



Early onset muscle weakness in Holsteins

What you can do to avoid muscle weakness

- When selecting sires, check their haplotype status with your semen supplier.
- When selecting sires, use inbreeding reports to reduce the risk of mating closely-related animals.
- Report recumbent calves and send tissue samples to DairyBio to contribute to future research.

Early onset muscle weakness is a genetic condition affecting Holsteins where otherwise healthy animals are unable to stand at birth or lose the ability to stand shortly after birth. It's also referred to as calf recumbency and Holstein Muscle Weakness (HMW). At this stage it has not been reported in other dairy breeds.

Calves exhibit muscle weakness, become unthrifty and succumb to secondary health problems such as pneumonia. Most calves do not survive beyond six weeks of age but a few recover. Given the animal welfare considerations, farmers may euthanise affected calves.

The condition was first reported in the scientific literature in 2022 in the USA and cases have been reported in Australia.

Haplotypes

A haplotype is a stretch of DNA (containing one or more genes) that is inherited as a block from a single parent.

Haplotypes may have desirable or undesirable effects on specific traits. For example, there is a haplotype for polledness. However harmful haplotypes tend to receive more interest.

[Read more about haplotypes.](#)

Mutation

A mutation is a change in the DNA sequence which affects the way genes are expressed. Some mutations can be passed on to progeny.

Muscle weakness is thought to be a recent mutation on chromosome 16. In other species, mutations in this region are linked to paralysis.

Cause

Muscle weakness is a genetic defect, caused by a harmful, recessive haplotype – or stretch of DNA (see box).

To be affected, a calf needs to inherit two copies of the recessive haplotype – one from each parent. However, some animals with two copies live apparently normal productive lives, suggesting it is a partially lethal mutation.

Origins

Recent work led by US researcher, Dr Ahmed Al-Khudhair traced the haplotype back to 1952. A key ancestor identified was Southwind (HOUSWA1964484), a popular bull from the 1980s. His descendants Roylane Socra Robust and his son Seagull-Bay Supersire are both known carriers and are sires of influential bloodlines.

Testing

There are two types of testing available. One is a reliable gene test which has been used by bull companies to test their bull teams. The second is a haplotype test that can identify *probable* carriers in genomically tested animals.

Since December 2023, DataGene's counterpart in the US, the [Centre for Dairy Cattle Breeding \(CDCB\)](#), [has included this haplotype in its genetic evaluations](#). CDCB reports animals as either:

- Noncarrier
- Carrier (1 copy of the recessive haplotype)
- Probable carrier
- Homozygous (2 copies of the recessive haplotype)
- Probable homozygous.

Now that tests are available, bull companies are actively working to identify carrier-bulls and we can expect that eventually there won't be many carrier bulls in the market place.

However, in the meantime, farmers should be mindful of carrier animals when making breeding decisions.

Identifying carrier animals in Australia

At the time of publishing, muscle weakness was not reported on DataVat. DataGene is working with bull companies and its counterparts overseas to report this haplotype status as soon as possible.

Contact bull companies for information relating to the haplotype status of individual bulls.

Breeding options

When selecting sires, check their haplotype/genetic defect status with your semen supplier and avoid mating (potential) carriers.

As with all genetic defects, managing inbreeding is important as there will likely be an additional harmful, recessive genes or haplotypes detected over time. Farmers are encouraged to use inbreeding reports to reduce the risk of mating closely-related animals.

Number of Australian cases

It is not known how many cases have occurred in Australia. At this early stage, research progress relies on farmers reporting recumbent calves when they occur and providing tissue samples for genotyping (see below).

Researchers report around 10% carrier frequency in the US herd. It is likely to vary by country depending on the historical use of affected sires.

Help us help you

DairyBio has established a Biobank where samples can be stored to investigate both this defect, as well as others. Sampling packs are available from DataGene for any farmer wanting to submit dead calf samples on an ongoing basis. There is no cost to the farmer and DataGene can supply an applicator, TSU and instructions.

[Order a kit online](#)

More information

DataGene Tech Note: [Harmful haplotypes in dairy cattle](#)

Introduction of HMW – [Joint industry statement \(CDCB, NAAB, Holstein Association USA](#). November 2023

Recumbency in Holstein Calves, [CDCB industry statement April 2023](#)

Understanding recumbency in Holsteins calves: [Genex update \(April 2023\)](#)

Al-Khudhair, A et al (2024) New mutation within a common haplotype is associated with calf muscle weakness in Holsteins, [Journal of Dairy Science, Volume 107, Issue 6, 3768 - 3779](#)

Dechow, C.D et al (2022) Identification of a putative haplotype associated with recumbency in Holstein calves, [Journal of Dairy Science Communications 2022; 3:412–415](#)

Contact us

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