilience
- Using genomics to predict animal performance in real time
- Genomic selection for transition health and fertility
- Advanced Heat Tolerance ABVs
- Breeding for reduced pollution and improved efficiency
- Genomic diversity for more resilient and profitable cows.



Molecular Genetics Genomics and Cell Sciences Senior Research Scientist, Amanda Chamberlain, and Molecular Genetics Genomics and Cell Sciences Research Scientist Coralie Reich monitoring genotyping of Ginfo samples for the DairyBio projects in the laboratory at AgriBio, Bundoora.

DairyBio

DairyBio is a bioscience research program, focused on delivering outcomes of direct value to Australian dairy farmers. Conducting both animal and plant improvement research, DairyBio is a joint initiative between Agriculture Victoria, Dairy Australia and the Gardiner Dairy Foundation.

The DairyBio team works in purpose-built facilities at the AgriBio Centre for AgriBioscience near Melbourne, as well as at Agriculture Victoria's research facilities in regional Victoria. The AgriBio research facility is home to Agriculture Victoria's molecular scientists and quantitative geneticists, as well as industry organisations such as DataGene, Holstein Australia, Jersey Australia and NHIA. Being co-located creates a unique mix of great scientific minds, cutting edge technology and real-world perspective.

More information: www.dairybio.com.au

DataGene Board

DataGene is governed by a skills-based board. Members are elected on their knowledge and experience in dairy, herd improvement, finance, R&D and governance. The board must include three directors with direct expertise in dairy farm management. Directors are entitled to serve a three-year term and up to three consecutive terms (i.e. nine years). The ongoing rotation of Directors ensures the ongoing refreshment of skills and experience on the board.

Graeme Gillan

Chair

Graeme is the former chair of the National Herd Improvement Association of Australia (NHIA) and former CEO of Holstein Australia. His involvement with dairy herd improvement spans more than 45 years working with several leading Australian genetics companies. Over this time Graeme has been involved at the coal face of herd improvement innovations including expanding the sources of genetics, the introduction of computerised mating programs and increasing the gene pool of the Jersey breed in the 1990s, overseas investment in Australian genetics in the 2000s and the promotion of genomics since 2010. He is passionate about the industry's role in influencing priorities for research, development and extension programs, to ensure herd improvement continues to deliver value to Australian dairy farm businesses.

Jeff Odgers

B. Business (Agricultural Management), Ass. Dip. Farm Management.

Dairy Australia nominated Director

Jeff Odgers has more than 35 years' experience in Australian agribusiness; through involvement in large scale dairy farming, and board roles in research, industry services and food manufacturing.

He was Dairy Australia Chair 2017-2020, serving as a non-executive director between 2013 and 2021. Jeff led Murray Dairy Inc as board Chair 2008-2012, during a time of significant evolution in the regions farm systems.

Jeff was also a non-executive director of Bega Cheese Limited 2011-2020 and prior to that Tatura Milk Industries Limited 2009-2011.

He has a deep understanding of the value chain and a passion for farming and encouraging the adoption of technology. Jeff is a strong believer in the capacity of the dairy industry to create and put tools in the hands of farmers, as an enabler towards strengthening their businesses.

DataGene Board

Lucinda Corrigan

BScAg (Hons), FAICD

Director

Lucinda and her husband run 4,200 performance-recorded cattle on seven properties in the NSW Murray Valley, near Albury. Over the past 30 years they have developed a leading Angus genetics business, 'Rennylea', from a small base, with dedicated use of Breedplan for genetic improvement and a highly accurate database of phenotypes and genotypes. Having graduated with an Agricultural Science degree, Lucinda also has significant off farm experience, including nine years as a Non-Executive Director of Meat and Livestock Australia and Chair of the Animal Genetics and Breeding Unit at the University of New England (current). In 2007 Lucinda received the Helen Newton Turner Medal from AAABG in recognition for her contribution to animal breeding and genetics.

