A pocket guide to

ABVs

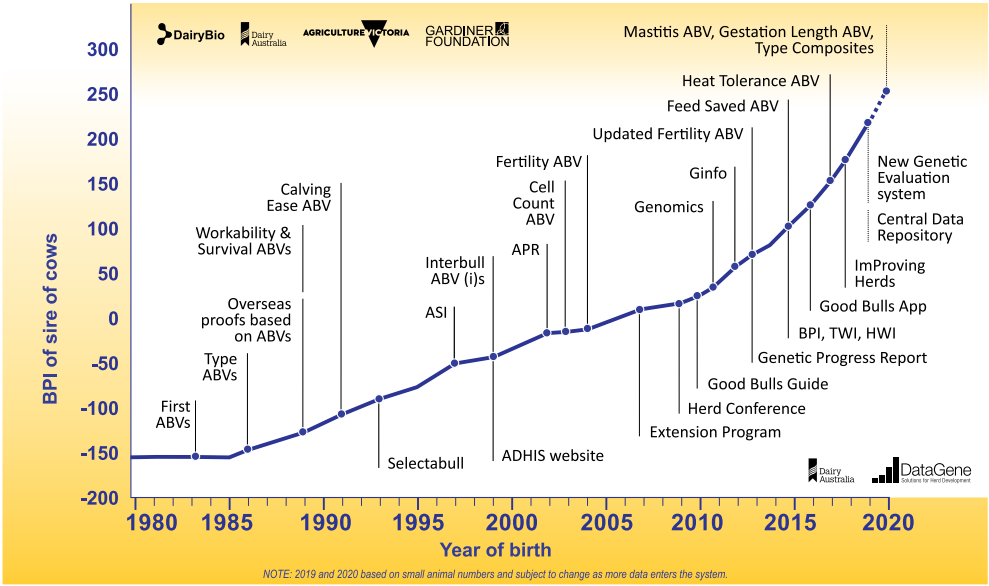
Australian Breeding Values

DataGene
Solutions for Herd Development

Dairy Australia
Your Levy at Work

Contents

Long term genetic trends (Holsteins)



NOTE: 2019 and 2020 based on small animal numbers and subject to change as more data enters the system.

Australia's two indices

Australia's two breeding indices take the hard work out of breeding for more than one trait at once. Choose the index that best matches your breeding priorities. Indices have a base of zero. The difference is in the emphasis given to specific traits.

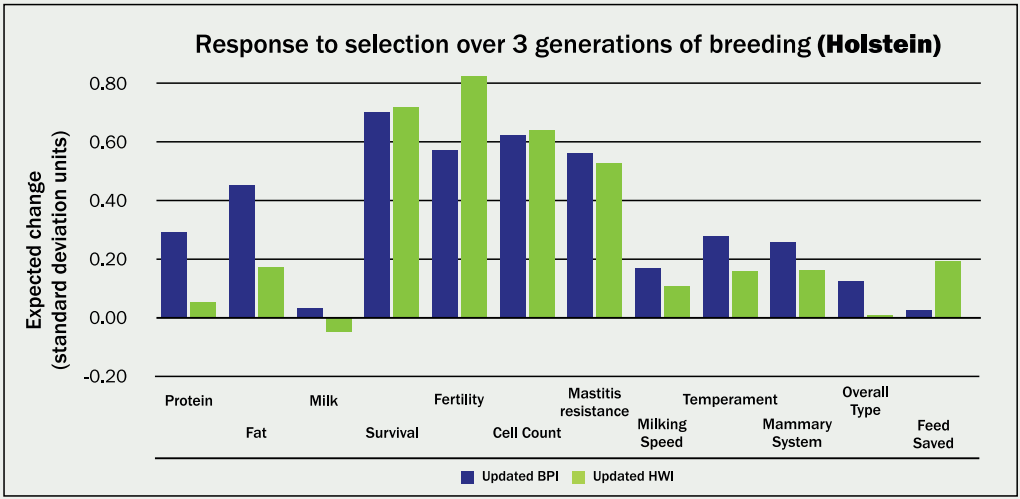
Balanced Performance Index (BPI)

