

A pocket guide to

ABVs

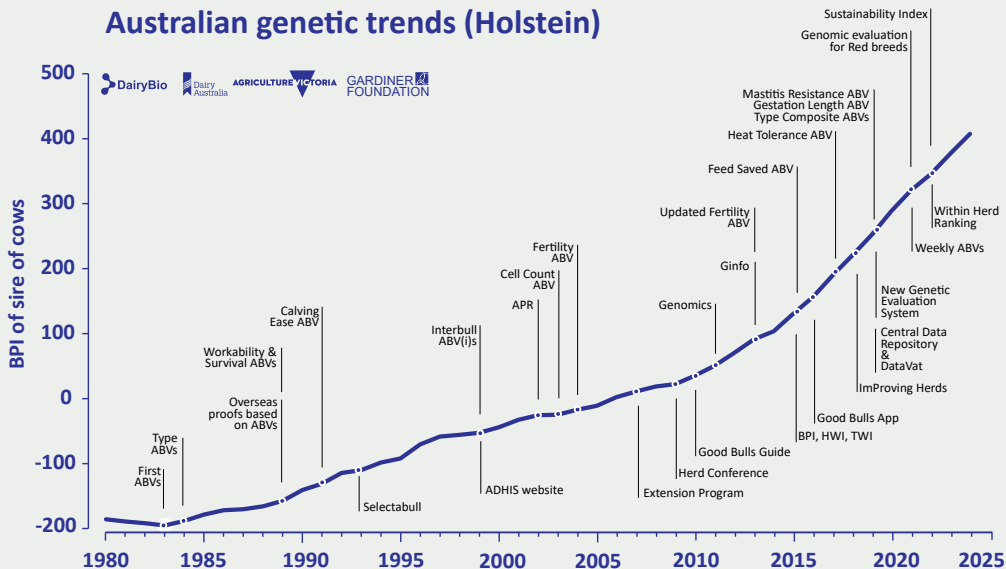
Australian Breeding Values


DataGene
Solutions for Herd Development



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Australian genetic trends (Holstein)



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



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)

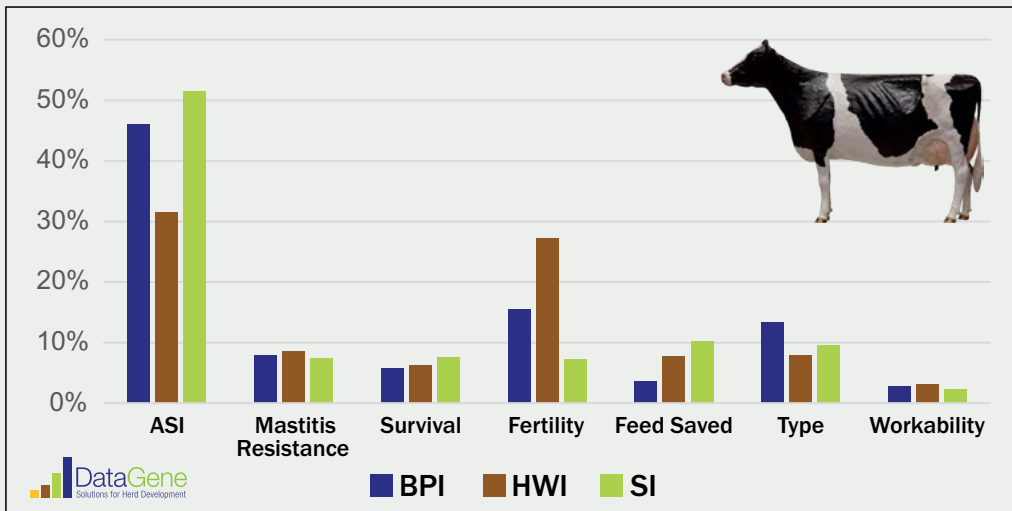
- Fast track fertility, mastitis resistance, calving ease, gestation length and feed saved
- Modelled on a strictly seasonal calving system

