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Nevada Market Beef Carcass Merit Program

Ron Torell, Area Livestock Extension Specialist
Norman Suverly, Extension Educator

Introduction

Youth livestock shows often hold market animal carcass evaluation programs or contests following their live show. These programs often prove to be the most educational aspect of the market animal project. The reason is that carcass measurements are more quantifiable whereas the live animal placing is subjective. Unfortunately, some carcass contests have historically fallen into the same situation as the live animal shows; identifying one animal or carcass as the "GRAND CHAMPION." This gives the impression that this particular animal is far superior to the remainder of the class. In reality, several of the animals in that class may have equal product value and yield the same eating experience. This carcass of merit program, utilizing a grid pricing system, recognize harvested animals with carcass traits that would be of similar economic value if they were sold on the open market.

Beef Carcass Evaluation

Beef carcass evaluation is accomplished through three carcass characteristics: quality grade, yield grade, and carcass weight. While these three grading systems are based on completely different standards, they are used to determine the value of a beef carcass. Livestock judges make subjective evaluations of live animal traits and try to relate them to the quality and yield grade and carcass weight.

Beef carcass **quality grades** are based on marbling and maturity. Maturity is estimated by size, shape and ossification of bones and cartilage, as well as color, firmness and texture of the meat (lean muscle). Marbling is intramuscular fat (small flecks of fat within the muscle) that can enhance the flavor, juiciness and tenderness of the meat.

Genetics, maturity, and management of the market animal play a large role in the amount of marbling. As a general rule, animals that have more fat on the carcass also tend to have more fat dispersed within the muscle, which is referred to as marbling. Therefore, fatter animals tend to have higher quality grades because they tend to have more marbling. Marbling is the last form of fat to be deposited on the animal, whereas external fat, or fat on the outside of the muscle, is deposited first. Marbling is also the first fat to be removed or used by the body as an energy source when the animal is exercised or loses weight.

The quality grades for young animals between the ages of 9 and 30 months of age are Prime, Choice, Select and Standard.

Prime and Choice are in the greatest demand by consumers. However high select and choice are the grades you should attempt to reach with a steer project. Only 2 percent of the national harvest reaches the prime quality grade.

Yield grade is based upon the yield of boneless, closely trimmed retail cuts from the round, loin, rib, and chuck and is commonly referred to as "carcass cutability." Factors used in the formula to calculate yield grade include:

1. The amount of external fat over the rib eye at the 12th rib, adjusted to a final amount based on the fat cover over the entire carcass.

2. The area of the rib eye muscle at the 12th rib of the carcass.

3. Hot carcass weight.

4. The amount of kidney, pelvic and heart fat (KPH) as a percentage of the hot carcass weight. The KPH percentage averages 2.5 percent.

Yield grades are expressed in numerical scores ranging from 1 through 5. Yield grade 1 is the most desirable as the carcasses are the leanest with an adequate amount of muscularity. When a carcass becomes fatter or the degree of muscle becomes less, the numerical yield grade becomes higher. Yield grade 5 is considered the least desirable.

Fed Cattle Grid Pricing

Value-based marketing refers to pricing cattle on an individual animal basis. Prices differ according to the underlying value of beef and by-products from each animal. The goal of grid pricing is to price cattle based on their "true" value to consumers, reduce problems of inconsistency in the final product, and send appropriate market signals to producers by which genetic and management changes can be made.

There are many price-discovery marketing grids in use within the beef industry. Two common grids are quality and yield grade. Quality grade grids place more value on degree of marbling while yield grade grids place more value on muscle. The most commonly used grid rewards producers for quality and yield grade as illustrated in Table 1. This grid is essentially the same as pricing on a dressed weight basis, except that in addition to dressing percentage, the packer also bases price on the known quality and yield grade of each carcass. Most packer grids list a base price for a choice, yield grade 3, 550-750-pound steer carcass. The price listed is on a carcass basis and not a live weight basis.

The grid shown in Table 1 has been modified slightly to reflect the needs of splitting the select grade into select minus, select and select plus for purposes of the carcass of merit program.