- Economic index
- Blends production, type and health traits according to their economic values
- In line with farmer preferences

Health Weighted Index (HWI)

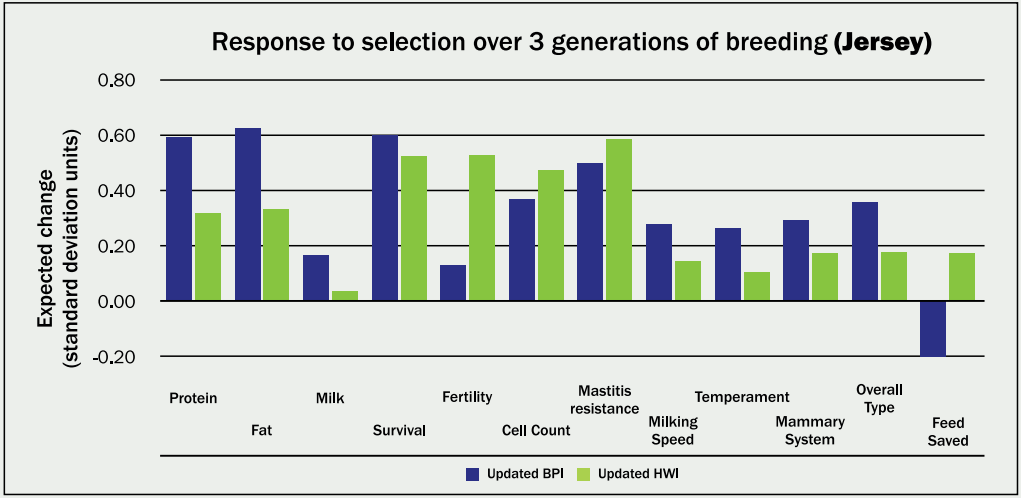
- Fast track fertility, mastitis resistance and feed saved
- Modelled on a strictly seasonal calving system

What you can expect (Holstein)



This graph shows the response you can expect for key traits if you use one of the indices consistently for 10 years.

What you can expect (Jersey)



This graph shows the response you can expect for key traits if you use one of the indices consistently for 10 years.

Base value (averages)

Indices and ABVs are relative measures, meaning they make more sense when compared to each other or to an average. The average, also known as the 'base' is a clearly defined group of animals to which all others are compared.

In Australia the average is defined as the purebred cows of the same breed that were born between 2009 and 2013. It is updated periodically so it reflects the cows that are milking in today's herds.

- **For production traits, feed saved, gestation length and indices, the average is set at 0.**
- **For type, health and management traits the average is set at 100.**

When working with your chosen index it is important to understand what the units mean.
The **BPI** is expressed in dollar units, with the breed average set at zero.
The **HWI** is measured in units, with the breed average set at zero.

Balanced Performance Index (BPI)

$

Eg. BPI of 300

On average this animal returns $300 more income over feed/herd costs. The average is 0.

Health Weighted Index (HWI)

Index units

Eg. HWI of 280

This animal is 280 units greater for the desired objective than average. The average is 0.

The Australian Selection Index (ASI) is a production-based index that ranks animals (bulls or females) on their ability to produce daughters with the most profitable combination of protein, fat and milk production. Traits are weighted according to the way Australian dairy farmers are paid for their milk (fat + protein - volume).

The ASI is expressed in dollars. An ASI of 200 means this animal is $200 more profitable from production than average.

The ASI is included in both of the two indices (BPI, HWI), with a higher weighting in the BPI.

For example, if an animal has an ASI of 200 then that is the contribution to production. If that same animal has a BPI of 300 then:

BPI 300 = ASI 200 + 100 from non-production traits

Production ABVs
ABVs are calculated for protein (kg and %), fat (kg and %) and milk production (L). Production ABVs are expressed in units (kg, %, L etc) against an average of zero, which represents the national average.

Milk (L)
The Milk ABV estimates an animal's ability to produce litres of milk. A Milk ABV of 500 means this animal is estimated to produce 500L more milk/yr than the average. More milk volume is not necessarily more profitable because most Australian dairy farmers are paid for milk solids. For this reason, most people prefer to use the ASI (see p9) rather than the Milk ABV.

