

Beef Carcass Evaluation

Convergent Ag Media, LLC

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BEEF CARCASS EVALUATION

Beef carcasses are evaluated, commercially sorted and placed in competitive judging events based on their value. The United States Department of Agriculture (USDA) has developed a system unique to bovine species that assists in the large scale value determination of beef carcasses. The value of a beef carcass relies on three things: 1) USDA Quality Grade, 2) USDA Yield Grade and 3) carcass weight. Quality and yield grades are used to sort carcasses into groups for carcass break down. In the beef industry today, most beef carcasses are fabricated at slaughter, vacuum packed as boxed primal and sub primal cuts and sold for dollars per hundred weight (\$/cwt) based on their yield and quality grades.

In the last several decades, carcass uniformity has been a primary focus of beef producers and packers. Physical handling restraints, the design of processing plants and the fact that the dimensions of many bags, boxes and shipping cartons are standardized, having carcasses all the same relative size and weight, benefits the packer. Additionally, the retail and food service segments have guidelines and specifications that call for certain sizes and dimensions that rely on a consistent carcass weight.

Although the size and weight of a carcass determine the total dollar value, the evaluation and ranking of beef carcasses is based on the quality and yield grades. In order to properly assess beef classes, a proper understanding of animal anatomy as well as the USDA Grading system is necessary.

Carcass Anatomy

Before we can begin evaluating carcasses, we must be able to recognize various parts of a carcass and have a basic understanding of carcass anatomy. Many steps are necessary to transform a live animal into a carcass. Slaughter procedures ultimately set the carcass up for break down and fabrication into primals and sub primals. After the blood, feet, hide, head and internal organs are removed, the carcass is split into two sides. Each side contains a round, loin, rib and chuck. Individual beef sides are split between the 12th and 13th ribs in a process called “ribbing.” At this point the carcass can be broken down into quarters. The forequarter contains the chuck, brisket, foreshank, rib and short plate. The hindquarter contains the short loin, sirloin, flank and round. Together, the two forequarters compose approximately 52% of the total carcass weight, while the two hindquarters are approximately 48% of the total carcass weight.

