The Holstein stature dilemma

Genetics Backgrounder November 2026

Key points

- Holstein cows have been getting consistently bigger for the past 55 years and the trend is set to continue, with a quick increase in the coming five years.
- Many Australian dairy farmers would like to reverse this trend as bigger cows have higher maintenance feeding costs and require larger facilities.
- Stature is highly heritable, so breeding decisions have a significant impact.
- The challenge is that stature is positively correlated with traits that are important to dairy profitability. In general, breeding for improved BPI, Survival and most type traits will also breed for increased stature.
- AI companies have very limited options for bulls that will lower stature while still maintaining progress for other key economic traits.
- Genomic testing cows is a valuable tool for reducing stature in herds.
- A potential first step towards breaking the link between stature and other important traits would be to stop using the breed society calculated final score for Overall Type and move to using an index constructed from component ABVs. Holstein USA has recently taken steps towards this with the launch of the Holstein Conformation Composite (HCC).

Contents

Bigger is not always better 2
Trends in Holstein Stature ABV 3
Breeding options for reducing stature 5
Breaking the link 6
References 6
More information 6
About DataGene 12
Appendix 1: Holstein Stature ABV – cows and bulls, 15-year trend 7
Appendix 2: Holstein Stature ABV – bulls, 8-year trend 7
Appendix 3: Holstein Stature ABV – cows: 55-year trend 8
Appendix 4: Estimating cow height from Stature ABVs 8
Appendix 5: What Stature ABV will reduce cow height in the next generation? 10
Appendix 6: Relationship between stature and other important traits 10
Appendix 7: Bull selection options in DataVat analysis 12

This document 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to accuracy, but DataGene accepts no liability, if, for any reason, the information is inaccurate, incomplete or out of date whether negligent or otherwise. Copyright DataGene Pty Ltd 2026. All rights reserved ©

Bigger is not always better

When it comes to breeding dairy cows – Holsteins in particular – bigger is not always better. There's a growing trend around the world for dairy farmers and their breeding advisors to include reducing stature in their selection criteria.

Bigger cows involve higher feed costs, both for heifer rearing and maintenance as mature animals. As Holstein size increases, cows can be more difficult to fit in existing dairies and facilities.

In Australia, the concern about stature has focussed on the Holstein breed. Increasing stature has also been flagged as an issue with Brown Swiss. In contrast, Australian Jersey breeders are looking to breed cows with slightly larger stature.

The genetics of stature

Stature specifically describes the height of dairy cattle. Because stature is related to other body-size traits, it is sometimes used by dairy farmers as a proxy for cow size. It is reasonable to assume that overall cow size is steadily increasing in line with stature.

Heritability

With a heritability of 0.4 to 0.5, stature is one of the most heritable traits in dairy cattle. This means selection for stature can have a significant impact on progeny.

For context, other highly heritable traits include fat and protein percentage, udder depth and rump angle. Traits with low heritability include daughter fertility, calving ease and survival/longevity.

Related traits

Production yield and most type traits are positively correlated with stature. Selection for improved production and overall type has underpinned the trend to increased stature in Holsteins.

Stature is negatively correlated to some important economic traits such as fertility and feed efficiency. Breeding for larger Holsteins has had an unfavourable impact on these traits.

Table 1: Traits correlated to stature

Traits positively correlated to stature (Breeding to reduce stature will also reduce these traits)	**Traits negatively correlated to stature** (Breeding to reduce stature will improve these traits)
• Milk production/yield (including protein and fat) • Mammary system • Longevity/survival • Liveweight • Overall type • Most type traits	• Fertility • Feed efficiency

Stature ABV

The Stature ABV estimates an animal's genetic merit for height. Stature is a linear trait meaning it is physically measured by breed society classifiers in centimetres which is converted to the 1 to 9 linear scale for ABV analysis.

A higher ABV indicates a genetic tendency towards taller animals, while a lower ABV indicates a tendency towards shorter animals. In Holsteins, stature is an example of a type trait with an intermediate optimum. Neither extreme (short or tall) is ideal. The optimum animal is in the intermediate range –A Holstein Australia defines the ideal stature as a classification score of 6-8.

Dairy Australia

This document 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. Copyright DataGene Pty Ltd 2026. All rights reserved ©

