L-5176

Texas Agricultural Extension Service
The Texas A&M University System

Texas Adapted Genetic Strategies

Frame Score and Weight of Cattle

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Body size is an important genetic factor in beef cattle production. Historically, size was first estimated by measurements such as height or length. As scales were developed, weight became more common as a measure of size. Measurement and weight are related but their rates of maturity differ. By 7 months of age, cattle reach about 80 percent of mature height but only 35 to 45 percent of mature weight. At 12 months, about 90 percent of mature height is reached, compared to only 50 to 60 percent of mature weight.

Frame Scores

Beef Improvement Federation (BIF) Frame Scores, a method of estimating skeletal size based on hip height, are shown in the chart on the reverse side. Frame scores represent differences in height at the same age of about 2 inches. Values in the chart represent averages of thousands of cattle, but individual animals may vary.

Heights should be determined on the topline directly over the hips or hooks with cattle standing on a firm, flat surface, legs symmetrically positioned, and head in a normal position. The most common device for determining height is a measuring stick, available at many livestock supply companies. It consists of a cross-arm (with a bubble level) attached in a 90- degree angle to an upright containing a rule.

The chart lists only six scores, but may be expanded for cattle outside the listed values. Formulas in the chart can be used to calculate scores for animals 5 to 21 months old, although 12 months is probably the most useful age for determining frame score.

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Frame score is not an exact measure of skeletal dimension, as differences in angulation of skeletal junctions influence height. But, frame score is the simplest, most useful method for estimating relative skeletal size.

Skeletal Size, Body Weight and Composition

Weight is often used to characterize body size, but a mature cow weighing 1,100 pounds in moderate fatness or body condition weighs only 800 pounds when extremely thin and 1,500 pounds when extremely fat. So, size is more accurately characterized by including relevant factors other than weight, such as skeletal size and body condition.

USDA Feeder Cattle Grades separately evaluate frame size (Small, Medium and Large) and body thickness (1 = slightly thick or thicker, 2 = narrow, 3 = very narrow). A USDA Medium Frame feeder steer is projected to finish at 1,000 to 1,200 pounds, with 0.5 inch of fat cover. Slaughter heifers weigh about 15 percent less than steers. A USDA Medium Frame animal has a frame score of about low 3 to low 5. USDA Small is below this range and USDA Large is above. In fact, anything above a low 7 frame score should probably be called Very Large.

The weight of mature cows in moderate body condition (Body Condition Score 5) averages the same as that of equivalent frame score steers with 0.5 inch of fat. Mature bulls weigh about 55 to 60 percent more than cows of the same frame score. Mature cow weight varies approximately 7 to 8 percent for each unit change in Body Condition Score, and extremes in muscling can cause weight to vary as much as 10 percent. For a complete discussion of the Body Condition 1 through 9 scoring system,

consult the Texas Agricultural Extension Service Publication B-1526, "Body Condition, Nutrition, and Reproduction of Beef Cows".

The most useful measure of body size is weight at a standard fatness or condition, which also accounts for differences in muscling, a shortcoming of the frame score system. Frame score is most valuable as a predictor of weights at slaughter, puberty and maturity.

Table 1. Cattle Frame Scores Based on Hip Height in Inches[1]

MALES[2]							FEMALES						
Age in Months	Frame Score[3]						Age In Months	Frame Score[3]					
	3.0	4.0	5.0	6.0	7.0	8.0		3.0	4.0	5.0	6.0	7.0	8.0
5	37.5	39.5	41.6	43.6	45.6	47.7	5	37.2	39.3	41.3	43.4	45.5	47.5
6	38.8	40.8	42.9	44.9	46.9	48.9	6	38.2	40.3	42.3	44.4	46.5	48.5
7	40.0	42.1	44.1	46.1	48.1	50.1	7	39.2	41.2	43.3	45.3	47.4	49.4
8	41.2	43.2	45.2	47.2	49.3	51.3	8	40.1	42.1	44.1	46.2	48.2	50.2
9	42.3	44.3	46.3	48.3	50.3	52.3	9	40.9	42.9	44.9	47.0	49.0	51.0
10	43.3	45.3	47.3	49.3	51.3	53.3	10	41.6	43.7	45.7	47.7	49.7	51.7
11	44.2	46.2	48.2	50.2	52.2	54.2	11	42.3	44.3	46.4	48.4	50.4	52.4
12	45.0	47.0	49.0	51.0	53.0	55.0	12	43.0	45.0	47.0	49.0	51.0	53.0
13	45.8	47.8	49.8	51.8	53.8	55.8	13	43.6	45.5	47.5	49.5	51.5	53.5
14	46.5	48.5	50.4	52.4	54.4	56.4	14	44.1	46.1	48.0	50.0	52.0	54.0
15	47.1	49.1	51.1	53.0	55.0	57.0	15	44.5	46.5	48.5	50.5	52.4	54.4
16	47.6	49.6	51.6	53.6	55.6	57.5	16	44.9	46.9	48.9	50.8	52.8	54.8
17	48.1	50.1	52.0	54.0	56.0	58.0	17	45.3	47.2	49.2	51.1	53.1	55.1
18	48.5	50.5	52.4	54.4	56.4	58.4	18	45.6	47.5	49.5	51.4	53.4	55.3
19	48.8	50.8	52.7	54.7	56.7	58.7	19	45.8	47.7	49.7	51.6	53.6	55.5
20	49.1	51.0	53.0	55.0	56.9	58.9	20	46.0	47.9	49.8	51.8	53.7	55.6
21	49.2	51.2	53.2	55.1	57.1	59.1	21	46.1	48.0	50.0	51.9	53.8	55.7
Mature	52.3	54.1	55.9	58.0	60.0	62.0	Mature[4]	48.2	50.0	52.0	53.9	55.8	57.5
Frame Score (5-21 months) = 0.4878 (Ht) - 0.0289 (Days of Age) + .00001947 (Days of Age)^2 + 0.0000334 (Ht) (Days of Age) - 11.548							Frame Score (5-21 months) = 0.4723 (Ht) - 0.0239 (Days of Age) + 0.0000146 (Days of Age)^2 + 0.0000759 (Ht) (Days of Age) -11.7086						
Steer Slaughter Weight[5]	1010	1105	1200	1295	1390	1485	Heifer Slaughter Weight[5]	860	940	1020	1100	1180	1260
Mature Bull Weight[6]	1590	1740	1890	2040	2190	2340	Mature cow weight[7]	1010	1105	1200	1295	1390	1485

[1]Approved by the Beef Improvement Federation.

[2]Steers continue growth longer than bulls, being about 1/2 to 1 inch taller at 18 to 21 months.

[3]USDA MEDIUM FRAME SIZE is a frame score of approximately 3.0 to 5.0. USDA LARGE FRAME SIZE is a frame score of approximately 5.0 to 7.0.

[4]If calved first at 2 years old. Add 1 inch if calved first at 3 years.

[5]At 0.5 inch fat cover.

[6]At 12 months, bulls weigh 50 to 60% of this mature weight, under most development programs.

[7]Moderate body fatness, cow Body Condition Score 5 (where 1 = extremely thin and 9 = obese; cow weight varies 7% to 8% per condition score and up to 10% for extremes in muscling). For breeding at 14 to 15 months heifers should weigh 60 to 65% of this mature weight.

Issued in furtherance of Cooperative Extension Work in Agriculture and Home Economics, Acts of Congress of May 8, 1914, as amended, and June 30, 1914, in cooperation with the United States Department of Agriculture. Zerle L. Carpenter, Director, Texas Agricultural Extension Service, The Texas A&M University System.

10M–5-97, New AS 1