National Breeding Objective review 2025

2024/25 review recommendations

Key recommendations to industry

1. All indices and all breeds
   To reflect changes in the market, update pricing for milk components and input costs. Specifically, this means:
   - Changing the protein:fat ratio from 2:1 to close to 1:1.
   - Updating feed costs but keeping the same ratio with milk.
   - Shifting to using forecast milk prices.
2. Health Weighted Index
   Enhance to better reflect the needs of seasonal herds with pasture-based systems by adding calving ease and gestation length.
3. The base (the average animal for breeding values)
   Update in line with international best practice (Interbull).
4. Potential new breeding indices
   Further investigate the value to industry of an index specifically for hotter regions and one for total mixed ration (TMR) operations.
5. Communication
   Consider activities to improve industry understanding of the Feed Saved ABV and breeding strategies to increase teat length and improve rear teat placement.

National Breeding Objective review

The National Breeding Objective (NBO) describes an agreed group of desirable traits, providing breeding direction for both bull and cow breeding across the country. Australia's NBO is aimed at increasing net farm profit. It is expressed through the three breeding indices – Balanced Performance Index (BPI), Health Weighted Index (HWI) and Sustainability Index (SI).

The NBO is reviewed every five years, to ensure it keeps pace with the evolving needs of dairy businesses, new knowledge and breeding technologies. The purpose of the 2024/25 NBO review is:

- To check that the National Breeding Objective as expressed through the BPI reflects farmer needs for breeding sustainable and profitable herds over the next 10 years.
- To develop indices based on scientific principles which are in line with farmer preferences and meet the agreed NBO.
- To inform the future direction of research priorities.

Review process

The NBO review is overseen by DataGene's Genetic Evaluation Standing Committee who determine the key themes for the review. The process for the 2025 NBO review involves three main stages:

- Consultation – identify industry needs and discuss proposed options (May – October 24 and Mar-June 25)
- Analysis and development of options (May – Jan 25)
- Implementation (build and test) – changes to the genetic evaluation system (July – Dec 25) for rollout with the December 2025 ABV release.

Read about the findings from 2024 industry consultation.

Balanced Performance Index (BPI)

The BPI is an economic index based on input costs and farmgate returns for milk and stock. Milk price is a vital component of the analysis. If the relative price paid for protein to fat changes, then it is appropriate for breeding indices to reflect this.

An analysis was conducted of 10-year trends of the relative value of protein (using skim milk powder) and fat (using butter). The protein:fat ratio was projected to 2034-35 and compared to the median value in the past 10 years.

The cost of the extra feed to produce additional milk solids is important to achieving gains in income over feed and herd costs. The analysis also updated feed costs, in line with rising milk prices.

The analysis concluded that milk price and feed costs were likely to see a step change increase over the next decade.

Recommendations:

- Update milk prices and change the protein:fat ratio from 2:1 to close to 1:1.
- Update the feed costs but keep same ratio with milk.
- Retain feed saved at half its actual value.

Apart from updating milk component pricing and input costs, the proposed BPI is unchanged.

Expected responses (compared to current BPI):

- Holstein: faster genetic gains for fat, survival and cell count; slower gain for protein and similar gain for fertility.
- Jersey: faster genetic gain for fat, fertility and cell count.

Health Weighted Index (HWI)

The Health Weighted Index was designed to fast-track fertility, mastitis resistance and feed saved. It was modelled on a seasonal calving system. The 2024 NBO consultation identified a desire for an index further customised for seasonal calving herds with grazing systems. Focusing specifically on the needs of pasture-based, strictly seasonal calving systems, the investigation included additional traits such as calving ease and gestation length and removed some type traits.

Recommendations:

- Broaden HWI to include calving ease and gestation length.
- Retain mammary system and feed saved at full weight.

Expected response (compared to current HWI):

- Holstein: faster genetic gain for fat, protein, survival, cell count, calving ease and gestation length; and similar gain for fertility.
- Jersey: faster genetic gain for fat, fertility, gestation length, cell count and mastitis resistance.

