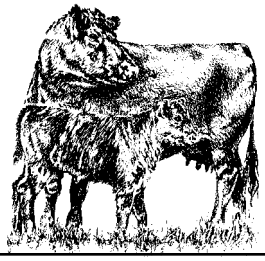

Western Beef Resource Committee *Fourth Edition*

Cattle Producer's Handbook

Genetics Section 841

Selecting for Carcass Traits

DeVon Knutson and Bill Zollinger
Oregon State University

Within the beef industry, the development of a marketing system based on individual carcass merit rather than on pen average is important for the animal breeder, the feedlot operator, the livestock buyer, and the meat purveyor. A system will be important to the economic success of the total industry.

Most cattle are purchased on some type of grade and yield basis in the major packers in the West. Therefore, a complete understanding of all the factors that affect carcass quality and yield grade is essential to everybody participating in the beef industry.

Currently, several small groups of individuals are sponsoring special programs where premiums are returned to producers based on the quality of the product. The National Beef Quality Audit in 1991 defined targets for several traits for the beef industry, as shown in Table 1.

Generally, carcasses are rewarded for yield grades number 1 and 2 and discounted for those with a yield grade of 4 and 5. Also, carcasses with a quality grade of choice and prime are usually paid more than those grading select.

The spread between choice and select carcasses vary with the season and demand. This spread can be as great as $12 per hundred during some times of the year and as no difference during other times of the year. Usually there is a $4 to $5 spread in favor of those carcasses that grade choice and prime.

Using EPD Values for Carcass Selection

At present carcass EPDs (Expected Progeny Differences) are not readily accessible for most sires. The accuracy for those that are available is not high. EPDs are available for carcass weight, marbling, ribeye area, and fat thickness. Although the data are limited, research trials show a definite advantage for the offspring grading choice from sires with high EPDs for marbling over sires with low EPDs for the same trait. In a study done at the Meat Animal Research Center using the Angus sire summary for 1989 and 1992, Angus bulls with high EPDs for marbling consistently sired a higher percent choice of their calves (Tables 2 and 3).

Table 1. 1991 National Beef Quality Audit carcass targets.

Live weight	1,000 to 1,350 lb
Carcass weight	650 to 850 lb (725 to 750 lb most preferred)
Quality grade:	
#1 Prime	7%
#2 Choice (upper 2/3)	24%
#3 Choice (lower 1/3)	40%
#4 Select	29%
#5 Standard	0%
Yield grade	1's and 2's
Fat thickness	.20 to .40 inches
Ribeye area	11.0 to 15.0 square inches

Source: 1991 National Beef Quality Audit.

Table 2. Average Expected Progeny Differences (EPDs) for sire group.

Sire summary year*	Sire group	Number of bulls	Expected Progeny Difference			
			Birth wt	Weaning wt	Yearling wt	Marbling
1989	High	6	+5.2	+21.5	+41.1	+.59
	Low	6	+6.1	+27.0	+51.6	-.23
1992	High	6	+4.1	+25.2	+41.5	+.31
	Low	6	+5.2	+29.4	+52.0	-.18

*Taken from annual Angus Sire Summary.

Table 3. Production traits of steers and heifers sired by low or high marbling Expected Progeny Difference (EPD) sires.

Sire marbling EPD:	Steers[1]		Heifers	
	Low	High	Low	High
Number of animals	63	66	65	59
Suckling				
Birth wt, lb[2]	93	93	86	87
Calving difficulty[3]	1.5	1.4	1.3	1.5
Adjusted 205-day wt, lb[2,4]	540	524	515	492
Actual weaning wt, lb[2,4]	529	503	506	472
Finishing				
Initial wt, lb[2,4]	639	612	737	705
Final wt, lb	1,101	1,093	1,106	1,064
Daily gain, lb	2.93	3.05	3.14	3.05
Feed intake, lb/day[2]	19.0	19.4	24.3	22.9
Feed/gain[2,5]	6.47	6.36	7.75	7.47
Carcass				
% choice	47	77	47	72
Yield grade	2.82	2.90	2.52	2.47
% yield grade 1	4.7	4.5	16.9	16.9
% yield grade 2	60.3	57.6	72.3	62.8
% yield grade 3	28.7	31.8	9.3	18.6
% yield grade 4	6.3	6.1	1.5	1.7

[1]Sex * marbling for all measurements (P>.1), thus data were pooled.
[2]Sex effect (P<.01).
[3]1=no assistance, 2=minor difficulty, 3=mechanical assistance, 4=caesarean section, 5=abnormal presentation.
[4]Marbling effect (P<.01).
[5]Feed/gain was analyzed as gain/feed. Reported feed/gain is the reciprocal of gain/feed.