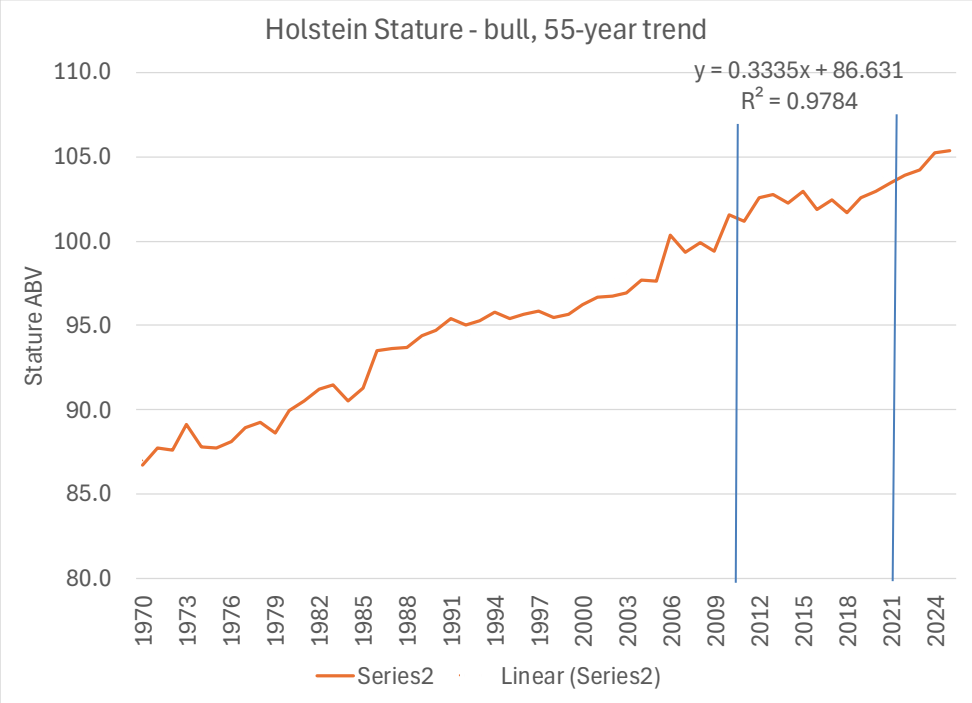
DataGene Solutions for Herd Development

Trends in Holstein Stature ABV

Holstein stature has been steadily increasing for at least the past 50 years. The average Stature ABV of Holstein **bulls** increased from 89 in 1970 to 106 in 2024 (Figure 1). Although there were some periods where stature "flatlined," the general trend has been upward, with an average rate of gain over the 55-year period of 0.3335 ABV points per year.

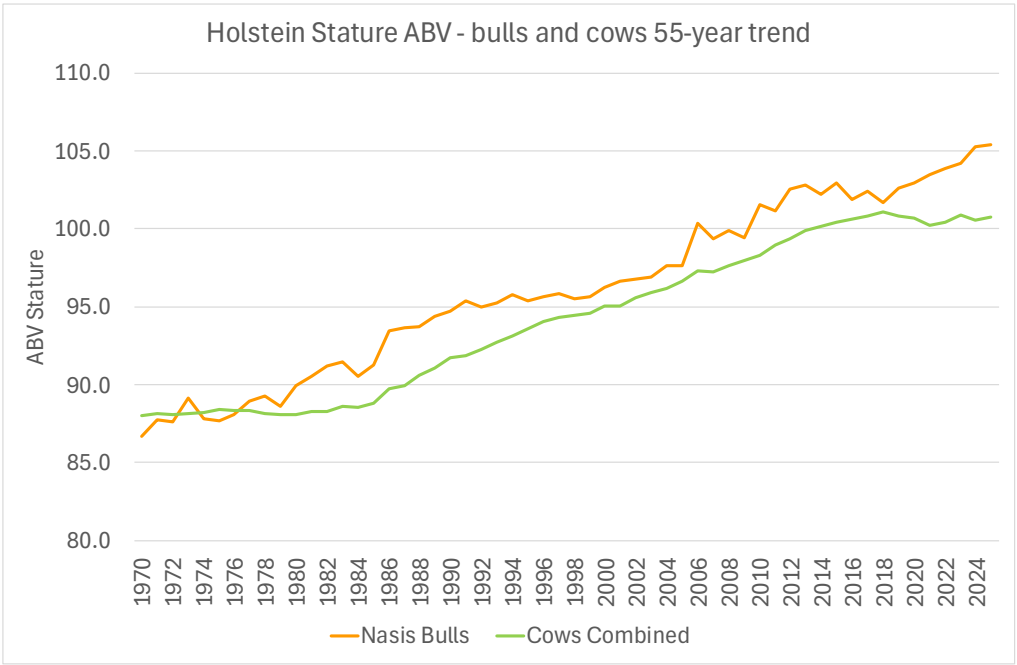
In the 15 years since 2010, the rate of gain for stature has slowed to 0.2177 ABV points per year (Appendix 1). This is mainly due to the period between 2010 and 2018 where the rate of gain was close to zero (0.0513) ABV points per year. Since that time, the rate of gain for stature has ticked up to 0.5152 ABV points per year (Appendix 2).

Figure 1: Holstein Stature – bulls, 55-year trend



The genetic trend for **cows** follows a very similar trajectory. The rate of gain for cows over the 55-year period is 0.2927 ABV points per year (Appendix 3), just short of bulls at 0.3335 ABV points per year (Figure 2).

Figure 2: Holstein Stature – bulls and cows, 55-year trend



Dairy Australia

This document 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. Copyright DataGene Pty Ltd 2026. All rights reserved ©

DataGene Solutions for Herd Development

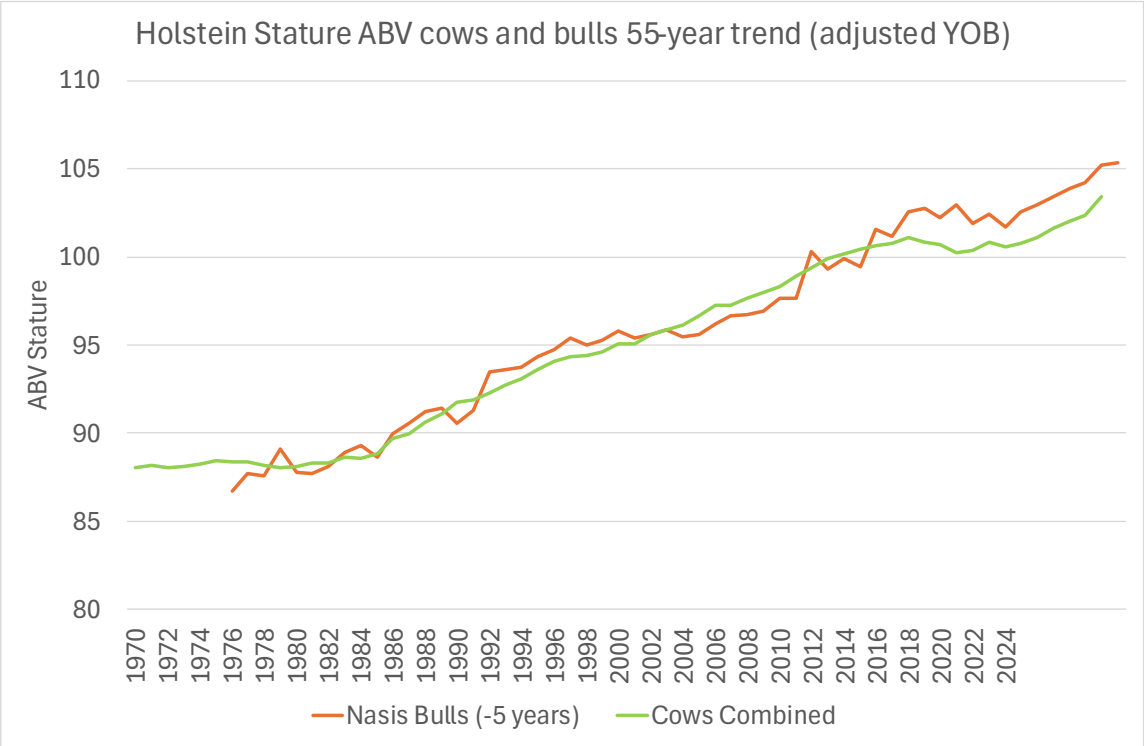
While the rate of gain for Stature ABV is similar over this period for both cows and bulls, there is a time lag of around 4–5 years. This lag is due to the fact that the average age of bulls siring cows is 3.5–4 years. (Bulls do not produce useable semen until a minimum of 12 months of age and have a life in the marketplace of 3–5 years with some extending that if they become daughter proven. Bovine gestation length is 9 months.)

