Breed Canadian and Benefit from International Exposure

There are many advantages to genotyping heifers as part of an overall herd management program including improved decisions for selection and mating. An added benefit lies in the potential to create animals of interest genetically for both domestic and foreign markets. When marketing animals domestically, GLPI or Pro$ are the indexes of choice for the vast majority of buyers. Breeders from our largest genetic export market, the United States, will likely be interested in an animal's GTPI or genomic Net Merit (NM$) value. Extra fees beyond the initial cost of genotyping are charged when these foreign indexes are requested for any Canadian animal. In this article, we help Canadian breeders estimate a genotyped animal's GTPI or genomic NM$ based on their GLPI or Pro$.

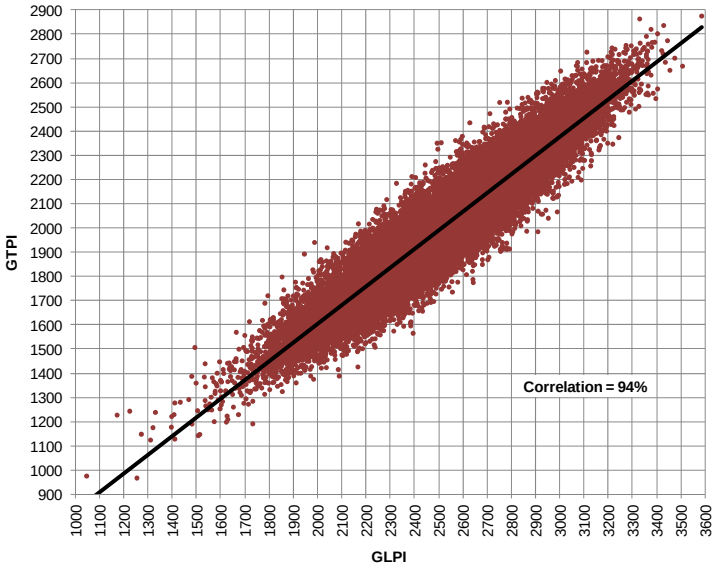
National Indexes

Canadian Dairy Network (CDN) calculates both national selection indexes, LPI and Pro$. These indexes are designed for Canadian breeders and producers to maximize profitability depending on their breeding goals. The U.S. also has two national selection indexes, TPI and NM$. TPI is calculated by Holstein USA, while NM$ is calculated by CDCB (Council for Dairy Cattle Breeding). Holstein Canada acts on behalf of Canadian breeders interested in receiving a U.S. genomic evaluation and facilitates the payment of the required fees. For Holstein females, the additional fee for obtaining U.S. genomic evaluations is currently $20 CAD.

Screening Based on GLPI

In Canada, official genomic evaluations including GLPI and Pro$ are released on a weekly basis for all newly genotyped females. These evaluations are available on the CDN website at noon EST on Tuesdays. In addition, genomic reports are available after signing in to your Holstein Canada online account. For males, the same process is used but the resulting genomic evaluations delivered to the bull owner are unofficial and therefore not presented on the CDN or breed association web sites.

Figure 1: Distribution of GTPI versus GLPI



To assist breeders in deciding whether or not to pay for receiving a U.S. genomic evaluation, CDN has related GLPI values for Holsteins in Canada to their GTPI values in the U.S. Figure 1 shows the relationship between GLPI and GTPI values for over 30,000 genotyped Canadian heifers. The correlation between these overall indexes is relatively high at 94% so knowing the GLPI of an animal in Canada provides an excellent indicator of how high its GTPI may be in the U.S. For example, if an animal has a GLPI of 3000, then following that line up in the graph will show that it crosses the solid dark line very close to 2400 on the GTPI scale, which means they are essentially equivalent on average. The actual data points show, however, that among all animals at 3000 GLPI, the range in their GTPI is broader from roughly 2200 to 2600. In terms of confidence intervals, 90% of the animals will have a GTPI that is within ±145 points from the

predicted level indicated by the dark solid line, regardless of their GLPI in Canada. For the example above, this means that 90% of all animals that have a GLPI of 3000 will have a GTPI value between 2255 and 2545 (2400±145).

