



A2 (Beta Casein) Reports Now Available!

February 7, 2022

Lactanet recently introduced its new on-line A2 (Beta Casein) reports that include a *Herd Summary* and *Animal Summary* that reflect the current profile of your herd for the various genotypes of beta casein, more commonly known as A2. These reports are exclusively provided to Lactanet customers enrolled on our milk recording services and include herdbook registered females that are known to be part of your herd inventory, regardless of breed.

What is Beta Casein?

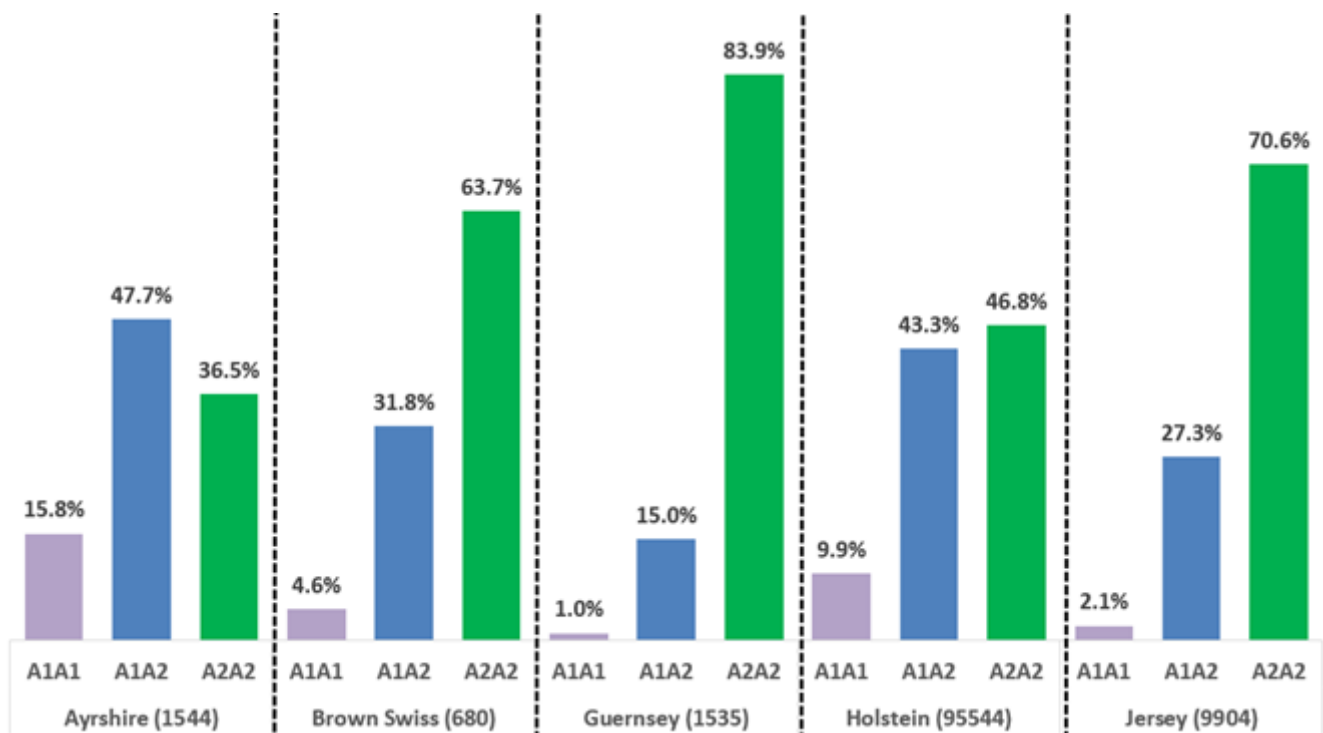
Beta casein is a protein that represents $\approx 30\%$ of all milk proteins. There are two forms of beta casein, namely A1 and A2 and they differ by only one of the 224 amino acids that make up beta casein. Some research has indicated that the digestibility of dairy products is improved with A2 beta casein proteins compared to A1.

