

Managing Herefords

Talk Like a Cattleman



A glossary of cattle terminology and acronyms.

Accuracy (of selection): Correlation between an animal's unknown actual breeding value and a calculated estimated breeding value for a trait.

Across-breed EPDs: Procedures and adjustment factors that allow direct comparison of EPDs from animals of different breeds. They are based upon across-breed EPD adjustment factors that are added to EPDs provided by the separate genetic evaluation of each breed.

Adjusted weaning weight (WW): An unshrunk, off-the-cow calf weight adjusted to 205 days of age and to a mature dam age equivalence.

Adjusted yearling weight (YW): An unshrunk weight adjusted to either 365, 452, or 550 days of age.

Alleles: Alternate forms of genes. Because genes occur in pairs in body cells, one gene of a pair may have one effect and another gene of that same pair (allele) may have a different effect on the same trait.

Alliance: A cooperative business arrangement in which a cattle producer, sometimes in cooperation with other producers, arranges for the retained ownership and/or contract sale of his/her animals before they actually are produced. The agreement typically defines the breeding system, selection methods, management conditions, and product specifications for the cattle.

Animal model: A genetic prediction procedure in which EPDs are directly computed for all animals in the population. See reduced animal model and sire model.

Artificial insemination (AI): The technique of placing semen from the male into the reproductive tract of the female by means other than natural service.

Average daily gain (ADG): Measurement of the average daily body weight change over a specified period of time of an animal on a feed test.

Backcross: The mating of a two-breed crossbred individual back to one of its parental breeds. Example: A Hereford-Angus crossbred cow bred back to an Angus bull.

Balance: The harmonious relationship of all body parts, blended or symmetry and pleasing appearance.

Barren: Sterile female.

Base pair: The complementary bases found within a DNA molecule. There are four different bases: adenine (A), thymine (T), cytosine (C), and guanine (G). A always pairs with T, and C always pairs with G. The base sequence ultimately determines the effect of the gene.

Beef Improvement Federation (BIF): A federation of organizations, businesses, and individuals interested or involved in performance evaluation of beef cattle. It seeks to build confidence of the beef industry in the principles and potentials of performance testing.

Biological type: A group of cattle breeds having similar geographic origin and past selection history and with similar genetic potential for traits of economic importance. British general purpose beef cattle breeds, for example, have genetic potential for moderate growth, muscling, and milk yield; whereas continental European dual-purpose breeds have genetic potential for high milk yield and rapid growth.

Birth weight (BW): The weight of a calf taken within 24 hours after birth. Heavy birth weights tend to be correlated with calving problems, along with other factors.

Bloom: An inclusive term used to describe the general look of a healthy, clean, lustrous hair coat.

Body capacity: A subjective assessment of the feed intake capacity of an individual or breed, typically assessed by visually evaluating body length, body depth, and spring of ribs.

Body condition score: A score on a scale of 1 to 9, reflecting the amount of fat reserves in a cow's body, where 1 = very thin and 9 = extremely fat.

Bos indicus: A subspecies of cattle of south Asian origin. Often known as Zebu, they have prominent humps forward of the shoulder. The Brahman breed is one example in the U.S.

Bos taurus: A subspecies of cattle of western Asian origin but often referred to as "European." Most breeds commonly found in the U.S. and Canada, and their European ancestors, belong to this group.

Brand: A permanent mark applied to an animal.

Branding iron: The tool used to apply a brand.

Bred: Applies to the pregnant female definitely safe in calf, or pregnant; also used to refer to the mating process.

Breed: Animals with a common origin and selection history. Animals within a breed have physical characteristics that distinguish them from other breeds or groups of animals within that same species.

Breeding objective: The goal of a breeder's selection program, for example to produce high quality, lean meat at lowest cost. It may also include a listing of the traits to be used as selection criteria to achieve the overall goal. Objectives may vary among breeders due to their genetic and physical resources and their markets.

Breeding soundness examination: Inspection of a bull, including evaluation of physical conformation and soundness through genital palpation, scrotal circumference assessment, and testing of semen for motility and morphological abnormalities.

Breeding value: Transmissible genetic merit of an individual, or the value of that individual as a parent. In the U.S. and Canada, genetic predictions are expressed as progeny differences rather than as breeding values. Because any parent contributes only half the genes in any one offspring, the progeny difference of an individual is half its breeding value.

