Breeding for fewer stillborn calves

Technote 33

HIGHLIGHTS

- Stillbirth is the leading cause of calf death.
- Two Australian Breeding Values (ABVs) can be used in breeding programs to reduce early life mortality.
- The Sire Stillbirth ABV predicts the percentage of progeny that are born dead.
- Maternal Stillbirth ABV predicts the percentage of calvings that result in a dead calf.
- To breed for fewer stillbirths, select animals with Stillbirth ABVs less than zero.

Calves that are born dead, or die within the first day of life, are classified as stillbirths. Recent Australian studies report a stillbirth incidence of 5-7%[1,2]. Internationally, incidences as high as 10% have been reported[1]. Stillbirth is the major cause of calf mortality, higher than scours (1%) and respiratory disease (0.5%) in Holstein calves in Australia[2].

Calving is a complex biological process, which means there are many factors that increase the risk of stillbirth. These include:

- Age of the dam – first-calving heifers are at higher risk.
- Calving ease – calves born with difficulty are at higher risk.
- Herd, year and season – there are differences in the incidence of stillbirth between herds, years and seasons
- Breed – Jersey calves are at higher risk.
- Sex – male calves are higher risk than females.
- Twins – are at higher risk.
- Gestation length – either too long or too short increases the risk.
- Hypocalcaemia (milk fever) in the dam – increases risk,
- and other factors[1].

Research has also shown that there is sufficient genetic variation between animals, within a breed, to use Stillbirth ABVs to genetically select for lower risk of stillbirth.

Both calf and cow play a role in a successful calving. The foetus' hormone system signals that parturition is about to begin about 12 days before birth. The dam, and her placenta, respond with a complex dance of hormones and tissue responses as the placenta matures – ready for the big day when calving occurs[3].

This is why, from a breeding perspective, it is important to breed for calves that are born alive (sire stillbirth) and cows that are able to give birth to a live calf (maternal stillbirth). They are two distinct traits that can be included in breeding programs.

While the benefits of lowering stillbirths are clear from the perspective of calf welfare, there are additional welfare and productivity benefits arising from lower maternal stillbirth rates. For example, studies by Bicalho et al[4]., Berry et al.[5], and Eaglen et al.[6], have reported that cows experiencing stillbirths show reduced pregnancy rate, increased days open, and lower milk yield early in the first lactation.

Stillbirth ABVs

The **Sire Stillbirth ABV** predicts the percentage of progeny that are born dead or die within a few hours of birth.

The **Maternal Stillbirth ABV** predicts the percentage of calvings that result in a calf that is born dead or dies shortly after birth.

Breeds

DataGene evaluates stillbirth across all dairy breeds: Holstein, Jersey, Australian Reds, Crossbreds, Brown Swiss, Ayrshire, Illawarra and Guernsey.

Using Stillbirth ABVs

Stillbirth ABVs are reported as a percentage above or below 0 where a lower number means fewer stillborn calves.

To reduce stillbirth rates, select animals with Stillbirth ABVs less than zero.

Most Holstein bulls fall between -2% to +2% for Stillbirth ABVs. The very best bulls are below -4% for Stillbirth ABVs. Most Jersey bulls fall between -1.5% to +1.5%. The very best bulls are below -4% for Stillbirth ABVs.

Dairy Australia

DataGene Solutions for Herd Development

Stillbirth ABVs are not included in any breeding index.

DataGene publishes Stillbirth ABVs in the Good Bulls App and excel spreadsheets, DataVat, and heifer genomic results. Some bull companies may also include Stillbirth ABVs in their catalogues.

Reliability

Reliability is a measure of confidence in an ABV. The reliability of an animal's breeding values improves with age as more information becomes available, for example genomics and daughters' performance records and herd test results.

The reliability of the Sire Stillbirth ABV in a young Holstein genomic bull is about 57%, which is similar to the Daughter Fertility ABV.

The reliability of Maternal Stillbirth is lower – about 52%.

Heritability

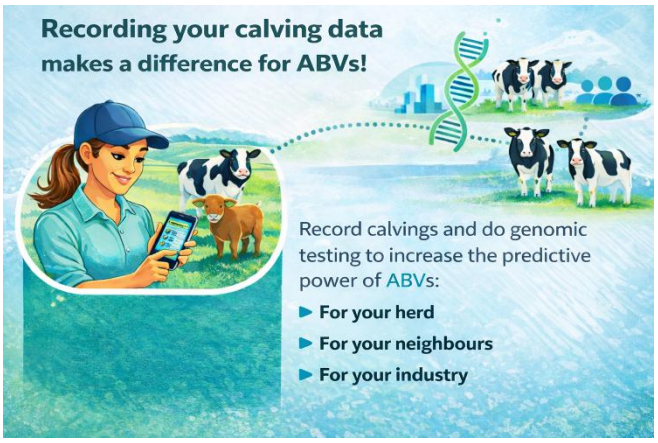
Like many health traits, stillbirth has low heritability (up to 2.4% in Australian breeds)[3], meaning that environmental factors play a large role in the differences observed between animals. However, the coefficient of genetic variation shows that there is still useful genetic variation relative to the average incidence of the trait. This indicates that genetic improvement is achievable through sustained selection.

Multi-trait model

A multi-trait model is used to leverage as much available data as possible to generate high quality genetic predictions for stillbirth traits. The fate of the calf and ease of calving are recorded at the time of calving in herd management software that feeds into DataGene's Centralised Data Repository. These data are used in the multi-trait model. In the statistical model, adjustments are made to account for environmental and management factors such as the herd, year, and season of calving, sex of the calf and parity of the dam.
Over time, the genetic trends for both Sire and Maternal Stillbirth ABV in Holsteins and Jerseys are gradually improving through indirect selection.

Can we do more?

Did you know that your data recording practices can influence the quality of ABVs for **your** herd? By accurately recording all calvings in herd management software and undertaking genomic testing, you make a difference to the predictive power of ABVs for your herds – as well as for your neighbours and friends.



Read more

[1] Axford, M.M., Khansefid, M., Haile-Mariam, M. et al., 2024. Genetic evaluation for stillbirth and preweaning mortality in Australian dairy cattle. Journal of Dairy Science.

[2] Axford, M.M., Khansefid, M., Chamberlain, A.J. et al., 2025. Genetic variation in novel calf traits using a farmer-centred, co-design approach to data collection. Journal of Dairy Science.

[3] Axford, M.M., 2026. Using genomic selection to improve dairy calf health. PhD thesis, La Trobe University, Victoria, Australia.

[4]Bicalho, et al., 2007. Effect of stillbirths on dam survival and reproduction performance in Holstein dairy cows. Journal of Dairy Science.

[5]Berry et al., 2007. Body condition score and body weight effects on dystocia and stillbirths and consequent effects on postcalving performance. Journal of Dairy Science.

[6]Eaglen et al., 2011. Phenotypic effects of calving ease on the subsequent fertility and milk production of dam and calf in UK Holstein-Friesian heifers. Journal of Dairy Science.

Factsheet (a quick read): Stillbirth ABVs

More information

DataGene
Ph 1800 841 848
Email: enquiries@datagene.com.au
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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.

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