Sustainability Index (SI)

Introduced in 2022, the Sustainability Index fast tracks genetic gain for lower emissions intensity while continuing to make gains for important economic traits.

Recommendations:

- Update milk prices and change the protein:fat ratio from 2:1 to close to 1:1.
- Update the feed costs but keep same ratio with milk.
- Apart from updating milk component pricing and input costs, the proposed Sustainability Index is unchanged.

Expected response (compared to current SI):

- Holstein: faster genetic gain for fat, survival, cell count and mastitis resistance; Slower increase in protein.
- Jersey: faster genetic gain for fat, fertility, cell count and mastitis resistance; slower increase in protein.

Base

Australian Breeding Values and indices are relative measures, meaning they only make sense when compared to each other, or a group of animals, to which all are compared. The Australian base is defined as the cows of the same breed that were born in a particular time period and is updated periodically. Read more.

There are two benefits from a base change:

- animals are compared to a more contemporary group of cows
- the Australian method of updating the base will be in line with international best practice

Recommendation:

- Update the base using a methodology in line with Interbull recommendations.

Expected response:

- The numerical value of all ABVs will change equally but animal rankings will not be affected by updating the base.

Options for further investigation

The consultation phase identified some interest in two potential new indices – one for herds in hot regions and one customised for herds with total mixed ration (TMR) systems.

Index for hot regions

Stakeholders expressed interest in an index for hot regions that included the Heat Tolerance ABV. However, the low reliability of the Heat Tolerance ABV

and the unfavourable relationship with production would compromise genetic gain for production. We investigated a potential index that included heat tolerance at half its economic weight and increased weighting for clinical mastitis, cell count and overall type to better reflect the breeding needs of herds in hot regions.

Recommendation: further investigate the value to industry of an index for hot regions.

TMR index

We investigated a potential TMR index which was highly correlated with the BPI (0.98) but had enough re-ranking among top sires to justify potential implementation. However the value to industry is unclear as there was mixed feedback, and the consultation phase also gave the strong message to "keep things simple."

Recommendation: further investigate the value to industry of a TMR-specific index.

What the new indices look like

The charts on the following pages provide some insights into what the new indices look like. Here are some key points that they illustrate.

Figures 1-3: The response to selection based on each index are shown in Figures 1-3. These figures illustrate the expected impact over time if breeding decisions are focused on each of the recommended indices (BPI, HWI, SI) in Holsteins. All indices have more emphasis on fat than the current indices.

Figure 4: Trait contributions to indices are shown in Figure 4. This is a way of describing the relative emphasis of each trait group within each index. Note that HWI now includes gestation length and calving ease. The emphasis on production, survival and feed saved is highest in the Sustainability Index. The emphasis on type is highest in the proposed BPI and similar to the current index.

Figure 5: This shows how the main Australian Indices (ASI/APR/BPI) have changed over time. The recommended BPI (2025) has more emphasis on fat and less emphasis on protein (coloured blue) and more on fertility and health traits (green).

Further reading

NBO consultation findings
NBO Options Paper

More information

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Figure 1. Response to selection for Balanced Performance Index (BPI) current and proposed in Holstein cattle

