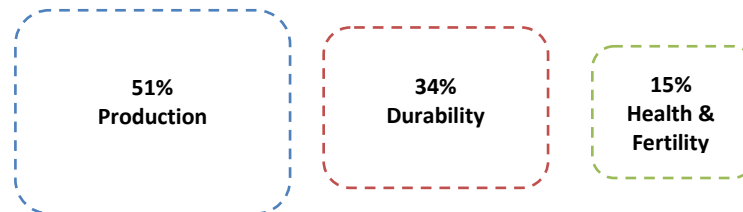


Lifetime Profit Index: Are We Achieving Our Goals?

Genetic progress achieved over the years in the Canadian dairy cattle population has been quite impressive. As time passes and the industry progresses, it's useful to re-evaluate our national index and selection goals to assure we're still on the right path. One excellent tool to assess results of selection decisions made by Canadian producers is the subsequent rate of genetic progress realized in the breed. Comparing the rate of genetic progress across different traits also sheds light on the emphasis placed on each trait, whether intentional or not. The analysis of genetic trends and relative trait emphasis outlined below reveals areas where our industry has made great improvements, as well as windows of opportunity.

LPI Today

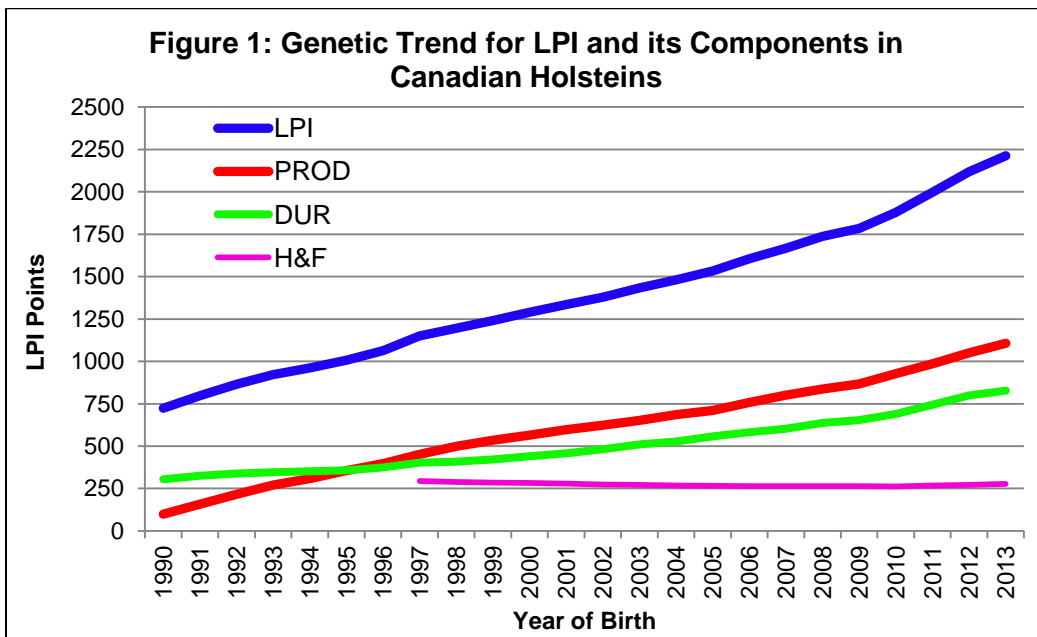
The Lifetime Profit Index (LPI) is the primary selection tool used within each dairy breed in Canada. The main goal of LPI in each breed is to define the combination of traits for which genetic progress is desired and the relative importance of each trait for achieving the overall breed improvement goals. The current Holstein LPI formula places the following emphasis on its three major components:



With the exception of the revised scale of expression introduced in April 2013, the traits and their relative weights in the LPI have been unchanged since 2008. Discussions with producers, industry personnel and technical experts regarding the modification and updating of the LPI have been initiated by Canadian Dairy Network (CDN). Following such a process, the LPI used in each dairy breed is likely to be changed starting with the genetic evaluation release in August or December 2014. Before discussing potential changes to our national selection index, we should first review and understand the outcome of selection decisions based on the current LPI.

Genetic Trends for LPI and its Components

Since the inception of LPI in 1991, steady progress has been made for this national selection index as can be seen in Figure 1. The rate of progress for LPI suddenly steepened after 2009, coinciding with the arrival of genomic evaluations in Canada. Had the breed continued on the same pre-2009 trajectory for genetic progress, the average LPI for the 270,000 registered Holstein heifers born in 2012 would be approximately 150 points lower than it is today and this average exceeds 170 for heifers born in 2013. In terms of the three LPI components, a boost in the rate of progress since genomics is also visible for the Production and Durability components (Figure 1). For Health and Fertility, the negative trend since the 1990's has been stopped and a slight upward trend has now been achieved with genomics.



