# The Modernized LPI – Launching April 2025

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The Lifetime Performance Index (LPI) was first introduced as a national selection index in 1991, combining six traits to reflect the performance that could be expected during the lifetime of future daughters. Over time, as the industry evolved, the LPI formula has followed suit, eventually combining traits into three components namely Production, Durability, and Health & Fertility.

To keep up with today's genetic selection and breeding objectives, Lactanet will be releasing a newly designed LPI formula on April 1, 2025. This modernized LPI was designed in consultation with breed associations, industry partners and breeders to identify the ideal formula for each breed. The new formula will include five subindexes for all breeds, namely Production (PI), Longevity & Type (LTI), Health & Welfare

(HWI), Reproduction (RI), Milkability (MI), as well as a sixth subindex, Environmental Impact (EI), for the Holstein breed. Each of these subindexes will be published on their own and combined into LPI while maintaining the previous LPI scale in each breed. Refer to Table 1 for an outline of the weightings for each subindex depending on the breed. Canadian dairy farmers will also have the option to customize the weight on each subindex when they login to LactanetGen.ca. This allows you to create your own personalized LPI (pLPI) for your breed(s) of interest and make individual breeding decisions that align with your goals!

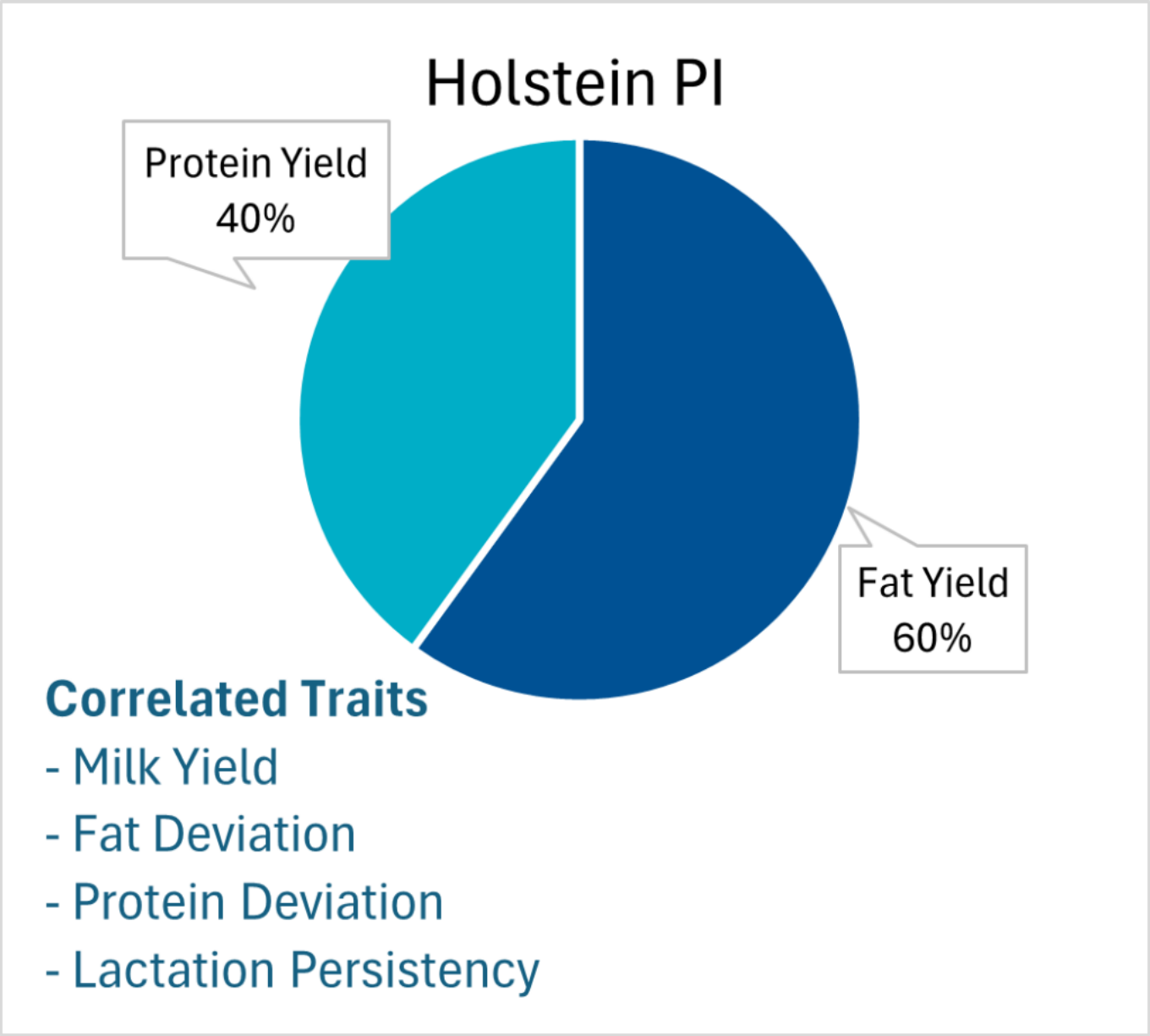
## Table 1. Relative Weights of Subindexes in Modernized Lifetime Performance Index by Breed

