Back to the Basics
GENETIC BREEDING VALUES

With the amount of information available to producers, things can sometimes get confusing. Every once and a while, it's good to get back to the basics. So, quiz yourself and test your knowledge!

Across

2 The record of an animal's ancestors.

4 Predicts average daughter profit to 6 years of age.

5 A numbered value that quantifies and allows comparison between the genetic potential of animals (two words).

6 After a cow has recorded production data added to her production genetic evaluations, they become _____ Breeding Values.

7 A sire with 20+ daughters from different herds contributing their performance data to his genetic evaluation is considered _____.

8 Recognized internationally as one of Canada's national genetic selection indexes: Lifetime _____ Index.

9 Everything about an animal that can be physically assessed or measured.

Down

1 The genetic potential of an animal.

3 _____ = (Sire EBV + Dam EBV) / 2 (two words).

6 Phenotype = Genotype + _____.

How well did you make out?

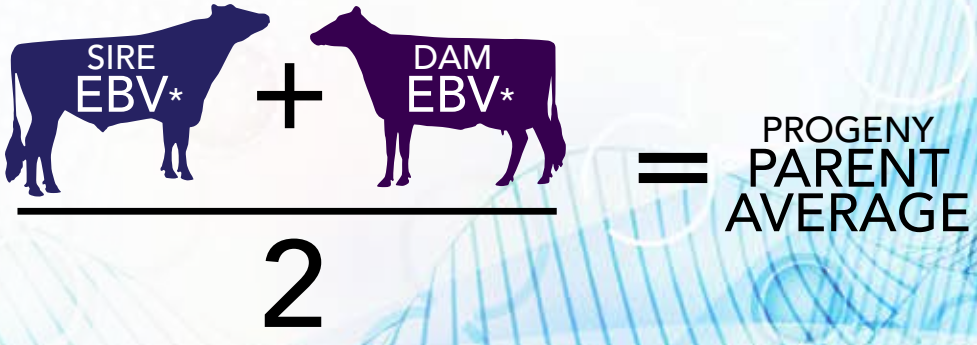
Check out **page 17** for the answers. If you missed a few of the answers, check out this quick explanation which will clarify the answers.

A pedigree is documentation indicating age, purity, basic information and the ancestors of an animal. If the calf is registered, the pedigree information is recorded in the Herdbook and the Canadian Dairy Network (CDN) is able to generate genetic evaluations for many traits. CDN provides genetic evaluations for the seven dairy breeds. Within each breed, all animals receive a genetic evaluation for a complete series of characteristics, including production, conformation and functional traits. These traits are combined into genetic indexes that allow producers to compare animals according to their genetic potential.

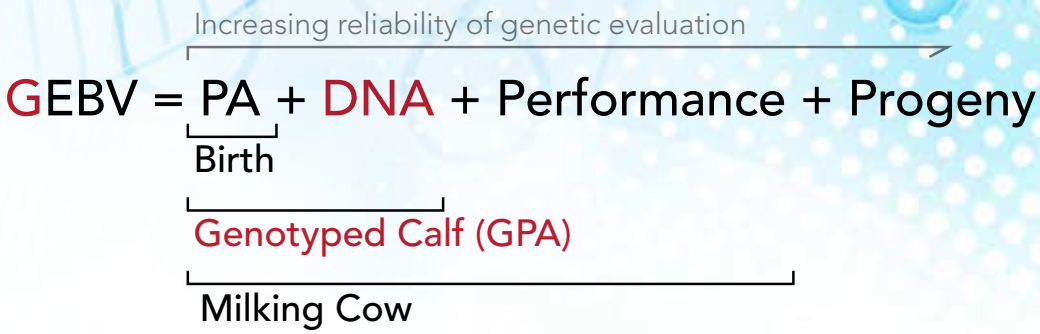
In Canada, we have two national genetic selection indexes: Lifetime Performance Index (LPI) and Pro$ (pronounced Pro dollars). Pro$ is a selection tool that maximizes genetic response for daughter profitability from milk sales. It was developed using on-farm Canadian profit data from DHI, taking current marketplace conditions into account along with the correlations between genetic traits. While LPI is a selection tool related to profit, it has more emphasis on type than Pro$. LPI leads to a balanced genetic response for its three major components (production, durability and health and fertility) and is specific to each breed's goals.

When using genetic indexes, it is important to remember that an animal's performance is the result of her genetic potential AND the environment she is in. This is sometimes expressed in the equation format: Phenotype = Genotype + Environment. Phenotype is the measure of what the animal actually looks like and how she performs. For example, services to conception, conformation assessment and milk recording are phenotypic measurements. Genotype is the genetic makeup of an animal and its ability to transmit its genes to the next generation. The third component of this is the environment which pays a key role in how the animal will actually perform based on the animal's surroundings and management.

The type of genetic evaluation depends on the information going into the calculations. An animal always starts with a Parent Average (PA). This PA can be calculated even before conception by taking the average of the parents' breeding values.



*Depending on the sire and dam, their respective breeding values could be a PA or EBV (or if they are genotyped, a GPA or GEBV).



CROSSWORD ANSWERS

ACROSS: 2. Pedigree 4. Pro$ 5. Genetictindex 6. Estimated 7. Proven 8. Performance 9. Phenotype

DOWN: 1. Genotype 3. ParentAverage 6. Environment

After a heifer calves for the first time, the addition of her own performance data changes her Parent Average to an Estimated Breeding Value (EBV). This is true for conformation traits after 1st lactation classification, production traits following supervised milk recording and consequentially her Pro$ and LPI values. The addition of phenotypic information increases the reliability of her breeding values. With time, more of her own performance data, and eventually her progeny's performance data, get added to her EBV calculations. For males, their progeny performance is required to change their PAs to EBVs. For a sire to become "proven", he needs at least 20 daughters from 10 different herds with both type and production data contributing to his genetic evaluation.

When an animal is genotyped, again increasing the reliability of the calculated breeding value, we add a G to the breeding value type. Therefore a genotyped calf with a PA gets a GPA and an genotyped animal with an EBV would have a GEBV.

Keep an eye open in the coming issues of the InfoHolstein for further explanation on coat colors, genomics strategies and much more!