British breeds: Breeds of cattle such as Angus, Hereford and Shorthorn originating in Great Britain.

Bull: A male (un-castrated) bovine animal.

Caesarean section: A process in which the calf is surgically removed from the cow during parturition by making a large incision in the right side of the cow just above the flank.

Calf: A baby bovine animal.

Calving ease: The opposite of calving difficulty. An easy calving is one that does not require assistance and does not impose undue strain on the calf or dam.

Calving ease score: A numerical score quantifying calving ease, ranging from 1 for an easy, unassisted calving through 5 for an abnormal presentation.

Calving season: The season(s) of the year when the calves are born. Limiting calving seasons is the first step to performance testing the whole herd, accurate records, and consolidated management practices.

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Carcass evaluation: Techniques for measuring components of quality and quantity in carcasses and using the information for genetic prediction of carcass merit.

Carcass merit: Desirability of a carcass relative to quantity of components (muscle, fat, and bone), USDA quality grade, and potential eating quality.

Carcass quality grade: An estimate of palatability based primarily on marbling and maturity and generally to a lesser extent on color, texture, and firmness of lean.

Carrier: An individual that is heterozygous, having one dominant and one recessive allele at a given locus. For example, an animal with one gene for polledness and one gene for horns will be polled but can produce horned offspring when mated to another animal carrying the gene for horns.

Castrate: To remove the testes of male cattle.

Central test: A comparison conducted at a single location where animals are assembled from several herds to evaluate differences in performance traits under uniform management conditions.

Chromosome: Chromosomes are paired strands of DNA, with accompanying structural proteins, on which genes are located. Domestic cattle have 30 pairs of chromosomes, one chromosome of each pair having been inherited from each parent. One random chromosome of each pair is transmitted to each egg or sperm cell produced by a parent.

Closed herd: A herd in which no outside breeding stock (cattle) are introduced.

Commercial producers: Producers whose primary goal is to produce animals for herd replacement, feeding and harvest rather than breeding stock for sale to other producers. Progressive commercial producers seek bulls or semen from seedstock breeders that have comprehensive programs designed to produce animals with optimum genetic merit for the combination of traits that increase efficiency and profit of their production system.

Compensatory gain: Rapid, subsequent gain of cattle that have been nutritionally deprived for some portion of their life.

Complementarity: The combining of breeds or individual animals that have

characteristics that complement each other, thereby obtaining optimum progeny.

Composite breed: A breed made up of combinations of other breeds.

Concentrate: Feed grains and other processed feed materials that contain a high proportion of nutrients and are low in fiber, such as corn, oats or soybean meal.

Conformation: A description of the shape of body parts of an animal.

Congenital: A condition that was acquired during prenatal life and therefore exists at or dates from birth. The term is often used in the context of defects present at birth.

Contemporary group: A group of cattle that are of the same breed and sex, are similar in age, and have been raised in the same management group (same location on the same feed and pasture). Contemporary groups should include as many cattle as can be accurately compared.

Continental (European) breed: Breeds originally developed on the continent of Europe. Examples include Simmental, Limousin and Charolais.

Correlation: A numerical measure, ranging between -1.00 and +1.00, describing how two traits are related. A high positive correlation means that as one trait increases, the other one usually does as well. For example, cattle with higher than average yearling weight generally will have larger mature size as well. When traits are negatively correlated, if one is above average, the other is likely to be below average.

Cow: A female bovine animal that has had one or more calves.

Crossbreeding: The mating of animals of different breeds or subspecies, frequently resulting in heterosis (hybrid vigor) for many economically important traits.

Cryptorchid: Male cattle with undescended testes.

Culling: The process of eliminating less productive or less desirable individuals from a herd.

Cutability: An estimate of the percentage of salable meat (muscle) from a carcass versus percentage of waste fat. Percentage retail yield of carcass weight can be estimated by a USDA prediction equation that includes measured or estimated values for hot carcass weight, rib eye area,

fat thickness, and estimated percent of kidney, pelvic, and heart fat.

Dehorning: The process of removing the horns from an animal when they are young. This is often done to help minimize injury to other cattle and handlers.

