

Test Your Language Skills

Can You Speak Performance?

Today's cattleman speaks a new language—performance. His familiarity of the performance jargon is basic to communications within the industry. Give yourself the language test. Can you speak performance fluently?

Accuracy (of selection). Correlation between "true" breeding value and estimated breeding value.

Adjusted Weaning Weight (WW). Weight adjusted to 205 days of age and for age of dam.

Adjusted Yearling Weight (YW). Weight adjusted to either 365, 452 or 550 days of age and for age of dam.

Ad Lib Feeding. No limit placed on amount of feed intake. Self feeding or allowing cattle to consume feed on a free-choice basis.

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.

Artificial Insemination (A.I.). The technique of placing semen from the male in the reproductive tract of the female by means other than natural service.

Average Daily Gain. Measurement of daily change in body weight when animals are fed for tests.

Backcross. The crossing of the F₁ offspring with either of the parental breeds.

Beef Carcass Data Service. A program whereby producers can receive carcass evaluation data on their cattle by using a special "carcass data" eartag in their slaughter animals. See county extension director, breed representative, BCIA representative or area office of USDA meat grading service for information.

Beef Improvement Federation (BIF). A federation or organization of persons interested or involved in performance evaluation of beef cattle. The purposes of BIF are to bring about uniformity of procedures, development of programs, cooperation among interested entities, education of its members and its ultimate consumers, and confidence of the beef industry in the principles and potentials of performance testing.

Birth Weight (BW). The weight of a calf taken within 24 hours after birth. Heavy birth weights tend to be correlated with calving problems, but the conformation of the calf and the cow are contributing factors.

Breed. Animals having a common origin

and characteristics which distinguish them from other groups within the same species.

Breeder. In most beef breed associations, the owner of the dam of a calf at the time she was mated or bred to produce that calf.

Breeding Program Goals. The objective or direction of breeder's selection programs. Goals are basic decisions breeders must make to give direction to their breeding program. Goals should vary among breeders due to relative genetic merit of their cattle, their resources and their markets.

Breeding Value. Value of an animal as a parent. The working definition is twice the difference between an infinitely large number of progeny and the population average when individuals are mated at random within the population and all progeny are managed alike. The difference is doubled because only a sample half (one gene of each pair) is transmitted from a parent to each progeny. Breeding value exists for each trait and is dependent on the population in which the animal is evaluated. For a given trait, an individual can be an above average producer in one herd and a below average producer in another herd.

British Breeds. Breeds of cattle such as Angus, Hereford and Shorthorn native to Great Britain.

Bull. An uncastrated male bovine.

Calf. The sexually immature young of cattle.

Calf Crop. The number or percentage of calves produced within a herd in a given year relative to the number of cows and heifers exposed to breeding.

Calving (Parturition). The act of giving birth.

Calving Difficulty (Dystocia). Abnormal or difficult labor, causing difficulty in delivering the fetus and placenta.

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.

Carcass Evaluation. Technique of measuring components of quality and quantity of carcasses.

Carcass Merit. Desirability of a carcass relative to quantity or edible portion and quality of product.

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. Days on feed and fat thickness (of 0.25 inches or more) are comparable to quality grade in estimating eating quality.

Carcass Quantity. Amount of salable meat the carcass will yield. Cutability is an estimate of percentage retail yield from a carcass.

Carrier. A heterozygous individual having one recessive gene and one dominant gene for a given pair of genes (alleles). For example, an animal with one gene for polledness and one gene for horns will be polled but can produce horned offspring.

Chromosome. Chromosomes are long DNA molecules on which genes (the basic genetic



codes) are located. Domestic cattle have 30 pairs of chromosomes.

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

Collateral Relatives. Relatives of an individual which are not its ancestors or descendants. Sibs are an example of collateral relatives.

Conception. The fertilization of the ovum or egg. The act of conceiving or becoming pregnant.

Congenital. Acquired during prenatal life. It exists at or dates from birth.

Contemporary Group. A group of cattle that are of the same breed and sex 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.

Correlation. A measure of how two traits vary together. A correlation of +1.00 means that as one trait increases the other also increases—a perfect positive relationship. A correlation of -1.00 means that as one trait increases the other decreases—a perfect negative, or inverse, relationship. A correlation of 0.00 means that as one trait increases, the other may increase or decrease—no consistent relationship. Correlation coefficients may vary between +1.00 and -1.00.