Fat (kg and %)
The Fat kg ABV estimates an animal's ability to produce kilograms of fat in the milk. A Fat kg ABV of 20 means this animal is estimated to produce 20kg more milk fat per year than the average.
The Fat % ABV estimates an animal's ability to produce milk with a higher or lower % of fat. Choose animals with a positive Fat % ABV if you want to increase fat % in your herd.

Protein (kg and %)
The Protein kg ABV is an estimate of an animal's ability to produce kilograms of protein in milk. A Protein kg ABV of 20 means this animal is estimated to produce 20kg more milk protein per year than the average.

The Protein % ABV is an estimate of an animal's ability to produce milk with a higher or lower percentage of protein. Choose animals with a positive Protein % ABV if you want to increase protein % in your herd.

Production ABVs draw upon data from herd recording and other sources.

The main health traits are mastitis resistance, survival and daughter fertility.

Mastitis resistance

While most reduction in mastitis comes from management, genetic variation for mastitis resistance does exist and some cows and bulls produce daughters that are less susceptible to mastitis than others. The Mastitis Resistance ABV is expressed relative to an average of 100 with higher breeding values indicating healthier cows. To breed replacements with improved mastitis resistance, choose bulls from the Good Bulls Guide with a Mastitis Resistance ABV of more than 100.

Survival (longevity)

The Survival ABV reflects an animal's ability to produce daughters that last in the herd for many lactations. Many factors influence the length of a cow's herd life. The Survival ABV includes all the factors that influence a cow's herd life. All indices improve survival with the highest weighting in the HWI. To improve longevity in your herd, select animals with a Survival ABV of more than 100.

Daughter fertility

While most improvement in herd reproductive performance comes through improved management, genetic variation for fertility does exist and some bulls produce daughters that are more likely to become pregnant earlier. The Daughter Fertility ABV reflects the percentage of an animal's daughters pregnant by six weeks after the mating start date compared to the average. For year round calving herds, this is equivalent to the percentage of their daughters pregnant by 100 days after calving. Daughter fertility is included in each of the two indices, with a higher weighting in the HWI.

To improve fertility in your herd, select animals with a Daughter Fertility ABV of more than 105.

Cows with a Daughter Fertility ABV of 110 had 10% more pregnancies after six weeks of joining compared to cows with an ABV of 100.

(Source: Morton unpublished)

Photo: Kerrie Anderson, Drouin

The **Calving Ease ABV** is an indicator of how easily a bull's progeny will be born, not the ease by which his daughters calve. The Calving Ease ABV is expressed as the percentage of normal or easier calvings in mature cows more or less than the average of 100. To improve calving ease from this mating, select bulls with a Calving Ease ABV of at least 100.

Gestation length

The Gestation Length ABV is an indication of an animal's influence on the number of days from conception to birth. The Gestation Length ABV is expressed as number of days of gestation more or less than the average of zero. To reduce gestation length of this mating, select animals with a Gestation Length ABV of less than zero.

Workability

Workability refers to three traits that reflect how easy a cow is to have in the herd: milking speed, temperament and likeability. Workability is included in both indices. Workability ABVs are expressed as a percentage more or less than an average of 100. To improve workability traits in your herd, select animals with Milking Speed ABV, Temperament or Likeability ABVs of more than 100.

A **Milking Speed ABV** of more than 100 means more daughters are rated satisfactory or better than average. That is, daughters are expected to have a milking speed faster than average.

A **Temperament ABV** of more than 100 means more of an animal's daughters rated satisfactory or better than average, i.e. temperament is more acceptable than average.

A **Likeability ABV** of more than 100 indicates more daughters rated satisfactory or better than average, i.e. farmers want more cows like this group of daughters.

Feed Saved ABV

The Feed Saved ABV allows you to breed cows with reduced maintenance requirements for the same amount of milk produced.