| Category | HO | JE | AY | BS | GU | MS | CN |
|---|---|---|---|---|---|---|---|
| **Production** | 40 | 48 | 46 | 55 | 50 | 52 | 55 |
| **Longevity & Type** | 32 | 30 | 30 | 27 | 35 | 30 | 30 |
| **Health & Welfare** | 8 | 10 | 4 | 6 | 3 | 8 | 5 |
| **Reproduction** | 10 | 10 | 9 | 7 | 10 | 5 | 6 |
| **Milkability** | 5 | 2 | 11 | 5 | 2 | 5 | 4 |
| **Environmental Impact** | 5 | – | – | – | – | – | – |

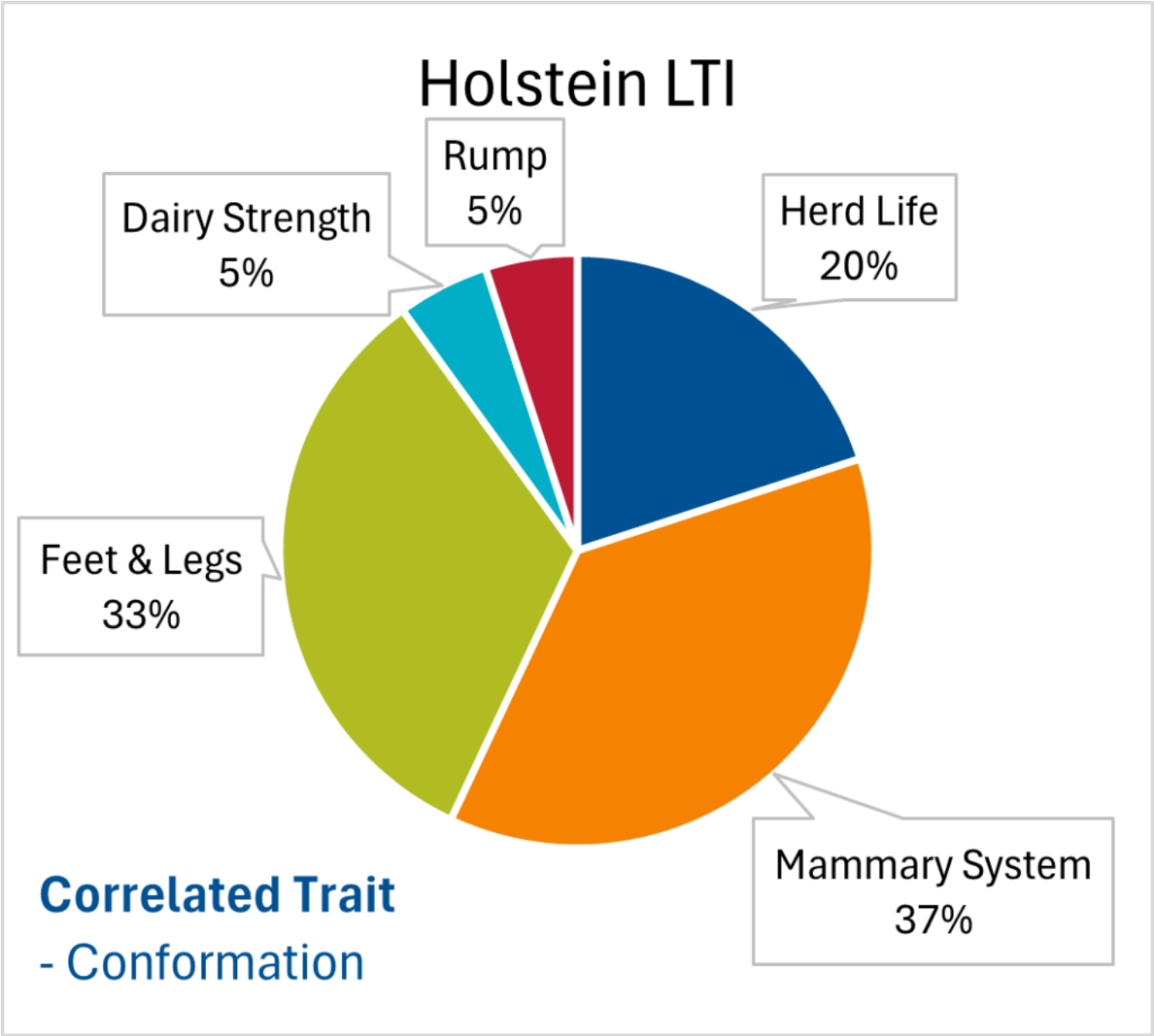
## LPI Subindexes

The six subindexes were developed by identifying the traits to be directly included as well as