



Holstein Conformation Traits in Canada

This article is the second in a series of four which will focus on the Canadian type classification system and genetic evaluations for conformation traits.

Type classification of dairy cattle helps producers make decisions related to mating, culling, marketing and genetic selection. Classification information collected by breed association classifiers is provided to Canadian Dairy Network (CDN) for the calculation of genetic evaluations.

Table 1 provides a list of type traits for which genetic evaluations are calculated for Holstein bulls and cows in Canada, as well as the heritability value associated with each. Heritability is a measure of the proportion of the total variation seen in the population which is due to genetics rather than environment. Traits such as Stature, Rump Angle/Pin Setting and Frame/Capacity have the highest heritabilities, at 53, 43 and 41 percent respectively, while Foot Angle, Median Suspensory and Udder Texture are more influenced by environmental factors as indicated by their lower heritabilities of 13, 15 and 17 percent respectively.

Genetic evaluations for each type trait are calculated independently. This means that the genetic evaluation system uses the classification and pedigree data for each specific trait separately to calculate bull proofs and cow indexes. For bulls, each daughter's first classification during first lactation is used while the latest classification, or reclassification, is used for calculating cow indexes for type traits. The type classification database used for genetic evaluations in the Holstein breed counts over two million classifications which have accumulated since the introduction of the linear scoring system in late 1981.

In Canada, genetic evaluations are currently published by CDN (www.cdn.ca) for 21 descriptive type traits which are appraised by the classifier on a 9-point linear scale (Table 1). From among these, there are 10 which are initially recorded as a measured trait and transformed into a linear score from 1 to 9. With the aim of promoting further world harmonization of evaluated type traits, both rear teat placement and rear legs-rear view are planned to be officially published starting February 2001.

Each descriptive trait is evaluated by the classifier with the objective of describing the cow relative to the extremes found in the Canadian Holstein population. Since each classifier appraises an average of over 10,000 cows per year, the required accuracy and consistency of the results is assured. For some specific traits, such as Rump Angle/Pin Setting, Rear Legs Side View/Set of Rear Legs, Udder Depth and Fore Teat Length, the mid-score of 5 is assigned when the cow exhibits the ideal conformation for these traits.

In accordance with the associated descriptive traits and 39 possible defective traits, the classifier determines a rating for each of seven major traits which are also identified in Table 1. For these traits, one of 18 different ratings is assigned by subdividing each of the six major classes of Poor, Fair, Good, Good Plus, Very Good and Excellent into three sub-scores (i.e.: Good-1, Good-2, and Good-3). Based on the detailed type appraisal of each cow, a final score is assigned which is used to calculate genetic evaluations for overall Conformation.

For foreign bulls first proven outside of Canada, MACE evaluations are currently published by CDN for 20 of the 29 Holstein type traits. In the case of the six major traits other than Dairy Character, the MACE evaluations are computed as a composite of the related descriptive traits for which Interbull provides MACE proofs. These MACE evaluations allow Canadian producers to compare the genetic potential of foreign-proven bulls on the same scale and general interpretation as official type proofs for bulls with daughters classified in Canada.

Subsequent articles in this series will explain how genetic evaluations for type traits are calculated in Canada for the traits described above. A proper understanding of the expression of bull proofs and cow indexes for each type trait is essential for optimum genetic selection and breeding decisions, which will also be addressed in a future article.

Table 1: Heritabilities for Holstein Type Traits		
Type Trait	Range in Scores	Heritability (%)
Conformation (Final Score)	Under 60 - Over 90	32
Dairy Character	Poor 1 - Ex 3	30
Frame / Capacity	Poor 1 - Ex 3	41
Rump	Poor 1 - Ex 3	24
Feet & Legs	Poor 1 - Ex 3	21
Fore Udder	Poor 1 - Ex 3	28
Rear Udder	Poor 1 - Ex 3	26
Mammary System	Poor 1 - Ex 3	29
Size	1 - 9 (measured)	37
Stature	1 - 9 (measured)	53
Height at Front End	1 - 9	25
Chest Width	1 - 9	27
Body Depth	1 - 9	32
Loin Strength	1 - 9	25
Pin Width	1 - 9 (measured)	34
Pin Setting (Desirability)	1 - 5 (measured)	43
Rump Angle	1 - 9 (measured)	43
Bone Quality	1 - 9	28
Foot Angle	1 - 9	13
Set of Rear Legs (Desirability)	1 - 5	26
Rear Legs Side View	1 - 9	26
Udder Depth	1 - 9 (measured)	39
Udder Texture	1 - 9	17
Median Suspensory	1 - 9 (measured)	15
Fore Attachment	1 - 9	27
Fore Teat Placement	1 - 9	31
Fore Teat Length	1 - 9 (measured)	30
Rear Attachment Height	1 - 9 (measured)	24
Rear Attachment Width	1 - 9 (measured)	24