Tim Jelbart

B. App. Sci (Hons) AAPI

Director

Tim is a dairy farmer and Holstein breeder from Inverloch, West Gippsland, Victoria. He is the general manager and director of Jelbart Dairy which is owned by Tim and his brother, comprising a dryland dairy and beef business with 1,100 high production Holstein milking cows and 1,500 head of dairy replacements and F1 Wagyu calves. The business relies on genomic testing for accurate genetic information, which has resulted in significant genetic gains across the herd in recent years. Before returning to the family farm Tim completed a degree in applied science, specialising in property valuation. He remains a part-time rural and agribusiness property valuer with CBRE and has valued some of the largest agribusiness assets across Australia.

Daniel Meade

Dip Agriculture, Dip Agronomy, GAICD

Director

Daniel and his wife Michaela are co-owner operators of Boonderoo Pastoral Company, milking 400 cows at Kolora, south-west Victoria. Their focus is on maximising pasture production and home-grown feed efficiency whilst breeding an efficient cow that suits this system. In 2017, Daniel received a Nuffield scholarship to investigate how agricultural organisations engage with farmers. Before starting dairy farming in their own right in 2018, Daniel spent 10 years as a Dairy Agronomist, and studied at Glenormiston Agricultural College. Daniel was first elected to Moyne Shire Council in 2016 and is currently the Deputy Mayor, having served as Mayor from 2019-2021. He has also held positions on numerous community organisations including WestVic Dairy, VFF, CFA and on local sporting clubs.

DataGene Board

Anthony Shelly

Anthony has spent most of his career in dairy herd improvement, creating the opportunity for him to fulfill a wide range of roles across the livestock industry. Anthony has an exceptional understanding of the application of herd improvement at all levels of business. He is also a non-executive director of the National Herd Improvement Association of Australia (NHIA), the current CEO of Genetics Australia. Anthony remains passionate about the role of genetics and data in helping farmers optimise their businesses.

Sam Simpson

MMarketing (Agribusiness), BAppSci(Agric), GradDipAgribusiness, DipFrontlineManagement

Sam and her husband operate at 450-cow dairy farm, Craiglands Holsteins, at Larpent in South Western Victoria. They have been members of Holstein Australia for 18 years and genotyping their animals since 2015. Sam runs the herd's breeding program as well as the business finances, HR and information systems. She is the Chair of DataGene's Data Access and Standards Standing Committee and is actively involved in a number of industry groups including promoting dairy to the local community and school groups. Craiglands Holsteins was a focus farm for the ImProving Herds project and Sam was a member of the MIR for Profit project steering committee. Before taking on a full-time role with the farm, Sam spent 10 years as a sheep officer and Farm$mart Project Manager with the Victorian Department of Primary Industries.

DataGene consultative committees

DataGene has a variety of formal and informal mechanisms that provide stakeholders with input to DataGene's priorities. Formal governance structures include the Board and Standing Committees.

The Genetic Evaluation Standing Committee and Herd Test Centre Committee meet regularly and make a valued contribution to DataGene policies and activities.

A formal standing committee gives members direct influence over DataGene's priorities and program activities. This is not simply an advisory body, but exercises authority as delegated by the Board in areas of industry policy and guidelines. It comprises individuals from within the dairy industry and herd improvement sector who possess relevant skills and experiences. Standing Committee members are nominated by stakeholders and appointed by the Board. It is chaired by a member of the DataGene Board and includes at least one member of the DataGene management team.

Genetic Evaluation Standing Committee

The Genetic Evaluation Standing Committee provides advice and recommendations to the DataGene Board on specialist matters in relation to genetic evaluation and related technologies.

