

Where is the information used coming from?

Breed Associations

Each dairy breed has their own association that provides genetic and performance data to be incorporated into evaluation calculations.

Dairy Herd Information Associations (DHIA)

Dairy cow and herd measurements with correctness and accuracy are the foundation of the DHI system. Data and samples are processed and analyzed to provide a wealth of information including fat, protein, somatic cell count, and Johnes' disease results. DHI field service, Labs and Dairy Records Processing Centers provide somatic cell count reports and genetic or genomic reports¹.

USDA-AGIL

The Animal Genomics and Improvement Laboratory collects all the information and generates the genomic reports. Their mission is to discover and develop improved methods for the genetic and genomic evaluation of economically important traits².



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Genetics

The U.S. Genetic Evaluation System: An Overview



To improve the quality
of the next generation of
a herd with each calf
that is born

Information That Goes Into Evaluations

Predicted Transmitting

Abilities: Genetic evaluations for type and production are computed using Animal Model procedures for estimating Predicted Transmitting Abilities (PTAs)⁴. PTAs are an estimate of genetic superiority that an animal will transmit to their offspring for a given trait. Animal model evaluations are based on an animal and its relationship to other animals being evaluated.

Information from the animal, its ancestors, and its progeny is all incorporated.

Management & Environment:

Accounting for non-genetic factors allows a more meaningful estimate of an animal's genetic merit.

Factors taken into consideration include regional and seasonal effects, genetic merit of mates, genetic competition of herdmates, and environmental correlation between daughters of a sire in the same herd⁴.

Information That Goes Into Evaluations (Cont.)



Production Records: Production records are standardized to account for the effects of age, season at calving, lactation number, and days open in the previous lactation. All records are standardized to a 2X, 305-day mature equivalent basis. A cow's lactation record is included in the evaluation if she has been in milk at least 40 days⁴.

Classification Scores: The Animal Model evaluation system accounts for the effects of age and stage of lactation on final score and linear traits at the time of classification. These scores evaluate individual traits in major dairy scorecard breakdowns to identify each animal's strengths and weaknesses in terms of type³.

Genetic Base: To help adjust for genetic progress and keep evaluations comparable over time, the evaluations use a genetic base as a reference point. The base is defined by making the average PTA for all cows born in a certain year equal to zero (the base year)⁴.

Evaluations are calculated and expressed relative to that base year.

Expression of Genetic Values

Predicted Transmitting Abilities:

PTAs are an estimate of genetic superiority that an animal will transmit to their offspring for a given trait. They are calculated for several traits, including milk, fat, protein, productive life, and final score. The numbers can be used to rank bulls and cows by their genetic merit. Linear type trait genetic evaluations are first calculated as PTAs⁴. PTAs for different type traits can vary a lot and are expressed in different units, so comparison is sometimes difficult. A practical solution for displaying several traits on the same graph is to standardize each of the traits.

Standard Transmitting Abilities:

Genetic evaluations for linear type traits are expressed as standard transmitting abilities (STAs); these STAs allow people to easily compare different traits of the same bull and see which traits have the most extreme values⁴.

Reliability: A measure of the estimated accuracy of the PTA, based on the amount of information included in the evaluation⁴. An animal that has been genomic tested will have a higher reliability than an animal who only has parental information. Reliabilities show how much confidence can be placed in an evaluation.