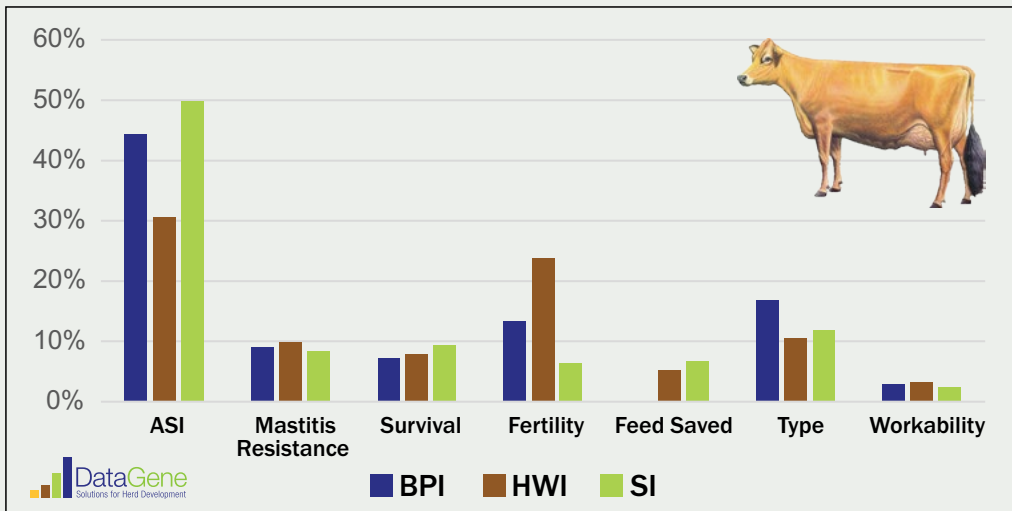


Sustainability Index (SI)

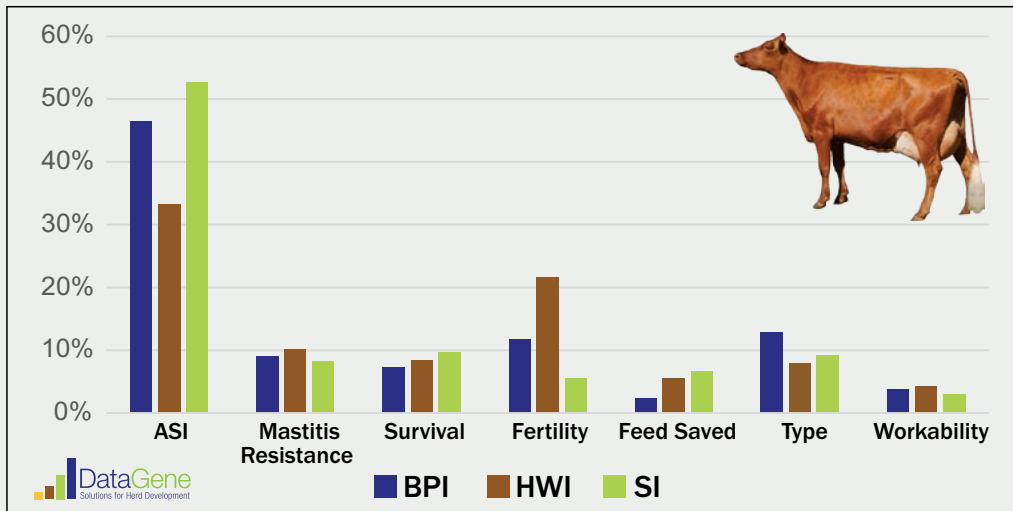
- Fast track genetic gain for lower emissions intensity
- Continue gains for important economic traits

Trait contributions to indices (Holsteins)





Trait contributions to indices (Red Breeds)



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 cows of the same breed that were born between 2018 and 2022. It is updated every five years in line with international best practice (ICAR guidelines).

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

The **Sustainability Index** is measured in units, with the breed average set at zero.

Balanced Performance Index (BPI)



Eg. BPI of 400

On average this animal returns \$400/year more income over feed/herd costs. The average is 0.

Health Weighted Index (HWI)



Index units

Eg. HWI of 380

This animal is 380 units greater for the desired objective than average. The average is 0.

Sustainability Index (SI)



Index units

Eg. Sustainability Index of 450

This animal is 450 units more efficient for emissions intensity 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 400 means this animal is \$400 per year more profitable from production than average.