Cow. A mature female bovine.

Crossbreeding. The mating of animals of different breeds (or species). Crossbreeding takes advantage of hybrid vigor or heterosis.

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

Cutability. An estimate of the percentage of salable meat from a carcass. Percentage of retail yield of carcass weight can be estimated by a USDA prediction equation that includes hot carcass weight, ribeye area, fat thickness and estimated percent of kidney, pelvic and heart fat.

Dam. The female parent.

Deviation. A difference between an individual record and the average for that trait for that contemporary group. These differences sum to zero when the correct average is used. A ratio deviation is the ratio less the average ratio or 100.

Dominant. Dominant genes affect the phenotype when present in either homozygous or heterozygous condition. A dominant gene need only to be obtained from one parent to achieve expression.

Dystocia (Calving Difficulty). Abnormal or difficult labor, causing difficulty in delivering the fetus and placenta.

Economic Value. The net return to an enterprise for making a unit change in a particular trait.

Environment. All external (nongenetic) conditions which influence the reproduction, production and carcass merit of cattle.

Embryo. A fertilized ovum (egg) in the earlier stages of prenatal development up to development of body parts.

Embryo Transfer. Removing fertilized ova (embryos) from one cow (donor dam) and placing these embryos into other cows (host cows). More calves can be obtained from cows of superior breeding value by this technique. Only proven producers should become donor dams.

Estimate. The process of calculating a particular value from data (verb). The value itself obtained from data (noun). The idea is that the true value is being obtained from the calculated value within limits of sampling variation.

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. EBV is a systematic way of combining available performance information on the individual, brothers and sisters of the individual, and the progeny of the individual, to improve the accuracy of selection compared with selection based on individual performance alone.

Estrus (Heat). The recurrent, restricted period of sexual receptivity in cows and heifers. Nonpregnant cows and heifers usually come into heat 18 to 21 days following their previous estrus.

Expected Progeny Difference (EPD). The difference in performance to be expected from future progeny of a sire, compared to that expected from future progeny of the average bull in the same test. EPD is an estimate based on progeny testing and is equal

to one-half the estimate of breeding value obtainable from the progeny test records.

F₁. Offspring resulting from the mating of a purebred (straightbred) bull to females of another purebred (straightbred) breed.

Feed Conversion (Feed Efficiency). Units of feed consumed per unit of weight increase. Also, the production (meat, milk) per unit of feed consumed.

Fetus. The unborn young of cattle after the body parts are formed.

Frame Score. A score based on subjective evaluation of height or measurement of hip height. This score is related to slaughter weights at which cattle will grade choice or have half an inch of fat cover over the loin eye at the 12th-13th rib.

Freemartin. Female born twin to a bull calf (approximately 9 out of 10 will not conceive).

Generation Interval. Average age of the parents when the offspring destined to replace them are born. A generation represents the average rate of turnover of a herd.

Genes. The basic units of heredity that occur in pairs and have their effect in pairs in the individual, but which are transmitted singly (one or the other gene at random of each pair) from each parent to offspring.

Genetic Correlations. Correlations between two traits caused by the same genes influencing both traits or multiple gene action. Successful selection for one of two traits that are positively, highly correlated will result in an increase in the other trait. If the genes that influence two traits generally cause desirable performance in one trait and undesirable performance in the other trait, improvement by selection within one herd will be difficult.

Genotype. Actual genetic makeup (constitution) of an individual determined by its genes or germplasm. For example, there are two genotypes for the polled phenotype [PP (homozygous dominant) and P_p (heterozygote)].

Genotype—Environment Interaction. Variation in the relative ranking of the performance of genotypes from one environ-

ment to another. For example, the "best" cattle (genotypes) for one environment may not be the "best" for another environment.

Gonad. The gland of a male or female that produces the reproductive cells. The testicle in the male and the ovaries in the female.

Half-Sibs. Individuals having the same sire or dam. Half-brothers and half-sisters.

Heat Synchronization. Causing a group of cows or heifers to exhibit heat together at one time by artificial manipulation of the estrus cycle.

Heifer. A female of the cattle species less than 3 years of age that has not borne a calf.

Herd. A group of cattle (animals) collectively considered as a unit.

