

# **Performance Traits in Beef Cattle:**

## **Weighing Cows and Calves**

Performance test guidelines recommend calves be weighed when they are close to 205 days of age. The accepted age range is 160 to 250 days of age. Weighing calves less than 160 days of age will cause an over-estimation of adjusted weaning weights. Weighing calves over 250 days of age will result in under estimation of adjusted weaning weights. Therefore, data from calves outside the age range is not figured into the herd average. An additional weigh day may be necessary if the herd is on a split calving season or on an extended calving season.

It is recommended to also weigh the cows at the same time the calves are weighed. The cow weight will be used to identify which cows wean a high percentage of their body weight. Generally, cows that wean a high percentage of their body weight are more efficient and profitable than cows that wean a low percentage of their body weight.

## **Hip Height**

Calf hip heights should be measured and adjusted to 205 days of age and for age of dam. Hip height indicates the makeup of a calf's weaning weight (such as a 500 pound adjusted weight on a small, medium or large frame). Hip height can be related to a numerical frame score (such as frame scores 1 through 9 or 10). Also, frame score or hip height can be related to the approximate weight of a calf when it achieves a given quality grade or attains a given amount of fat thickness.

The recommended site for linear height measurement is a point directly over the hooks. This measurement is adjusted to production end point at 205 days and 365 days (within Beef Improvement Federation ranges currently used for adjusted weights).

Frame score is a convenient way of describing the skeletal size of cattle. With appropriate height growth curves, most animals should maintain the same frame score throughout their life, while their actual height increases with age. This allows one frame score value to be used regardless of when the animal was evaluated. However, the frame score will change for animals that mature earlier or later compared with average animals.

Environmental factors can also alter an animal's growth performance. Nutritional level is a major factor. Cattle that do not receive adequate nutrition will be below average in growth rate, while cattle fed extremely high levels will grow faster.

## **Muscling Score**

When the calves are weighed, they are also graded, or evaluated, for muscling or conformation. Muscle score is a visual evaluation of the amount of natural thickness and muscling a calf possesses. These scores are used to identify the more heavily muscled calves for retention as replacements or for herd sires. These values can be used to identify dams and sires that are producing lighter muscled calves.

Cattle that possess minimum qualifications for this grade usually show a high proportion of beef breeding. They must be thrifty and moderately thick throughout. They are moderately thick and full in the forearm and gaskin, showing a rounded appearance through the back and loin with moderate width between the legs, both front and rear. Cattle show this thickness with a slightly thin covering of fat; however, cattle eligible for this grade may carry varying degrees of fat.

Cattle that possess minimum qualifications for this grade show a high proportion of beef breeding and slight dairy breeding may be detected. They must be thrifty and tend to be slightly thick throughout. They tend to be slightly thick and full in the forearm and gaskin, showing a rounded appearance through the back and loin with slight width between the legs, both front and rear. Cattle show this thickness with a slightly thin covering of fat; however, cattle eligible for this grade may carry varying degrees of fat.

Cattle that possess minimum qualifications for this grade are thrifty and thin through the forequarter and the middle part of the rounds. The forearm and gaskin are thin and the back and loin have a sunken appearance. The legs are set close together, both front and rear. Cattle show this narrowness with a slightly thin covering of fat; however, cattle eligible for this grade may carry varying degrees of fat.

Cattle in this grade are thrifty animals that have less thickness than the minimum requirements specified for the No. 3 grade.

## **Dam's Body Condition and Hip Height**

A Body Condition Score (BCS) is an appraisal of the energy reserves (degree of fatness) of a beef cow. The most commonly used scale to score body condition is based on a scale of 1 to 9, with body condition of 1 indicating an emaciated animal and 9 indicating a very fat animal.

The cow's hip height measurement is measured in the same method as described for the calf.

## **Information that is calculated with the above information:**

### **Adjusted 205-Day Weight**

From actual calf weights, adjusted 205-day weights and weight ratios are calculated. Each actual calf weight is:

1. Adjusted to 205 days of age
2. Adjusted for age of dam

Under performance test guidelines, calf weights are not adjusted for sex of calf. Adjustment for calf sex is not needed because adjusted calf weights and weight ratios are reported within sex groups (bulls, heifers and steers). Adjusted weights allow calves within a sex group to be reported on an equal basis. When adjusted weaning weights are calculated, calves (within the same sex group) can be compared for preweaning growth, cows can be compared for maternal qualities and sires can be compared for growth of offspring.

