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# Yearling Heifer Frame Score and Mature Cow Size in the Angus Breed

## **Abstract**

Obtaining a frame score on yearling heifers provides one opportunity to develop uniformity in the commercial cow herd. A total of 4,023 records were available from the American Angus Association's mature cow size database to investigate the yearling frame score and mature size relationship. For every unit increase in frame score, mature height will be increased around 1.6 inches, and mature weight will be increased by about 83 lbs. Knowing the relationship between a yearling frame score measurement and actual mature size should assist producers in better defining the frame score that will fit within their specific environment and feed resources.

## **Keywords**

ASL R1337

## **Disciplines**

Animal Sciences

# Yearling Heifer Frame Score and Mature Cow Size in the Angus Breed

## A.S. Leaflet R1337

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### Summary

**Obtaining a frame score on yearling heifers provides one opportunity to develop uniformity in the commercial cow herd. A total of 4,023 records were available from the American Angus Association's mature cow size database to investigate the yearling frame score and mature size relationship. For every unit increase in frame score, mature height will be increased around 1.6 inches, and mature weight will be increased by about 83 lbs. Knowing the relationship between a yearling frame score measurement and actual mature size should assist producers in better defining the frame score that will fit within their specific environment and feed resources.**

### Introduction

Obtaining a frame score on yearling heifers is one opportunity that can be used to develop uniformity in the commercial cow herd. The frame-score measure can further be used to indicate the mature height and weight of the heifer when she reaches maturity at around five to six years of age. The purpose of this investigation was to develop the relationship between yearling heifer frame score and mature cow size at four through seven years of age.

### Materials and Methods

A total of 4,023 records were available from the American Angus Association's mature cow size database to investigate the yearling frame score and mature size relationship. Only those records in which the female had both a yearling hip-height measurement and mature size measures (height, weight, and body-condition score) were used in the analysis. Additionally, yearling height measures taken on heifers greater than 540 days of age were deleted from the analysis. The yearling hip height was converted into a frame score according to Beef Improvement Federation Guidelines:

Frame score =  $-11.7086 + .4723 \cdot \text{height} - .0239 \cdot \text{age} + .0000146 \cdot \text{age}^2 + .0000759 \cdot \text{height} \cdot \text{age}$ ,  
where, age is measured in days, and height is measure in inches.

All of the mature weight records were adjusted to a condition score six using the adjustment factors presented in Table 1. These adjustments are the same as those used in the mature size genetic evaluations for the Angus breed.

Regressions of cow height and weight on frame score were accomplished using the GLM procedure of SAS (SAS Institute Inc, Cary, NC). Models were fit within each of four years (4-7) and included herd-year-season fixed effects and linear and quadratic covariates for frame score.

Another regression analysis was conducted to ascertain whether average body-condition changes as frame size increases. For example, do larger-framed animals tend to have a lower average body-condition score? The model used to address this issue included herd-year-season and cow-age fixed effects and frame score as a linear covariate.

**Table 1. Conditions score adjustments for Angus cows.**

| Condition score | Adjustment, lb |
|-----------------|----------------|
| 2               | +256           |
| 3               | +201           |
| 4               | +152           |
| 5               | +86            |
| 6               | 0              |
| 7               | -88            |
| 8               | -190           |

### Results and Discussion

The average age for hip height measuring in the heifers was  $381 \pm 31$  days. The average hip height at this age is  $47.9 \pm 2.3$  inches. Using the age and hip height measures, the average frame score was calculated to be  $5.3 \pm 1.1$ . The distribution of frame score within the Angus data base is shown in Figure 1.

Descriptive statistics for the cows within each of the four age categories are shown in Table 2. As shown, Angus cows have achieved their mature height by the time they are four years old; however, mature weight is not achieved until much later in their reproductive life.