Deviation: The difference between an individual record and the average for that trait in the individual's contemporary group. For all animals within a contemporary group, these differences sum to zero when the correct average is used. A ratio deviation is an individual's ratio minus the group average ratio or 100.

Direct effect: For weaning weight that portion of preweaning growth that is due to the calf's genetics (see Maternal Effect).

Direct EPD: An EPD representing the effect of the individual's own genes on the trait of interest. A calving ease direct EPD, for example, represents calving ease of an individual's progeny. See also Maternal EPD.

Disposition (temperament): A measure of an animal's docility, wildness, or aggression toward unfamiliar situations, human handlers, or management interventions.

DNA (Deoxyribonucleic acid): The chemical compound that stores within each cell genetic information unique to an individual. A DNA molecule is composed of two strands of nucleotides bound to one another by chemical bonds between each complementary (A-T and G-C) base pair. The molecule has the appearance of a twisted ladder. The sequence of bases within DNA molecules determine amino acid sequences of proteins, control development, and establish the genetic potential for production of the individual.

Dominant: An allele is dominant when its presence prevents a recessive allele from affecting the phenotype of an individual heterozygous at the locus in question. For example, the allele for polledness (P) is dominant to the allele allowing growth of horns (p), so an animal with the genotype Pp shows the polled form of the trait.

Double muscling: A simply inherited trait evidenced by an enlargement of the muscles with large grooves between the muscle systems especially noticeable in the hind leg.

Dystocia (calving difficulty): Abnormal or difficult labor causing difficulty in delivering the fetus and/or placenta. Difficult births lead

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to increased calf and cow mortality and to more difficult rebreeding of the cow.

Ear tag: Method of identification by attaching a tag to the ear.

Economically relevant trait (ERT): Traits that are of direct economic importance to cattle producers.

Embryo transfer: Removing fertilized ova (embryos) from one cow (the donor), generally in response to hormone-induced superovulation, and placing these embryos into other cows (the recipients). More calves can be obtained from cows of superior breeding value by this technique.

Environment: All external (nongenetic) conditions that influence the reproduction, production, and carcass merit of cattle. When environmental influences on phenotypic merit are not properly accounted for in genetic evaluations, they reduce the accuracy of breeding value estimation and of subsequent selection.

Environment interaction: When the difference in performance among genetic groups depends upon the environment in which they are compared. For example, the most profitable breed in the Great Plains is probably not the same as the most profitable breed on the Gulf Coast. Also, different breeds and crosses will be optimum for producing beef for different market specifications and requirements.

Estimated breeding value (EBV): An estimate of an individual's true breeding value for a trait based on the performance of the individual and close relatives for the trait itself and sometimes performance of genetically correlated traits. EBV is a systematic way of combining available performance information on the individual and sibs and the progeny of the individual. Expected progeny differences have replaced EBVs in most breed association programs.

Estrous synchronization: Using synthetic hormones to make a group of females come in heat at the same time. They can then be bred at the same time and all the calves will be born in a short period, ensuring uniform ages in calf crop and lower labor requirements.

Expected Progeny Difference (EPD): The difference in expected performance of future progeny of an individual, compared with expected performance of future progeny of an individual of average genetic merit in the base time frame for the genetic evaluation. EPDs

are estimated from phenotypic merit of an individual and all of its relatives and are estimates of one-half the breeding values. EPDs are generally reported in units of measurement for the trait (e.g., lb., cm., etc.).

F1: Offspring resulting from the mating of a purebred (straight-bred) bull to purebred (straight-bred) females of another breed.

Fat thickness: Depth of fat in tenths of inches over the rib eye muscle at the 12th rib. It consists of a single measurement at a point three-fourths of the lateral length of the rib eye muscle from the split chine bone.

Feed conversion (feed efficiency): Units of feed consumed per unit of weight gained.

Fertilization: The union of the male and female gametes to form a new, genetically unique individual. In cattle, sperm and egg cells with 30 chromosomes each combine to form a zygote with the 60 chromosomes normal to the species.

Finish: The degree of fatness.

Founder: A nutritional ailment from overeating; foundered animals become lame with sore front feet and excessive hoof growth.

Frame score: score based on subjective evaluation or actual measurement of hip height.

Freemartin: Female born twin to a bull calf (approximately 9 out of 10 will be infertile).