traits that will have a favorable genetic improvement due to their correlation with the subindex, even if not directly included. Each subindex is defined in more detail below along with the traits included for the Holstein breed.

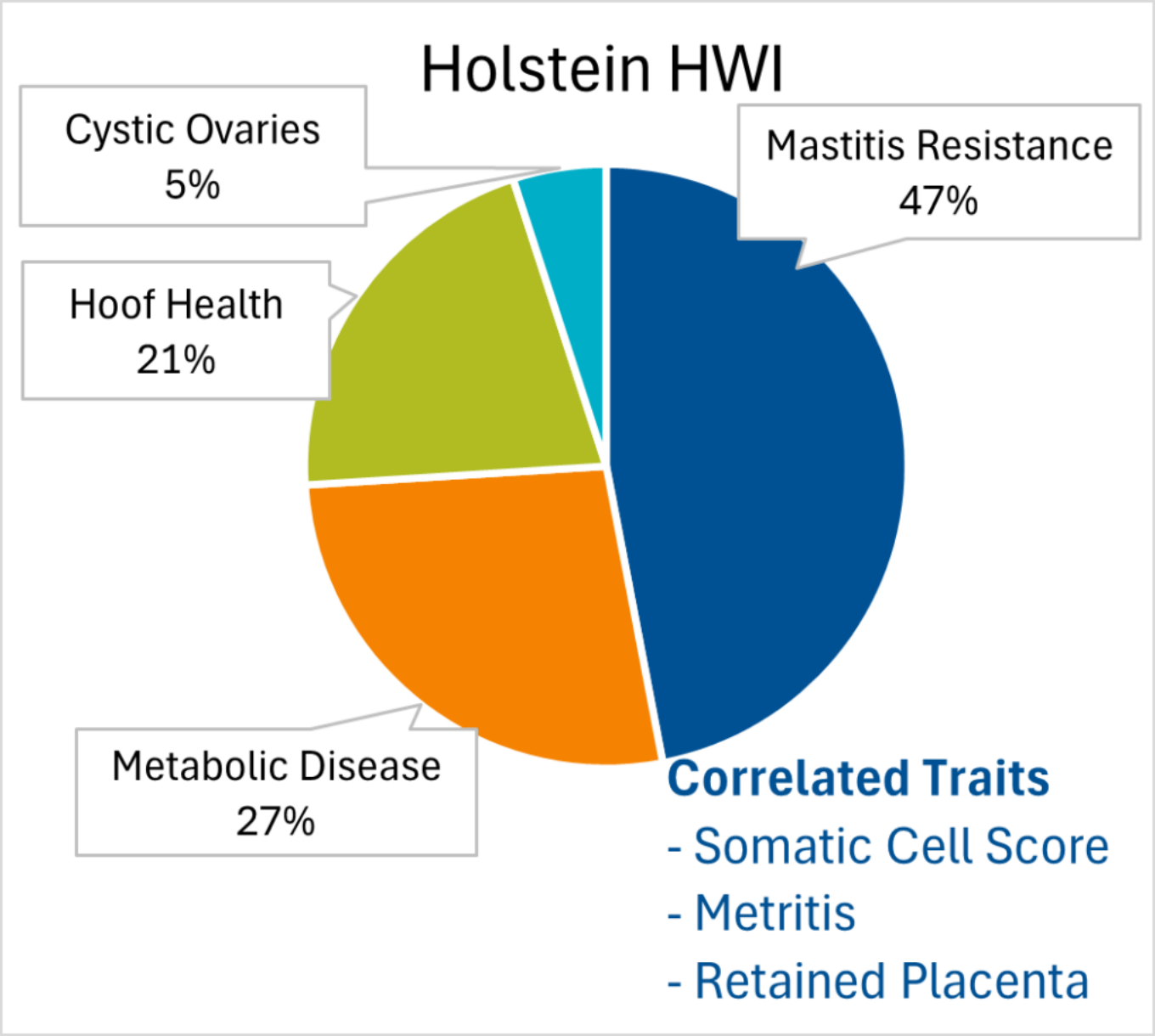
The Production Index (PI) is similar to the previous Production component of the LPI with the aim of maximizing fat and protein yields thereby increasing profitability. This subindex is also positively correlated with Milk Yield, Fat Deviation, Protein Deviation and Lactation Persistency.