**Table 2. Descriptive statistics for the mature cow size measures and body condition scores.**

| Cow age, yrs | No.  | Height, in | Weight, lb | Condition score |
|--------------|------|------------|------------|-----------------|
| 4            | 1503 | 52.8 ± 2.5 | 1264 ± 170 | 5.3 ± .9        |
| 5            | 996  | 52.9 ± 2.5 | 1318 ± 189 | 5.6 ± .9        |
| 6            | 694  | 52.8 ± 2.4 | 1338 ± 189 | 5.6 ± .9        |
| 7            | 524  | 52.9 ± 2.3 | 1351 ± 186 | 5.8 ± .9        |

**Table 3. Regression parameters for cow size on frame score for Angus cows.**

| Trait      | Cow age, yr |       |       |       | Overall |
|------------|-------------|-------|-------|-------|---------|
|            | 4           | 5     | 6     | 7     |         |
| Height, in | 1.72        | 1.44  | 1.65  | 1.49  | 1.60    |
| Weight, lb | 85.49       | 83.87 | 88.38 | 81.58 | 83.38   |

The relationships between frame score and cow height and weight for ages four-seven are depicted graphically in Figures 2 through 4. The regressions of cow height and weight on frame score are shown in Table 3. Quadratic effects were not significant ( $P < .05$ ) for cow height nor for cow weight. For every unit increase in frame score, mature height will be increased around 1.6 inches, and mature weight will be increased by about 83 lbs.

The relationship between body-condition score and frame score was found to be significant ( $P < .005$ ), with the trend in the positive direction. The magnitude of the relationship is very small, however, being a positive .06 change in body-condition score for every positive increase in one unit of frame score. It may also be of interest to note that the model accounted for only 49% of the variation in body condition score.

#### Implications

**Commercial cow-calf producers desiring to select for uniformity in replacement females can use frame score as one of the selection tools. Knowing the relationship between a yearling's frame score measurement and actual mature size should assist producers in better defining the frame score that will match their specific environment and feed resources.**

#### Acknowledgments

Appreciation is extended to the American Angus Association for the use of data to conduct this analysis, and to Daryl Strohbehn for being the stimulus to conduct the analysis.

Figure 1. Distribution of yearling heifer frame scores.

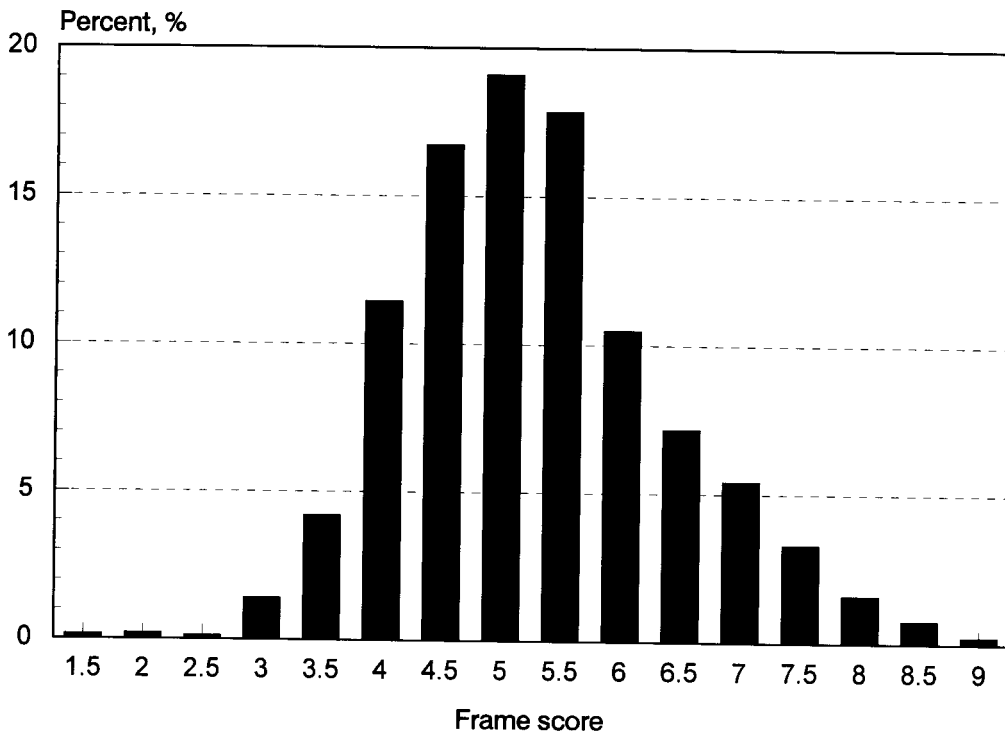


Figure 2. Angus 4-year-old cow height and weight by yearling frame score.

