

# Field Guide to Understanding the Canadian Sheep Estimated Progeny Differences (EPDs)

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Canadian purebred and commercial sheep producers can access genetic evaluations through GenOvis delivered by CEPOQ in Quebec. The genetic evaluation numbers are produced by the Center for Genetic Improvement of Livestock (CGIL) at the University of Guelph. These evaluations are based on a Canadian genetics database that contains all of the data collected by GenOvis since 2000 and data collected in Ontario from 1986 - 2010 providing a common genetic comparison in the form of EPDs for Canadian sheep producers.

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| What is an Estimated Progeny Difference (EPD)? | 4 |
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The performance of an animal is a mixture of its genetics and the environmental conditions in which it was raised. An EPD is the numerical estimate of the **genetic** value that an animal will pass on to its progeny for a **particular trait**. An EPD encompasses all performance data on the relatives of the animal, as well as the animal's own performance data. EPDs should be used along with visual selection. It is important to remember that when selecting sheep, the EPDs account for environmental effects, and therefore allow you to choose sheep solely on differences in genetic traits.

EPDs are expressed in the same units in which the trait is measured. They represent the genetic deviation from the average animal of the base population for that breed for that trait. For example, an EPD of +0.1 for BORN1 (number born at first lambing)

means that the progeny of that animal will have 0.1 more lambs than the progeny of an animal with an EPD of 0. If the average is 1.9 lambs born at first lambing than the progeny of an animal with a +0.1 BORN1 will on average have 2.0 lambs at first lambing. To relate this to monetary benefits, if 400 replacement ewes are kept from sheep with +0.1 BORN1, 40 more lambs would theoretically be born from them, translating to an extra \$4000 at \$100 per lamb.

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## How to Interpret a Canadian EPD

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### 1. Trait Name AWT50

The EPD is recognized as an abbreviation of the trait name. In this case, AWT50 relates to the adjusted weight at 50 days.

### 2. EPD (same unit as trait, kg) 0.43

EPDs are numerical deviations from the average animal of that breed for that trait. For example, this AWT50 EPD of +0.43 means that the animals progeny on average should be 0.43 kilograms heavier at 50 days than an animal with AWT50 EPD of 0.

### 3. Accuracy (0%-99%) 81

This number is an indication of how close the EPD is to the *true genetic value* of the animal. The greater the amount of performance data that is available, the higher the accuracy for that EPD will be and the less likely it is to change once more performance data is added to the evaluation.

### 4. Percentile Rank (0%-99%) 94

This number reflects the position, in terms of percentile rank, that this EPD is in for the animal's breed. For example, a 90% indicates that the animal is in the top 10% of all animals of the same breed for this trait.

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## What is a Selection Index?

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Selection indexes are used to select for several traits at once. Each index is formulated to provide an average rate of progress that has been set for each trait. As great as it would be to increase a trait such as BORN1 up to 5 lambs per lambing, what would be the point if only 1 of those lambs survive? By balancing traits into indexes, it is possible to select for a number of important traits with one number. There are four indexes for use by sheep breeders; Growth index, Maternal index, Terminal index, and Maternal T index.

Commercial producers should look for terminal traits in rams used to sire market lambs and maternal traits in rams used to sire replacement ewe lambs.

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**EPDs for Weight and Carcass Traits**

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| Trait Name  | SURV<br>(lambs)  | BIRTH<br>(kg)  | AWT50<br>(kg)   | AWT100<br>(kg)  | LOIN<br>(mm)  |
|---|--|--|---|---|---|
| <b>EPD</b>  | 0.1  | 0.8  | 0.5   | 0.7   | 0.3   |
| <b>Accuracy</b>   | 34   | 64   | 42  | 64  | 51  |
| <b>Percentile</b>   | 63   | 95   | 90  | 81  | 82  |
| <b>Compared to a ewe with an EPD of 0, this ewe's progeny will:</b> | Have 0.1 more lambs that survive to weaning due to their genetics      | Have progeny that are 0.8kg heavier at birth due to their genetics       | Have progeny that are 0.5kg heavier at 50 days due to their genetics      | Have progeny that are 0.7kg heavier at 100 days due to their genetics | Be 0.3 mm deeper in loin eye muscle depth due to their genetics |
| Trait Name  | MSURV<br>(lambs)   | MBIRTH<br>(kg)   | MAWT50<br>(kg)  | FAT<br>(mm)   |   |
| <b>EPD</b>  | 0.2  | 0.1  | .3  | -0.2  |   |
| <b>Accuracy</b>   | 24   | 46   | 30  | 36  |   |
| <b>Percentile</b>   | 78   | 64   | 18  | 96  |   |
| <b>Compared to a ewe with an EPD of 0, this ewe's progeny will:</b> | Have 0.2 more lambs that survive to weaning due to her maternal traits | Have progeny that are 0.1 kg heavier at birth due to her maternal traits | Have progeny that are 0.3kg heavier at 50 days due to her maternal traits | Be 0.2 mm leaner due to their genetics                                |   |

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**Weight and Carcass EPD Definitions**