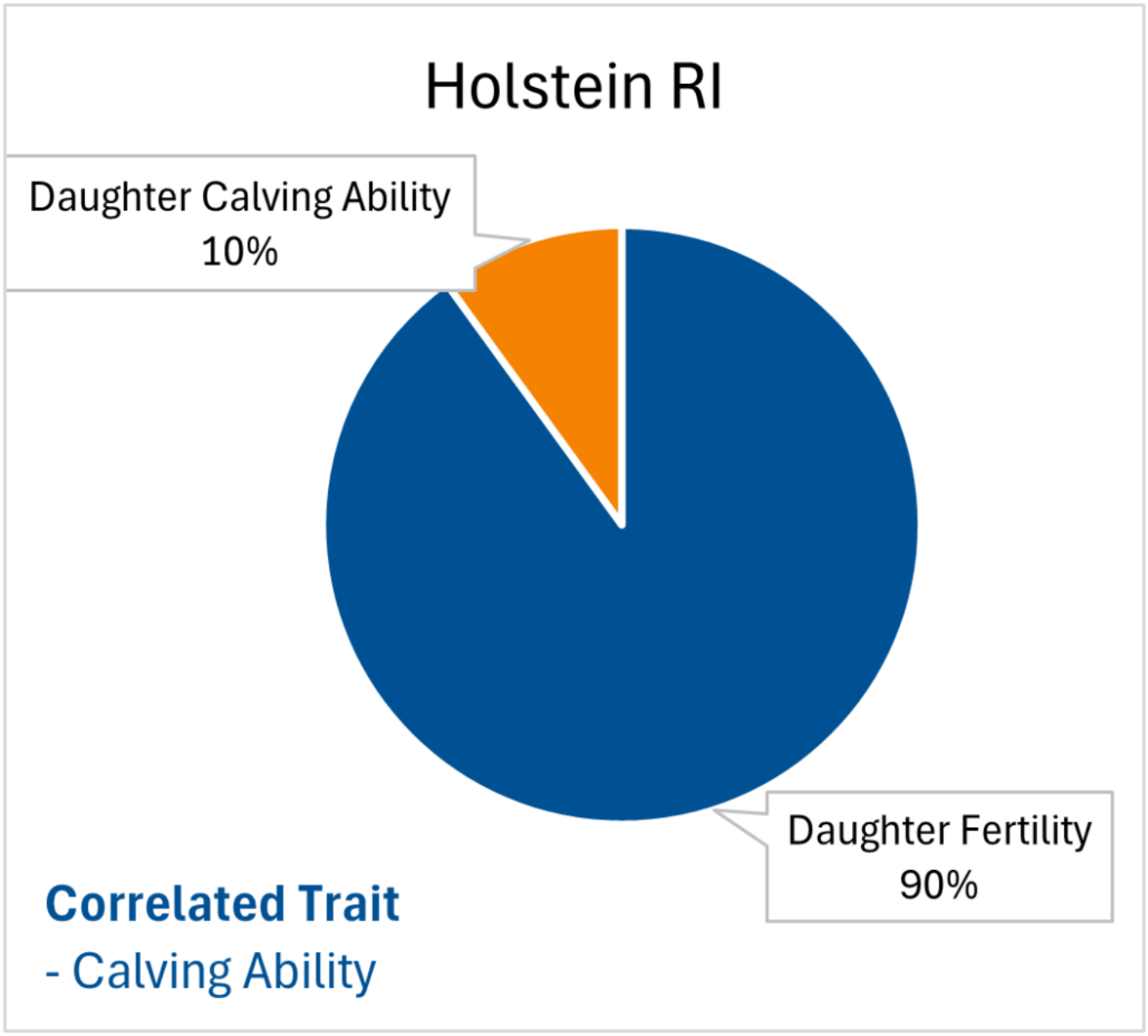

The Longevity & Type Index (LTI) aims to enhance herd longevity favouring functional conformation through selection for Herd Life, Mammary System, Feet & Legs, Dairy Strength and Rump.