Figure 3 uses the same data as Figure 2, but the x axis for bulls has been adjusted back by 5 years. Not surprisingly, when this adjustment is made, the cow and bull trends line up very well.

The correlation between NASIS bull Stature ABV (adjusted) and cow Stature ABV by year of birth is 0.98.

If the relationship continues, then over the next 7 years (at least) cows will increase in stature by approximately half an ABV point per year.

Figure 3: Holstein stature – cows and bulls, 55-year trend (adjusted year of birth)



What the genetic trend means for future herds

Australian Holstein cows are expected to become taller over the next five years. Based on recent bull Stature ABV trends, average cow stature is projected to increase by about 0.8 cm between 2025 and 2030 (Appendix 4). This follows an estimated increase of about 0.8 cm between 2010 and 2025.

Cow Stature ABV trends closely follow bull trends, with a lag of about four to five years. This relationship, combined with the relationship between Stature ABVs and classification measurements, provides the basis for the projection shown in Figure 4.

While the projected increase is modest, it is in the opposite direction to the breeding goals of farmers who want smaller cows. The change in individual herds will depend on their breeding decisions and environment.

The level of industry discussion suggests that farmers are still concerned about increasing cow size.

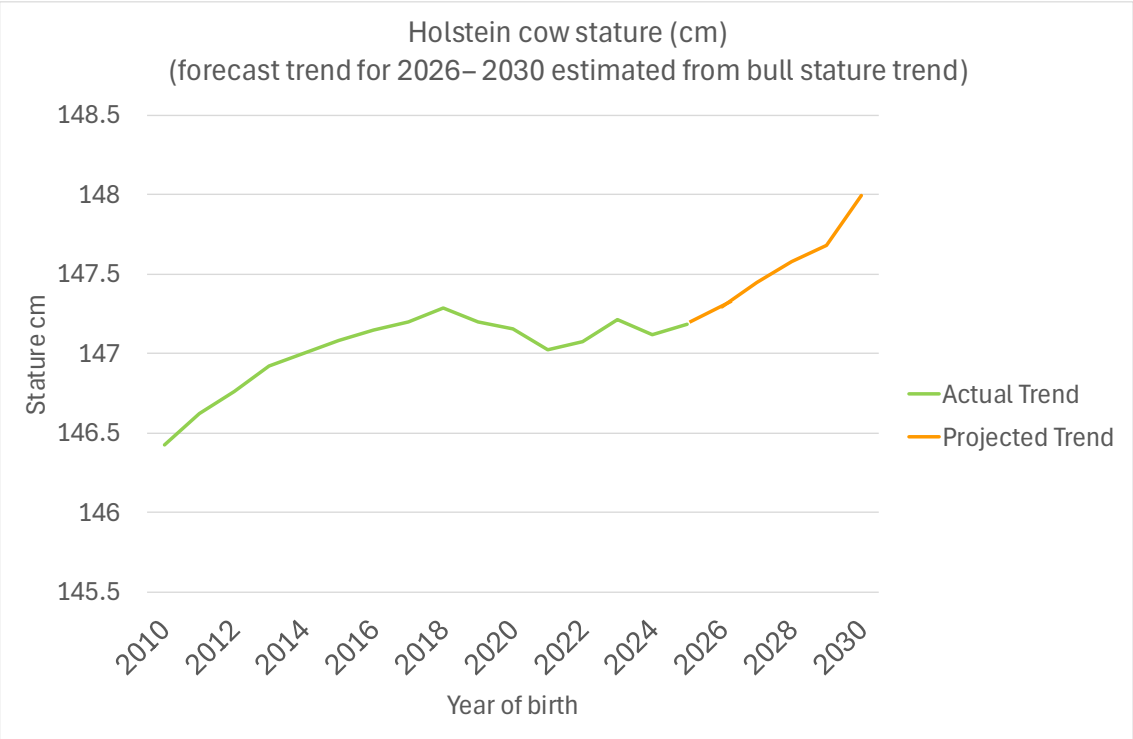
…. Continued over page

Dairy Australia

This document 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. Copyright DataGene Pty Ltd 2026. All rights reserved ©

DataGene Solutions for Herd Development

Figure 4: Holstein cow stature in cm forecast 2026–2030 (estimated from bull stature trends)



Impact of 2025 base change

In December 2025, DataGene adjusted the 'base' in line with ICAR recommendations. This had large implications for Type ABVs, including Stature.

