

Australian Selection Index

Technote 31

HIGHLIGHTS

- The Australian Selection Index (ASI) ranks animals on their ability to produce daughters with the most profitable milk solids production.
- The milk volume charge was removed from the ASI in December 2022, in recognition that most major dairy processors had removed the volume charge from their payment structures
- The energy cost to produce a litre of water (containing lactose, etc) has been retained in recognition that more energy is required to produce the same quantity of milk solids by animals that produce higher volumes of milk.

Australian Selection Index

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 and fat.

Traits are weighted according to the way Australian dairy farmers are paid for their milk.

The ASI is expressed in dollars. An ASI of 200 means this animal produces \$200 per year more milk solids than average.

The ASI is included in the BPI and the HWI. For example, if an animal has an ASI of 200 then that is the contribution to the index from production. If that same animal has a BPI of 300 then:

$$\text{BPI } 300 = \text{ASI } \$200 + \$100 \text{ from non-production traits.}$$

The ASI is not included in the Sustainability Index. The Sustainability Index uses a modified production component that has a significantly higher weighting on Protein kgs.

Milk volume penalty

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 2022 to better reflect the current Australian milk pricing system. This was in recognition that most major dairy companies had removed the volume charge from their payment systems.

Table 1: ASI trait weightings (from December 2022)

	Price	Energy cost	Index weight
Protein (\$/kg)	7.26	-0.50	6.76
Fat (\$/kg)	3.63	-1.55	2.08
Milk volume (\$/L)	0.0*	-0.082	-0.082

* Prior to December 2022, the milk volume price weighting was 0.028)

Energy adjustment

The ASI is a net index that accounts for the energy cost to produce a kg of protein, a kg of fat and a litre of water.

Take for example, two bulls, both transmitting 60kg milk solids, made up of 40kg of fat and 20kg protein. Animal A produces the 60kg milk solids with a milk ABV of 500 L while animal B transmits 60kg milk solids with a milk ABV of 1000L. Animal B's daughters require more energy to produce the greater volume of milk carrying the same amount of milk solids. In table 1, this energy penalty is applied to the milk volume component for simplicity.

	Bull A	Bull B
Protein ABV	20	20
Fat ABV	40	40
Milk ABV	500	1000
ASI	177	136

Refer over page for details on December 2022 changes.

2022 review of pricing signals

In 2022, DataGene reviewed the trait weightings in the Australian Selection Index (ASI) to ensure it reflected current milk pricing systems. The review process included a study of current market signals (undertaken by FreshAgenda).

The key findings from the FreshAgenda study were:

- From 2019 onwards, most major dairy companies removed the volume charge from their payment structures.
- Dairy companies indicated they were not intending to reinstate volume charges in the near future.
- There were strong signals to farmers to optimise milk components and this was still a feature of milk supply agreements, despite the removal of volume charges.
- The value of protein in relation to fat had not yet returned to pre-2015 levels, which averaged 2.63. From January 2015 to date the ratio of protein to fat averaged 1.50. Since 2020, the protein to fat ratio improved slightly to 1.74.
- There was a structural shortage of fat in the Australian domestic market which had the potential to increasingly influence the relative pricing of fat to protein in milk supply agreements coming years.

Changes implemented Dec 2022

From December 2022, DataGene has removed the volume charge of $-\$0.028/\text{L}$ of milk out of the milk economic value but retained the energy cost ($-\$0.082$).

In the ASI the economic weight for volume is based on a liquid without any fat and protein. Even if there are no transport costs, a negative weighting on milk ABV will remain because of the energy required for producing the volume.

Animal rankings

An analysis of NASIS bulls for Holstein and Jersey indicated that the expected re-ranking with this change was small, with most bulls falling into the range of plus or minus 14 ASI. In both the Holsteins and the Jerseys, the largest movements were plus or minus 40 ASI. The correlations between the old and new ASIs was greater than 0.99 (see Figures 1 & 2).

Impact on indices

As there is a volume charge component to all three indexes, animal rankings for Balanced Performance Index (BPI), Health Weighted Index (HWI) and Sustainability Index (SI) will also be affected.

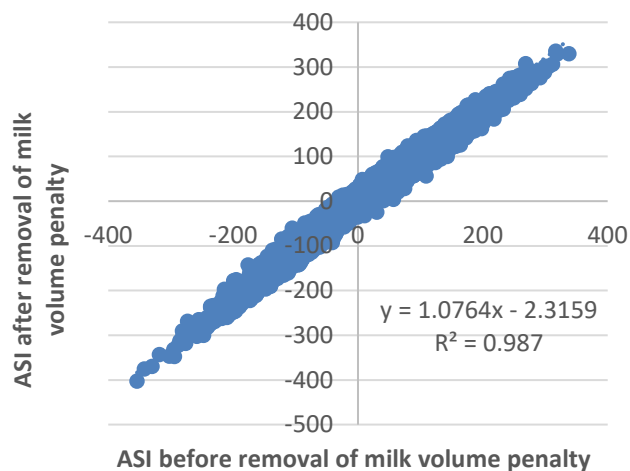


Figure 1: Holstein ASI correlation

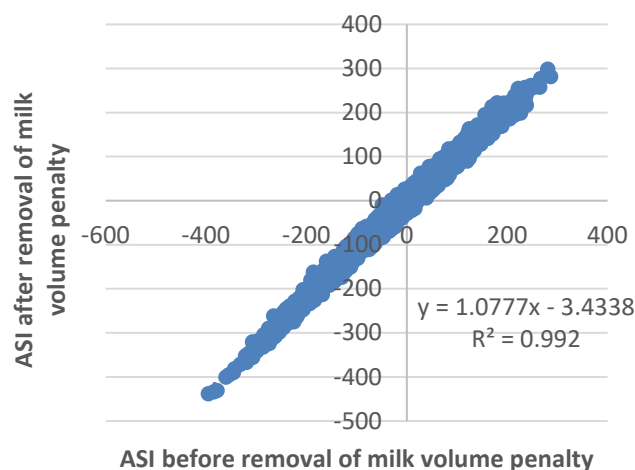


Figure 2: Jersey ASI correlation.

Response to Selection

The removal of the volume charge has had a small impact on the response to selection when any of the three main indices are used. Response to selection for milk and protein kgs has increased slightly while fat kgs is barely affected. Very small changes in other traits have been identified.

Acknowledgement

DataGene is an initiative of Dairy Australia and the herd improvement industry. DairyBio provides the research pipeline to develop and maintain Australian Breeding Values.

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