1994

Breed-Type and Mating System effects on Beef Cattle Carcass Characteristics

D. M. Marshall
South Dakota State University

Breed-Type and Mating System Effects on Beef Cattle Carcass Characteristics

D.M. Marshall[1]
Department of Animal and Range Sciences

SDSU

CATTLE 94-9

Summary

The effects of dam breed-type (Simmental x Hereford, Angus x Hereford, and Tarentaise x Hereford) and mating system (rotational versus rota-terminal) on carcass characteristics were evaluated. Means for dam breed-type and mating system were adjusted in separate analyses to one of three slaughter endpoints: 437-day slaughter age, 734-lb carcass weight, or .49 inches of carcass fat thickness. Calves from Simmental x Hereford dams had heavier carcasses compared to the other two dam breed-types when adjusted to a constant slaughter age or fat thickness. Calves from Angus x Hereford dams tended to have more external fat, smaller rib eye area, and more marbling than calves from the other two dam types on an age-constant and carcass weight-constant basis. Terminal-sired (Charolais) calves had less external fat and larger rib eye area than rotational calves at a constant age or carcass weight. The dam breed-type x mating system interaction generally did not approach significance.

Key Words: Breed-type, Mating System, Carcass

Introduction

In order to compete with other sources of food protein, the beef industry must produce meat products that are desirable to consumers and relatively cost-efficient. Genetics and various management alternatives are among the tools that producers can use to alter carcass value. The objective of this study was to evaluate specific dam breed-types and mating systems with regard to beef carcass characteristics.

Materials and Methods

Carcasses evaluated in this study were from calves born from 1988 through 1992 at the Antelope Range Livestock Station in northwestern South Dakota. The cow herd consists of two-breed rotations of Angus x Hereford, Simmental x Hereford, and Tarentaise x Hereford with annual additions of replacement females. A terminal breeding segment was added to provide comparisons between rotational versus rotational-terminal (i.e., rota-terminal) breeding systems. The mating design of the study is shown in Table 1. Some cows within each of the three dam types are mated to Charolais sires (rota-terminal matings) and the others are mated within rotation (rotational matings).

Calves were weaned in the fall at an average age of about 7 months. Following a preconditioning period of 2 to 3 weeks at the station, steers and terminal-cross heifers were sent to a commercial feedlot. Calves received a high energy finishing diet in the feedlot. Calves were slaughtered in commercial packing plants in either one or two groups per year at an average age of 437 days. Carcass information obtained on samples of calves included carcass weight, external fat thickness, estimated KPH fat, rib eye area, and carcass quality grade.

The statistical model included the effects of dam type (Simmental x Hereford, Angus x Hereford, and Tarentaise x Hereford), rotation phase within dam type (high percentage Hereford dams versus low percentage dams), mating system (rotational versus rota-terminal), and the interaction between dam type and mating system. Means for dam breed-type and

[1]Associate Professor.

Table 1. Mating design used to produce calves in the study

	Sire breed	
Dam breed-type	Rotational	Rota-terminal
Simmental x Hereford	Polled Hereford or Simmental	Charolais
Angus x Hereford	Polled Hereford or Angus	Charolais
Tarentaise x Hereford	Polled Hereford or Tarentaise	Charolais

mating system were adjusted to one of three slaughter endpoints: 437-day slaughter age, 734-lb carcass weight, or .49 inch of carcass fat thickness. Within the Tarentaise x Hereford dam group, F_1 dams were combined with low percentage Hereford dams for analyses. No F_1 dams remained in the other two dam groups for the years included in this study.

Results and Discussion

Carcass trait means by dam breed-type and mating system are presented in Table 2. The statistical adjustment for alternative slaughter endpoints (i.e., age, carcass weight and fat thickness) estimates the expected performance if all calves had been slaughtered at the overall average value for the particular endpoint. For example, the slaughter age-adjusted values in Table 2 estimate the dam breed-type and mating system means that would have resulted if all calves had been slaughtered at 437 days of age. The dam breed-type x mating system interaction generally did not approach significance, indicating that dam breed-type differences were relatively consistent across the two mating systems. Therefore, means are presented only for the main effects of dam breed-type and breeding system.

Calves from Simmental x Hereford dams had heavier carcasses compared to the other two dam breed-types when adjusted to a constant slaughter age or fat thickness. Calves from Angus x Hereford dams tended to have more external fat, smaller rib eye area, and more marbling than calves from the other two dam types on an age-constant and carcass weight-constant basis. KPH fat was similar across the three dam groups for each endpoint adjustment. Rota-terminal calves sired by Charolais had less external fat and larger rib eye area than rotational calves at a constant age or carcass weight.

Implications

Decisions made by the cow-calf producer directly impact the final beef products available to consumers. Differences between breed-types and breeding systems were found for several important carcass characteristics in this study. Such differences should be among the factors considered by the cow-calf producer in developing a breeding program.

Table 2. Carcass characteristics adjusted to a common slaughter age, carcass weight, or fat thickness

Dam type[a]	n	Carcass wt, lb	Fat cover, in.	Rib eye area, sq. in.	KPH fat, %	Marbling score[b]
		Adjusted for Slaughter Age (mean = 437 days)				
S x H	89	751	.43	13.1	2.0	10.0
A x H	137	718	.54	12.3	2.0	10.9
T x H	91	707	.46	12.6	2.0	9.5
F-test		**	**	**	NS	**
Mating system						
Rotational	221	720	.53	12.3	2.0	10.0
Rota-terminal	96	730	.43	13.1	2.0	10.3
F-test		NS	**	**	NS	NS
		Adjusted for Carcass Weight (mean = 734 lb)				
S x H			.42	12.9	2.0	10.0
A x H			.56	12.5	2.0	11.0
T x H			.48	12.8	2.0	9.6
F-test			**	**	NS	**
Mating system						
Rotational			.54	12.4	2.0	10.1
Rota-terminal			.43	13.1	2.0	10.3
F-test			**	**	NS	NS
		Adjusted for External Fat Thickness (mean = .49 in.)				
S x H		756		13.1	2.0	10.2
A x H		711		12.4	1.9	10.8
T x H		710		12.6	2.0	9.6
F-test		**		**	NS	**
Mating system						
Rotational		716		12.3	2.0	9.9
Rota-terminal		736		13.0	2.0	10.5
F-test		+		**	NS	+

[a]S = Simmental, A = Angus, and T = Tarentaise.
[b]8 = slight, 9 = slight +, 10 = small -, 11 = small.
+P<.10, ** P<.01, NS nonsignificant.