Pro$:
Genetic Selection for Profit

Fill in the blank: When making genetic selection decisions, my ultimate goal is to create a _____ cow. If you filled in the blank with the word "profitable", a new tool is on the way that will be of interest to you. Over a year of research has led to the development of a new genetic selection index that will allow Canadian dairy producers to improve their herd profitability.

Why do we need a second national index?

This index was developed by Canadian Dairy Network (CDN) over the past year following an industry request to explore the possibility of developing a second national index that targets dairy producers who generate essentially all of their farm revenue from milk sales. The newly developed, profit-based index has been named "Pro$" (pronounced Pro Dollars), and has officially been approved for release in August 2015. Pro$ will be available in the Holstein and Jersey breeds, while other dairy breeds will use the research behind the development of Pro$ to modify their existing LPI formula to better reflect profit.

The development of Pro$

The backbone of Pro$ is cow profitability data from Valacta and CanWest DHI - data that comes directly from Canadian dairy farms. This information is provided to their customers across Canada in the form of a Cow Profitability Report as well as a Herd Summary Profitability Report. The economic parameters used to derive the profitability values for each cow are updated annually by economists in order to assure their relevancy.

Using the cow profitability formula derived by Valacta and CanWest DHI, CDN calculated the accumulated profit to six years of age for nearly 700,000 Holstein cows born from January 2005 to September 2008. This time period was chosen in order to give each cow the opportunity to reach six years of age when the analysis was conducted at the end of 2014. If cows did not survive to six years of age, their accumulated profit until the date they left the herd was considered as their lifetime profit. While profit can be accumulated to any age, or to each calving, the decision to define profit to six years of age allows each cow the opportunity to express its ability to survive through multiple cycles of reproduction and production, which is important for defining which traits are most important contributors to lifetime profitability. Once the accumulated profit was calculated for each animal, the cows were grouped by sire to calculate the average profit of its daughters to six years of age.

The final step required to develop Pro$ involved performing a statistical regression analysis, which is a technical way of saying sire proofs for various traits were used as input to predict the average daughter profit to six years. Sires were only included if they had at least 100 daughters with profit data, leading to a total of 830 Holstein sires analyzed. Using regression analysis allowed CDN to consider the genetic relationships among all traits to determine the contribution that sire evaluations for each trait have in terms of predicting the average profit of their daughters in a scientifically sound and objective way.

Interpreting bull ratings for Pro$

Pro$, the "Pro" standing for "profit", will be expressed in dollars and as a deviation from breed average. In other words, sires with a Pro$ of $0 are expected to produce daughters that have an

average accumulated profit to six years that is equivalent to the average cow in Canada, which is approximately $2500 for Holsteins. Likewise, bulls with a Pro$ of $1000, can be expected to sire daughters that have an average accumulated profit to six years that is $1000 higher than daughters of the average Pro$ bull. In other words, selecting sires with a higher Pro$ value will directly translate to increased lifetime profit of the resulting daughters. This concept is illustrated in Graph 1 and Figure 1 below. If your herd is better managed than the average herd in Canada, your herd's average accumulated profit to six years may be higher than the national average but the interpretation of the difference between the Pro$ values for two sires remains equal across all herds.