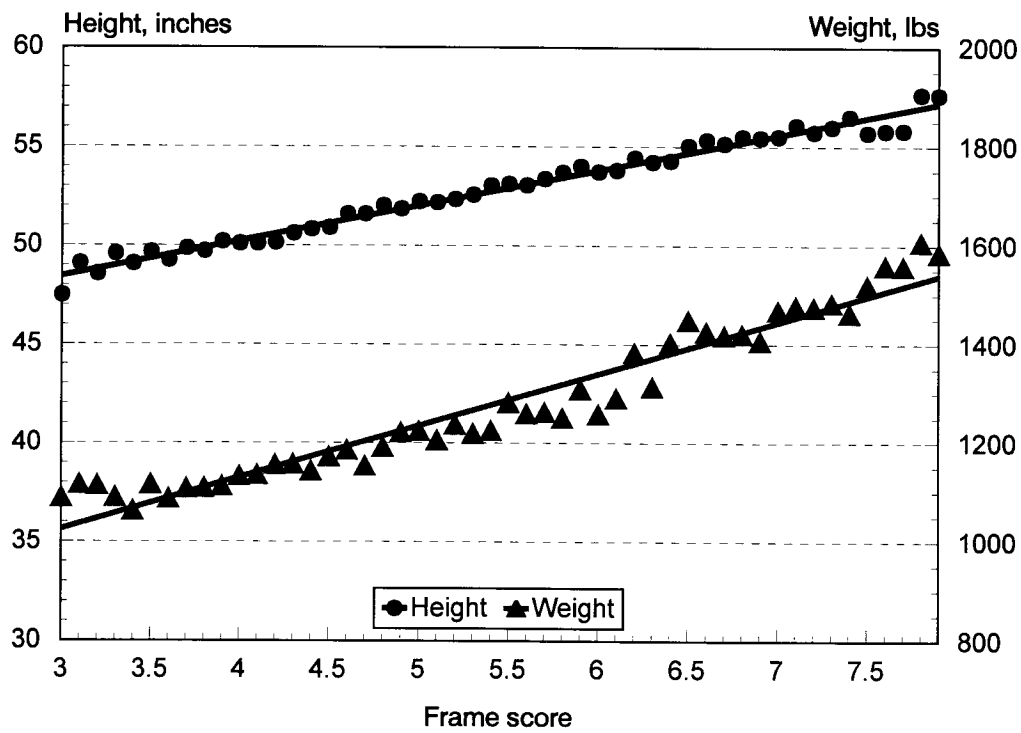


Figure 3. Angus 5-year-old cow height and weight by yearling frame score.