Members of the Genetic Evaluation Standing Committee in 2023 included:

- Tim Jelbart (Chair), DataGene board
- Steph Bullen, Dairy Australia
- Andrew Aldridge, ADF
- Janet Auchterlonie, dairy farmer
- Trevor Parrish, dairy farmer
- Jennie Pryce, DairyBio
- Tim Weller, WWS
- Christian Hickey, NHD
- Bruce Ronalds, ABS
- Rob Derksen, Genetics Australia
- Glen Barrett, Jersey Australia
- Rohan Butler, Holstein Australia
- Daniel Abernethy, Zoetis
- Matt Shaffer, DataGene
- Thuy Nguyen, DataGene.

The Genetic Evaluation Standing Committee met four times during 2022/23. The committee received regular progress updates and provided feedback on the updating genomic analysis, and progress with the Sustainability Index, splitting bases for Red Breeds, Within Herd Herd Ranking Tool, changes to Good Bulls criteria, and Semen Fertility Values.

Reports from each meeting are distributed to stakeholders and are available on request.

DataGene consultative committees

Data Access and Standards Standing Committee

The Data Access and Standards Committee provides strategic advice and guidance to stakeholders in the dairy industry, including DataGene. It establishes the guidelines for the operation of the CDR and DataVat and provides advice on the development and implementation of data standards to support industry data sharing. The Committee guides the development of policies and processes for the access and use of herd improvement industry data and develops and oversees a process for handling requests for exceptions to these policies.

At its first meeting, held in February 2023, the committee identified the following priority areas: impact of multiple animal IDs on genomic data, inline data, health data, NLIS recording of beef on dairy, suitability of DIF files, ease of data correction and autocorrection of parentage via genomics.

Data Access and Standards Standing Committee members:

- Sam Simpson, (Chair), DataGene Board
- Andrew Aldridge, Farmer Member
- Glen Barrett, Jersey Australia
- Jacqui Biddulph, Farmer Member
- Steph Bullen, Dairy Australia
- Heather Campbell, Farmer Member
- David Chandler, Easy Dairy
- John Crowther, Holstein Australia
- Paul Douglas, STgenetics
- Daniel Espinosa, MSD Animal Health (Allflex)
- Peter Nish, TasHerd Pty Ltd
- Phil Wren, National Herd Development
- DataGene staff.

Herd Test Centre Committee

The primary objective of the Herd Test Centre Committee is to provide advice and recommendations to DataGene in relation to opportunities such as new data sources, new diagnostic analysis, and enhanced software and reporting including HerdPlatform and the Centralised Data Repository (CDR). The scope of the Herd Test Centre Committee is on pre-competitive discussions, including software and service development. HerdPlatform is a tool on DataVat that gives farmers interactive access to their herd test results and new herd recording and herd improvement tools, reports, and services.

The committee is made up of management representatives from National Herd Development (NHD), Hico, Dairy Express, TasHerd and FarmWest, with input from DataGene and secretariat support from Chris Murphy. The committee met three times during 2022/23 on topics including workability data collection, promotion and uptake of HerdPlatform, calculating yields in robotic and inline systems, and redevelopment of DataGene's Centre software.

Vale Geoff Potts

Geoff Potts spent most of his career in the dairy industry, including 16 years with Dairy Express where he combined his practical experience with computing expertise to develop reports that made it easy for dairy farmers to make management decisions from their herd test data. In recent years he was an important contributor to DataGene's Herd Test Committee and the development of Herd Platform. He will be remembered for his passion, persistence and commitment to herd improvement for the Australian dairy industry.

DataGene acknowledges the Traditional Custodians of country throughout Australia and their connections to land, sea and community. We pay our respect to their Elders past and present and extend that respect to all Aboriginal and Torres Strait Islander peoples.

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DataGene
Solutions for Herd Development

DataGene is an independent and industry-owned organisation responsible for driving genetic gain and herd improvement in the Australian dairy industry and is an initiative of Dairy Australia and industry. This report is published for your information only. It is published with due care and attention to accuracy, but DataGene accepts no liability, if, for any reason, the information is inaccurate, incomplete or out of date whether negligent or otherwise.
September 2023.