Merit Grid

To determine the carcass merit for a particular carcass simply add the numbers from the grid in Table 1 corresponding to the quality and yield grades, plus the carcass weight adjustment factor and other discounts. Find the corresponding award in Table 2. For examp le, a Choice minus, yield grade 2, 890-pound carcass would have a combined score of minus $3.00. The Choice minus yield grade 2 would have given the carcass a $1.00/cwt premium on the grid; however, the overweight 890-pound carcass would have received a $4.00/cwt discount, resulting in the minus $3.00/cwt discount off the base price. This would identify that carcass as a red carcass merit. Obviously the animal was an extremely large-framed steer, which is discounted in today's market. This steer would have weighed approximately 1435 pounds live considering a typical 62% dressing percent. These types of animals are discounted on the open market so why should they not be discounted in a youth show?

Just as in the real cattle feeding world, hitting the "grid" can add value to each animal. Missing the grid can be economically devastating indicating changes in genetics and/or management are necessary. The merit program should serve as a valuable educational tool to help youth and parents align the youth market steer project with the beef industry's needs. It is suggested that youth and parents refer to their *4-H Beef Resource Handbook* for additional information to help educate themselves and produce steers that hit the grid. You can get a copy of the *4-H Beef Resource Handbook* through your local Extension Office or order it through Ohio State University for $10 plus shipping. To order, call 614-292-1607 and ask for publication number 4H 117R Beef Resource Handbook.

Table 1. Nevada 4-H Market Beef Carcass Award of Merit Grid

Quality Grade	Yield Grade (Assumes Choice-Select Minus Spread of $9/cwt)				
	($/cwt Carcass)				
	Y.G. 1	Y.G. 2	Y.G. 3	Y.G. 4	Y.G. 5
Prime	$8.00	$7.00	$6.00	-$9.00	-$14.00
C+	$3.00	$2.00	$1.00	-$13.00	-$18.00
C & C-	$2.00	$1.00	$/cwt carcass base	-$15.00	-$20.00
Select +	-$5.00	-$6.00	-$7.00	-$20.00	-$25.00
Select	-$6.00	-$7.00	-$8.00	-$22.00	-$27.00
Select -	-$7.00	-$8.00	-$9.00	-$24.00	-$29.00
Standard	-$16.00	-$17.00	-$18.00	-$33.00	-$38.00

Carcass Weights ....   Other

<550 lbs. (-$19.00/cwt).......................   Dark cutters (No discount due to the nature of youth shows)
550-749 lbs. (Base).............................   Bullocks/stags (-$25.00) or disqualified depending on severity
750-950 lbs. (-$4.00/cwt)
>950 lbs. (-$19.00/cwt)

*Information extracted from current USDA report on commonly used packer grid premium and discount schedules.

Table 2. Award of Merit Categories

Purple	Carcasses with combined value of +$3.00/cwt and above
Blue	Carcasses with combined value of +$0 to $2.00/cwt
Red	Carcasses with combined value of -$5.00 to -$1.00/cwt
White	Carcasses with combined value of -$7.00 to -$6.00/cwt
No recognition	Those carcasses with combined value below -$7.00/cwt

Glossary of Terms

Carcass – the muscle, bone, and fat associated with the harvest (slaughter) of an animal, after removal of the head, hide, feet and internal organs.

Cwt. – an abbreviation meaning hundredweight or 100 pounds.

Dressing – the removal of the hide, head, tail, lower legs, blood, organs (except kidney), and gastrointestinal tract at slaughtering.

Dressing Percentage – the proportion of carcass weight relative to live weight of an animal. Heavier muscled animals tend to have a higher dressing percentage. Animals with a higher degree of finish usually have a higher dressing percentage. The more weight that is contained in parts such as the rumen, hide, head, etc., the lower the dressing percentage. The average dressing percentage for steers and heifers is 62 percent, but can vary greatly with changes in the type of cattle. To calculate dressing percentage, take the carcass weight divided by live weight multiplied by 100.

$$\frac{\text{Carcass weight}}{\text{Live weight}} \times 100$$

Example:
$$\frac{682}{1100} \times 100 = .62 \times 100 = 62\%$$

Fat Thickness – the typical linear measurement of fat taken over the rib eye between the 12th and 13th rib.