### **Adjusted 205-Day Ratios**

Weight ratios are calculated for adjusted 205-day weights. A weight ratio is calculated by dividing a calf's adjusted 205-day weight by the average adjusted 205-day weight of the calf's sex group and multiplying by 100.

Weight ratios show an animal's relationship to its group average in percentage points. The group average will have a ratio of 100. If a calf has a weaning weight ratio of 105, it could be said that this calf was 5 percentage points above the group average. Weight ratios will show the same comparisons seen with adjusted weight.

### **Average Daily Gain**

Average daily gain (ADG) is calculated by subtracting the calf's birth weight or a standard birth weight from the calf's actual weaning weight and then dividing by the calf's age in days. Average daily gain is used to calculate the adjusted 205-day weaning weight. Average daily gain represents the rate of gain for a calf from birth to the day the calf was weighed without the influence of birth weight.

### **Adjusted Hip Height**

As with muscle scores, hip height will receive added emphasis due to packer specifications for slaughter cattle. The packer emphasis will be average-medium frame (42 inch for steers at 205 days of age; frame score 4.0) up to average-large frame (46 inch for steers at 205 days of age; frame score 6.0) cattle. Packer interest is toward more "moderate" frame size cattle that fit the majority of available market outlets. Calves out of this size range will probably become increasingly difficult to market as packers continue the move to boxed beef and possibly to prepackaged retail cuts (Table 1).

Table 1. 205-Day Frame Scores

Frame Score	Male	Female
2	38.0	37.0
3	40.0	39.2
4	42.1	41.2
5	44.1	43.3
6	46.1	45.3
7	48.1	47.4
8	50.1	49.4

(Beef Improvement Federation)

### **205-Day Hip Height Ratios**

The 205-day hip height ratio is calculated and used just like the 205-day adjusted weight. That is, the individual calf's adjusted 205-day hip height is divided by the average 205-day hip height of the calf's sex group and multiplied by 100. Any calf with a ratio above 100 is taller than the average within sex group and any calf with a ratio below 100 is shorter than the average within sex group.

### **Muscle Score**

The amount of muscling carried by a calf will receive more emphasis in the future. This will be in response to packer emphasis on purchasing heavily muscled cattle. The more heavily muscled cattle will yield a higher percentage of lean muscle in relation to fat and bone than thinner or lighter muscled cattle.

### **Efficiency Percent**

The efficiency percent is the calculation of the calf's adjusted 205-day weight divided by the cow weight times 100 (for example:  $(525/1100) \times 100 = 47.7$  percent). Mature cows should wean 50 percent of their body weight when their calves are 205 days of age. As cows have increased in size, it has become harder to accomplish that goal. A 1,000 pound cow will more likely wean a 500 pound calf than a 1400 pound cow will wean a 700 pound calf (205-day adjusted weight).

Most of the time as cow size increases, the efficiency percent decreases. There also is a negative relationship between efficiency percent and calf breakeven. As efficiency percent goes down, calf breakeven (cost of producing a pound of beef) goes up. The efficiency percent calculation is very important. A cattle producer would more likely want to keep a replacement heifer from a cow that weaned 50 percent of her body weight rather than 38 percent of her body weight.

### **Other Records and Performance Traits**

Birth weight is a performance trait. Actually, birth weight is an item that is part of the weaning performance records. Birth weights are used in calculating adjusted weaning weights. Where a breeder is not securing birth weights, a standard birth weight is used to calculate adjusted weaning weights.

Under field conditions, birth weights are of great importance to both purebred and commercial breeders as an indicator of calving ease or potential calving problem.

The purebred breeder should know the birth weights on their cattle and use this information in marketing cattle and advising buyers. A primary concern and goal of commercial operators is to have a very high percentage of their cattle calve unassisted. Problems arise when a bull is used that sires calves with birth weights heavy enough to cause calving difficulties. This problem can be intensified even more if the bull is used on heifers or on small cows. The result will be a commercial cattleman that does not return as a repeat bull buyer.

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