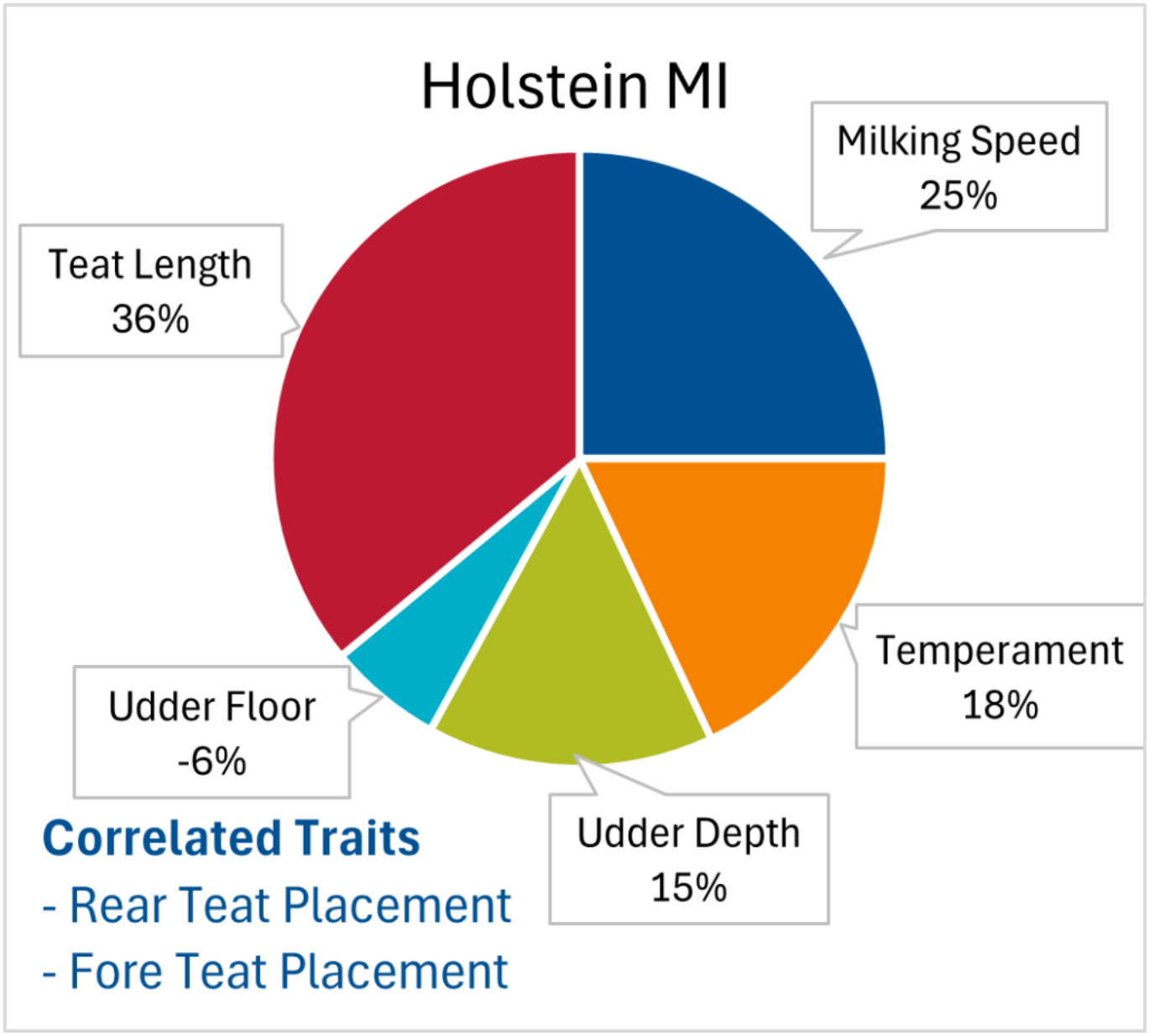

The Health & Welfare Index (HWI) improves disease resistance and animal welfare traits including Mastitis Resistance, Metabolic Disease, Hoof Health, Cystic Ovaries, Somatic Cell Score, Metritis, and Retained Placenta. In combination with superior management, the HWI will lead to healthier, more disease resistant cows thereby decreasing expenses.