Graph 1: The relationship between average daughter profit to 6 years and a sire's Pro$
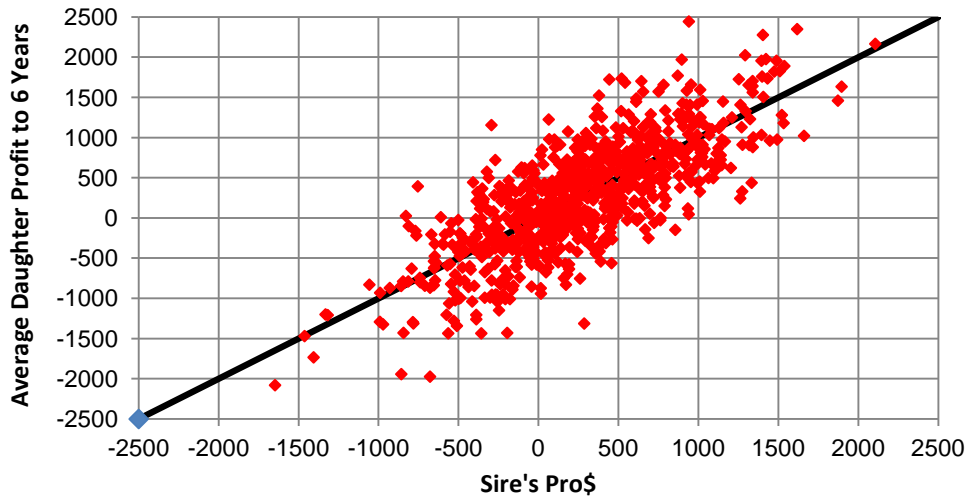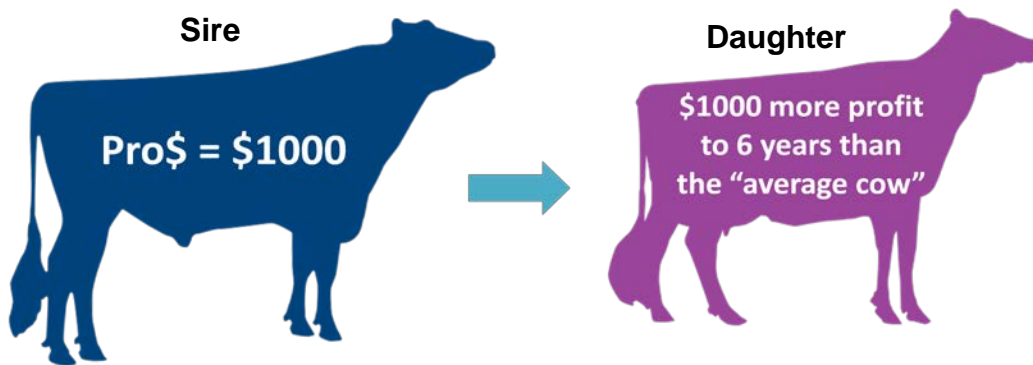

Figure 1: Interpretation of a sire's Pro$ value

Sire

Pro$ = $1000

Daughter

$1000 more profit to 6 years than the "average cow"

LPI and Pro$ - Similarities and Differences

Effective August 2015, the updated LPI formula for Holsteins will have relative weights of 40%, 40% and 20%, respectively, on the Production, Durability (longevity and functional conformation), and Health & Fertility components. Also of importance is the inclusion of the new Mastitis Resistance index introduced in August 2014 into the LPI formula. Taking these LPI updates into consideration, what can you expect as a result of selecting for Pro$ compared to LPI?

First off, it is important to realize that lifetime profit can be defined differently from farm to farm, depending on the sources of revenue and associated expenses. While Pro$ is targeted to meet the needs of producers who generate essentially all their revenue from milk sales, LPI retains

the interests of those who market genetics domestically and abroad. Compared to LPI, using Pro$ as your primary selection tool will maximize production yields, longevity and overall fitness. On the other hand, using LPI as your primary selection tool will lead to a herd with exceptional conformation and fat and protein deviations. No matter which index you align yourself with, you can be confident that all of the information that feeds the traits in each index is sourced directly from Canadian dairy farms.

So which proven sires top the charts for Pro$? Table 1 shows the sires that would currently rank in the Top 15 for Pro$ as well as their rank for the current LPI. Examining the two lists reveals 10 out of 15 bulls are in common. Five bulls ranking in the Top 15 for Pro$ rank outside of the Top 15 for LPI, as is indicated by the shaded cells in the LPI rank column.

Table 1: If we had Pro$ today, where would the top LPI proven sires rank?

LPI		Pro$		Short
Rank	LPI	Rank	$	Name
2	3110	1	2365	Sudan
1	3203	2	2321	Brewmaster
10	2951	3	2304	Pinkman
7	2969	4	2265	Gillespy
36	2816	5	2250	Freddie
8	2964	6	2152	Manifold
12	2931	7	2113	Stargazer
16	2906	8	2070	Supersonic
23	2877	9	2054	AltaCaliber
10	2951	10	2050	Mogul
13	2924	11	2045	Snowman
30	2843	12	2032	Jett Air
5	2989	13	2001	Lego
6	2972	14	1995	Fork
38	2798	15	1990	Bronco

The differences in ranking between the two lists above highlight some of the differences between the two indexes and may help producers better align themselves with the index that serves their goals. Over a year of research has led to the development of Canada's new profit-based index, Pro$, to be released for the first time with the August 2015 official genetic evaluation run. The provided background on the creation of Pro$, the explanation of Pro$ proof interpretation, and the comparison between Pro$ and LPI should allow Canadian producers to feel confident in this new and innovative genetic selection tool.

Authors: Lynsay Beavers, Industry Liaison Coordinator, CDN
                Brian Van Doormaal, General Manager, CDN

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