

Performance Data Reporting and Contemporary Grouping For Beef Cattle Genetic Evaluation

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The process of analyzing individual performance records and converting them to meaningful predictors of an animal's genetic merit is a process that has undoubtedly been debated in countless pickup trucks, sale arenas, coffee shops, kitchen tables and most certainly many professors' offices. In many ways the genetic evaluation of beef cattle is very complex. However, the basic premise used to compare animals is very simple. The basis on which all animals are evaluated is how they (and/or their progeny and grand-progeny) performed against their contemporaries. In other words, how did the animal perform within its contemporary group?

We know that not all the differences in an animal's performance are related to its genetics. Part of the difference is due to environmental effects. The result of the expression of an animal's genetics in an environment is an animal's phenotype. Every performance measure cattle producers take of an animal is a measurement of the animal's phenotype. For example, we know, and adjust, for the fact that the weaning weights of calves born to 2-year-old dams are lighter than the weights recorded for calves born to 5- or 6-year-old dams. An individual calf's weaning weight is the result of the calf's genetics for pre-weaning growth and the environment in which the calf was raised. This environment includes the herd, year and season it was born, the amount of milk provided by the calf's dam, which was influenced by the amount of grass she ate, the age of the dam, the calf's sex, and other effects that would also be experienced by the calf's contemporaries.

EPDs were designed to predict an animal's genetic value after environmental effects have been removed. Since EPDs are calculated on the basis of comparisons, it makes sense that we must make fair comparisons. In a sense, comparing apples to apples and oranges to oranges. When animals are appropriately grouped with contemporaries in terms of similar management and environment, then differences in performance are likely due to differences in genetics. Thus, proper contemporary grouping is critical for EPDs to be accurate.

The contemporary group helps animal geneticists separate genetic differences from environmental effects so that animals are compared on a level playing field. A common technical definition of a contemporary group is "a group of the same breed (not required in multi-breed systems such as the MB-ICE system that produces Chianina EPDs), born within a 90-day period, raised at the same location or in the same herd, of the same sex and managed alike from birth until time of measurement." More simply put, a contemporary group is a group of animals that have had an equal opportunity to perform.

Many breed registries help breeders to define correct contemporary groups according to the breed percentage (not required in multi-breed systems), sex, calving period and herd, but producers must carefully group animals according to other management and environmental factors like health and nutrition. Even so, individual breeders are ultimately responsible for the accurate contemporary grouping of their animals. It is likely that only you know the management history of your herd. When completing performance data entry forms, consideration should always be given to the management and nutrition of the calves and their dams, and then they should be grouped accordingly.

In theory, contemporary grouping is easy, but the application of contemporary grouping in real life can present many challenging decisions. A common error in building contemporary groups is breeders not assigning enough groupings to accommodate calves that have received unequal treatment. Just as damaging, some breeders create too many contemporary groups. Assignments should be as simple as possible while still accounting for major differences in management. A useful method to aid in contemporary grouping is to assign distinct contemporary group codes to animals that are exceptions to regular management practices. For example, calves that received preferential treatment (cattle being fitted for show, for example) should be placed within their own contemporary group.

It is important to note that contemporary groups never increase in size after the calving season is over. A contemporary group may, however, decrease in size. Often, as calves get older the contemporary group will decrease in size due to culling, injury, sickness, death or assignment to sub-groups that reflect different management treatments. Contemporary groups cannot be recombined once animals have been defined to be members of separate groups.

Reporting complete data is an important part of contemporary grouping that deserves special attention. In order to make EPDs as accurate as possible, it is critical that complete and accurate performance data be submitted on every calf born in your herd. Incomplete or inaccurate data reduces the reliability of each animal's EPDs. The preciseness of an animal's EPDs, particularly animals that have no progeny, depend greatly on an animal's own performance record.