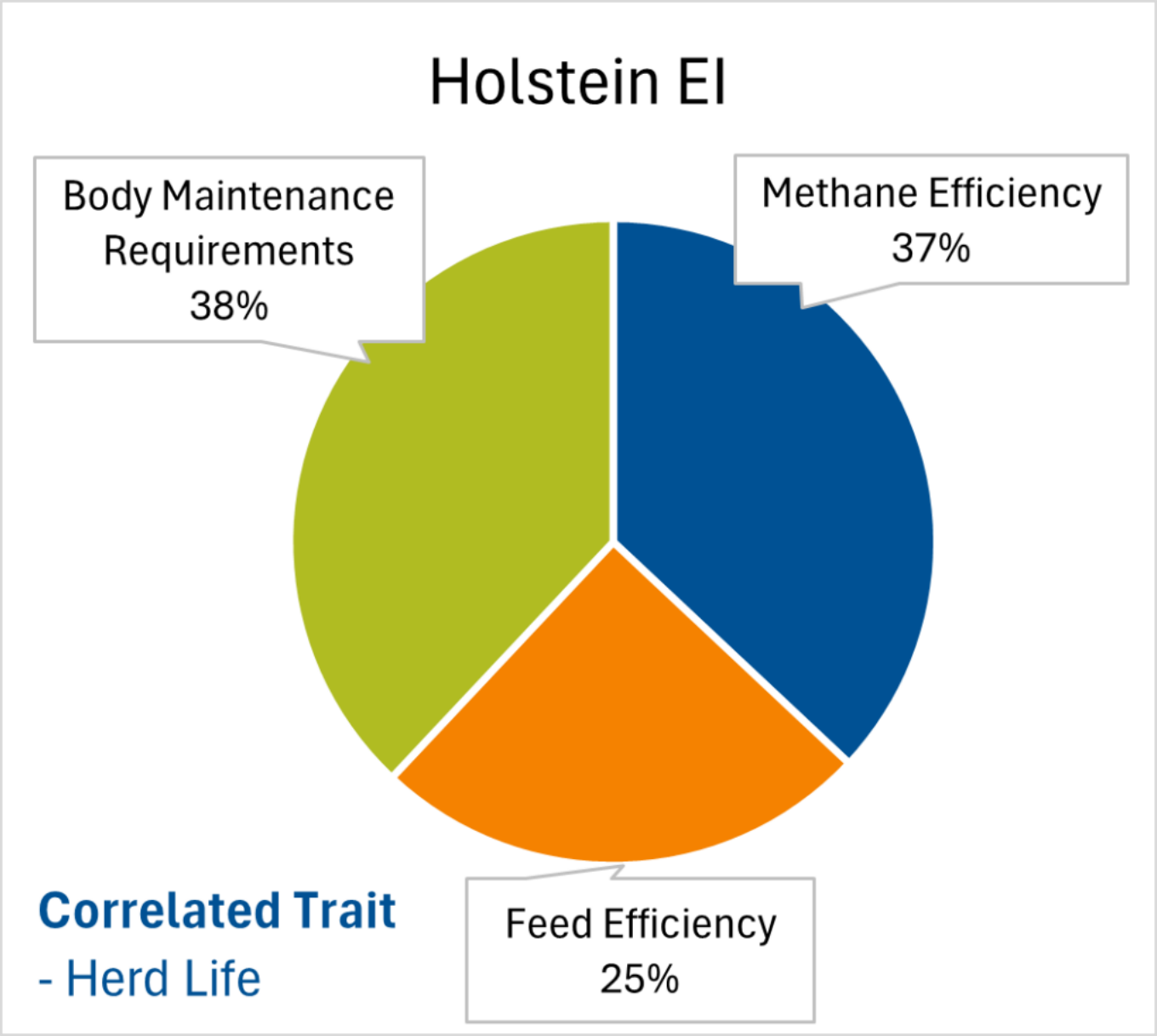

The goal of the Reproduction Index (RI) is to achieve genetic gain for female fertility and calving performance, which is represented by Daughter Calving Ability. Selection for this subindex also yields progress for Calving Ability.




The Milkability Index (MI) is a new component of LPI with an aim to optimize milking efficiency designed to help all dairy farmers regardless of their production system. In addition to moderate weights on Milking Speed and Temperament, this subindex includes mammary traits related to desired udder and teat attributes.




The Environmental Impact Index (EI) is another new component, aimed at reducing the environmental footprint of your herd through selection of Feed Efficiency, Methane Efficiency, and Body Maintenance Requirements. This subindex was designed recognizing that body size and weight are important in determining an animal's carbon footprint, helping to reduce feed costs and reach industry sustainability goals.




## Expression

To aid in user understanding, changes to the mathematical nature of the previous LPI will also be implemented. Each subindex will be expressed on a standardized scale, so the average proven sire is set to 500, with favourable values reaching 900 or more. The standardized subindex values have a standard deviation of 100, which means that two-thirds of proven sires will fall between 400 and 600. The standardized scale in combination with percentile ranks will help farmers and A.I.

organizations compare values for each subindex and identify the elite sires. The expected genetic gain in a 5-year period will also be published, so users can easily see how each trait will be impacted. For example, a 60:40 ratio on Fat Yield and Protein Yield in the Holstein Production Index means more than 500 kilograms of expected progress for Milk Yield in the next five years.

## Pro$

This newly designed LPI has a 95% correlation with Pro$, Canada's profit-based selection index. As such, a divergence of top bulls will continue to exist depending on selection goals. The Pro$ formula is updated in April of each year with new economic weights to calculate profit for cows up to six years of age or disposal.  Dairy farmers can align themselves with either selection index to create different blood lines and sires to meet their breeding program goals.

## Summary

A new modernized LPI will be launched on April 1, 2025, including six subindexes published on their own and combined into LPI to produce a balanced response for traits of importance. With LPI, you can boost genetic progress and select for a herd that is high performing, efficient, and long lasting!

## Partager

By Hannah Sweett, Ph. D.

Hannah discovered her passion for agriculture during her undergraduate degree at the University of Guelph and through work experience in the dairy industry. She holds a B.Sc. in Molecular Biology and Genetics and a Ph.D. in Animal Genetics, focusing on the genetic improvement of dairy cattle fertility.