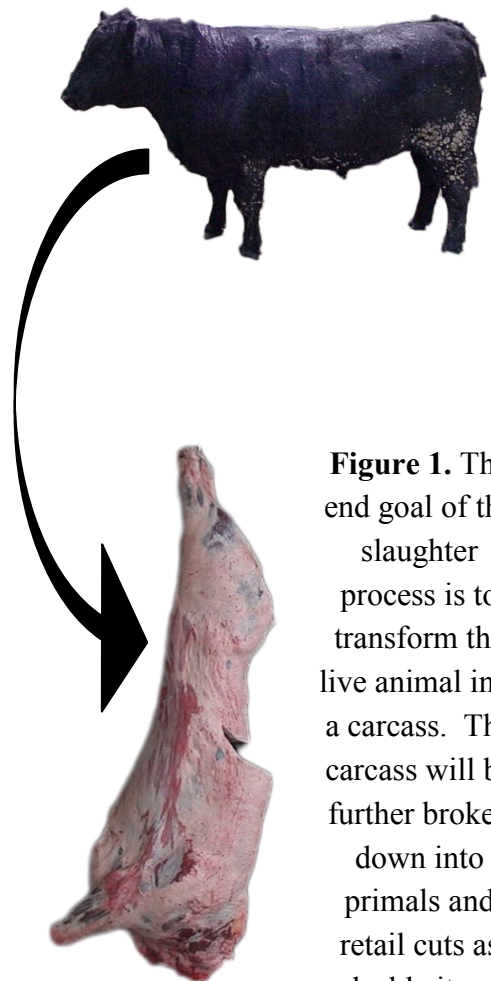
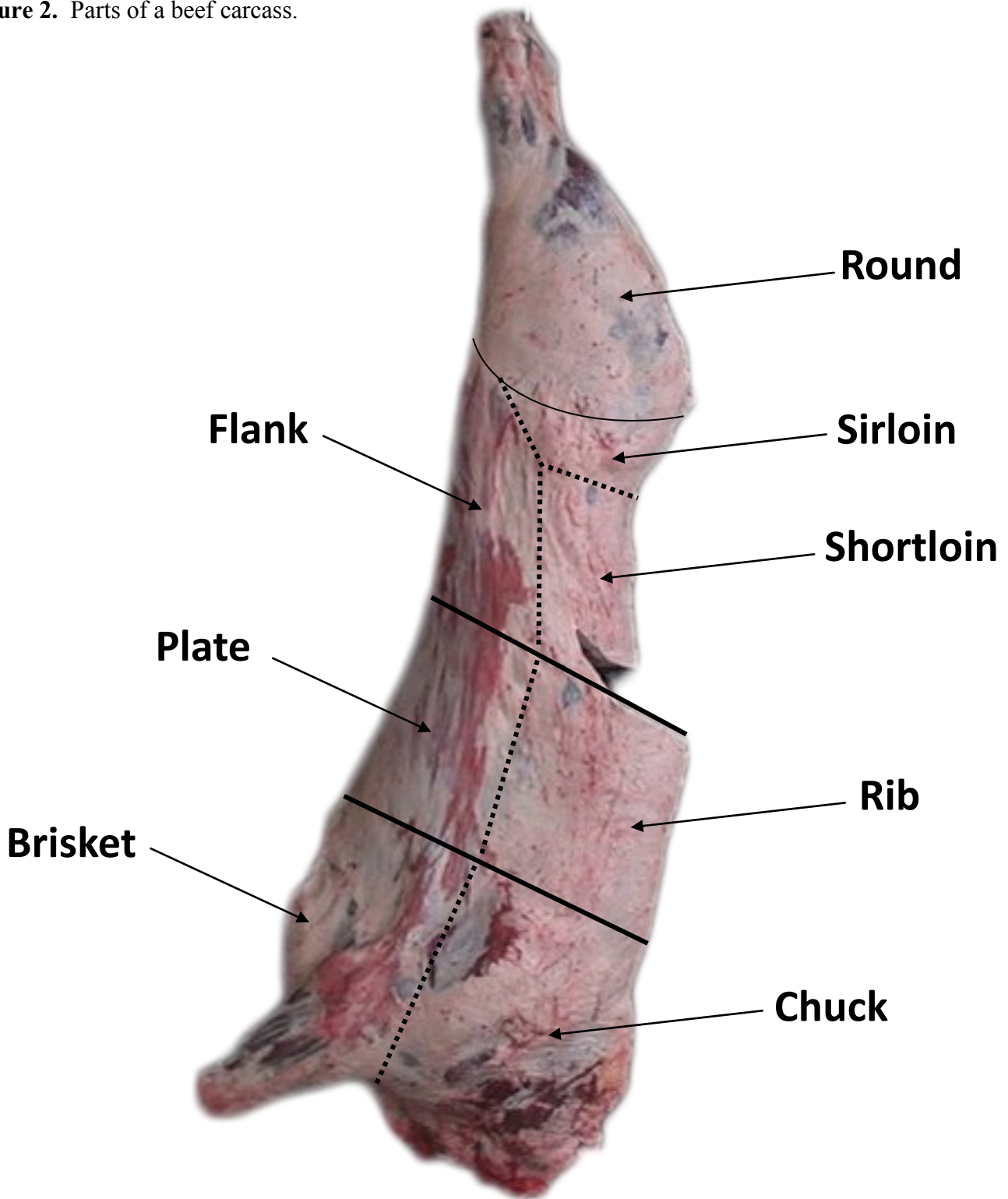


Figure 1. The end goal of the slaughter process is to transform the live animal into a carcass. The carcass will be further broken down into primals and retail cuts as saleable items.

Figure 2. Parts of a beef carcass.



“Before we can begin evaluating carcasses, we must be able to recognize various parts of a carcass and have a basic understanding of carcass anatomy.”

Carcass Grading

Meat grading is often times confused with meat inspection. Meat inspection is a mandatory program conducted by the Food Safety and Inspection Service (FSIS) segment of the USDA. On the other hand, meat grading is an entirely voluntary service conducted by the Agriculture Marketing Service (AMS) of the USDA. Grading segments carcasses into categories based on factors that predict the taste and quantity of meat from carcasses. Quality grades predict palatability, while yield grades predict cutability.

