



Milk Caseins: Updated Genotype Frequencies by Breed

- November 21, 2025

Since our [last milk casein update in 2022](#), the Lactanet Genetics database has received significantly more Beta Casein and Kappa Casein gene test results from A.I. companies, breed associations, and international sources. Here we provide updated genotype frequencies by breed, offering insights into selection strategies for milk digestibility and cheese yield.

Beta Casein (A2)

Beta Casein is a major protein found in cow's milk and exists in two forms, A1 and A2. Figure 1 shows the updated frequency of each Beta Casein genotype by breed, with the count of animals tested for this casein in brackets. Of the animals with gene test results, 92% are female of which 40% are Canadian born. The A2A2 genotype is most prevalent in

the Guernsey (86.4%), Brown Swiss (84.1%), and Jersey (77.8%) breeds globally. Since the last update, Lactanet received additional data from the International Bull Evaluation Service (Interbull), which has led to many European bulls now included. This increased data is most apparent for the Brown Swiss breed, since the frequency of the A2A2 genotype significantly increased to 84.1%. For Canadian born Brown Swiss animals, however the frequency is 70.5% .

Figure 1. Distribution of Beta Casein Genotypes by Breed (No. Animals)

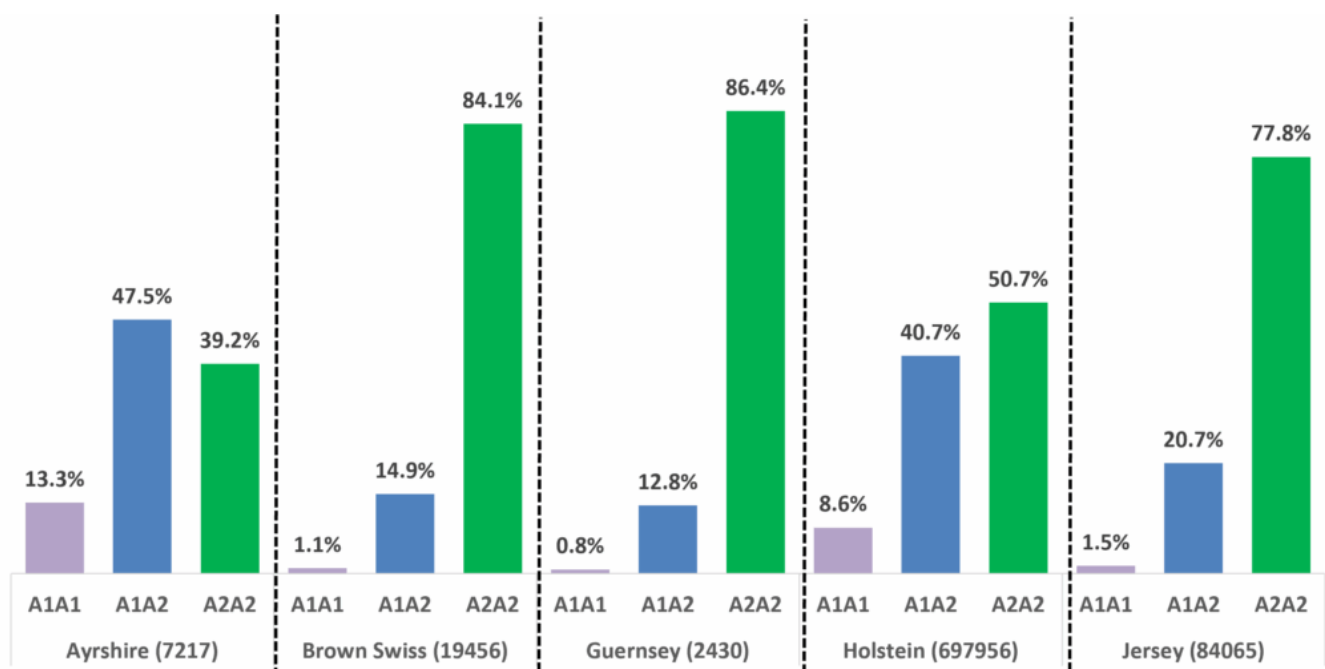
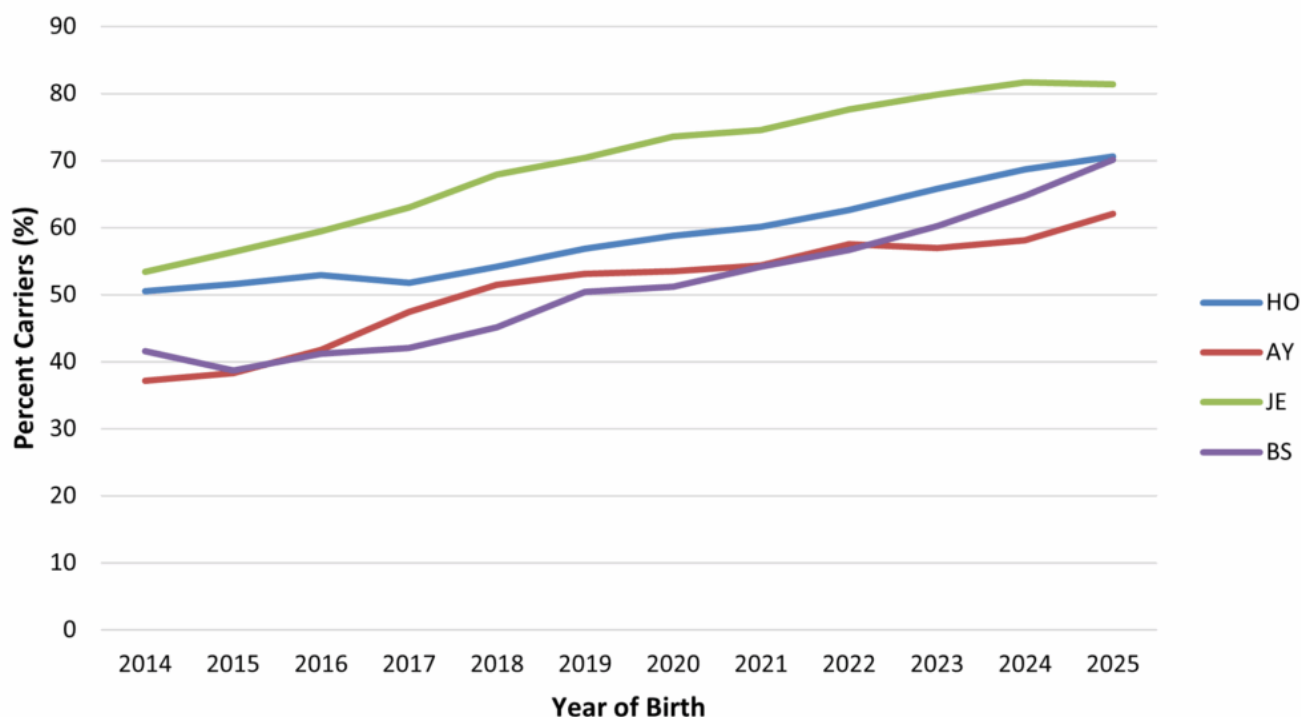