The ASI is included in all three indices (BPI, HWI and Sustainability Index), with the highest weighting in the Sustainability Index.

For example, if an animal has an ASI of 400 then that is the contribution to production. If that same animal has a BPI of 500 then:

$$\text{BPI } 500 = \text{ASI } 400 + 100 \text{ from non-production traits}$$

Production

ABVs are calculated for protein (kg and %), fat (kg and %) and milk production (L). Production ABVs are expressed in units (kg, %, L) 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 per year than the average.

Fat (kg and %)

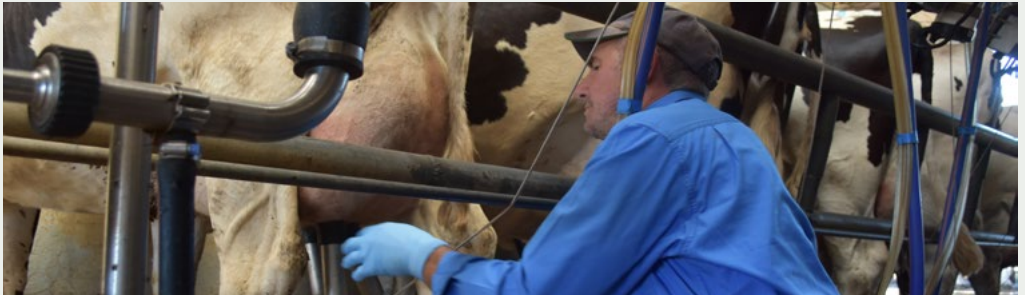
The Fat kg ABV estimates an animal's ability to produce kilograms of fat in the milk. A Fat kg ABV of 20 means this animal is estimated to produce 20kg more milk fat per year than the average.

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, daughter fertility and heat tolerance.

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 Sustainability Index. To improve longevity in your herd, select animals with a Survival ABV of more than 100.

Sire stillbirth and maternal still birth

The Sire Stillbirth ABV reports an estimate of the percentage of progeny that are born dead or die within a few hours of birth. Whereas, the Maternal Stillbirth ABV predicts the percentage of calvings that result in a calf that is born dead or dies shortly after birth. Stillbirth ABVs are reported as a percentage above or below 0 where a lower number means fewer stillborn calves. To lower stillbirth rates, choose bulls that are less than zero. Stillbirth ABVs are not included in any breeding index.



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 three 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.



Heat tolerance

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 of the Heat Tolerance ABV by using a team of bulls.

Calving ease

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.

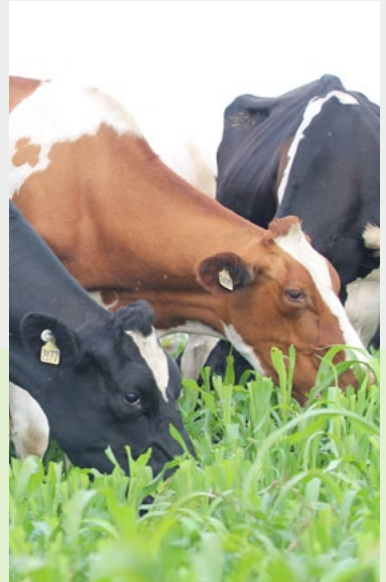
Gestation length

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.



Feed saved

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





Workability refers to three traits that reflect how easy a cow is to have in the herd: milking speed, shed temperament and overall likeability. Workability is included in all three 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.