Quality Grading

Quality grading is an evaluation of the characteristics that affects the palatability of the end product. Palatability can be described as the tenderness, juiciness and flavor of a cut of meat. Quality characteristics include the *marbling score, maturity, lean texture, firmness of lean* and *fat* and the *color of the lean and fat*. Quality characteristics, particularly color, effects consumers' purchasing decisions at the retail counter.

Marbling Determination

Marbling is the flecks of *intramuscular* fat, or fat within muscles. Desirable marbling is fine-textured and distributed evenly and uniformly throughout the lean. Evaluation of marbling in beef carcasses is based on the visual appraisal of the amount and distribution of marbling in the ribeye between the 12th and 13th ribs. The marbling in the ribeye at the 12th rib is a good indicator of the marbling throughout the entire carcass.

Marbling scores are divided into ten degrees. Starting with the least amount of marbling and continuing to the greatest amount of marbling, the degrees of marbling are Devoid (D), Practically Devoid (Pd), Traces (Tr), Slight (Sl), Small (Sm), Modest (Mt), Moderate (Md), Slightly Abundant (SlAb), Moderately Abundant (MAb), Abundant (Ab). Each marbling score corresponds with a specific USDA Quality Grade.

Each marbling degree is divided into 100 subunits, however, marbling scores are usually discussed in tenths (i.e. Md²⁰ vs Md⁸⁰). Thus a marbling score can be anything from a Small⁰ to a Small¹⁰⁰. Small¹⁰⁰ has more marbling than a Small⁰ and almost as much marbling as a Mt⁰. Determining marbling scores takes practice and time to be consistent.

Low Quality



A greater amount of marbling within the ribeye is more desirable and ultimately we will rank high quality carcasses above low quality carcasses when placing classes.



High Quality

Maturity Determination

The age of an animal has a significant effect on meat palatability, especially in regard to tenderness. The primary cause of age associated toughening is the reduced solubility of the connective tissue called collagen. As cattle mature, their muscles become progressively tougher and therefore, a young carcass is more desirable than an old carcass.

Maturity is described as the physiological age of the carcass rather than the chronological age. At the time of slaughter, the chronological age of animals is virtually unknown and so other indicators of physiological age are used. The size, shape and ossification of the bones and cartilage as well as lean color help determine maturity. USDA graders will balance skeletal and lean maturity to assign an overall maturity grade to a carcass.

Skeletal Maturity

Skeletal maturity is determined by the extent of ossification in the thoracic, lumbar and sacral vertebra. The vertebral column ossifies from the rear of the animal to the head. Therefore the most ossified bones should be the sacral and the least ossified bones should be the thoracic.

The top part of the thoracic vertebrae, or the dorsal edge, contains a region known as “buttons.” Youthful carcasses have buttons that are still cartilage at the top of each dorsal spinous process. As the animal ages, the buttons ossify or turn to bone and become hard and porous. As a general rule, skeletal maturity can largely be determined using the first three intact buttons on the thoracic vertebrae. Based on the average percentage of ossification present, carcasses can be loosely sorted into the correct maturity class.

The shape and appearance of rib bones are indicators of maturity as well. Youthful animals have rounded, narrow, red rib bones. As the animal gets older, their rib bones flatten and become whiter in color. The loss of red color is due to the loss of the ribs ability to produce red blood cells in more mature animals.

USDA Maturity	% Ossification in Top 3 Thoracic Buttons
A	0-10%
B	10-35%
C	35-70%
D	70-90%
E	>90%

Table 1. Skeletal maturity can be determined using the first three intact buttons on the thoracic vertebrae. Simply average the percentage of ossification present in the first three buttons to find one value to help estimate skeletal maturity.

USDA Maturity	Age- Mo.	Age- Yrs.	Vertebral Column Ossification		
			Sacral	Lumbar	Thoracic
A	0-30	0-2.5	Distinct separation	No ossification	No ossification
B	30-42	2.5-3.5	Completely fused	Nearly complete ossification	Show some ossification
C	42-72	3.5-6	Completely fused	Complete ossification	Moderately ossified
D	72-96	6-8	Completely fused	Complete ossification	Considerable ossification
E	>96	>8	Completely fused	Complete ossification	Completely ossified

Table 2. USDA maturity classifications by chronological age and descriptions of ossification in sacral, lumbar and thoracic vertebrae.