Feed Saved is included in both indices, with the higher weighting in the HWI. The Feed Saved ABV is expressed in kilograms of dry matter of feed saved per cow per year more or less than the average of zero. A positive number represents feed saved; a negative number represents extra feed consumed. To improve feed efficiency in your herd, select animals with a Feed Saved ABV greater than zero.

Heat Tolerance ABV

The Heat Tolerance ABV allows you to identify animals with greater ability to tolerate hot, humid conditions with less impact on milk production.

To improve heat tolerance in your herd, select animals with a Heat Tolerance ABV of greater than 100. Allow for the lower reliability by using a team of bulls.

Type traits

Australian Breeding Values are available for more than 20 type traits which are assessed by breed association classifiers. ABVs for type traits are expressed against the breed average which is set at 100. A bull's type ABVs are based on his daughters' classifications, including both registered and non-registered daughters.

ABVs are available for:

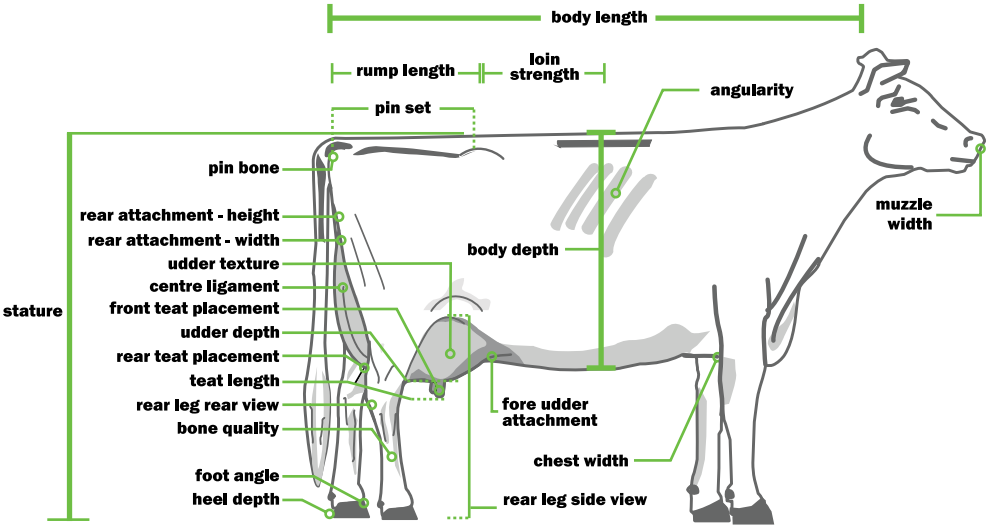
Composite traits
- Overall type
- Mammary system
- Dairy strength
- Rump
- Feet & legs

General characteristics
- Stature
- Angularity
- Muzzle width
- Chest width
- Body length
- Body depth
- Bone quality

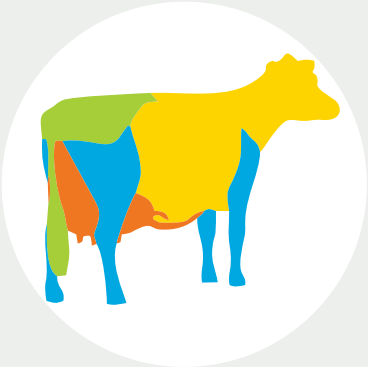
Mammary system
- Udder texture
- Udder depth
- Fore attachment
- Rear attachment - height
- Rear attachment - width
- Centre ligament
- Teat placement - front
- Teat placement - rear
- Teat length

Rump
- Rump length
- Pin width
- Pin set
- Loin strength

Feet & legs
- Foot angle
- Heel depth
- Rear set
- Rear leg rear view


body length
rump length
loin strength
angularity
pin set
pin bone
rear attachment - height
rear attachment - width
udder texture
centre ligament
front teat placement
udder depth
rear teat placement
teat length
rear leg rear view
bone quality
foot angle
heel depth
stature
body depth
fore udder attachment
chest width
rear leg side view
muzzle width

Composite type traits



- Mammary system
- Feet & legs
- Dairy strength
- Rump

Dairy farmers are often more interested in a group of traits which combine to affect a cow's functional performance in the herd.