Gene: A gene is a discrete segment of the DNA molecule, located at a specific site (its locus) on a specific chromosome pair. Two copies of each gene exist in each nucleated diploid cell in an animal. Only one gene of each pair is randomly transmitted to the offspring through the gamete. The unique nucleotide sequence of each gene determines its specific biological role.

Gene marker: A specific sequence of nucleotides that is easily detectable and can be used to differentiate among alleles at a locus.

General-purpose breed: A breed with acceptable genetic merit in reproductive, maternal, growth, and carcass traits, but not specialized in either terminal or maternal characteristics. Such breeds frequently are used in rotational crossbreeding programs.

Generation interval: Average age of parents when the offspring destined

to replace them are born. It should be computed separately for male and female parents and then represents the average turnover rate of bulls and cows in the herd. When other factors are held constant, generation interval is inversely related to the rate of response to selection. That is, rapid generation turnover enhances rate of selection response.

Genetic antagonism: A genetic correlation in which desirable genetic change in one of the traits is accompanied by an undesirable change in the other. For example, because of the positive genetic correlation between milk yield potential and cow maintenance requirement, selection for increased milk would lead also to increased feed cost for maintenance.

Genetic correlations: Correlations between breeding values for two traits that arise because some of the same genes affect both of them. When two traits (weaning and yearling weight for example) are positively genetically correlated, successful selection for one trait will result in an increase in the other trait as well. When two traits are negatively genetically correlated (birth weight and calving ease, for example), successful selection for one trait will result in a decrease in the other.

Genetic linkage map: A diagram showing where genes and markers are located on a chromosome and their relationship to one another.

Genome: The entire complement of DNA characteristic to individuals of a species.

Genotype: The two alleles present at a locus in an individual. For a locus with only two alleles, three genotypes are possible. For example, at the polled/horned locus in cattle, two common alleles are P (the dominant allele preventing growth of horns) and p (the recessive allele allowing horn growth). The three possible genotypes are PP (homozygous dominant), Pp (heterozygous or carrier), and pp (homozygous recessive).

Gestation: The period of pregnancy or the period of time from conception until young are born, averaging about 285 days in cattle.

Get: Calves sired by the same bull.

Get-of-sire: A show division in which all animals shown are sired by the same bull.

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Half-sibs: Individuals having the same sire but different dams (or less commonly the same dam but different sires). Half-brothers, half-sisters, or half brother/sister.

Harvest: To slaughter an animal.

Heat: The recurrent period of sexual receptiveness in cows, when the cow will stand for the bull to breeder her. Also known as estrus.

Heifer: A young female bovine that has not had a calf.

Heritability: The proportion of the differences among cattle, measured or observed, that is transmitted, on average, to their offspring. Heritability of different traits may vary from zero to one. The higher the heritability of a trait, the more accurately individual performance predicts breeding value and the more rapid should be the response to selection for that trait.

Heritability estimate: An estimate of the proportion of the total phenotypic variation between individuals for a certain trait that is due to transmissible genetic merit. It is the proportion of total variation for a trait caused by differences among individuals in breeding value.

Heterosis (hybrid vigor): Amount by which the average performance for a trait in crossbred calves exceeds the average performance of the two or more purebreds that were mated in that particular cross.

Heterozygote: A genotype in which the two alleles at a locus are different, e.g. Pp.

Homozygote: A genotype in which the two alleles at a locus are the same, e.g. PP or pp.

Hot carcass weight: Weight of a carcass just prior to chilling.

Inbreeding: The mating together of parents more closely related than average in the population. Inbreeding decreases the proportion of heterozygous gene pairs in the offspring and increases the proportion of homozygous gene pairs. It increases the frequency of expression of genetic defects caused by recessive genes. Inbreeding may increase prepotency for simply inherited and highly heritable traits.

Inbreeding coefficient: A numerical measure, ranging from zero to 1.0, of the intensity of inbreeding of an individual. It represents the proportion of gene loci in the individual at which both genes are identical copies of the same ancestral gene.

Inbreeding depression: The reduction in performance level for many economically important traits that accompanies, on average, the increase in inbreeding coefficient.

Indicator traits: Traits that do not have direct economic importance, but aid in the prediction of economically important traits.

Integrated resource management (IRM): Producing beef cattle in a manner that efficiently, profitably, and sustainably uses available human and physical resources.