The Genetics of A2

Animals of any dairy breed can have their DNA tested to identify their beta casein genotype based on the transmission of the A1 and/or A2 forms from their parents. This A2 gene testing is easily done at the same time as genotyping for a genomic evaluation. The possible beta casein genotypes are A2A2, A1A2 or A1A1 and the proportion of each within a breed is dependent upon the frequency of the A1 and A2 genes in that population. The Lactanet Genetics database has been receiving beta casein (A2) gene test results for several years from A.I. companies, breed associations, and international sources.

Figure 1 shows the frequency of each A2 genotype by breed as estimated using the gene test results currently available, with the count of animals indicated in brackets.

Figure 1: Estimated frequency of A2 genotypes by breed



New A2 Herd and Animal Reports

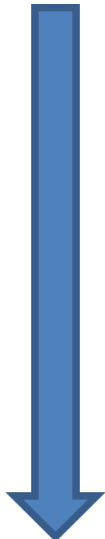
Given the growing rate of A2 testing among females genotyped in Canada and the increasing interest in A2A2 sires, Lactanet developed a new reporting service for our customers. The *A2 Herd Summary* and *A2 Animal Summary* reports are accessible via the [MySite section](#) of the Lactanet website for each herd on milk recording. These reports are based on registered animals in the DHI herd inventory and includes a herd profile report and an animal report by A2 genotype category.

National benchmarks are based on all registered females included in the inventory of all herds enrolled on Lactanet milk recording services. The goal is to provide Canadian producers with an overview of the A2 status of their herd and animals.

A2 Genotype Categories

Lactanet geneticists developed an advanced calculation of probabilities based on actual A2 gene test results and all available pedigree data to assess the most likely A2 genotype of each female in your herd.

Your herd inventory is divided into three groups, namely Cows (lactating or dry), Yearlings (heifers over 12 months) and Heifers (12 months of age and under). For each age category, counts and percentages are presented for seven A2 genotype groups as follows:

Known A2A2	Gene test of A2A2 or both parents have an A2A2 genotype (100% probability based on pedigree)	Decreasing likelihood of producing A2 Milk 
Most Likely A2A2	Probability of 75% to 99% of A2A2 genotype	
Likely a Carrier of A2	A2A2 genotype probability <75% but probability of carrying at least one copy of the A2 gene exceeds 50%	
Known or Likely A1A2	Gene test of A1A2 or ≥75% probability of A1A2 genotype	
Likely a Carrier of A1	A1A2 genotype probability <75% but probability of carrying at least one copy of the A1 gene exceeds 50%	
Known or Likely A1A1	Gene test of A1A1 or ≥75% probability of A1A1 genotype	
Insufficient Information	Not enough data available (i.e.: pedigree and/or A2 gene test results)	

How to Use the A2 Genotype Reports

An example of the *A2 Genotype Herd Summary* is provided in Figure 2. The top section provides herd statistics compared to national benchmarks within each of the three animal age groups and the bottom section is a visual representation of the proportion of animals in each group across the seven A2 genotype categories. For producers aiming to increase the percentage of A2A2 genotypes in their herd an increased trend should be seen from Cows to Yearlings to Heifers for the first two A2 categories that include known or most likely A2A2 females.

The value of these reports will vary significantly from herd to herd. Minimally, the *Herd Summary* will provide you with an overall profile of

your herd status and the evolution of the various A2 genotype groups across the three age categories. For herd owners interested in increasing the frequency of A2A2 genotype in their herd, the *Animal Summary* report provides the best indication of which females are most likely to be A2A2 or to produce daughters that may be.

Some herd owners are interested in having a complete herd of A2A2 animals so they may qualify to produce “A2 Milk”. This goal is possible to achieve over time by selection of sires that have the A2A2 or A1A2 genotypes. The [Genetics section](#) of the Lactanet web site provides group query tools that allows you to filter sires by their A2 genotype, which is also a feature of the [Compass software](#) freely available to producers across Canada.