An ABV based on a combination of traits is referred to as a 'composite' trait.

DataGene publishes ABVs for four composite type traits: mammary system, feet & legs, dairy strength and rump.

The Overall Type ABV is a combination of all traits, so is also technically a composite. At this stage, the only composites published for Jerseys are mammary system and overall type.

There are some variations in the composites provided to each breed as a result of differences in classification systems.

Overall type

The Overall Type ABV is a reflection a cow's overall classification score which is based on 23 linear traits as assessed by breed associations. An animal's Overall Type ABV refers to its ability to produce daughters with higher classification scores. Cows with a higher Overall Type ABV are often more structurally sound; which contributes to longer herd life. This is why overall type is included in both indices – BPI and HWI.

To improve overall type in your herd choose animals with an Overall Type ABV of greater than 100.

Mammary system

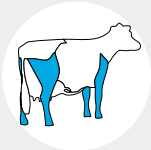
The Mammary System ABV is a composite ABV calculated using a number of individual udder trait ABVs, including udder texture, fore attachment, rear udder height, rear udder width, centre ligament and teat placement.

Cows with good udders last longer in the herd and are easier to milk. This is why mammary system is included in both of the indices – BPI and HWI.

To improve mammary system choose animals with a Mammary System ABV of greater than 100.

Dairy Strength

The Dairy Strength ABV is a composite trait, incorporating dairy strength classification score, stature, muzzle width, body depth, chest width, angularity and loin strength. Dairy strength is positively correlated with rear attachment and rump. Selecting to improve Dairy Strength is likely to improve these traits at the same time.



Feet & Legs

Sturdy and sound feet and legs are important for Australian dairy cows in grazing systems. The Feet & Leg ABV is calculated from Feet & Legs classification score, foot angle, heel depth, rear set, bone quality and rear leg view. The Feet and Legs ABV is positively correlated to mammary system, overall type, stature, udder traits and likeability. Selecting to improve feet and legs is likely to improve these traits at the same time.

Rump

The Rump ABV is calculated from rump classification score, pin width, pin set and loin strength.

Rump is positively correlated with dairy strength. Selecting to improve rump is likely to also improve dairy strength at the same time.

DataVat
Tools for better decisions

DataVat is a web portal for tools and resources that use the Australian dairy industry's central data repository for animal information.
Developed by DataGene with funding from Dairy Australia, DataVat makes it easy to access and share data in the central data repository. Tools and reports will be progressively added to DataVat over time.

There are three types of information/reports available through DataVat:

- Open access
- Herd reports (requires login*)
- User pays services/reports (requires login)

* Herd reports draw upon individual herd records. They are restricted access, requiring login and authorisation from the herd owner because they display herd details in the reports and are specific to that herd. Herd reports include the Genetic Progress Report, Genetic Futures Report and Fertility Focus Report.

Good Bulls

The Good Bulls Guide is published by DataGene three times a year, in April, August and December.

Use Good Bulls to improve profitability and confidently select semen suited to your breeding objectives.

The Good Bulls Guide is also available as an interactive App.

DataGene's HerdData App is a quick and easy way to enter or access herd records using your smart phone or tablet, while you are in the paddock or dairy.

The app synchronises data with your herd management software. There's no longer any need to hand write information on bits of paper and then enter it into the office computer at the end of the day.
HerdData is available to any Australian dairy herd. You don't need to be herd testing.

Genetic Progress Report

Genetic Progress Reports are produced for herd-recorded herds after each ABV release.

The 2-page report allows you to track the effect of your breeding decisions and to monitor trends in your herd's genetic merit. It includes a graph showing the herd's genetic trends for profit (Balanced Performance Index) over 10 years, compared with the Australian breed average and top 10% in the country. Additional graphs track the herd's genetic changes for type, longevity, mastitis resistance, fertility, protein and fat.

Use the Genetic Progress Report to identify breeding areas that have performed well and traits for improvement.

DataGene
Solutions for Herd Development

Dairy Australia
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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. DairyBio provides the research pipeline to develop and maintain Australian Breeding Values.

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Published by DataGene Limited