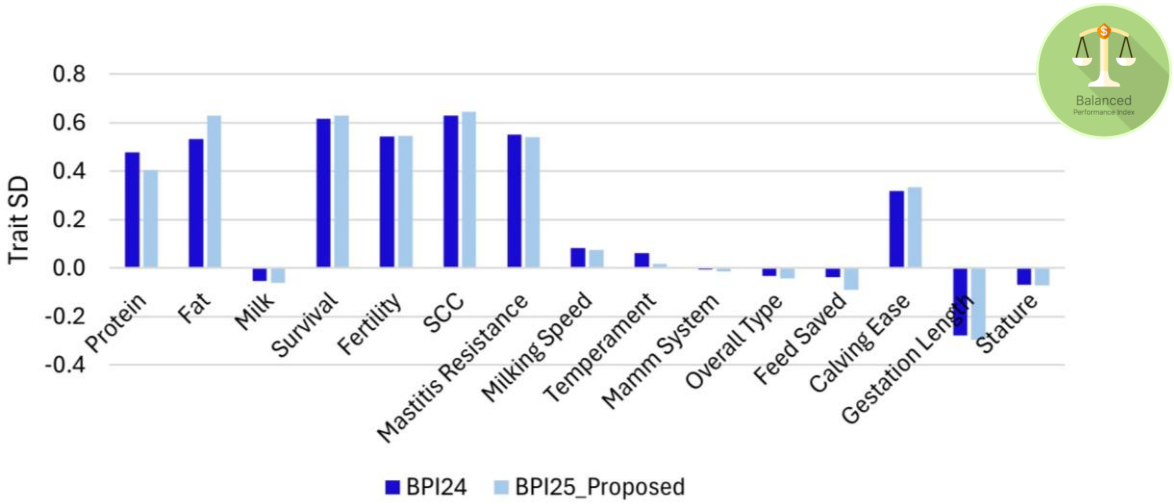

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Figure 2. Response to selection for Health Weighted Index (HWI) current and proposed in Holstein cattle

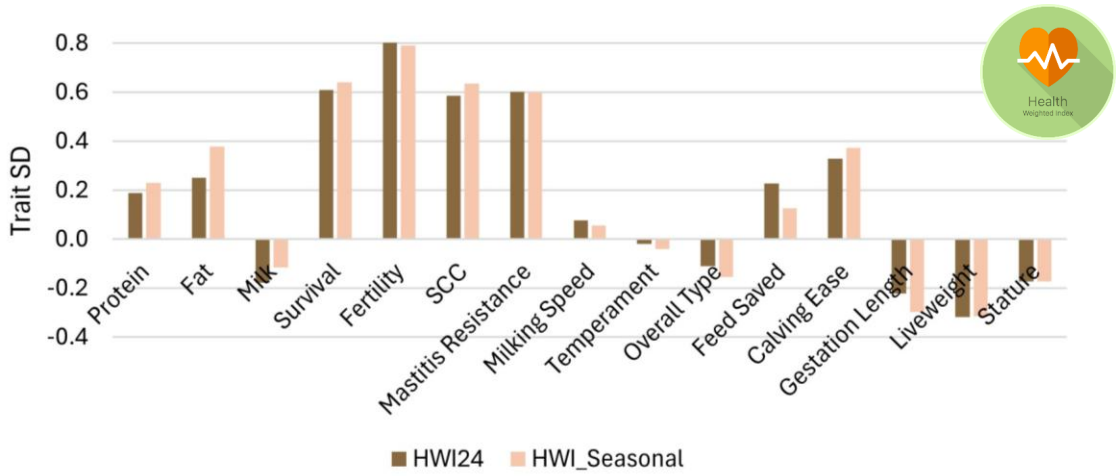

Figure 3. Response to selection for Sustainability Index (SI) current and proposed in Holstein cattle