Carcass Grading

Lean Color and Texture

The color and texture of the lean tissue in the ribeye are also used to determine maturity. Just like bone, the color and texture of the lean goes through changes during maturation. While young veal carcasses are a pale, bright, light red color, very mature cattle produce meat that is dark purplish red and very coarse in texture. We describe the ideal color of beef as cherry red.

The texture of lean refers to the number of muscle bundles and the thickness of connective tissue that surrounds individual muscle bundles separating them from other bundles. Finely textured lean contains such a slight amount of connective tissue that few, if any muscle bundles are visible. In coarse lean, the bundles are separated by heavy connective tissue making the muscle bundles very easy to see. Finely textured lean is usually more tender than coarse textured lean.

Overall Maturity

The USDA recognizes five classes of maturity: A, B, C, D and E where A is the youngest and E is the oldest. Carcasses with A and B maturity are considered young carcasses and C, D and E carcasses are considered old, or “hardbones.” Within each maturity class, there are 100 subunits, usually expressed in tenths. Similar to marbling scores a carcass can fall with the same maturity class, but have varied degrees of ossification. For example, a young C⁰ and old C¹⁰⁰ are both still C. Skeletal and lean maturity will be assigned a grade and then the two numbers will be averaged to come up with an overall maturity.

When the skeletal and lean maturities are within 40 units of each other, use a simple average (skeletal + lean = overall): $A^{20} + A^{40} = A^{30}$. If there is greater than 40 units difference, average the difference, but adjust the final maturity 10 units towards the bone: $B^{60} + A^{80} = B^{30}$. However, the lean maturity may never help a carcass with C, D, or E skeletal maturity cross the B/C line and obtain a young carcass designation: $C^{50} + A^{60} = C^{00}$. Additionally, the overall maturity may not be more than one full grade different than the bone maturity: $E^{20} + C^{80} = D^{20}$.

Skeletal Maturity	Lean Maturity	Overall Maturity
A ⁶⁰	A ⁴⁰	A ⁵⁰
A ⁵⁰	A ⁹⁰	A ⁷⁰
C ⁶⁰	B ¹⁰	C ⁰⁰
D ⁶⁰	B ²⁰	C ⁶⁰
E ⁰⁰	B ²⁰	D ⁰⁰

Table 3. Skeletal and lean maturity is balanced to determine the overall maturity of a carcass.

Figure 3. Thoracic buttons are analyzed for any signs of ossification. As the rings indicate, visual analysis begins at the top three thoracic buttons.

Figure 4. Maturity can also be judged by looking at the amount of fusion within the sacral vertebrae.



Determining Final Quality Grade

After marbling and maturity are determined, they are combined to assign the USDA Quality Grade. There are eight USDA beef quality grades that correspond with marbling scores of carcasses with a specific maturity. USDA Prime, Choice, Select and Standard are designated for young beef (A and B) while Commercial, Utility, Cutter and Canner are designated for old beef (C, D and E). Each grade is broken down into high, average and low, with the exception of select which only has high and low. Determination of a young versus an old carcass is crucial in determining the correct overall quality grade as the same quality grades do not apply to young and old carcasses. (NOTE* Carcasses with B maturity are not eligible for either High or Low Select and will be automatically discounted to **High Standard**.)

Degrees of Marbling	Maturity	
	A	B
Abundant	High Prime	High Prime
Moderately Abundant	Average Prime	Average Prime
Slightly Abundant	Low Prime	Low Prime
Moderate	High Choice	High Choice
Modest	Average Choice	Average Choice
Small	Low Choice	High Standard
Slight	High and Low Select	High Standard
Traces	High Standard	High Standard
Practically Devoid	Low Standard	Low Standard

