

Central bull tests offer

A Means of Comparison

Story by **Scott Barao**



PHOTOS OF THE INDIANA BEEF EVALUATION PROGRAM BULL TEST BY BRAD PARKER

Each year a large number of bulls are evaluated through central test stations, offering several distinct advantages to purebred and commercial cattle producers in that area.

Each bull is the product of both genetics and the environment in which he is reared. Genotype, or genetic makeup, determines his value as a sire. The best estimate of a young bull's genotype is his phenotype, or physical expression of each trait. If the environment for a group of cattle can be standardized, then the genetic differences that exist between them can be more accurately assessed.

The role of the central test station is to provide an environment conducive to the evaluation of genetic differences for several economic traits that are inherent in a group of bulls. Most tests follow a standard format in which bulls are delivered to the test facility when they are approximately 7 months of age. After a two- to three-week warm-up period — during which they adjust to the facilities, their ration, and each other — the bulls are placed on a gain test for a certain number of days. The Maryland Central Bull Test is a 140-day gain test, but 112-day tests are also common.

Tests may vary from forage tests to high-energy rations. For the Maryland test, we formulate rations to be high enough in energy to allow bulls to express their genetic potential but still remain sound and useful. In most cases, the bulls are sold by public auction shortly after the test ends.

Test stations provide purebred breeders with an objective way to compare the performance of a sample of their bulls with others of the same breed. Likewise, the stations provide commercial cattle and seedstock producers an excellent source of performance-tested bulls from several herds. In most cases, the bulls are evaluated for growth and for several other traits of importance to the commercial cattle industry.

At the conclusion of the test, bulls are generally 12-14 months of age. The bulls have been together (in the same environment) for about 40% of their lives. Bear in mind that 60% of each bull's life was spent in a different environment — on the farm from which he came. Subsequently, you must use some caution in evaluating lifetime gains or other traits that are influenced by the pretest environment.

What are the traits of value that can be measured in a test station? How are measures of each interpreted? Here are some insights:

► Average daily gain is the most meaningful figure obtained at a test station. It is under strong genetic control, so it is relatively assured that a fast-gaining bull will sire progeny that are above average in that trait.

CONTINUED ON PAGE 154

A Means of Comparison CONTINUED FROM PAGE 152

Core traits

Growth, or average daily gain (ADG). This is the single-most meaningful figure obtained at a test station. It is simply the total gain made by the bull during the test period divided by the length of the test. This figure is under strong genetic control, so it is relatively assured that a fast-gaining bull will sire progeny that are above average in that trait.

An average daily gain ratio is used to express the performance of each individual bull relative to the average of his contemporaries. For example, a ratio of 110 indicates that a bull has gained at a rate 10% above average. Likewise, a ratio of 85 indicates the bull's gain was 15% below the average of the others.

Not all test stations establish ratio groups on the same basis. Thus, you should find out exactly how contemporary groups are determined before using the resulting ratios. Bulls may be ratioed within breeds or across all bulls on test together.

Weight per day of age (WDA). This figure is calculated by dividing the off-test weight by the age of the bull (in days) at that time. It provides a measure of lifetime performance to this point. Remember, however, that about 60% of the lives of the bulls tested together were in different environments.

Weight per day of age indicates something about a bull's potential for growth and about his pretest environment, especially when it is evaluated with the on-test average daily gain. For example, if a bull has a relatively low weight per day of age as compared to his test gain, it can be assumed that his pretest environment did not allow him to express his potential for growth, and his high gain on test is at least partially a result of compensatory gain.

On the other hand, a high weight per day of age compared to the test gain may mean that the bull had an excellent pretest environment. The ideal situation is for a bull to be considerably above average in both average daily gain and weight per day of age.



Adjusted yearling weight (adj. YW).

This figure attempts to estimate what each bull's weight would have been at exactly 365 days of age. It is a slightly better predictor of genetic growth potential than is weight per day of age.

Index, or ranking. Many test stations will have an overall index to help rank bulls on their total desirability. Since these indexes may vary considerably from one test



► Expected progeny differences reported at central test stations are valuable because they provide some across-herd estimates of genetic differences for traits such as milk and birth weights not measured at the station.

station to another, it is difficult to generalize about them. As a potential buyer, you should determine inputs into the index and decide whether this index reflects the selection emphasis that is best for your operation.

Other traits

Frame score or hip height. The beef industry is demanding cattle with high cutability at desired harvest weights. To produce optimum carcasses, cattle should be harvested at an optimum weight for their frame score.

Large-frame cattle usually gain more rapidly than their small-frame contemporaries, and they generally produce carcasses

that are leaner, with higher cutability but a lower quality grade at a given weight end point. Frame size is an additional attempt to describe the bulls on test and to give an additional predictor of what to expect of their progeny.

Efficient cattle are those whose frame size is compatible with their environment.