As shown in Fig. 1, less external fat was found in the high marbling EPD sire group. Intermuscular fat percentage or seam fat was not affected by marbling EPD groups. These results indicate that it is possible, using existing genetic resources, to maintain marbling score and intramuscular fat percentage while decreasing fat deposition in other parts of the carcass. EPDs are another tool to use when selecting for carcass merit.

Selection for reduced fat thickness may be associated with increases in mature weight, age at puberty, and reduced fertility. Cattle need to maintain a body condition score of 5 or 6 to maintain reproductive efficiency. Lean

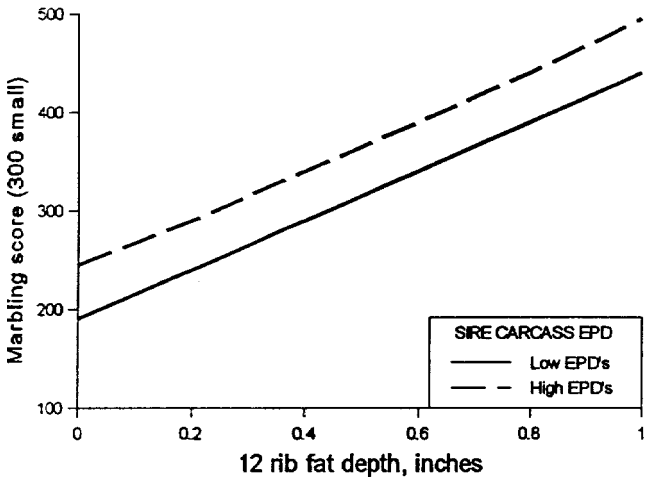

Fig. 1. Regression analysis for steer marbling score and 12th rib fat depth.

body composition and larger mature size will increase nutritional requirements and decrease cow efficiency. To compensate for this change ranch management needs to supply additional feed or carry fewer cows.

Carcass Data Collection

Heritabilities are moderate to high for carcass traits (Table 4). Collecting and using carcass data is an excellent way to make herd improvements. Pasture mating or artificial insemination with individual sires allows identification of sires that produce desirable carcasses. In programs of multi-sire breeding, carcass data evaluations apply to the whole herd and are more difficult to effect change.

Carcass data can be collected several different ways. The National Cattlemen's Beef Association (NCBA) has a carcass collection program arranged with several packing plants where either individual or group carcass data can be collected. USDA tags can be used to collect carcass information. Some custom feedlots will also offer carcass data collection as a service. Most packing plants provide a detailed report on quality and yield grades of kill lots. Regardless of the collection method, it is the producer's responsibility to make sure well in advance that the packing plant and the feeder understand that carcass data will be collected on a particular set of cattle.

Table 4. Heritability estimates for carcass traits.*

Trait(s)	Heritability
Carcass weight	.50
Quality grade	.40
Marbling	.35
Fat depth	.45
Ribeye area	.40
Yield grade	.30
% retail cuts (% cutability)	.30
Retail product weight	.40
Estimated retail cuts per day of age	.30
Fat trim wt.	.50
Frame	.45
Muscling	.45
Tenderness	.50

*Source: Based on numerous research studies.

Summary

As individual carcass data become more important to the profits or losses of the producer, it will become more important to collect carcass data. As more carcass data are collected, EPDs for carcass data will become more available to bull buyers. Greater improvements can then be made in the industry for carcass quality grade and yield grade.

Carcass data are now available to the producer through various programs. Other economic traits such as reproductive performance cannot be ignored while emphasis is placed on carcass traits.

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