Implementation of the base change resulted in all Stature ABVs increasing by 4.3 ABV points. This has led to a heightened focus on stature as the number of bulls available below the 'magical' 100 point is now significantly less (even though bulls with a Stature ABV of 98 on the old base were unlikely to reduce stature in the average herd).

The reason for this increase is that the base now includes all animals born 2018–2022. Previously, only cows with type phenotypes (classification scores) were included in the base calculation. This created a significant bias as the group of animals in the base was made up of a subpopulation of cows with elite type (registered herds, Ginfo herds and daughters of elite proven bulls). Type ABVs for many animals increased with the new base, as the additional animals now included in the base were of a lower type standard than the old phenotype-dominated base.

Breeding options for reducing stature

Breeding shorter Holstein cows while maintaining progress in production, type and other important traits is challenging.

Bull selection

The obvious approach is to use bulls with lower Stature ABVs. It's not that simple in practice though, because relatively few of the available lower-stature bulls combine the Stature ABVs needed to reduce cow height with the overall breeding values sought by the market (e.g. BPI, production traits).

To reduce cow size by 2 cm in one generation, the bulls selected would need to have a Stature ABV of 94 or less (Appendix 5). Bulls with a Stature ABV of 98 or less would reduce cow size by 1 cm per generation.

There was only one bull in the April 2026 edition of DataGene's Good Bulls Guide with a Stature ABV of less than 94; and only 17 of the 452 bulls in that edition had a Stature ABV of 98 or less.

Dairy Australia

This document 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. Copyright DataGene Pty Ltd 2026. All rights reserved ©

DataGene Solutions for Herd Development

Bull companies

The growing demand for shorter cows does not readily translate into a wide choice of commercially attractive bulls. The challenge for bull companies and sire analysts is finding bulls with lower Stature ABVs that also meet market expectations for BPI, production and type.

Where bull companies require bulls to meet minimum Overall Type and Mammary System ABVs, the positive associations of these traits with Stature can limit the choice of lower-stature bulls (Appendix 6).

An analysis of DataVat records (April 2026) illustrates this constraint. Bulls with Stature ABVs of less than 100 represented just 13% (577) of the 4,287 genomically tested Holstein bulls born in 2025 and 2026. These bulls had lower average BPI and Overall Type ABVs, with the lowest averages among bulls with Stature ABVs below 95 (Appendix 7).

However, an ABV below 100 is not a universal requirement for reducing stature: the relevant comparison is with the Stature ABVs of the cows being joined.

Cows

Knowing the Stature ABVs of the cows being joined helps breeders assess whether a bull is likely to reduce or increase the stature of their replacements. Genomic testing provides a reliable estimate of a cow's genetic merit for stature, even before she is fully grown.

Breaking the link

Stature will continue to increase in Holsteins while Overall Type continues to be calculated from the Holstein breed society classification score. This is partly because the ideal linear score for Stature in Holsteins is a linear score of 6, 7 or 8 (2-year-olds measuring between 146 and 150.5 cm).

DataGene has set up a Type working group to explore calculating type composites (Overall Type, Mammary System, Dairy Strength, Rump and Feet & Legs) from the component ABVs. This work is considering desirable trends as well as accounting for intermediate optimums. An alternative index would need to put enough downward selection pressure on stature that it overcomes the strong positive correlation with other key traits.

The US approach

Increasing stature has also been identified as a problem in US Holsteins. US Holstein genetics and the associated trait trends have a large effect on the Australian and global populations.

Holstein USA recently launched the Holstein Conformation Composite (HCC). It is designed to emphasise intermediate optimum values for key traits that support long-term functionality by promoting moderate frame size, balanced udders built for longevity and production potential, and sound feet and legs. The HCC favours lower values for stature, and stature has a relatively heavy weighting to overcome the positive correlations with other traits to change the traits' genetic and phenotypic direction.

References

Graham, J. and Bewley, J. (2026) About the Holstein Conformation Composite. Holstein Association USA website.

Wu, X.L., Horn, A., Nicolazzi, E. and Cole, J.B. (2026). Cattle grow taller: Implications of outdated ordinal scores for genetic evaluations and selection? JDS Communications, 7(3), 349–354. https://doi.org/10.3168/jdsc.2025-0930

More information

Peter Thurn
DataGene Stakeholder Relations Specialist
M: +61 417 575 986 | E: pthurn@datagene.com.au