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

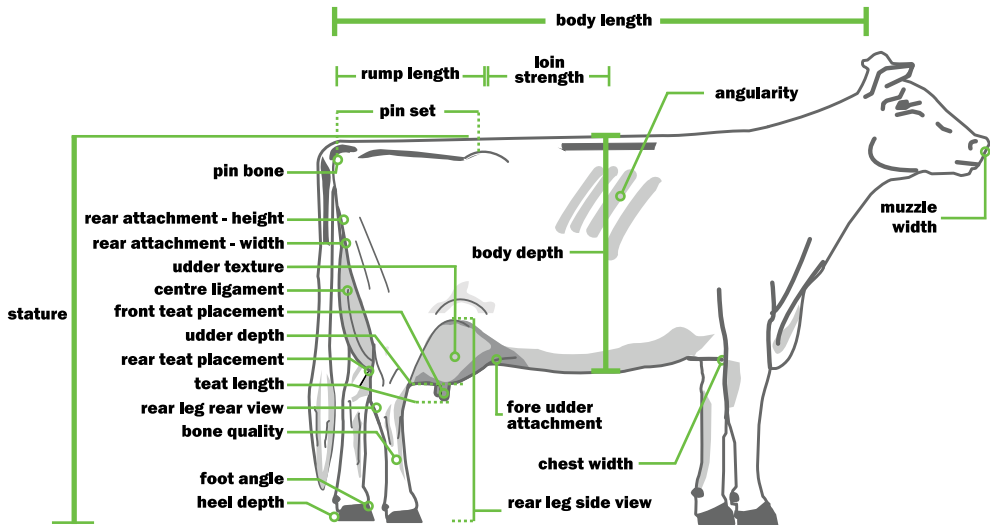
- Udder texture
- Udder depth
- Fore attachment
- Rear attachment - height
- Rear attachment - width
- Centre ligament
- Teat placement - front
- Teat placement - rear
- Teat length

Rump

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

Feet & legs

- Foot angle
- Heel depth
- Rear set
- Rear leg rear view





- 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.

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 of a cow's overall classification score which is based on more than 20 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 all three indices – BPI, HWI and Sustainability Index.

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



Mammary system

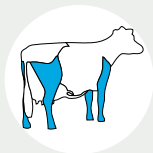
The Mammary System ABV is calculated using a number of individual udder trait ABVs, including udder texture, fore attachment, rear udder height, rear udder width, centre ligament and teat placement. Cows with good udders last longer in the herd and are easier to milk. This is why mammary system is included in all three indices – BPI, HWI and Sustainability Index.

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



Dairy strength

The Dairy Strength ABV incorporates dairy strength classification score, stature, muzzle width, body depth, chest width, angularity and loin strength.



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.



Rump

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

For some traits the optimum is an intermediate score. For example, rear teat placement: neither extreme is desirable: cups are difficult to attach if rear teats are too close or too wide. The optimum position is intermediate. A bull with a Rear Teat Placement ABV of 100 may represent the breed average but the optimum for the trait may be different.

Six type traits with intermediate optimums have a letter after the ABV. The letter indicates if the ABV is within the optimum range (O) or an alternative letter indicating the trait direction.



	Letter	Description	Optimum	Letter	Description
Pin set	H	High	O	L	Low
Rear Leg set	S	Straight	O	C	Curved
Bone quality	C	Coarse	O	S	Sharp
Udder depth	D	Deep	O	S	Shallow
Teat placement - Front	W	Wide	O	C	Close
Teat placement - Rear	W	Wide	O	C	Close



DataVat is your portal into the dairy industry's Central Data Repository (CDR).

DataVat allows you to:

- Search for bulls using filters to find the right bulls for your herd.
- View and download the genomic results for your animals.
- Access management reports such as Genetic Progress and Fertility Focus.
- Access HerdPlatform to extract greater value from your herd recording data (participating herd test centres only).

To access DataVat go to <https://www.datavat.com.au> and click on the **Sign Up** button.

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 is updated on HerdPlatform within a few days of herd testing. HerdPlatform was developed by DataGene in collaboration with Dairy Express, NHD, HICO and Farm West.





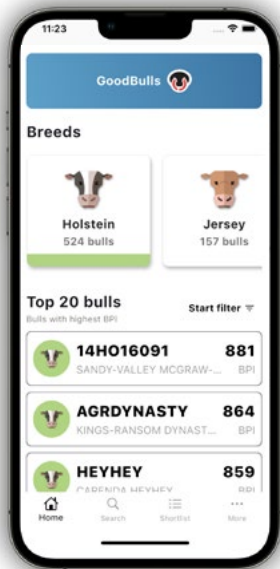
Good Bulls

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.

Available from the App Store and Google Play.



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.

The subscription gives access to added features but the workability reporting feature is free for all users.

Available from the App Store and Google Play.



Genetic Progress Reports are produced for herd-recorded herds in April, August and December, after each public 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 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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