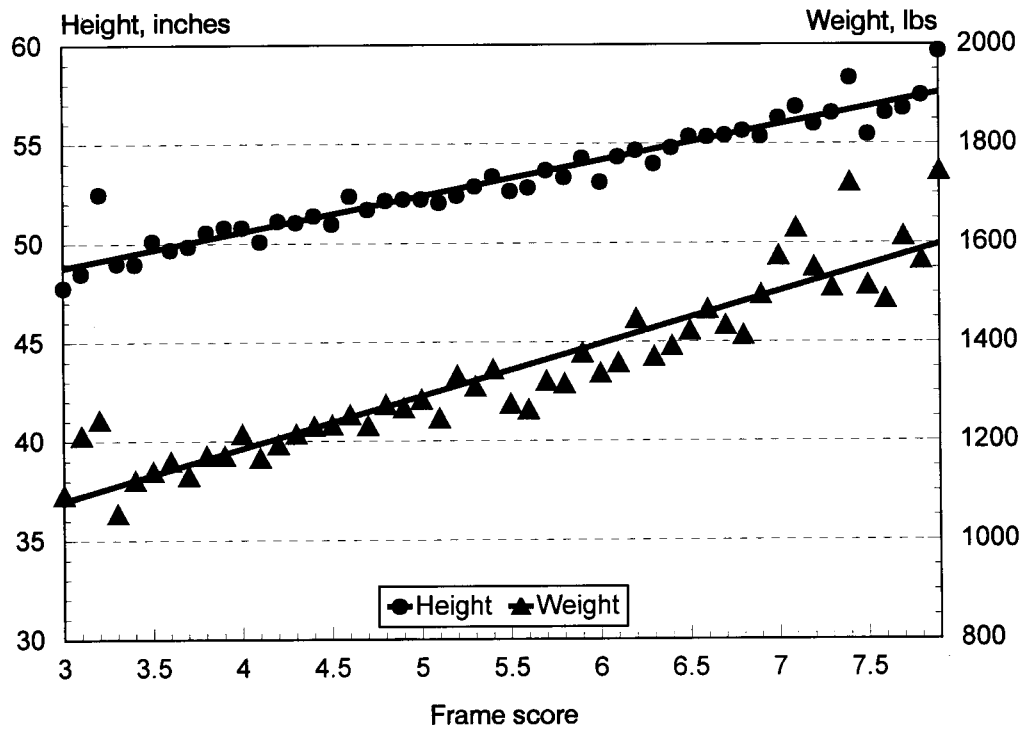


Figure 4. Angus 6-year-old cow height and weight by yearling frame score.

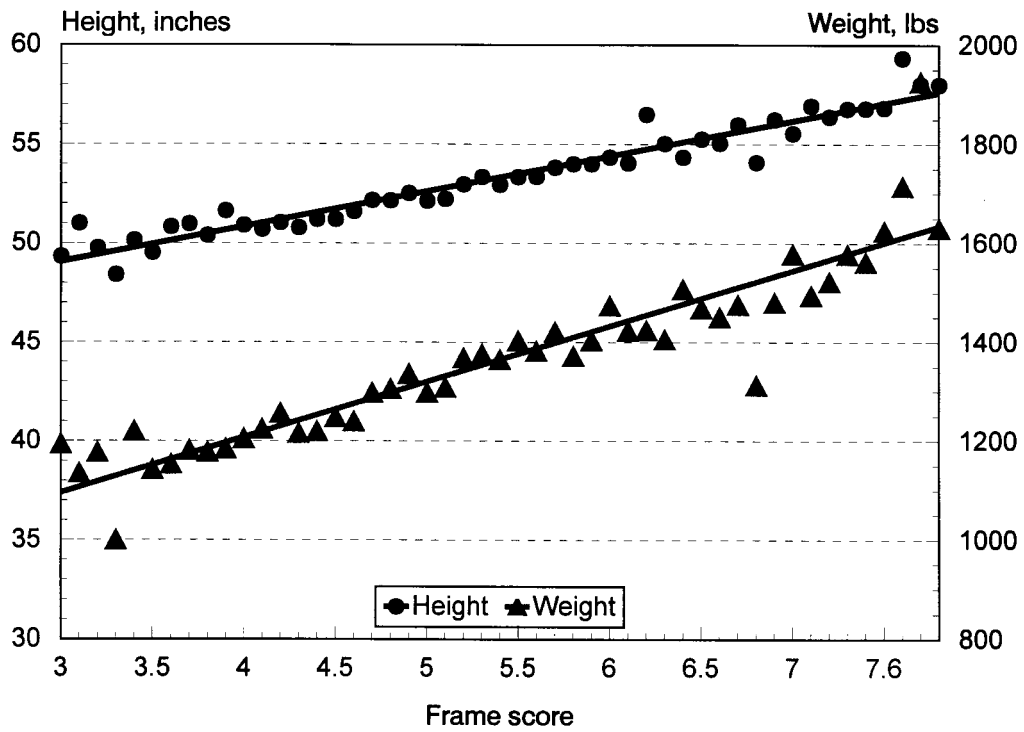


Figure 5. Angus 7-year-old cow height and weight by yearling frame score.

