

EVALUATION OF BODY CONDITION SCORING FOR ESTIMATING CARCASS FAT PERCENTAGE OF VARIOUS COW TYPES

E.D. Tinker¹, D.S. Buchanan², M.N. McCarter³,
H.G. Dolezal⁴, R.R. Frahm² and L.W. Knori⁵

Story in Brief

The accuracy of a body condition scoring system for predicting carcass fat of different biological types of cows was evaluated. Four different two-breed-cross cow groups (Hereford x Angus, Brown Swiss x Angus, Jersey x Angus and Simmental x Angus), representing different biological types were utilized. Fifty-five cows were weighed, measured for hip height and assigned a body condition score before slaughter. After a 24 hour chill the kidney and pelvic fat was removed and sampled and a random side of the carcass was deboned, ground and sampled. Samples were analyzed for moisture, protein and fat content. Equations using various live animal measurements to predict carcass fat percentage were developed for each cow type. Analysis of the prediction equations showed there were no significant differences among the different cow type equations. This indicates that the body condition scoring system utilized is appropriate for cows of different biological types.

(Key Words: Body Condition Score, Crossbred Cows, Composition.)

Introduction

Reproductive performance of beef cows is influenced greatly by the energy status of the cow. Body condition scoring is one proven method of assessing the energy status of live beef cows. A number of studies have shown strong relationships between cows' body condition score (BCS) and carcass fat content. However, these studies have been conducted with only one breed, or cow type, in each study. It is important to know if the same relationship between BCS and carcass fat content exists for a variety of cow types. If the relationship varies for cows with different biological types, refinements may need to be made in the

¹Graduate Assistant ²Professor ³Former Graduate Assistant ⁴Associate Professor ⁵Herdsmen

BCS system to account for cow type. Therefore this study was conducted to examine whether a similar relationship exists between BCS and carcass fat content of cows with various breed combinations and biological types.

Materials and Methods

Fifty-five cows were used in this study, representing four different two-breed combinations: Hereford x Angus, Brown Swiss x Angus, Jersey x Angus and Simmental x Angus. All cows were mature (11, 12 or 13 years old), nonpregnant and nonlactating. Before slaughter all cows were weighed, measured for hip height and assigned a BCS by each of four people familiar with the 1 - 9 scoring system (1 = emaciated, 9 = very obese). An average of the four scores was used in statistical analysis of the data. Cows were slaughtered at the Oklahoma State University meat laboratory and allowed to chill for 24 h. Kidney and pelvic fat was removed from the chilled carcass, weighed and a sample collected. A random side of the carcass was deboned and soft tissue (lean and fat) ground and sampled for analysis. Composition of samples was determined by standard laboratory procedures for moisture, protein and fat.

Total fat content of each carcass was determined by multiplying the weight of each carcass component by the fat percentage of that component, as determined by the laboratory analysis. Total fat content was divided by chilled carcass weight to acquire carcass fat percentage. Since cow types with a wide variety of mature sizes were included in the study, fat percentage of the carcass should be a more appropriate comparison among cow types than total weight of carcass fat.

Statistical analysis was performed to develop an equation consisting of live animal measures which could be used to predict carcass fat percentage. Prediction equations were developed for each cow type and the four equations were then compared for differences.

Results and Discussion

The best model for predicting the percentage carcass fat included BCS of the cow and BCS raised to various powers. These traits were used to develop separate prediction equations for each cow group. The coefficients for prediction equations developed for all cows and individual cow groups are presented in Table 1. The cow group equations have numerical differences for the coefficients of the variables used, but these equations were not different from one another. The estimated carcass fat percentage for each equation over a BCS range of 3 to 7 is shown in Figure 1. This illustration showed that prediction of carcass fat percentage was very good for BCS in the 4 through 6.5

Table 1. Coefficients for carcass fat percentage prediction equations developed for all cows and individual cow groups^a.

| Cow Type | Intercept | BCS ^b | BCS ² | BCS ³ | BCS ⁴ | R ² |
|------------------------|-----------|------------------|------------------|------------------|------------------|----------------|
| All cows | -49.21 | 60.43 | -25.05 | 4.27 | -.25 | .91 |
| Hereford x Angus | 569.60 | -420.34 | 113.40 | -13.19 | .57 | .96 |
| Brown Swiss x Angus | -97.91 | 103.13 | -38.61 | 6.09 | -.33 | .97 |
| Jersey x Angus | -75.57 | 88.33 | -35.28 | 5.86 | -.33 | .88 |
| Simmental x Angus | -329.81 | 335.44 | -121.68 | 18.72 | -1.03 | .98 |

^a Use prediction equation coefficients as in this example for all cows: $-49.21 + (60.43 \times \text{BCS}) + (-25.05 \times \text{BCS}^2) + (4.27 \times \text{BCS}^3) + (-.25 \times \text{BCS}^4)$.

^b BCS = Body condition score.

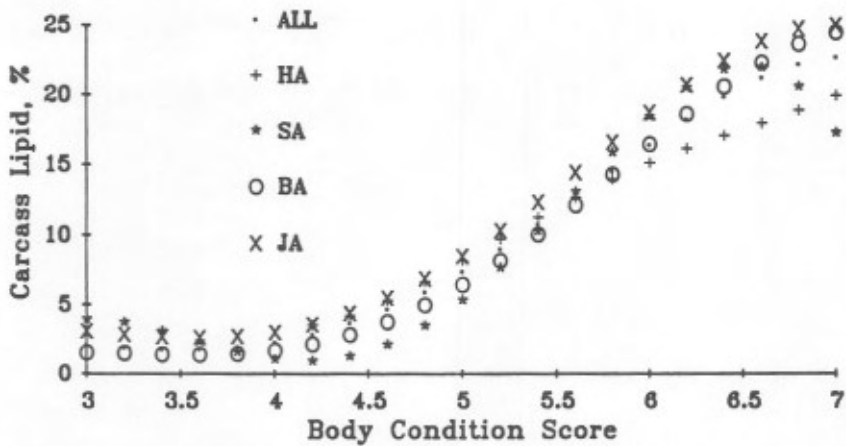


Figure 1. Estimation of carcass fat percentage with individual cow group prediction equations over a body condition score range from 3 to 7.

range, which is the range in which most of the cows in the study were scored. However, the equations do not predict very well for cows with BCS of less than 4 or greater than 6.5.

The results of this study indicate that the body condition scoring system is an accurate method of assessing body fat content of cows of different biological types.



Figure 1. Estimation of calcium (in percentage) with individual cow group prediction equations over a body condition score range from 1 to 7.

range which is the range in which most of the cows in the study were scored. However, the equation does predict very well for cows with BCS of less than 4 or greater than 6.5. The results of this study indicate that the body condition scoring system is an accurate method of assessing body fat content of cows of different biological types.