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Performance Testing Beef Cattle

F. W. Crandall

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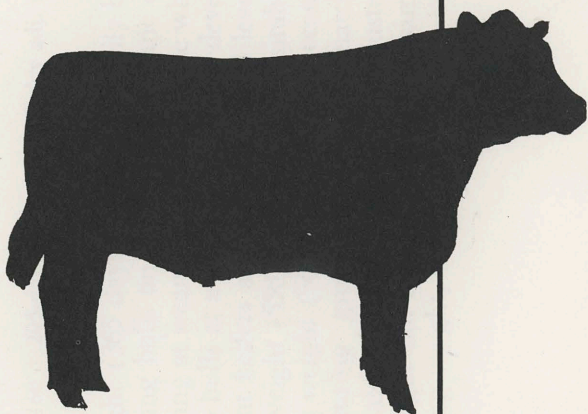
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PERFORMANCE

TESTING

BEEF CATTLE



Cooperative Extension Service:
South Dakota State University
and U. S. Department of Agriculture

C. 1

Performance testing measures genetic differences in beef cattle, providing an additional tool for use in a selection and culling program. It measures individual characteristics of economic importance and helps a breeder identify individuals of genetic importance within his herd.

A performance testing program for beef cattle may be simple or elaborate. A rancher may be interested only in weaning weight data or he may want to combine that data with information on any or all the following factors: birth weight, rate of gain, 12- or 18-month weight, feed efficiency, grade and carcass evaluation.

Adjustments must be made for such environmental variation as differences in age, sex differences, and age of dam. This increases the effectiveness of selection because a greater portion of the differences measured are due to heredity.

Record of performance program begins with the positive identification of the new-born calf. This can be done by tattooing the ear or by using one of several types of tags. The types of tag used is usually governed by its cost and the ease with which it can be read. Record the identification number, sex, date of birth, and identification number of sire and dam in a manner that will best serve your purpose. It is simplest to mark calves shortly after birth, but if it is more convenient to mark only once or twice a week, it will have little or no effect on subsequent weaning weight records.

Birth weights are optional in a record of performance program. The advantage of knowing birth weight is in having a more accurate measure of gain from birth to weaning. There is a positive relationship between birth weight and weaning weight. Calves born heavier usually maintain the advantage.

Birth weights may be useful in selecting for optimum size; that is, to get as heavy a calf as possible without calving trouble. It can have some positive value in a progeny test for choosing sires for use on heifers.

Individual birth weights are not used in the South Dakota program in the record adjustment procedure. An average birth weight of 70 pounds is used primarily because taking birth weights is difficult on most ranches.

Weaning weight records are important in selecting replacement heifers and culling the cow herd for increased production. On most operations it is impossible to weigh all calves at exactly the same

age. Since the ages will vary, it is necessary to adjust these weights to a common age.

Weaning weights are taken to measure the mothering ability of the cow as well as the growth potential of the calf. It is necessary to adjust individual calf records to a standard age. The standard generally accepted by performance test programs throughout the United States is 205 days of age. The object of this adjustment is to arrive at the best estimate of what a calf of a particular sex, nursing a mature dam, would have weighed at exactly 205 days of age. Weigh the calf between 140 and 250 days of age, but as near the 205-day age as possible.

Weights are usually taken at the time the calves are weaned. Calves can be weighed prior to weaning if it is more convenient, but do not take weights after weaning, as calves may vary in their response to their post-weaning environment. This tends to influence the best estimate for the traits being measured.

To adjust an individual weight to a standard 205-day basis, determine the average daily gain from birth to date of weighing (subtract a constant 70-pound birth weight from the actual weight, then divide that figure by actual age in days when weighed). Multiply the average daily gain by 205 days and add the 70 pounds birth weight. This gives the 205-day weight, which can be summarized by the following formula:

$$\frac{\text{Act. Wt. (lbs.)} - 70 \text{ lbs.}}{\text{Age in days}} \times 205 \text{ days} + 70 \text{ lbs.} = 205\text{-day adj. wt.}$$

This weight is adjusted for age only. No adjustment has been made for sex or age of dam.

The age of dam influences the weaning weight of a calf. In most herds cows will vary widely in age; therefore, adjustment for these differences is necessary. A cow reaches her productive potential at about 5 years of age and there is little decrease in her productivity until she has passed 10 years.

In order to adjust for variations that might be due to differences in cow ages, it is advisable to adjust all cows to a mature basis. Multiply the adjusted 205-day weight by the following factors according to age of dam:

2 years	1.15
3 years	1.10
4 years	1.05
5 through 10 years	no adjustment
11 years and older	1.05

Sex adjustments are made primarily to allow comparison of cow production on a herd-wide basis. Bull calves normally attain greater weights than steer calves, and steer calves weigh more than heifer calves. Records for growth of individual animals can be reported within a sex group or adjusted to a common sex. When converting 205-day weights to a common sex, base calculations on a 10% difference between bulls and heifers, with steer weights being 5% less than bulls and 5% greater than heifers. To convert 205-day weights adjusted for age and age of dam from one sex to another, the following factors are used:

- Heifers multiplied by 1.10 = bull
- Steers multiplied by 1.05 = bull
- Heifers multiplied by 1.05 = steer
- Bulls multiplied by .95 = steer

Weaning weights recorded in commercial herds are usually adjusted to a steer basis. Purebred herds are either reported as within sex groups or converted to a bull basis. The South Dakota program adjusts all herds to a steer basis.