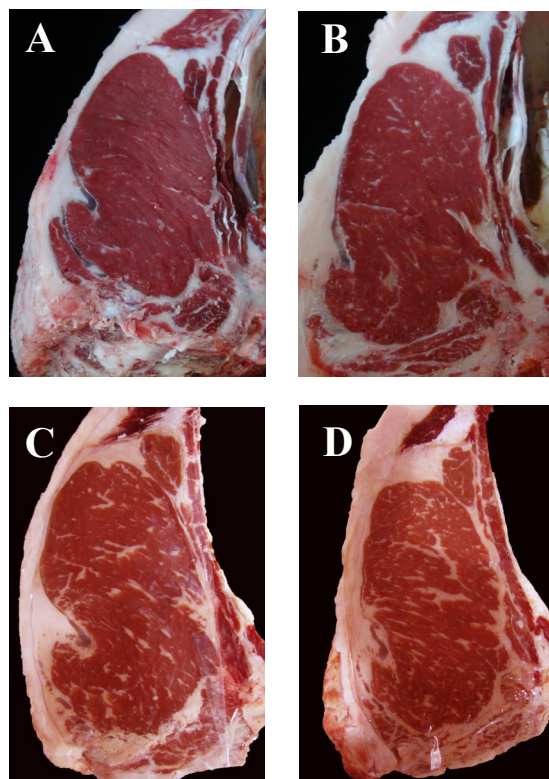


Figure 5. Pictures representing a range of quality grades. A: Select, B: Low Choice, C: Top Choice, D: Prime.

Table 4. Carcasses with A and B maturity are considered “young” and are eligible for USDA Prime, Choice, Select and Standard quality grades.

Quality Grade	Maturity		
	C	D	E
High Commercial	Moderate	Slightly Abundant	Moderately Abundant
Average Commercial	Modest	Moderate	Slightly Abundant
Low Commercial	Small	Modest	Moderate
High Utility	Slight	Small	Modest
Average Utility	Traces	Slight	Small
Low Utility	Practically Devoid	Traces	Slight

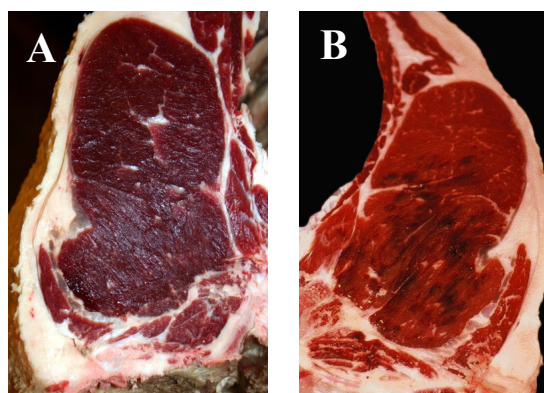


Figure 6. Dark cutters (A) and blood splash (B) are two defects heavily discounted in plants due to severe consumer disapproval.

Table 5. Old carcasses are classified by C, D or E maturity and are placed in USDA Commercial, Utility, Cutter and Canner quality grades.

Yield Grading

Yield grade estimates the amount of boneless, closely trimmed retail cuts from a carcass. In other words, we are estimating the carcass cutability. There are five USDA Yield Grades for slaughter cattle ranging between 1 and 5 with 1 being the leanest and 5 the fattest. USDA Yield Grades are determined with four carcass traits: hot carcass weight, subcutaneous fat or backfat, ribeye area and kidney, pelvic and heart fat.

Similar to quality grading, yield grading can be done by examining the amount of fat at the 12th rib, three quarters of the way up the ribeye from the backbone, as well as the size of the ribeye in the same location. The most critical part of yield grading in judging is the ability to recognize yield grades 4 and 5 as they are heavily discounted and regardless of quality, will be discriminated against in plants.

The following descriptions of the visual characteristics will be useful in identifying carcasses from the varying yield grades.

Yield Grade 1 – A YG 1 carcass will have a thin layer of external fat over the rib, loin, rump and clod with slight deposits of fat in the flank and cod/udder regions. A very thin layer of fat is present over the round, shoulder and neck and “bluing” or the visibility of muscles through fat, is evident on many areas of the carcass including the round and chuck.

Yield Grade 2 – A YG 2 carcass is almost completely covered in fat, but the lean is completely visible through the fat over the round, chuck and neck. There is usually a slightly thin layer of fat present over the loin rib, and inside round, while a slightly thicker layer is present over the rump, hip and clod. Small deposits of fat will be present in the flank and cod/udder regions.

Yield Grade 3 – A YG 3 carcass is usually completely covered in fat with the only lean visible through the fat is the lower portion of the outside round and the neck. A slightly thick layer of fat is present over the round, loin, loin edge and rib with a moderately thick fat layer over the rump, sirloin and clod. Slightly larger deposits of fat are present in the flank and cod/udder regions.