Interim EPD: An EPD computed from an individual's own performance information and/or the EPDs of its parents. Interim EPDs may be used to support selection and merchandizing decisions before EPDs from regularly scheduled national cattle evaluation runs become available.

Kidney, pelvic and heart fat (KPH): The internal carcass fat associated with the kidney, pelvic cavity, and heart. It is expressed as a percentage of chilled carcass weight.

Lactation: The period of calf nursing between birth and weaning.

Lethal gene: A gene or genes that cause the death of any individual in which they are expressed.

Libido: Sex drive. In bulls, the propensity to detect and mate estrous females.

Linebreeding: A form of inbreeding in which an attempt is made to concentrate the inheritance of some favored ancestor in descendants within a herd. The average relationship of the individuals in the herd to this ancestor is increased by linebreeding, but at the cost of an increased level of inbreeding.

Linecross: Offspring produced by crossing two or more inbred lines.

Locus: The specific location of a gene on a chromosome.

Maintenance energy requirement: The amount of feed energy required per day by an animal to maintain its body weight and support necessary metabolic functions.

Marbling: The specks of fat (intramuscular fat) distributed in muscular tissue. Marbling is usually evaluated in the rib eye between the 12th and 13th rib. It is a major factor in assigning USDA quality grade of a beef carcass.

Marker Assisted Selection (MAS):

The use of genetic markers to select for specific alleles at linked QTLs and therefore specific traits.

Maternal EPD: An EPD representing the effect of the genes of an individual's daughters on the trait of interest. A calving ease maternal EPD, for example, represents the ease with which an individual's daughter's calves are born.

Maternal heterosis: Amount by which the average performance for a trait in the progeny of crossbred cows exceeds the average performance of progeny of purebred cows of the two or more breed ancestors of the crossbred cows.

Maternal sires: Sires whose major function is to sire daughters (often crossbreds) with outstanding genetic merit for reproductive and maternal traits, adaptability to prevailing environmental conditions, and longevity. Such females would ideally be crossed to sires of a terminal breed with all offspring marketed.

Maturity: An estimation of the physiological age of the animal or carcass. It is assigned by assessing muscle characteristics and the stage of bone maturity.

Metabolic body size: The weight of the animal raised to the $\frac{3}{4}$ power ($W^{0.75}$); a value indicative of the feed required to meet metabolic needs and maintain current body weight.

Microsatellite: A type of genetic marker. It is composed of repeating nucleotide sequences within DNA that are locus specific and variable in the number of times the sequence is repeated.

Minisatellite: A type of genetic marker widely used in DNA fingerprinting that consists of repeating subsets of nucleotides that are highly polymorphic and widely distributed throughout the genome.

Morphology: A parameter recorded during microscopic examination of semen in the standardized breeding soundness evaluation quantifying the visual characteristics of spermatozoa, expressed as the percentage that appear normal.

Motility: A parameter recorded during microscopic examination of semen in the standardized breeding soundness evaluation quantifying spermatozoa movement, expressed as the percentage demonstrating forward progressive motility.

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National Hereford Feedout: Formerly the Genetic Outreach Program the National Hereford Feedout is open to producers from across the country to consign whiteface cattle. The Kansas Hereford Association organizes the program in such a way that Hereford and Hereford-English cross pens can be entered in the test with just a minimum of five head.

Number of contemporaries: The number of animals of similar breed, sex, and age against which an animal was compared in performance tests. The greater the number of contemporaries, the greater the accuracy of comparisons.

Outbreeding (outcrossing): Mating together of animals that are not closely related. Mild outbreeding is illustrated by mating cows to a sire of their own breed but who is not closely related to them. Such outcrossing may widen the genetic base in a herd and reduce inbreeding accumulation. A higher level of outcrossing is illustrated by crossing two *Bos taurus* breeds. This generally would result in beneficial heterosis for economically important traits.

Ovulation: Release of the female germ cell (egg or ovum) by the ovary. Cows usually ovulate several hours (up to 15 hours) after the end of estrus or standing heat.

Palatability: Acceptable to the taste or sufficiently agreeable in flavor to be eaten.

Parturition: The act of giving birth; calving.