What Traits are Producers Selecting For?

Figure 2 helps us understand what traits producers selected for relative to what would be expected based purely on LPI. If producers had strictly used LPI to make all selection and mating decisions during the past five years, we would expect zeros for all traits along the length of the horizontal axis. Relative to what is expected based on the current LPI formula, bars appearing above the line are traits that received more emphasis, while bars below the line are traits that received less emphasis.

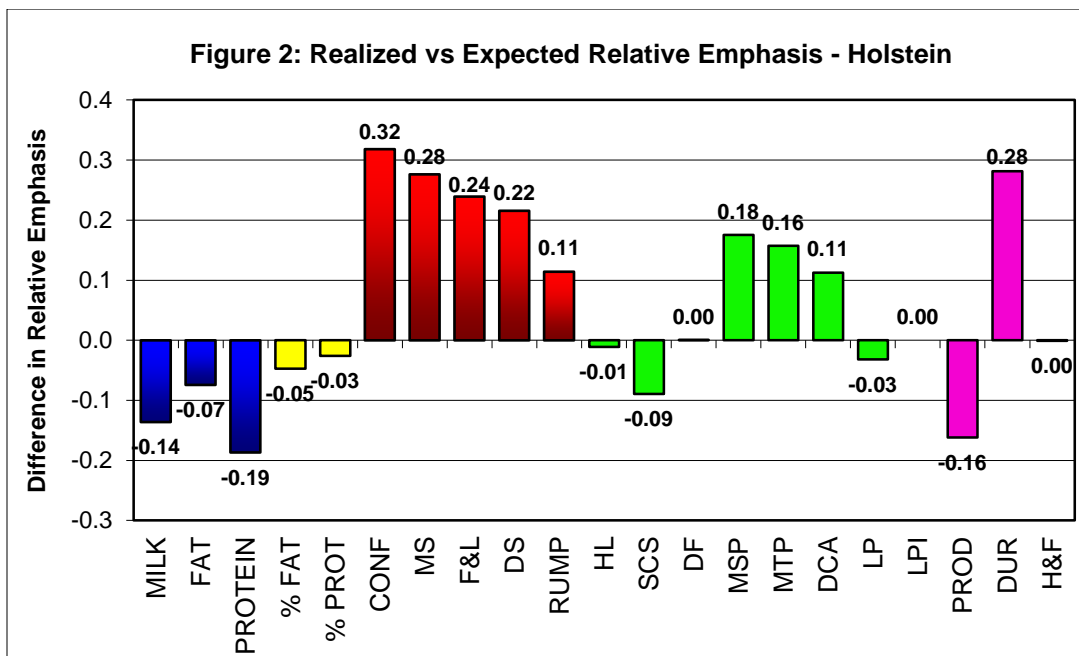


Figure 2 reveals that, over the past five years, much more emphasis has been placed on the major type traits compared to what we would expect based on the LPI formula, which is also true to a lesser degree for Milking Speed and Temperament as well as Daughter Calving Ability. Production yields and percentages have received less

emphasis, and we achieved what would be expected in terms of Herd Life as well as Health and Fertility, specifically Daughter Fertility.

It is clear by the above chart that Canadian producers have been placing much more emphasis on Conformation, Mammary System, Feet & Legs and Dairy Strength than what was expected by the LPI formula. A common but suboptimal strategy used by many producers is the application of minimum proof levels for specific traits when selecting sires to use in the herd. Results in Figure 1 suggest this is often the case for type traits in particular as well as some of the functional traits. The key question, however, is *"Is this emphasis too much from a breed improvement viewpoint?"* Extra attention put on individual traits means there is less emphasis than expected on other traits for which genetic progress is also desired. For example, the extra emphasis placed on type traits in the past five years will have contributed to the lower than desired emphasis on production.

Health and Fertility-wise, we are achieving what we would expect based on the emphasis placed on this component of the LPI. The question now, however, is *"Is this emphasis too little from a breed improvement viewpoint?"* Recall in Figure 1 that we have just turned the corner for this LPI component but the amount of genetic progress made for Health and Fertility has been relatively small. If the emphasis placed on this component were increased we would surely make more genetic gains in this area of growing importance.

Summary

With more than twenty years of selection for LPI in Canada great progress has been made for traits of importance affecting profitability. Gains increased substantially with the adoption of genomics, particularly for the Production and Durability components. The Health and Fertility component has stopped its downward trend and opportunity now exists to select more aggressively for this area of increasing importance on both national and international levels. Over the past five years, Canadian producers have placed a great deal of emphasis on conformation traits and less emphasis on production traits, relative to what was expected through strict selection for LPI. In coming months, CDN will be working closely with producers, industry personnel, technical experts and its Genetic Evaluation Board to examine the best options for updates to the LPI formula in each breed.

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

Date: October 2013