Yield Grade 4 – A YG 4 carcass is usually completely covered in fat. The only visible lean is on the shank, outside plate and flank. A moderately thick layer of fat will be present over the round, loin and rib and a thick layer of fat covers the rump, hip and clod. There are large deposits of fat in the flank and cod/udder region.

Yield Grade 5 – A YG 5 carcass usually has a thick layer of fat over all external regions with extensive fat in the brisket, cod/udder and flank regions.

Table 6. The amount of back fat in inches can be converted to a preliminary yield grade (PYG). The PYG is further adjusted for the hot carcass weight, ribeye area and percent of kidney pelvic and heart fat.

Back fat at 12th Rib (inches)	Preliminary Yield Grade
0.0	2.0
0.1	2.3
0.2	2.5
0.3	2.8
0.4	3.0
0.5	3.3
0.6	3.5
0.7	3.8
0.8	4.0
0.9	4.3
1.0	4.5

Table 7. For every 25 increase in pounds of carcass weight, from the base, ribeye area will increase 0.3 in². REA adjustment = (Expected - Actual REA) * 0.3.

Base Carcass Weight	Expected Ribeye Area
600	11.0
700	12.2
800	13.4
900	14.6
1000	15.8

KPH	Adjustment
2.0%	-0.3
2.5%	-0.2
3.0%	-0.1
3.5%	0.0
4.0%	+0.1

Table 8. KPH adjustments are simply added or subtracted from the PYG according to this chart.



Yield Grade 1



Yield Grade 2



Yield Grade 3



Yield Grade 4



Yield Grade 5

Figure 7. Pictured above are ribeyes of carcasses with increasing numerical yield grades. Trim, heavy muscled carcasses are more desirable and will yield a higher percentage of lean meat.

Example calculation:
 HCW: 850; PYG: 3.4;
 REA: 15.3; KPH: 3.0%.
 REA adj: 14.0-15.3=
 -1.3*0.3= -0.4.

Thus, FYG=3.4 - 0.4 -
 0.1=2.9.

Evaluation of a Class

Evaluation of beef carcasses requires the ability to determine the value of each individual carcass and rank the carcasses accordingly. This is done by quality grading carcasses first, followed by yield grading. Trimness has the greatest influence on yield, followed by muscling. To successfully rank a class of beef carcass, judges must evaluate both quality and cutability for optimum levels and understand the balance between the traits. In some instances, there will be an extremely lean, but low quality carcass or there may be a YG 4 or YG 5 carcass with very desirable marbling. To assist in the decision making process and to help place the correct level of emphasis, we use a simple rule to rank beef carcasses. Beginning with the most desirable carcass and ending with the least, rank carcasses in the following order: USDA Prime, USDA High and Average Choice, USDA Low Choice, USDA Select, YG 4, USDA Standard and YG5. Thus, a YG 2, USDA Select would place above a YG 4, USDA Average Choice.

“Rule of Thumb” for placing carcasses:

1. USDA Prime
2. USDA High and Average Choice
3. USDA Low Choice
4. USDA Select
5. YG 4
5. USDA Standard
6. YG 5

Approaching a Class of Beef Carcasses

In a class of beef carcasses, there will be four carcasses to compare. To accurately place a class, begin by evaluating each carcass individually. An initial evaluation of marbling and maturity must be done to separate the carcasses into categories based on their overall quality grade. Subsequently, a carcass can then be evaluated on cutability or lean yield. Cutability is simply an evaluation of trimness and muscling.

Looking at the marbling and backfat at the cut surface of the 12th rib is the optimal place to begin evaluating. After determining the quality grade of carcasses, trimness and muscling can be analyzed by achieving some distance between you and the exhibits. It is important to look at all sides of the carcass to see differences in the trimness and muscle shape between carcasses. Pairs or groups of exhibits within the same quality grade are sorted by trimness and muscling with higher cutability carcasses sorting up. Utilizing the “rule of thumb” provides a consistent and effective way to accurately place beef carcasses.

Helpful Guidelines for Beef Judging

- ◆ Go with first instincts and place classes early on after time is in
- ◆ Utilize time wisely especially in reasons classes to allow plenty of time to take notes
- ◆ Keep notes organized to assist when answering questions and preparing reasons
- ◆ Remember the “Rule of Thumb” and which characteristics trump each other for final ranking. Begin by sorting on quality
- ◆ During practices and contests, remember to stay focused and positive!