Pedigree: A tabulation of names of an individual's ancestors, usually only those of the three to five closest generations. Pedigree information is used to establish genetic relationships among individuals to use in genetic evaluations.

Percent calf crop: The percentage cows and heifers exposed to breeding within a herd and year that produce calves.

Performance data: The record of the individual animal for reproduction, production, or carcass merit. The most useful performance records for management, selection, and promotion decisions will vary among purebred breeders and for purebred breeders compared with commercial cattle producers.

Performance pedigree: A pedigree that includes performance records of the individual, ancestors, relatives, and progeny in addition to the usual

pedigree information. Expected progeny differences may also be included.

Performance testing: Measure of individual performance; specifically, rate and efficiency of growth and carcass traits.

Phenotype: The visible or measurable expression of a character; weaning weight, postweaning gain, or reproduction for example. For most traits, phenotype is influenced by both genotype and environment.

Polled: Naturally hornless cattle. Having no horns or scurs.

Possible change: The amount by which an individual's current EPD might reasonably be expected to change (either upwards or downwards) as more information becomes available in subsequent national cattle evaluations. This measurement of error in prediction decreases as the number of offspring per sire increases.

Postpartum: After the birth of an individual.

Postpartum interval: The number of days between parturition and the first postpartum estrus.

Prepotency: The ability of a parent to transmit its characteristics to its offspring so that they resemble that parent, and one another, more than usual. An individual that is homozygous for a dominant allele will show prepotency for the trait controlled by that gene, but not necessarily for any other trait. Inbred cattle, having a higher than average degree of homozygosity, may be more prepotent than outbred cattle but only for simply inherited or highly heritable traits.

Prewaning gain: Weight gained between birth and weaning.

Progeny: The young, or offspring, of the parents.

Progeny testing: Evaluating the genotype or estimating the breeding value of an individual by evaluating the comparative phenotypic merit of its progeny.

Puberty: The age at which the reproductive organs become functionally operative and secondary sex characteristics begin to develop.

Purebred: An animal of known ancestry within a recognized breed that is eligible for registry in the official herd book of that breed.

Qualitative (categorical) traits: Those traits in which there is a sharp distinction between phenotypes, such as black vs. red or polled vs. horned. Only one or a few pairs of genes are involved in the expression of many qualitative traits.

Quantitative Trait Loci (QTL): A gene locus that has an effect on a quantitative trait. Often the actual nucleotide sequence is unknown, so selection is based upon genotype at a linked gene marker.

Quantitative traits: Those traits, such as weaning weight, in which there is no sharp distinction in the range of phenotypes, with a gradual variation from one extreme to the other. Usually, many gene pairs are involved as well as environmental influences affect variation for such traits.

Rate of genetic improvement: The amount of improvement per unit of time (year). The rate of improvement is dependent on: (1) heritability of traits considered, (2) selection differentials, (3) genetic correlations among traits considered, (4) generation interval in the herd, and (5) the number of traits for which selections are made.

Ratio: An expression of an animal's performance for a particular trait relative to the herd or contemporary group average.

Recessive: Recessive alleles are expressed only when homozygous. They must have been inherited from both parents before the phenotype with which they are associated can be expressed. At the locus affected the growth or absence of horns, for example, homozygous recessive pp individuals are horned whereas PP and Pp individuals are polled.

Reference sire: A bull that has previously been progeny tested and subjected to national cattle evaluation that is used concurrently with a test sire or sires in a new progeny test program. Reference sires provide genetic linkages among herds and/or existing databases, allowing indirect comparison of the test sire with bulls evaluated at other places and times.

Regression: A measure of the relationship between two variables expressing the expected change in one of them per unit change in the other. Using regression methods, the value of one trait can be predicted by knowing the value of others. For example, easily obtained carcass traits (hot carcass weight, fat

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thickness, rib eye area, and percentage of internal fat) are used to predict percent cutability.

Relative economic value: The amount by which net income to the cattle enterprise will change, per unit change in genetic merit for a trait.

Rib eye area: Area in square inches of the longissimus muscle measured at the 12th rib interface on the beef forequarter.

Ribonucleic acid (RNA): A single-stranded molecule composed of ribonucleotides. RNA differs from DNA in that it contains the base uracil (U) instead of thymine (T). RNA is formed from DNA through transcription. It is involved in transferring and translating the genetic message from a gene into a protein product with a specific physiological function.