KPH – the amount of fat contained in the regions of the kidney, pelvis and heart as a percentage of the carcass weight.

Lb. – an abbreviation meaning pound.

Ossification – when cartilage turns from soft tissue to a hard bone-like structure.

Packer – the person or entity that harvests (slaughters) and dresses the animal and sells the carcass whole or as primals and wholesale cuts.

Quality Grade – a grade that reflects palatability (flavor, tenderness, and juiciness) and is determined by estimating the amount of marbling and the physiological age.

Retail Cuts – the cuts of meat that the consumer buys at the meat counter.

Retailer – the person selling to the consumer. They are the entity that buys primal or wholesale cuts and then processes and packages retail cuts for the consumer.

Rib Eye Area – the surface area of the longissimus dorsi (rib eye) muscle between the 12th and 13th rib of a beef carcass. Rib eye area is measured in carcasses that are ribbed (the muscle area is cut and visible between the 12th and 13th ribs) by taking a direct grid reading of the rib eye muscle. When using this method, place the plastic grid on the rib eye and count the dots located within the perimeter of the muscle. Be sure not to count the smaller muscles that surround the rib eye muscle. After counting the dots, divide the total by 10 to calculate the rib eye area in square inches. Rib eye area is an important indicator of muscling. A typical 600-pound carcass should have an 11 square-inch rib eye. Rib eye size will vary with the muscularity of the animal and the carcass weight.

Live Weight – animal's live weight frequently adjusted for distance traveled to the show. Often these adjusts are as follows:
0-10 miles – 3%; 11-20 miles – 2%; 21-50 miles – 1%; 51 plus – 0%

Hot Carcass Weight – carcass weight prior to chilling.

Maturity – physiological maturity of the animal at the time of harvest. Beef carcass grades provide 5 maturity groups (A, B, C, D, and E). "A" indicating carcasses from very young animals and "E" indicating carcasses from very old animals.

Marbling – intramuscular fat or flecks of fat in rib eye muscle. An indication of quality. Moderate (Md.), Modest (Mt), Small (Sm), Slight (Sl), Traces (Tr), Partially Devoid (PD).

Yield Grade – identifies carcasses for differences in cutability. Grades are 1, 2, 3, 4, and 5, with 1 being most desirable. The formula to calculate yield grade includes fat thickness, rib eye area, hot carcass weight, and KPH percent.

Cutability % - is directly related to yield grade and is the percentage of the carcass that will be realized in trimmed, boneless retail cuts from the loin, rib, chuck, and round.

Yield Grade 1.0 = 54.6 Cutability %
Yield Grade 2.0 = 52.3 Cutability %
Yield Grade 3.0 = 50.0 Cutability %
Yield Grade 4.0 = 47.7 Cutability %
Yield Grade 5.0 = 45.5 Cutability %

Literature Cited

Schroeder, T.C., C.E. Ward, J. Mintert and D.S. Peel. "Beef Industry Price Discovery: A Look Ahead." Research Institute on Livestock Pric ing, Research Bulletin I 98, March 1998.

Feuz, Dillon M. "Issues to Consider When Selling Cattle on a Grid or Formula." Neb Guide. June 1998.

Schroeder, Ted C., Ernest E. Davis. "Fed Cattle Grid Pricing." Texas Agricultural Extension Service. L-5245, May 1999.

Black, Jodi P., R. Warren Flood, John Grimes, and Jeanne M. Osborne. "Beef Resource Handbook." Ohio State University Extension. 4-H 117R, 2001.

Hale, Dan. "2002 Beef Quality Challenge." *Beef* Magazine. December 2002.

U.S.D.A. Standards for Grades of Carcass Beef. January 31, 1997.