Heredity. The transmission of genetic or physical traits of parents to their offspring.

Heritability. The proportion of the differences among cattle, measured or observed, that is transmitted to the offspring. Heritability varies from zero to one. The higher the

heritability of a trait, the more accurately does individual performance predict breeding value and the more rapid should be the response due 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 heredity. More specifically, hereditary variation due to additive gene action.

Heterosis (hybrid vigor). Amount by which the crossbreds exceed the average of the two purebreds that are crossed to produce the crossbreds.

Heterozygous. Genes of a specific pair (alleles) are alike in an individual.

Homozygous. Genes of a specific pair (alleles) are alike in an individual.

Inbreeding. Production of offspring from parent more closely related than the average of a population. Inbreeding increases the proportion of homozygous gene pairs and decreases the proportion of heterozygous gene pairs. Also, inbreeding increases prepotency and uncovering of undesirable recessive genes.

Independent Culling Levels. Selection or culling based on cattle meeting specific levels of performance for each trait included in the breeder's selection program. For example, a breeder could cull all heifers with weaning weights below 400 pounds (or those in the bottom 20 percent on weaning weight) and yearling weights below 650 pounds (or those in the bottom 40 percent).

Involution. The return of an organ to its normal size or condition after enlargement, as of the uterus after parturition. A decline in size or activity of other tissues; the mammary gland tissues normally involute with advancing lactation.

Linebreeding. A form of inbreeding in which an attempt is made to concentrate the inheritance of some one ancestor, or line of ancestors, in a herd. The average relationship of the individuals in the herd to this ancestor (outstanding individual or individuals) is increased by linebreeding.

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

Marbling. The specks of fat (intramuscular fat) distributed in muscular tissue. Marbling is usually evaluated in the ribeye at the 12th-13th rib.

Metabolic Body Size. The weight of the animal raised to the $\frac{3}{4}$ power ($W^{0.75}$); a figure to indicate level of metabolism to maintain a certain body weight.

Metabolism. The transformation by which energy is made available for body uses.

Most Probable Producing Ability (MPPA). An estimate of a cow's future productivity for a trait (such as progeny weaning weight ratio) based on her past productivity. For example, a cow's MPPA for weaning ratio is calculated from the cow's average progeny weaning ratio, the number of her progeny with weaning records, and the repeatability of weaning weight.

National Sire Evaluation. Programs of sire evaluation conducted by breed associations to compare sires on a progeny test basis. Carefully conducted national reference sire evaluation programs give unbiased estimates of expected progeny differences. Sire evaluations based on field data rely on large numbers of progeny per sire to compensate for possible favoritism or bias for sires within herds.

Nonadditive Gene Effects. Favorable effects or actions produced by specific gene pairs or combinations. Nonadditive gene action is the primary cause of heterosis. Nonadditive gene action occurs when the heterozygous genotype is not intermediate in phenotypic value to the two homozygous genotypes.

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

Open. A term commonly used to indicate a nonpregnant female.

Optimum Level of Performance. The most profitable or favorable ranges in levels of performance for the economically important traits in a given environment and management system. For example, although many cows produce too little milk, in every management system there is a point beyond which higher levels of milk production will decrease profit.

Outcrossing. Mating of individuals that are less closely related than the average of the breed. Commercial breeders and some purebred breeders should be outcrossing by periodically adding new sires that are unrelated to their cow herd. This outcrossing should reduce the possibility of loss of vigor due to inbreeding.

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

Pedigree. A tabulation of names of ancestors, usually only those of the three to five closest generations.

Performance Data. The record of the individual animal for specific traits such as birth weight, weaning weight, postweaning gain, yearling weight, etc.

Performance Pedigree. A pedigree that includes performance records in addition to the usual pedigree information. Performance records for the individual and certain ancestors and progeny records of the individual and certain ancestors are included on the performance pedigree of some breed associations. Also, the performance information is systematically combined to list estimated breeding values on the pedigrees of some breed associations.

Performance Testing. The systematic collection of comparative production information for use in decision making to improve efficiency and profitability of beef production. Differences in performance among cat-

tle must be utilized in decision making for performance testing to be beneficial. The most useful performance records for management, selection and promotion decisions will vary among purebred breeders and for purebred breeders compared to commercial cattle producers.