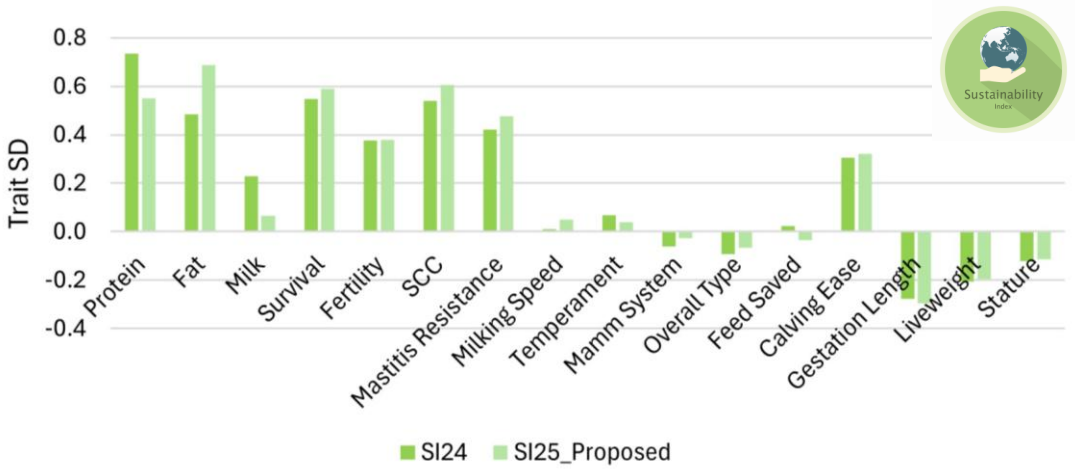

Figure 4. Trait contribution to proposed indices in Holstein cattle

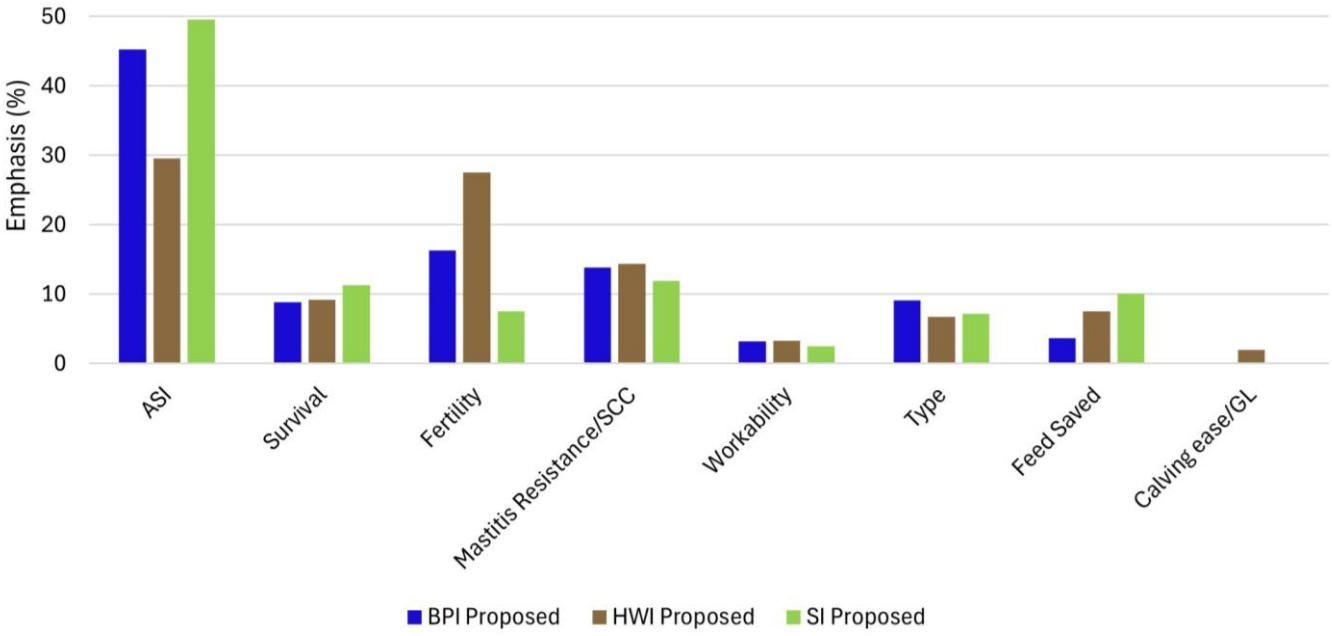

Figure 5. Change in trait contribution in Australia's main indices over time in Holstein cattle