Note Taking

Taking a set of accurate and complete notes is essential to successfully organizing a set of reasons and can even help when answering questions on a class. When evaluating a class, we are considering differences in trimness, muscling and quality between three pairs (top, middle and bottom) with one exhibit going last. Therefore, note cards can be set up in a logical manner with boxes for each of those pairs as well as a space for notes on the last place exhibit.

In each box, a space should be designated for differences in trimness, muscling and quality or T, M and Q. Merits for the pairs should be written on the left, while grants should be filled in on the right. Also recommended for beef carcasses is a grid to record the carcass, weight and quality and yield grade information. The grid should be filled in as quickly as possible to help assist in placing class, but also serves as a study tool when preparing for reasons and questions. Please see page 18 for an example note card.

After a class has been placed, begin by taking notes on the closest pair. This allows ample time to accurately assess the hardest decision and write down the correct details. In time, using abbreviations for terms will conserve space on your note card and each individual can develop their own form of short hand. Additionally, underlining, circling or starring can help indicate areas of importance or signify large differences that need added emphasis.

Lastly, differences in trimness, muscling and quality should be written down in a logical order. When listing out terms, always start at the ribeye and then move from the top of the carcass down. Maintaining term order will make giving reasons simpler and listening to reasons more pleasant.

Trimness, Muscling and Quality Terminology

Trimness

At the **ribeye**
Over the **lower rib**
Over the **round**
Over the **sirloin**
Over the **loin edge**
Over the **rib**
Over the **chuck**
Cod/udder fat
Over the **brisket**
Kidney, pelvic and heart fat

Muscling

Ribeye—larger, shapelier
Round—wider, thicker, plumper, heavier muscled, higher volume
Sirloin—plumper, meatier, fuller
Loin—fuller, wider, meatier
Rib—thicker, fuller
Chuck—thicker, thicker clodded, heavier muscled

Quality

Marbling—higher degree/greater amount, finer texture, evenly distributed
Maturity—Lean color (cherry red) and degree of ossification

Figures 8-11. The following pages contain images of carcass sides and close ups of the corresponding ribeyes. Utilize the carcass data given to help rank the carcasses and take notes for questions and reasons. An example note card is shown to provide one way to organize details while judging. Lastly, there are example reasons and questions provided for further practice.

Figure 8. Carcass 1

HCW: 900

PYG: 4.5

REA: 14.2

KPH: 4.0%

FYG: 4.7

Marbling: Small 80

Maturity: A 00

Quality Grade: Ch-



Figure 9. Carcass 2

HCW: 900

PYG: 3.0

REA: 12.5

KPH: 3.0%

FYG: 3.5

Marbling: Slight 40

Maturity: A 00

Quality Grade: Se-



Figure 10. Carcass 3

HCW: 900

PYG: 2.6

REA: 11.0

KPH: 2.5%

FYG: 3.3

Marbling: Slight 60

Maturity: A 00

Quality Grade: Se+



Figure 11. Carcass 4

HCW: 900

PYG: 3.0

REA: 16.1

KPH: 2.5%

FYG: 2.4

Marbling: Small 50

Maturity: A 00

Quality Grade: Ch-



Example Note Card

Class Name: Beef Carcasses

Placing: 4-3-2-1

4/3—Easy, greater quality, higher premiums

T

M— largest ribeye, heavier muscled round, plumper sirloin, fuller loin and rib, thicker chuck

Q*—higher degree, finer, even distributed marbling

3/2—close pair, trimness advantages

T— ribeye, lower rib, round sirloin, loin edge, rib, chuck, less cod fat, brisket, KPH

M

Q—slightly greater amount of marbling

2/1— Easy, trimmer, higher % trimmed retail cuts

T*—at the ribeye, lower rib, round, sirloin, loin edge, rib, chuck, less cod fat, brisket, less KPH

M

Q

Last— 2

Acknowledge high quality-adequate marbling to grade USDA Low Choice

However, USDA YG 4, fattest wastiest carcass, had excessive fat at the ribeye, lower rib, round, sirloin, loin edge, rib, chuck, cod, brisket, KPH

Yield lowest % trimmed roasts and steaks

3/4

T— at the ribeye, less cod, brisket, less KPH

M

Q

2/3 muscle advantages

T

M— ribeye, thicker, plumper round, meatier sirloin, fuller rib and thicker chuck

Q

1/2 Much higher quality, heavier muscled

T

M—ribeye, higher volume round, plumper, meatier sirloin, thicker loin and rib, heavier muscled chuck