Phenotype. The visible or measurable expression of a character; for example, weaning weight, postweaning gain, reproduction, etc. Phenotype is influenced by genotype and environment.

Phenotypic Correlations. Correlations between two traits caused by both genetic and environmental factors influencing both traits.

Polled. Naturally hornless cattle. Having no horns.

Pounds of Retail Cuts per Day of Age. A measure of cutability and growth combined, it is calculated as follows: (cutability × carcass weight) ÷ by age in days. Also, it is reported as lean weight per day of age (LWDA) by some associations.

Possible Change. The variation (either plus or minus) that is possible for each expected progeny difference (EPD). This measurement of error in prediction or estimation of EPD decreases as the number of offspring per sire increases.

Prepotent. The ability of a parent to stamp its characteristics on its offspring so that they resemble that parent, or each other more than usual. Homozygous dominant individuals are prepotent. Also, inbred cattle tend to be more prepotent than outbred cattle.

Progeny. The offspring of animals.

Progeny Records. The average, comparative performance on the progeny of sires and dams.

Progeny Testing. Evaluating the genotype of an individual by a study of its progeny records.

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

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

Qualitative Traits. Those traits in which there is a sharp distinction between phenotypes, such as black and white or polled and horned. Usually, only one or few pairs of genes are involved.

Quantitative Traits. Those traits in which there is no sharp distinction between phenotypes, with a gradual variation from one phenotype to another, such as weaning weight. Usually, many gene pairs are involved, as well as environmental influences.

Random Mating. A system of mating where every female (cow and heifer) has an equal or random chance of being assigned to any bull used for breeding in a particular breeding season. Random mating is required for accurate progeny tests.

Rate of Genetic Improvement. Rate of improvement per unit of time (year). The rate of improvement is dependent on: (1) herita-

bility 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.

Reach. The difference between the average performance level of the cow herd and the performance level of the herd sire.

Recessive Gene. Recessive genes affect the phenotype only when present in a homozygous condition. Recessive genes must be received from both parents before the phenotype caused by the recessive genes can be observed.

Reference Sire. A bull designated to be used as a benchmark in progeny testing other bulls (young sires). Progeny by reference sires in several herds enable comparisons to be made between bulls not producing progeny in the same herd(s).

Regression (Regressed). A measure of the relationship between two variables. The response of value of one trait can be predicted by knowing the value of the other variable. For example, easily obtained carcass traits (hot carcass weight, fat) thickness, ribeye area and percent of internal fat are used to predict percent cutability.

Rotational Crossbreeding. Systems of crossing two or more breeds where the crossbreed females are bred to bulls of the breed containing the least genes to that female's genotype. Rotation systems maintain relatively high levels of heterosis and produce

replacement heifers from within the system. Opportunity to select replacement heifers is greater for rotation systems than for other crossbreeding systems.

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

Seed Stock Breeders. Producers of breeding stock for purebred and commercial breeders. Progressive seed stock breeders have comprehensive programs designed to produce an optimum or desirable combination of economical traits (genetic package) that will ultimately increase the profitability of commercial beef production.

Selection. Causing or allowing certain individuals in a population to produce offspring in the next generation.

Selection Differential (Reach). The difference between the average for a trait of the selected cattle and the average of the group from which they came. The expected response from selection for a trait is equal to selection differential times the heritability of the trait.

Selection Index. A formula which combines performance records from several traits or different measurements of the same trait into a single value for each animal. Selection indexes weigh the traits for their relative net economic importance and their heritabilities plus the genetic associations among the traits.

Sibs. Brothers and sisters of an individual.

Steer. A male bovine castrated before the development of secondary sex characteristics.

Terminal Sires. Sires used in a crossbreeding system where all their progeny, both male and female, are marketed. For example, F₁ crossbred dams could be bred to sires of a third breed and all calves marketed. Although this system allows maximum heterosis and complementarity of breeds, replacement females must come from other herds.

Trait Ratio. An expression of an animal's performance for a particular trait relative to the herd or contemporary group average. It is usually calculated for most traits as:

$$\frac{\text{Individual record}}{\text{Average of animals in group}} \times 100$$

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 based on the same four carcass traits.

Variance. Variance is a statistic which describes the variation we see in a trait. Without variation, no genetic progress is 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 days of age. 