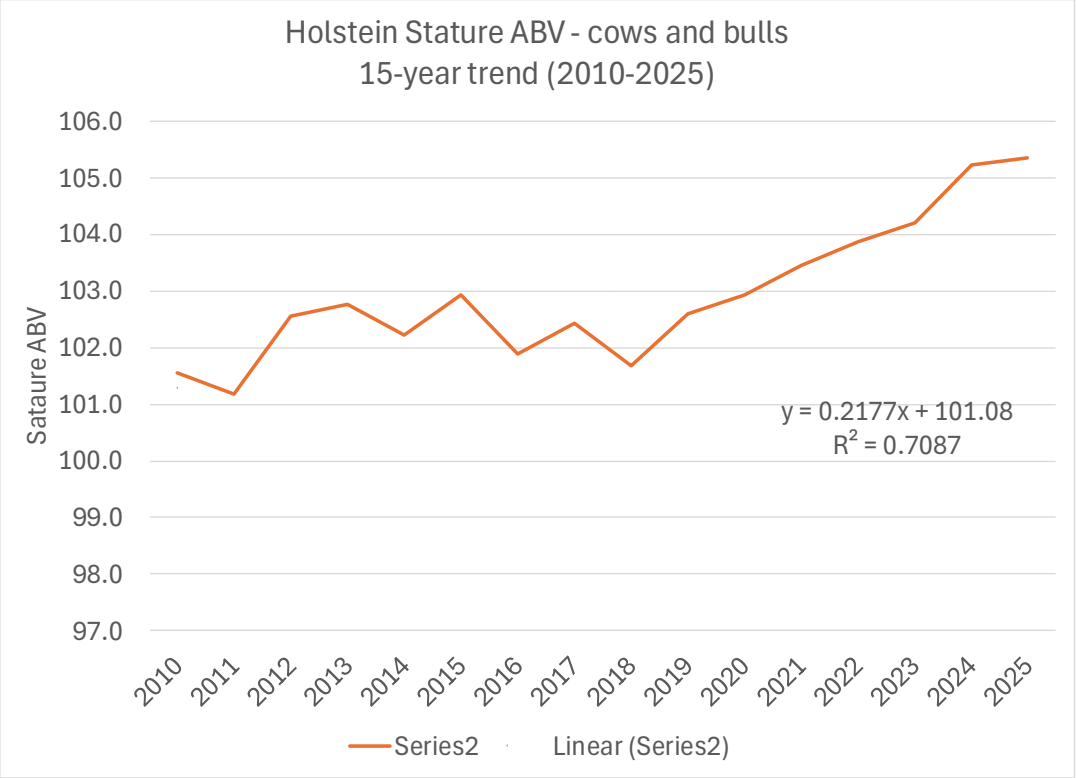
Dairy Australia

This document 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. Copyright DataGene Pty Ltd 2026. All rights reserved ©

DataGene Solutions for Herd Development

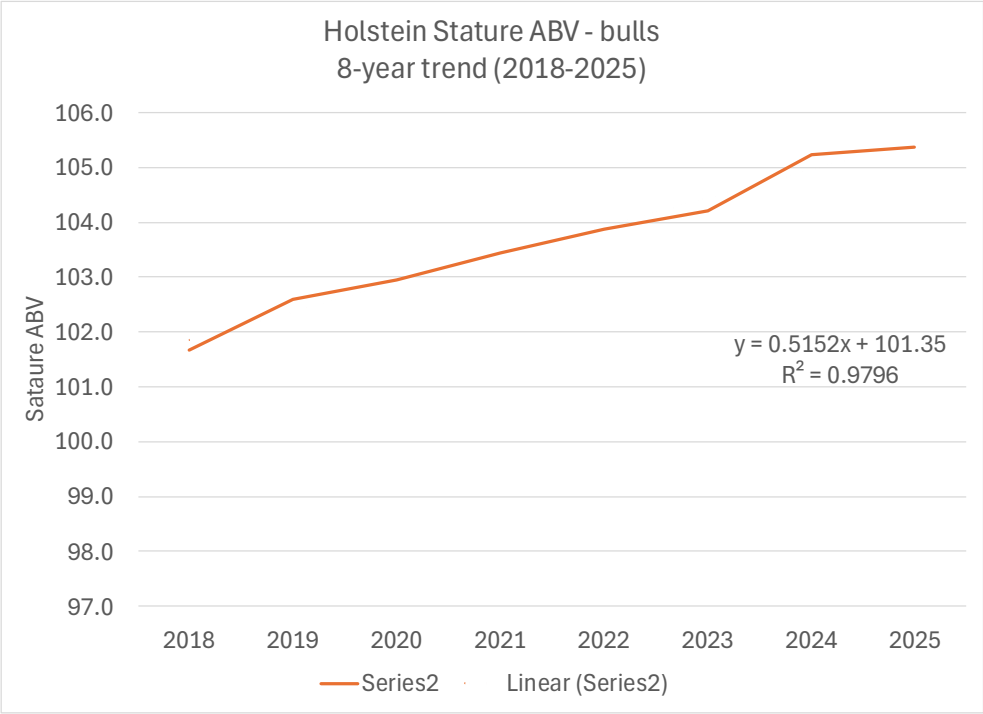
Appendix 1: Holstein Stature ABV – cows and bulls, 15-year trend

Figure 5: Holstein Stature ABV – cows and bulls, 15-year trend (2010-2025)



Appendix 2: Holstein Stature ABV – bulls, 8-year trend

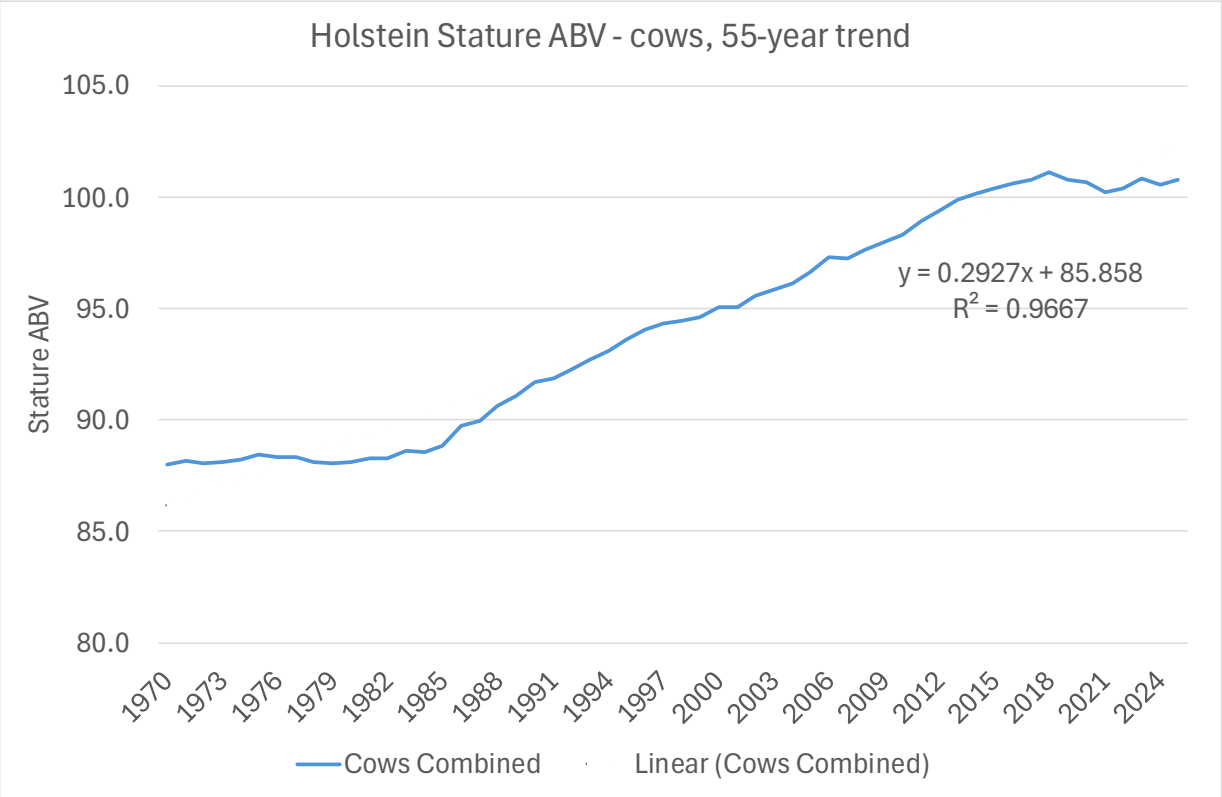
Figure 6: Holstein Stature ABV – bulls, 8-year trend (2018–2025)