Fat thickness. Calculated retail yield (or yield grade) is a function of the lean-to-fat ratio in the carcass. The single most important measurement in the cutability formula is the measure of subcutaneous fat over the ribeye on the carcass. This fat measurement can be approximated on a live animal using ultrasound. When interpreting this measurement, remember: most steers are harvested between 1,100 and 1,200 pounds (lb.), cattle get fatter as they get heavier, and steers are generally 0.25 inch (in.) fatter than bulls at the same weight.

Percent intramuscular fat (%IMF). A second measure of fatness gathered via live-animal ultrasound is percent intramuscular fat (often referred to as marbling). This is a measure of the fat content within the ribeye muscle. It can provide some information about the ultimate quality of a carcass.

Ribeye area (REA). Carcass muscle can also be estimated by ultrasound equipment. As with all measures of performance, ribeye area estimates should be adjusted to a constant age or weight

CONTINUED ON PAGE 156

A Means of Comparison CONTINUED FROM PAGE 154

before comparisons between animals are made.

Scrotal circumference (SC). Scrotal circumference in yearling bulls is a direct indication of the rate and extent of testicular development and sperm-producing capability. Because the correlation is high between the scrotal circumference of a bull and the age of puberty of his half-sisters or daughters, scrotal circumference is a valuable prediction of reproductive potential.

A bull with a large scrotal circumference can be expected to produce more sperm cells each day and to sire daughters that will reach puberty at an earlier age. Scrotal circumference should be adjusted to a standard bull age and a constant age of dam before bulls are compared.

Expected progeny differences (EPDs).

Expected progeny differences are the best estimate available of a bull's future progeny performance relative to the average sire in the breed. Expected progeny differences are calculated based upon an individual's own performance, performance of relatives and, eventually, performance of progeny.

Expected progeny differences reported at central test stations are valuable because they provide some across-herd estimates of genetic differences for traits such as milk and birth weights not measured at the station. Remember that expected progeny differences on yearling bulls in test stations will be based largely on the performance of relatives and accuracies will be relatively low.

Birth weight. This is the most important known trait contributing to calving ease. Since percent calf crop weaned is the trait of greatest economic importance to the commercial industry, birth weight should be of considerable interest to

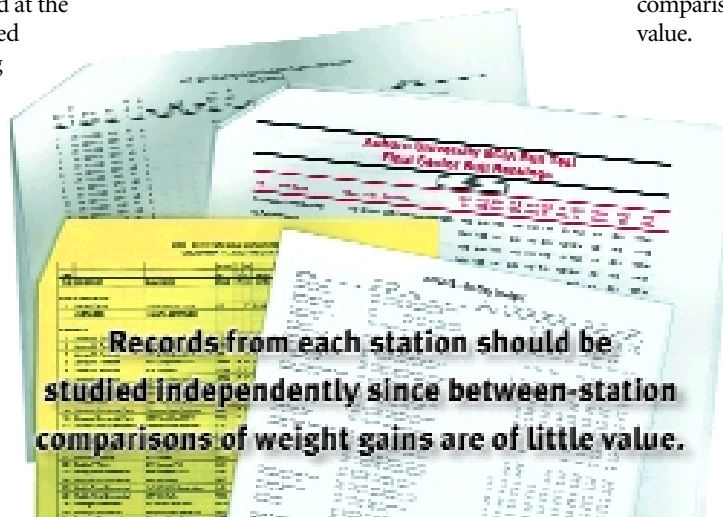


► The role of the central test station is to provide an environment conducive to the evaluation of the several economic traits that are inherent in a group of bulls.

commercial cattle producers. The age and size of a bull's dam can have considerable impact on his birth weight, but a bull's actual birth weight can still be very informative about the amount of calving difficulty one might encounter with his calves. Most birth weights presented are unadjusted.

Weaning weights and ratios. The pretest environment will have a major influence upon the level of performance.

meaningful comparisons of genetic differences between bulls from many herds. To maximize their value to the industry, test stations should include measures of weight gain, reproductive potential and body composition. These will include measures at the station, pretest measurements and expected progeny differences. Records from each station should be studied independently since between-station comparisons of weight gains are of little value.



Records from each station should be studied independently since between-station comparisons of weight gains are of little value.

However, an individual's weaning weight ratio can serve as a good indication of the level of performance within the herd of origin and also of the relative milking ability of the bull's dam.

Comparisons between stations. Some individuals have suggested that all test station operators should feed similar rations to allow comparison of the bulls fed at different stations. The cost and availability of different feedstuffs make this impractical. Even if similar rations were fed at different stations, important influences that cannot be controlled (such as weather) would make meaningless any comparison of actual gain figures between stations.

Summary

Central test stations are useful to the beef industry because they allow

Editor's Note: Scott Barao is an Extension livestock specialist and beef program leader with the University of Maryland department of animal and avian sciences, College Park, Md. He coordinates the Maryland Central Bull Test conducted at Queenstown, Md. This article is reprinted with permission from the "Animal Agriculture Update" newsletter published by the University of Maryland Cooperative Extension.