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- SURV**                      Animals with a more positive SURV EPD produce lambs that have a better ability to survive to weaning due to the lamb's own genetics
- BIRTH**                    Animals with a more positive BIRTH EPD produce lambs that are heavier in live weight at birth due to the lamb's own genetics
- AWT50**                    Animals with a more positive AWT50 EPD produce lambs that are heavier in live weight at 50 days of age due to the lamb's own genetics

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| AWT100 | Animals with a more positive AWT100 EPD produce lambs that are heavier at 100 days of age due to the lamb's own genetics   |
| MSURV  | Ewes with a more positive MSURV EPD are better at helping their progeny survive to weaning   |
| MBIRTH | Ewes with a more positive MBIRTH EPD produce lambs that are heavier in live weight at birth due to the ewe's larger womb and her ability to provide nutrients to the fetus   |
| MAWT50 | Ewes with a more positive MAWT50 EPD produce lambs that are heavier in live weight at 50 days of age by having a greater potential for milk production and mothering ability |
| LOIN   | Animals with a more positive LOIN EPD produce lambs which contribute to higher lean meat yield. This value estimates the difference between animals in loin eye depth.       |
| FAT    | Animals with a more negative FAT EPD produce lambs that are leaner. This value estimates the difference between animals in back fat depth.                                   |

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**EPDs for Reproduction Traits**

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| Trait Name  | AGE<br>(days)   | BORN1<br>( lambs)             | WEAN1<br>( lambs)    | INTV<br>(days)   | BORNL<br>( lambs)             | WEANL<br>( lambs)    |
|---|---|-------------------------------|----------------------|--|-------------------------------|----------------------|
| <b>EPD</b>  | -1.2  | 0.03                          | 0.01                 | -3.4   | 0.01                          | 0.02                 |
| <b>Accuracy</b>   | 13  | 13                            | 13                   | 13   | 13                            | 13                   |
| <b>Percentile</b>   | 79  | 68                            | 97                   | 99   | 57                            | 64                   |
| <b>Compared to a ewe with an EPD of 0, this ewe's progeny will:</b> | Give birth to their first set of lambs 1.2 days earlier | Give birth to 0.03 more lambs | Wean 0.01 more lambs | Give birth to their next set of lambs 3.4 days earlier | Give birth to 0.01 more lambs | Wean 0.02 more lambs |

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**Reproduction EPD Definitions**

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| AGE   | Ewes with a more negative AGE EPD will give birth to daughters that will produce progeny earlier                      |
| BORN1 | Ewes with a more positive BORN1 EPD will produce daughters that give birth to more progeny during their first lambing |

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| WEAN1 | Ewes with a more positive WEAN1 EPD will produce daughters that wean more progeny during their first lambing |
| INTV  | Ewes with a more negative INTV EPD will take less time between subsequent lambings                           |
| BORNL | Ewes with a more positive BORNL EPD will produce daughters that give birth to more progeny at later lambings |
| WEANL | Ewes with a more positive WEANL EPD will produce daughters that wean more progeny at later lambings          |

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| <b>Selection Index Definitions</b> | <b>11</b> |
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| TERM  | The terminal index selects animals that have more muscling, less fat and that grow faster. There is a tendency for animals that grow faster to have higher birth weights and less muscling. This index balances the traits so that improvement can be made in both muscling and growth while limiting the increase in birth weight. It is necessary for producers to take real-time ultrasound measurements for fat and muscle depth in order to receive this index. |
| GROW  | The growth index is for producers who do not take real-time ultrasound measurements for fat and muscle depth. This index has been designed to increase growth and minimize the loss in muscling as much as possible. Using this growth index should result in lambs that grow faster than if only one growth trait was used for selection.   |
| MATN  | The maternal index attempts to increase the number born and weaned, and to keep birth weight constant while increasing weight weaned. There is more emphasis put on number of lambs born than on weaned due to the high correlation between the two traits and lower heritability of number weaned.  |
| MATNT | This maternal index has been formulated to have the same function as the maternal index above but it also includes the loin depth and fat depth measurements.  |

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| <b>Selection Index Weighting Factors</b> | <b>12</b> |
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The important thing to realize when using a selection index is that all the traits are weighted separately and differently to create the index. In some cases very different traits for 2 lambs can combine to create the same index value. While indexes are very useful tools, it is always good to consider the individual EPDs to ensure that the indexes, as well as the traits, will contribute to the desired effect you want to achieve with your flock.

Below are the weighting factors for the EPDs in each of the indexes:

|        | <b>GROW</b> | <b>MATN</b> | <b>TERM</b> | <b>MATNT</b> |
|--------|-------------|-------------|-------------|--------------|
| BIRTH  | -0.96       | -0.96       | -1.07       | -1.07        |
| AWT50  | 0.99        | 0.99        | 1.08        | 1.08         |
| GAIN   | 1.32        | 1.32        | 1.29        | 1.29         |
| FAT    |             |             | -1.58       | -1.58        |
| LOIN   |             |             | 0.92        | 0.92         |
| MBIRTH |             | -1.92       |             | -2.14        |
| MAWT50 |             | 1.98        |             | 2.16         |
| BORNL  |             | 10.32       |             | 11.26        |
| WEANL  |             | 9.87        |             | 10.77        |