This document 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. Copyright DataGene Pty Ltd 2026. All rights reserved ©

Appendix 3: Holstein Stature ABV – cows: 55-year trend

Figure 7: Holstein Stature ABV – cows: 55-year trend (1970–2025)



Appendix 4: Estimating cow height from Stature ABVs

Holstein Australia's linear stature scores provide the observed cow measurements (phenotypes) used in the calculation of Stature ABVs.

Height ranges for junior and senior two-year-old cows were used to estimate an average height for each linear score. These estimates were then aligned with Stature ABVs.

To project cow height from 2026 to 2030, the estimated relationship between Stature ABV and height was combined with the historical relationship between bull and cow Stature ABV trends. The projection assumes that the relationship between bull and cow trends continues.

Holstein Australia provided tables for junior and senior 2-year-olds that relate stature measurements in cm to the linear type scores (1 to 9 scale) that are used in ABV calculation. Each score has a range in cm, so for the purposes of this work, the midpoint was used to represent the linear score. The scores for the junior and senior 2-year-olds were averaged to represent the average 2-year-old (combined midpoint). See Table 2 (over page).

The recent work on Intermediate optimum type traits identified the relationship between the linear score (1 to 9 scale) and Stature ABV. To this, the combined midpoint from Table 2 (stature cm in the table below) has been aligned with the ABV and linear score. Table 3 (over page) shows this.

Dairy Australia

This document 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. Copyright DataGene Pty Ltd 2026. All rights reserved ©

DataGene Solutions for Herd Development

Table 2: Height ranges for linear classification scores for Holstein stature

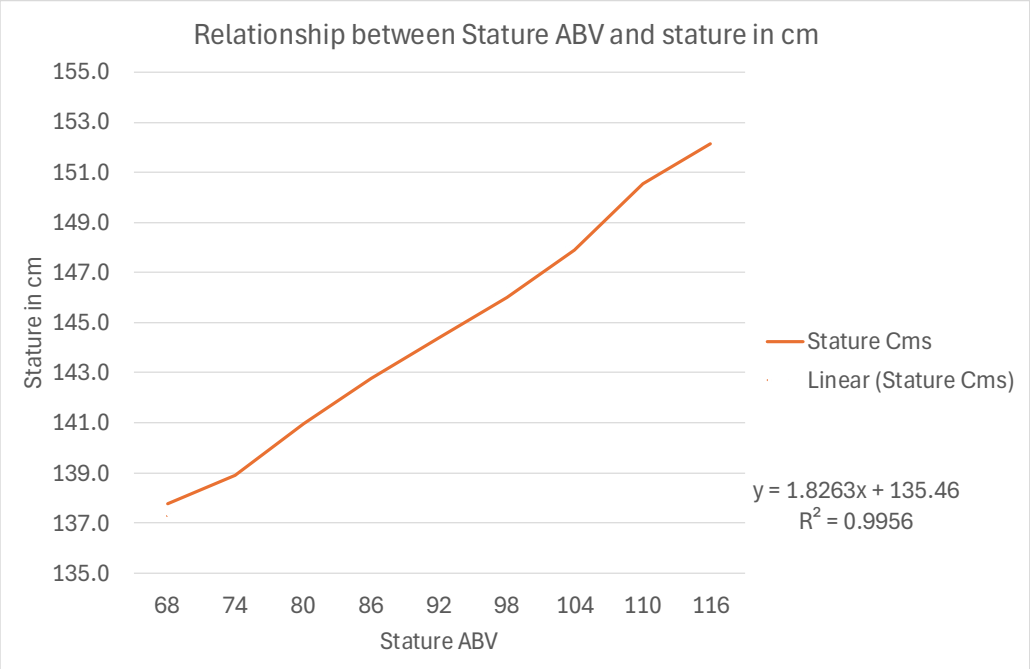
Linear Score	Jnr 2 cm min	Jnr 2 cm max	Jnr 2 midpoint	Snr 2 cm min	Snr 2 cm max	Snr 2 midpoint	Combined midpoint
1		137.3	137.3		138.2	138.2	**137.8**
2	137.4	139.5	138.5	138.3	140.4	139.4	**138.9**
3	139.6	141.4	140.5	140.5	142.3	141.4	**141.0**
4	141.5	143.1	142.3	142.4	144.0	143.2	**142.8**
5	143.2	144.7	144.0	144.1	145.6	144.9	**144.4**
6	144.8	146.3	145.6	145.7	147.2	146.5	**146.0**
7	146.4	148.5	147.5	147.3	149.3	148.3	**147.9**
8	148.6	151.6	150.1	149.4	152.5	151.0	**150.5**
9	151.7		151.7	152.6		152.6	**152.2**

Table 3: Stature ABVs translated into stature in centimetres

Stature ABV	68	74	80	86	92	98	104	110	116
Linear score	1	2	3	4	5	6	7	8	9
Stature (cm)	137.8	138.9	141.0	142.8	144.4	146.0	147.9	150.5	152.2

Figure 8 shows the relationship between Stature ABV points and stature in cm. With a correlation of 0.99, the cow trend can be confidently extrapolated to estimate future cow stature.