It is important to report all the calves born on your farm or ranch and their respective weights. Granted reporting all data takes more effort, but the benefits far outweigh the costs. Sending performance data to many breed registries on "computes" or non-registered animals is often at a reduced or no charge. If you do not report all the data, the overall performance records of your operation will not be as accurate as they could be. Every calf should be weighed at birth. No exceptions! Yes, especially weigh the DEAD ones. It is important that both the sire and dam of a dead calf get the credit they deserve. Reporting only the good calves does not identify the poor producing parents. Not only will reporting each calf aid the accurate calculation of EPDs, it will also keep

the dam's production record current. Often breeders will try to economize by only sending in data and registering a portion of their calf crop, usually the top end.

The practice of only reporting part of the contemporary group data is seriously flawed! It is as important, maybe more important, to identify the bottom end of the genetics and cull them, as it is to identify the top end. Additionally, by not reporting the bottom end of the calves, the top end doesn't get the credit they truly deserve.

For example, a producer has 10 bull calves. The average weaning weight for all 10 calves is 625 pounds (see Table 1). Note that calf #1 is 101 lb. below the group average and has a ratio of 84, while the best calf (#10) is 117 lb. above the average with a ratio of 119. It is important to remember that National Cattle Evaluation programs focus on the deviations (or difference) of calf weights from the average of the contemporary group rather than each calf's adjusted weight.

Now let's consider the calves if the producer reports only the heavy half of the calves. The new group average is 675 lb. The average weight, ratios and deviations are shown in the right portion of the table. With the new grouping, the heaviest calf (#10) has a ratio of only 110 and a deviation of +67 lb. He still looks good, but not as growthy as he really is. More importantly, notice calf #6. When all the calves are considered, he was slightly above the average (ratio = 102, deviation = +14). If only the heavy calves are reported, he now looks inferior with a deviation of -36 and a ratio of 95. When data is only submitted on the best or poorest calves, they are being treated unfairly. And, the resulting culling and selection decisions the producer makes will be flawed.

Each calf you raise depends on you for a fair comparison relative to its mates. Many producers think it is advantageous to only report the best calves, when in fact it penalizes them. Only you know how your calves have been managed. Make sure your contemporary groupings reflect this knowledge. Common contemporary group criteria used in genetic evaluations are listed below. Some helpful tips for breeders to use in creating contemporary groups are included in the section 'A Guide to Contemporary Grouping.'

Table 1. Weaning Weight Contemporary Example

Calf ID	Adj. 205d. Weight	All Calves Reported		Top Half Reported	
		Deviation	Ratio	Deviation	Ratio
1	524	-101	84		
2	562	-63	90		
3	578	-47	93		
4	605	-20	97		
5	606	-19	97		
6	639	14	102	-36	95
7	643	18	103	-32	95
8	655	30	105	-20	97
9	694	69	111	19	103
10	742	117	119	67	110
Average Deviation and Ratio		0	100	0	100
Average Weight		625		675	

A Guide to Contemporary Grouping

1. Use group codes on registration application or performance data submission forms to assign calves to contemporary groups.
2. Use the group codes to put a sick or injured calf into a single animal contemporary group if the illness or injury affected the calf's performance.
3. Take weaning weights and measurements on all calves on the same day (when a majority of the calves are between 160 and 250 days of age), including as many calves in each contemporary group as legitimately possible.
4. Weigh all animals in a group before separating them, especially before separating show calves or bulls for a test station.
5. If the age spread of calves is greater than 90 days, choose two or more weigh dates, using as few as possible.
6. Have progeny from two or more sires in each contemporary group.
7. When calves are within an appropriate age range for each trait, record yearling weight, height, scrotal circumference, pelvic area, and ultrasound measurements on the same day.
8. If carcass data are to be collected on cull bulls, heifers or steers, report weaning weights on all animals. These data allows selection of replacement females and bulls to be accounted for in genetic evaluations and help prevent bias in the predictions.
9. Do not weigh each calf individually as it reaches 205 days of age but rather weigh each calf in a group individually when calves average approximately 205 days of age.
10. Do not include calves receiving special treatment (show, bull test, sale) in the same group with those that did not receive an equal opportunity to perform.