Réseau laitier canadien
Canadian Dairy Network

Interpretation and Use of Canadian Bull Proofs For Lactation Persistency

February 1999

The implementation of the Canadian Test Day Model (CTDM) for calculating genetic evaluations for production traits and Somatic Cell Score using individual test day records, provides Canada with a unique opportunity to produce bull evaluations for a new trait, called Lactation Persistency. Canada is the only country in the world where genetic evaluations for this trait exist.
The Canadian Test Day Model uses the cow's test day records from the first three lactations and estimates a specific lactation curve, at a genetic level, for each lactation. For bulls, these genetic lactation curves for each daughter become the basis of his proof for each of Milk, Fat and Protein yields. The Canadian Test Day Model is able to provide a bull proof for each specific day throughout the lactation which, when totalled also produces an evaluation on a 305-day lactation basis. Below is an example lactation curve for the Holstein breed which can be used to explain the Lactation Persistency ratings for bulls evaluated in Canada.

Lactation Persistency is expressed in terms of a percentage based on the bull's genetic ability for milk yield at 280 days in milk compared to day 60. In the Holstein breed, the average published rating for persistency is 63% indicating that, on average, the genetic potential for milk yield at 280 days in lactation is 63% of the genetic potential at 60 days in milk. The diagram also shows two fictitious bulls, A and B, which have above-average and below-average persistency with ratings of 68% and 54%, respectively. This example is somewhat simplified since the published persistency rating for each bull is a combination of three values; persistency of milk yield in each of first, second and third lactation. Even if a bull has only first lactation daughters, the Canadian Test Day Model is still able to estimate persistency evaluations for the

later lactations. When combining the individual lactation persistency values into one published proof for each bull, a weight of 50% is placed on first lactation persistency while a weight of 25% is used for each of second and third lactation persistency.
Lactation Persistency proofs differ across breeds. This reflects the known fact that the average lactation curve within each breed varies. The Canadian Test Day Model represents the first approach at examining lactation curves at a genetic level and therefore generating bull proofs for Lactation Persistency in all dairy breeds. The table below provides the average published bull proof for each breed as well as the general range in values.
Table 1: Average and Range in Bull Proofs for Lactation Persistency by Breed

	Lactation Persistency Proofs		
		Approximate Range	
Breed	**Average**	**Minimum**	**Maximum**
Ayrshire	51%	41%	61%
Brown Swiss	62%	54%	70%
Canadienne	50%	42%	58%
Guernsey	61%	53%	69%
Holstein	63%	53%	73%
Jersey	62%	55%	69%
Milking Shorthorn	54%	46%	62%

Use of Lactation Persistency Bull Proofs
Lactation Persistency is an additional auxiliary trait available in Canada due to the importance it has at the farm level. With the method of expressing lactation persistency bull proofs, there remains a small, positive relationship with EBVs for milk, fat and protein yields. This means that care must be taken using Lactation Persistency proofs when selecting mating sires. Concentrate on selecting sires for high production combined with functional conformation, which can be done by using the Lifetime Profit Index (LPI) or the Total Economic Value (TEV), and when deciding between bulls of approximately similar total merit, select the one with the highest Lactation Persistency rating.