Figure 8: Relationship between Stature ABV and stature (cm), Holstein bulls



The NASIS bull trend for Stature ABV can be used to estimate what will happen to cow stature in the next 5 years. The following support this approach:

- Table 2 and Figure 8 above.
- The high (0.98) correlation between NASIS Bull Stature ABV (adjusted by 5 years) and Cow Stature ABV by year of birth.
- The high (0.99) correlation between Stature ABV and stature in cm.

Dairy Australia

This document 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. Copyright DataGene Pty Ltd 2026. All rights reserved ©

DataGene Solutions for Herd Development

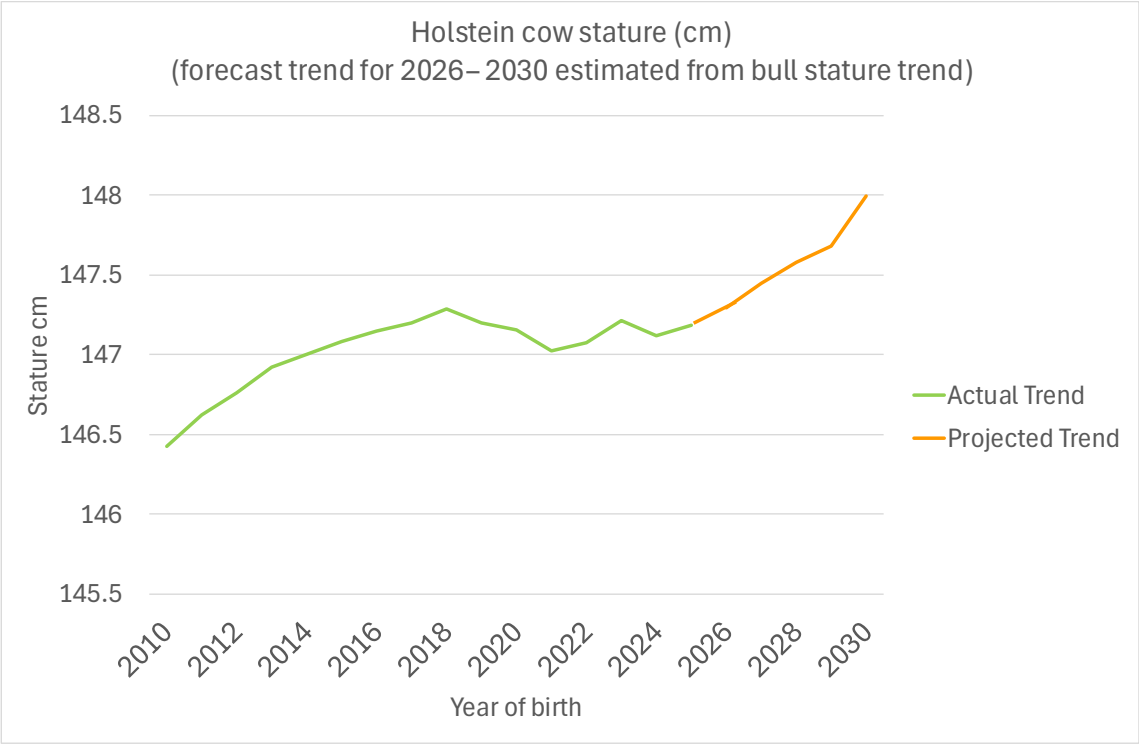
Figure 9 shows the trend for cow stature in cm. The trend for 2026–2030 has been estimated from the bull Stature ABV trend.

DataGene's analysis indicates the following trends in cow stature.

- 2010–2025: cow stature increased by about 0.76 cm.
- 2018–2025: cow stature essentially flatlined.
- 2026–2030: cow stature is forecast to increase by almost 1 cm (0.81 cm) This will represent an increase in stature of 1.6 cm since 2010.

While the forecast increase appears to be modest at best, the trend is still a concern given farmers are wanting to reduce stature. Industry conversations about the increase in cow size and stature, indicate the issue is bigger than the forecast increases might imply.

Figure 9: Cow stature (cm) trend, projected 2026–2030



Appendix 5: What Stature ABV will reduce cow height in the next generation?

It is always difficult to equate genotype (ABV points) to phenotype (cm) because the individual herd environment influences how breeding values translate to observed performance.

Each Stature ABV point represents about 0.31 cm. This analysis estimates that cows born in 2025 will have an average stature of 147.2 cm which equates to 100.8 ABV points. To reduce cow size by 2 cm in one generation, the bulls used would need to have an ABV for Stature of 94 or less.

Appendix 6: Relationship between stature and other important traits

Many of the traits that make bulls attractive in the market are positively correlated with stature. Production yield traits, Overall Type, Mammary System and even BPI all show positive correlations with stature. Figure 10 (over page) shows the relationship between Stature ABV and Overall Type ABV while Table 4 shows the correlations and the rate of change in Stature for a 1 unit increase in the relevant ABV or index.