Yearling or 365-day weights are computed separately for each sex. The post weaning period begins on the day weaning weights are taken. The period between weaning and final weight should be at least 140 days, and the final weight should not be taken when the animal is less than 350 days of age. A longer post-weaning rate of gain period is desirable—160 days or longer—but it should be the same for all animals of the same sex within a herd.

Compute 365-day weights by subtracting the actual weaning weight from the actual final weight and dividing by the number of days between the weights. This produces the average daily gain. Multiply average daily gain by 160 days and add it to the 205-day weight adjusted for age and age of dam to obtain the 365-day adjusted weight. The following formula is appropriate for computing adjusted 365 day weight:

$$\frac{\text{Act. final wt.} - \text{Act. wn. wt.}}{\text{No. of days between wts.}} \times 160 + 205\text{-day adj. wt.} = 365\text{-day adj. wt.}$$

Yearling weight (365 days) is used primarily by breeders developing bulls on a fairly high plane of nutrition, beginning at weaning time. For those who prefer to develop bulls at a slower rate or for developing replacement heifers at a more practical level, a long yearling weight (550 days) is more desirable than the yearling weight (365 days). This is accomplished by measuring growth for approximately 345 days immediately following weaning. Adjusted long yearling weight can be calculated in the same manner as yearling weight, except that 345 days are

substituted for the 160 days previously used. The formula becomes:

$$\frac{\text{Act. final wt.} - \text{Act. wn. wt.}}{\text{No. of days between wts.}} \times 345 + 205\text{-day adj. wt.} = 550\text{-day adj. wt.}$$

Weight ratios or index values can be used to readily determine the relative position of any animal in a test in comparison with the rest of the group. Such information is valuable in a selection and culling program and may be valuable for sale purposes. For instance, if we say that a certain animal had a weaning weight of 460 pounds and made a gain of 2.4 pounds per day on test, we have said nothing about the relative value of this animal compared with the rest of the animals that were tested. On the other hand, if we assign an index value or calculate a weight ratio for each factor, we establish the relative value of this animal in relation to the balance of the group.

The South Dakota program uses weight ratio figures rather than indexing each factor. Weight ratios are calculated by dividing each individual adjusted weight by the average weight of the group in which it is tested. The average adjusted weight of all calves in a herd is equal to 100. By dividing individual adjusted weight by the average, we arrive at a number either greater or less than 100. For instance, if the average adjusted weaning weight for a herd is 400 pounds and an individual's weight is 460 pounds, we divide the 460 by 400 and arrive at a figure of 1.15. This is multiplied by 100 to arrive at the 115 figure that is entered on the weaning weight summaries. The procedure is the same as that used to calculate percentage.

Weight ratios calculated on this basis are often termed index numbers. They are not index numbers, however, since there has been no adjustment of the actual percentage figure. They do indicate the rank of each individual within the group and offer assistance to the producer in selecting animals on the basis of their relative performance within the group in which they were tested. Since several managerial and environmental factors enter in, they are not valid for comparing animals from different herds or animals from different groups.

Calculate weight ratios within sex groups. If the group includes more than one sex, adjust weights to a common sex before weight ratios are calculated. Sire, dam, and sex group summaries are made by averaging the weight ratios of the animals involved in each group.

Conformation, grade, or type scores are used in many of the performance record programs. There appears to be little relationship between an animal's

ability to grow or gain weight and its conformation score. Conformation or type evaluation must be done by visual appraisal and is subject to opinion and error. It does have value as an assurance of selecting for structural soundness and thickness of natural fleshing or muscling.

Weaning weight scores probably have less value than scores assessed at a later age, since they can be influenced by condition and bloom to some degree. Scores should be made by at least three individuals observing the cattle independently, and the final score should be the result of averaging the three individual scores.

The South Dakota program reports these scores as actual values. Scoring is done by assigning numbers to each animal. Numbers range from 0 to 17, with zero the lowest possible score and 17 the highest. Generally speaking, 15 to 17 indicates animals that are in the fancy feeder grade or purebred animals of show quality. Grades of 12 to 14 are feeder cattle in the choice grades, or animals suitable for breeding stock in purebred herds. Scores of 9 to 11 are good grade feeder animals, or purebreds suitable for use in commercial herds. Type or conformation scores below those mentioned indicate animals that are unsuitable for breeding stock in either a commercial or purebred herd.

If you are interested in initiating a performance testing program in your herd, contact your County Agricultural Agent or the Secretary, South Dakota Livestock Production Records, Inc., 601 Centre Street, Rapid City, South Dakota 57701.

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John T. Stone, Dean of Extension, South Dakota State University, Brookings.
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