Figure 2 illustrates the trend in the percentage of Canadian females estimated to be carriers of A2 for the Holstein, Jersey, Ayrshire and Brown Swiss breeds. In other words, a heifer or cow is a carrier of A2 if it has at least one copy of the A2 form, so both A2A2 and A1A2 animals are carriers. These animals can pass the A2 form to their offspring. Over time, the data clearly shows a steady increase in the proportion of animals carrying A2. This upward trend reflects a growing interest among Canadian breeders in selecting for A2, making it a more prominent part of their breeding strategy.

Figure 2: Trend in Percentage of Canadian Females Estimated to be Carriers of A2

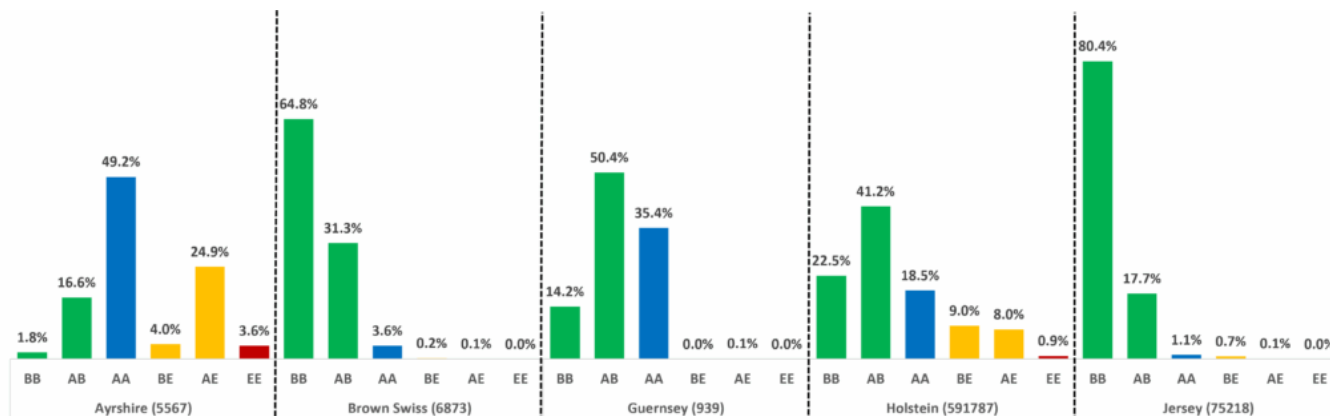


Kappa Casein

Kappa Casein is another milk protein, which influences the amount of clotting that occurs during cheese production and the overall cheese yield. As a reminder, six different Kappa Casein genotypes can result, AA, AB, AE, BB, BE, and EE. Cows with the BB genotype produce milk with higher levels of fat and protein that clots more quickly, producing the highest cheese yield. The EE genotype on the other hand produces milk that does not clot and is therefore considered the most undesirable genotype to cheese processors. Figure 3 shows the frequency of each Kappa Casein genotype by breed, with the count of animals with gene test results available in brackets. Similar to the Beta Casein results, 93% are female with 38% being Canadian born. Jersey and Brown Swiss breeds lead the BB frequencies with 80.4% and 64.8%, respectively.

Figure 3. Distribution of Kappa Casein Genotypes by

Breed (No. Animals)



Viewing Results

Milk recording customers can view an [A2 \(Beta Casein\) report](#) including a herd and animal summary in their MySite account each January. The Advanced functions of the Group Query on the LactanetGen.ca website can also be used to filter animals by their Beta or Kappa Casein genotypes. Herd owners wishing to increase the frequency of A2 in their herd should use A2A2 or A1A2 sires while those wishing to increase the frequency of cows producing Kappa Casein B, should select for BB or AB sires.

Partager



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