Figure 2: Example of the A2 Genotype Herd Summary

A2 (BETA CASEIN) GENOTYPE HERD SUMMARY



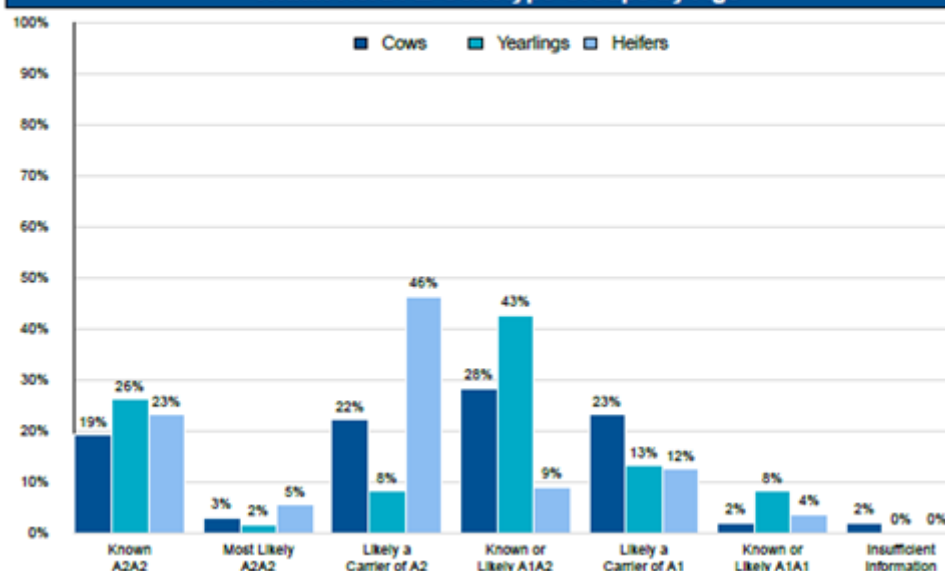
HERD NAME:
DHI HERD ID:

REPORT DATE: 2022-02-02

	Cows (Lactating & Dry)			Yearlings (> 12 Months)			Heifers (< 12 Months)		
	Herd*		Canada	Herd*		Canada	Herd*		Canada
	No.	%	%	No.	%	%	No.	%	%
A2 Genotype Group:									
Known A2A2	19	19.2%	1.1%	16	26.2%	2.3%	13	23.2%	2.2%
Most Likely A2A2	3	3.0%	4.9%	1	1.6%	8.3%	3	5.4%	9.8%
A2A2 Sub-Total:	22	22.2%	6.0%	17	27.9%	10.5%	16	28.6%	12.0%
Likely a Carrier of A2	22	22.2%	52.9%	5	8.2%	56.8%	26	46.4%	58.2%
Known or Likely A1A2	28	28.3%	3.7%	26	42.6%	4.5%	5	8.9%	4.3%
Likely a Carrier of A1	23	23.2%	20.6%	8	13.1%	17.9%	7	12.5%	17.2%
Known or Likely A1A1	2	2.0%	0.5%	5	8.2%	0.6%	2	3.6%	0.6%
Insufficient Information	2	2.0%	16.4%	0	0.0%	9.7%	0	0.0%	7.8%
Total for Herd*:	99			61			56		

* Based on herdbook registered females included in the DHI herd inventory at your most recent test day.

Within Herd A2 Genotype Groups by Age



Summary

Beta casein A2 testing is gaining producer interest and marketing and selection of A2A2 sires is also growing. In response to these growing trends, Lactanet now offers its A2 Genotype reports that includes a Herd Summary and Animal Summary that is freely available to Lactanet DHI customers via their [MySite account](#). These reports provide herd owners with an overall profile of their herd status, broken down into three age groups and seven possible A2 genotype categories, as well as a complete

list of animals within each A2 category.

Producers interested in increasing the frequency of A2A2 cows in their herd can do so by the preferred use of A2A2 or A1A2 sires, which can easily be identified using filtering features of the [Group Query tool](#) on the Lactanet web site or in [Compass](#) as a freely available genetic herd management software.



By Brian Van Doormaal

Brian has dedicated his professional career of nearly 37 years involved in the genetic improvement of dairy cattle in Canada. He is well-known for his numerous extension articles and public speaking engagements in both official languages.