Table 1: Probability of Reaching Specific GTPI Levels Based on the Animal's GLPI

GLPI	Level of GTPI in United States								
	2700	2600	2500	2400	2300	2200	2100	2000	1900
3700	99								
3600	95								
3500	77	97					Essentially		
3400	44	84	98				100% Certain		
3300	16	54	89	99					
3200	3	23	66	93					
3100		5	31	74	96				
3000		1	9	40	82	98			
2900			1	14	50	87	99		
2800				2	20	60	92	99	
2700					4	27	71	95	
2600						7	36	79	97
2500		Essentially				1	12	46	85
2400		No Chance					2	17	56
2300								3	24
2200									5
2100									1

Another way of analyzing the same data is presented in Table 1, which shows the probability that an animal's GTPI surpasses specific levels depending on its GLPI value. For example, a heifer or young bull with a GLPI that rounds to 3200 has a 3% chance of reaching a GTPI of 2700 or higher and an 23% chance of surpassing 2600 GTPI. Considering low GTPI levels, there is a 93% chance that an animal with 3200 GLPI reaches at least 2400 GTPI and it is essentially certain that they will pass the 2300 GTPI mark.

Similar to the analysis above done for GTPI, the association between Pro$ and genomic NM$ was examined. Figure 2 shows the plot of these values for genotyped Canadian Holstein heifers, which are also highly correlated at 93%. Table 2 shows the probability that an animal's' genomic NM$ surpasses specific levels depending on its genomic Pro$ value.

Figure 2: Distribution of Genomic NM (GNM) versus Pro$

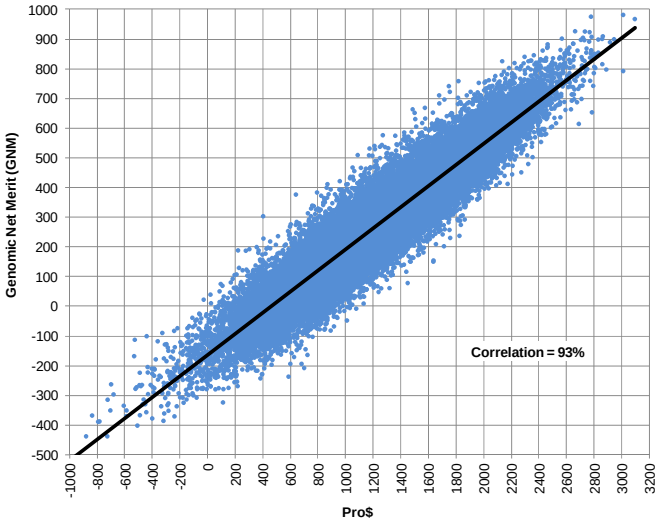


Table 2: Probability of Reaching Specific GNM Levels Based on the Animal's Pro$

Pro$	Level of Genomic Net Merit (GNM) in United States								
	825	800	775	750	725	700	675	650	625
3400	99								
3300	98	99					Essentially		
3200	96	98	99	99			100% Certain		
3100	90	95	97	98	99				
3000	82	88	93	96	98	99			
2900	69	79	85	91	95	97	99	99	
2800	54	66	74	83	89	93	96	98	99
2700	38	50	60	71	80	86	92	95	97
2600	24	34	44	56	67	76	84	89	94
2500	14	21	29	40	52	62	73	80	87
2400	7	12	17	26	36	46	58	67	77
2300	3	5	9	15	23	31	42	52	64
2200	1	2	4	7	13	18	27	36	48
2100		1	2	3	6	10	16	23	33
2000			1	1	3	4	8	13	20
1900					1	2	4	7	11
1800		Essentially				1	1	3	5
1700		No Chance						1	2
1600									1

The strong association between GLPI and GTPI, as well as between genomic Pro$ and genomic NM$, means that knowing the GLPI or Pro$ of an animal in Canada provides a great indicator of the level of its U.S. index values. As Canadian breeders you can focus your selection and mating decisions on either GLPI or Pro$ and then identify those heifers for ordering genomic evaluations from the United States to increase the international exposure of your top genetics.

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