Rotational crossbreeding: Systems of crossing two or more breeds where the crossbred females are bred to bulls of the breed contributing the lowest proportion of genes to those females. Rotational crossbreeding systems maintain relatively high levels of heterosis and allow for replacement heifers to be produced from within the system.

Roughage: High fiber plant materials that contain a low proportion of nutrients and are usually bulky and coarse, such as hay, silage and forages.

Roundup: Times when ranchers will gather cattle for vaccinations, wean calves and prepare them to be sold.

Scrotal circumference: A measure of testes size obtained by measuring the distance around the testicles in the scrotum with a circular tape. Related to semen producing capacity and age at puberty of female sibs and progeny.

Scurs: Horny tissue or rudimentary horns that are attached to the skin rather than the bony parts of the head

Seedstock breeders: Producers whose primary goal is to produce breeding stock rather than animals for feeding and harvest. Progressive seedstock breeders have comprehensive programs designed to produce animals with optimum genetic merit for the combination of traits that will increase downstream profit of commercial beef production.

Selection: Choosing some individuals and rejecting others as parents of the next generation of offspring.

Selection index: A formula that combines performance records from several traits or different measurements of the same trait into a single value for each animal. Selection indexes assign relative emphasis to different traits according to their relative net economic importance, their heritabilities, and the genetic associations among them.

Serving capacity: A measure of the motivation, willingness, and ability of a bull to detect and service females in estrus.

Sibs: Brothers and sisters of an individual.

Sire model: A genetic prediction procedure in which EPDs are directly computed for all sires with progeny in the population.

Sire summary: Published genetic predictions (EPDs) of sires for economically important traits from national cattle evaluation programs.

Sperm: A mature male germ cell.

Springer: Heifer or cow showing signs of advanced pregnancy; near calving.

Standardized performance analysis (SPA): A set of programs that allow producers to collect, process, and interpret information on biological efficiency and economic returns to a seedstock or commercial beef production enterprise.

Steer: Castrated male bovine.

Super ovulation: Process by which a cow is treated with reproductive hormones to induce her to produce more eggs than normal.

Supplement: Nutritional additive intended to remedy deficiencies of the diet, such as salt, minerals, protein.

Tandem selection: Selection for one trait at a time. When the desired level is reached in one trait, then selection is practiced for a second trait.

Tattoo number: Numbers, and sometimes letters, tattooed in the ear or ears to permanently identify the animal.

Temperament (disposition): A measure of the relative docility, wildness, or aggression of an animal toward unfamiliar situations, human handlers, or management interventions.

Terminal sires: Sires used in a crossbreeding system in which all of the progeny, both male and female, are

marketed. For example F, crossbred dams could be bred to terminal sires of a third breed and all calves marketed. Although this system allows maximum heterosis and complementary of breeds, replacement females must come from other herds.

Transcription: The process by which an RNA copy is made from a gene.

Translation: The process by which ribosomes use the nucleotide sequence in RNA to synthesize proteins.

Ultrasonic measurements: A non-invasive method used to estimate carcass characteristics and reproductive events. It operates off the principle that sound waves echo differently with different densities of tissue.

USDA yield grade: Measurements of carcass cutability categorized into numerical categories with 1 being the leanest and 5 being the fattest. Yield grade and cutability are predicted from the same four carcass traits.

Variance: Variance is a statistic that numerically describes the differences among individuals for a trait in a population. Without variation, no genetic progress would be possible, since genetically superior animals would not be distinguishable from genetically inferior ones.

Weight per day of age (WDA): Weight of an individual divided by its age in days.

Whole Herd Reporting (WHR): An inventory based performance recording system in which the production of all animals in a breeding herd and the performance of all progeny are accounted for annually. In calf-based systems, by contrast, progeny performance data may be recorded selectively and production information is not gathered on females who do not produce live calves. An inventory based Whole Herd Reporting system is necessary to acquire the data for genetic evaluation of some reproductive traits.

Yield grade (see cutability): A numerical score ranging from 1 (high yield) to 5 (low yield) reflecting the expected proportion of boneless, closely-trimmed cuts from the beef carcass. It is estimated from a USDA prediction equation that includes measured or estimated values for hot carcass weight, rib eye area, fat thickness, and estimated percentage of kidney, pelvic, and heart fat.

