

Dominant Red By Cory Salzl

The AMSS Board of Directors enacted the following policy at the December 2014 Board Meeting in regards to the Dominant Red gene found in Holstein genetics:

Dominate Red Gene Policy: In order to maintain the true color characteristics of the breed, animals who are descendants of parents carrying the Dominant Red gene shall not be allowed to be registered in the herdbook or genetic expansion programs of the AMSS. Descendants of parents carrying the Dominant Red gene shall only be allowed to be registered in the herdbook or genetic expansion programs if proven to be a non-carrier of the Dominant Red gene through an approved DNA test which will be paid by the breeder.

The Dominant Red gene (also sometimes referred to as the Variant Red gene) is not new to North American dairy cattle genetics, but recent research and an increased presence of the gene in the Holstein population has sparked the AMSS Board to take this action preventing the inclusion of this gene in the Milking Shorthorn breed. A Canadian Holstein, Surinam Sheik Rosabel-Red, born on October 21, 1980 is the first documented animal to express this gene. However, it was not until research published in 2013 that identified the exact causal mutation responsible for the Dominant Red gene in Holsteins and confirmed its mode of transmission.

Dominant Red is completely independent of the better-known Recessive Red gene and is located at a different point on the genome. The Dominant Red gene follows an inheritance pattern typical of other dominant traits, such as polled. It is important to note that the Dominant Red form of this gene also will dominate over the traditional red/black gene, so an animal who is expected to be black and white due to the traditional red/black part of the genome will be red and white if it has at least one copy of the Dominant Red gene. See Figures 1.

Figure 1. Possible Dominant Red Genotypes and Associated Phenotypes

Genotype	Phenotype
d d	Black or Red*
D d	Red
D D	Red

d=Non-Dominant Red; D=Dominant Red

* Will express the coat color found on the traditional recessive red/dominant black point on the genome

Since the Dominant Red gene essentially masks the expression of the traditional red/black gene, it could present potential negative implications in the Milking Shorthorn breed. Coat color is an integral part of determining herd book status as well as show-ring and award eligibility. Essentially, a red animal that carries the Dominant Red gene can carry any combination of red or black at the traditional coat color point of the genome. Therefore, a Dominant Red carrier has the potential to produce black offspring even when mated to another red animal. The Dominant Red gene could persist for many generations and as soon as it is not transmitted produce black offspring.

Carriers of the Dominant Red gene are identified on the Holstein Association USA website.

Tested animals are identified with the following codes:

DR0=Not a carrier of the Dominant Red allele

DR1=Carrier of one copy of the Dominant Red allele

DR2=Homozygous or carriers two copies of the Dominant Red allele.

A current list of Registered Holsteins sires carrying the Dominant Red allele (DR1 or DR2) is being developed and will be posted on the AMSS website.

Visit the Red & White Dairy Cattle Association website for more information on gene inheritance and some additional history on the Dominant Red gene.

There are currently no known carriers of the Dominant Red gene in the Milking Shorthorn breed. With the importance of coat color and preserving the breed character of the red, white and roan – the AMSS Board of Directors and the Genetics Committee felt it was in the best interest of the breed to prevent this gene from being brought into our herdbook.