Dairy Australia

This document 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. Copyright DataGene Pty Ltd 2026. All rights reserved ©

DataGene Solutions for Herd Development

Figure 10: Relationship between Stature and Overall Type ABVs in Holstein bulls

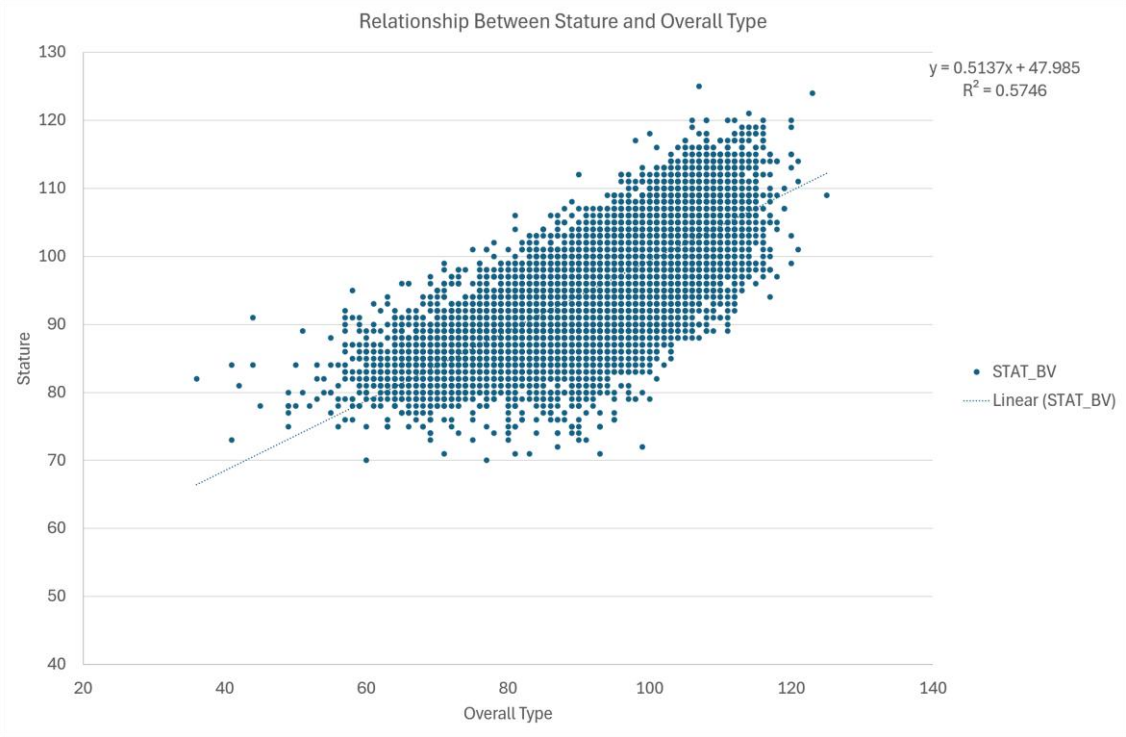


Table 4: Correlations and the rate of change in stature for a 1 unit increase in the relevant ABV or index.

Trait	Stature change per unit increase	Correlation
BPI	0.011	0.524
Protein ABV	0.257	0.522
ASI	0.18	0.463
Overall Type ABV	0.514	0.758
Mammary System ABV	0.606	0.77
Survival ABV	0.592	0.398
Fertility ABV	-0.223	0.196

The strong relationships of Overall Type and Mammary System with Stature have implications for bull selection, given the market's use of independent culling thresholds for these traits. For each unit change in Overall Type, Stature increases by 0.514 points. For each 100 points of change in BPI, stature increases by 1 unit.

Another way of thinking about this is bulls that are 800 BPI are likely to be 3 Stature ABV points higher than those at 500 BPI. It is becoming increasingly difficult for bull companies to find bulls that will lower stature, that have marketable breeding values for other important traits such as BPI, yield traits and key type composites.

Dairy Australia

This document 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. Copyright DataGene Pty Ltd 2026. All rights reserved ©

DataGene Solutions for Herd Development

Appendix 7: Bull selection options in DataVat analysis

Finding bulls that combine lower Stature ABVs with commercially competitive BPI and type ABVs is a challenge for bull companies. To examine the available selection pool, DataVat records were analysed for 4,287 genomically tested Holstein bulls born in 2025 and 2026, using breeding values from [insert evaluation date].

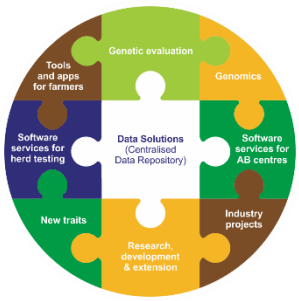
Table 5 groups these bulls by Stature ABV and shows the number, average BPI and average Overall Type ABV in each group.

Table 5: Bulls grouped by Stature ABV

Stature Range	Number	BPI Av	Overall Type Av
<95	51	203	95
95-99	526	489	99.5
>100	3,710	505	100.8

Only 13% (577 out of 4,287) of bulls have Stature ABVs less than 100 and these bulls generally have lower Overall Type and BPI, meaning that they are less likely to be selected by bull companies as marketable options. The absolute best options to reduce stature (<95 Stature) are extremely unlikely to be selected due to their poor BPI and Overall Type.

These results illustrate the limited pool of bulls with very low Stature ABVs and the challenge of meeting other breeding priorities. However, group averages do not describe every bull, and an ABV below 100 is not a universal requirement for reducing stature. A bull's potential to reduce stature depends on how its Stature ABV compares with those of the cows being joined.



About DataGene

DataGene is an independent and industry-owned organisation responsible for driving genetic gain and herd improvement in the Australian dairy industry. DataGene performs pre-competitive herd improvement functions such as genetic evaluation, herd testing and herd improvement software development and data systems. DataGene is a Dairy Australia and industry collaboration. www.datagene.com.au Ph 1800 841 848
E: enquiries@datagene.com.au

Dairy Australia

This document 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. Copyright DataGene Pty Ltd 2026. All rights reserved ©

DataGene Solutions for Herd Development