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Acronyms:

ADG	average daily gain	EU	European Union
AHA	American Hereford Association	F1	progeny resulting from the cross of two purebreds
AI	artificial insemination	F2	progeny resulting from the cross of an F1 with a purebred
AHW	American Hereford Women	FAT	backfat EPD
ANCW	American National CattleWomen	FDA	Food and Drug Administration
APHIS	Animal and Plant Health Inspection Service	FE	feed efficiency
AVMA	American Veterinary Medical Association	F:G	feed-to-gain (usually expressed as a ratio)
BCIA	beef cattle improvement association	FMD	foot-and-mouth disease
BCIP	beef cattle improvement program(s)	FMI	Food Marketing Institute
BCS	body condition score(s)	FSH	follicle-stimulating hormone
BIC	Beef Industry Council	FSIS	Food Safety and Inspection Service
BIF	Beef Improvement Federation	FY	fiscal year
BII\$	Brahman influence profit index EPD	GnRH	gonadotropin-releasing hormone
BLM	Bureau of Land Management	HPI	Hereford Publications Inc.
BLV	bovine leukosis virus	HSUS	Humane Society of the United States
BMI\$	baldie maternal profit index EPD	HYFA	Hereford Youth Foundation of America
BMP	best management practice	IBR	infectious bovine rhinotracheitis
BQA	Beef Quality Assurance	IE	idiopathic epilepsy
BQAP	Beef Quality Assurance Program	IMF	intramuscular fat (marbling); also refers to EPD
BRD	bovine respiratory disease	IRM	Integrated Resource Management
BRSV	bovine respiratory syncytial virus	JNHE	Junior National Hereford
BSE	bovine spongiform encephalopathy also sometimes used to refer to breeding soundness exam.	LH	luteinizing hormone
bST	bovine somatotropin	M&G	milk and growth EPD
BVD	bovine viral diarrhea	MARC	Roman L. Hruska U.S. Meat Animal Research Center
BW	birth weight	MLV	modified-live virus
CAFO	concentrated animal feeding operations	MM	maternal milk EPD
CBB	Cattlemen's Beef Board	NAILE	North American International Livestock Exposition
CE	calving ease direct EPD	NASS	National Agricultural Statistics Service of USDA
CEZ\$	calving ease profit index EPD (always use dollar sign with abbreviation)	NBCEC	National Beef Cattle Evaluation Consortium
CHAPS	Cow Herd Analysis and Performance System	NBQA	National Beef Quality Audit
CHB	Certified Hereford Beef	NCBA	National Cattlemen's Beef Association
CHB\$	Certified Hereford Beef profit index EPD	NJHA	National Junior Hereford Association
CIDR	Controlled Internal Drug Release insert, used for synchronization	NOP	National Organization of Poll-ettes
CL	corpus luteum	NWSS	National Western Stock Show
CME	Chicago Mercantile Exchange Inc.	PACE	Pan-American Cattle Evaluation
CP	crude protein	PI	persistently infected
CREP	Conservation Reserve Enhancement Program	PI3	parainfluenza-3 virus
CRI	Cooperative Resources International	PRIDE	Program for Reaching Individuals Determined to Excel Convention
CRP	Conservation Reserve Program	QSA	Quality System Assessment
CWD	chronic wasting disease	REA	ribeye area, also refers to EPD
DDGS	distillers' dried grains with solubles	RFI	residual feed intake
DOD	Dam(s) of Distinction	RFID	radio frequency identification
DTN	Data Transmission Network	SC	scrotal circumference, also refers to EPD
DVM	doctor of veterinary medicine	SPA	Standardized Performance Analysis
DWG	distillers' wet grains	TPR	Total Performance Records
EID	electronic identification	UGC	Ultrasound Guidelines Council
EPA	Environmental Protection Agency	USDA	U.S. Department of Agriculture
EPD	expected progeny differences	USMEF	U.S. Meat Export Federation
EQIP	Environmental Quality Incentives Program, NRCS provides leadership	WDA	weight per day of age
ERS	Economic Research Service of USDA	WW	weaning weight, also refers to EPD
ET	embryo transfer	YG	yield grade
		YW	yearling weight, also refers to EPD