Q— higher degree, finer, even distributed marbling

	HCW	Marb/Mat	PYG	REA	Notes
1	900	Sm 80	4.5	14.2	Easy last!
2	900	Sl 40	3.0	12.5	
3	900	Sl 60	2.6	11.0	
4	900	Sm 50	2.6	16.1	

Reasons

Official Placing: 4-3-2-1

Cuts: 5-2-4

4 easily placed over 3 due to greater quality thus, 4 would demand a higher premium in a value based boxed beef program. 4 was higher quality as indicated by a higher degree of finer, more evenly distributed marbling in the ribeye. Furthermore, 4 was much heavier muscled as shown by clearly the largest ribeye, coupled with a heavier muscled, plumper round and sirloin extending into a fuller loin and rib and a much thicker clodded chuck. I grant 3 displayed less fat at the ribeye, less cod fat, less fat over the brisket combined with less kidney, pelvic and heart fat.

I placed 3 over 2 in a close pair due to trimness advantages. 3 was trimmer as shown by less fat at the ribeye, over the lower rib, round, sirloin, loin edge, rib and chuck along with less cod fat, less fat over the brisket and less kidney, pelvic and heart fat. In addition, 3 revealed a slightly greater amount of more evenly dispersed marbling in the ribeye. I readily admit 3 was heavier muscled as depicted by a larger, shapelier ribeye, thicker plumper round, meatier sirloin, fuller rib as well as a thicker chuck.

I easily placed 2 over 1 as 2 was without a doubt trimmer and would easily yield a higher percentage of trimmed retail cuts. 2 was trimmer as illustrated by far less fat at the ribeye, over the lower rib, round, sirloin, loin edge, rib and chuck, along with less fat in the cod, over the brisket and less kidney and pelvic fat. I immediately concede 2 was higher quality (USDA Low Choice vs USDA Low Select) as clearly depicted by a higher degree of finer, more evenly distributed marbling in the ribeye. Moreover, 1 was heavier muscled as shown by a much larger ribeye, higher volumed round and plumper, meatier sirloin extending into a wider, thicker loin and rib, combined with a heavier muscled chuck.

I acknowledge 1 revealed adequate marbling to grade USDA Low Choice. Nonetheless, 1 was clearly the fattest, wastiest carcass (USDA Yield Grade 4) in the class as indicated by an excessive amount of fat at the ribeye, over the lower rib, round, sirloin, loin edge, rib and chuck, coupled with the absolute most cod fat, fat over the brisket and kidney and pelvic fat. Therefore, 1 would easily yield the lowest percentage of trimmed roasts and steaks and thus, placed last.

Sample Questions

1. How many carcasses graded USDA Choice or better?
2. Which carcass calculates the lowest numerical yield grade?
3. Between carcasses 2 and 3, which carcass has trimness advantages over the fore and hind quarter?
4. Between carcasses 2 and 3, which carcass possessed the larger ribeye, higher volume round and thicker rib and chuck?
5. How many carcasses would be ineligible for a Top Choice boxed beef premium program?
6. Which carcasses displayed the largest ribeye?
7. Which carcass revealed the absolute least amount of coarse marbling?
8. How many carcasses graded USDA Select?
9. 1-Y/2-N: Where there any hard bones in the class?
10. 1-Y/2-N: Where any carcasses ineligible to receive a USDA Select Quality Grade?
11. Which carcass is expected to yield the lowest percentage of boneless, closely trimmed retail cuts?
12. Between carcasses 2 and 3, which carcass revealed a greater amount of evenly distributed marbling in the ribeye?
13. Which carcass was the lightest muscled as shown by the smallest ribeye, narrowest round and flattest rib and chuck?
14. Which carcasses is the best combination of quality and cutability and would have the highest consumer appeal?
15. 1-Y/2-N: Did any of the carcasses exhibit blood splash in the ribeye?

Answers: 1. 2; 2. 4; 3. 3; 4. 2; 5. 4; 6. 4; 7. 2; 8. 2; 9. 2; 10. 2; 11. 1; 12. 2; 13. 3; 14. 4; 15. 2

