

ANIMAL HUSBANDRY NO. 18-1973 RICHARD J. EPLEY

Beef consumers are often interested in buying a side of beef or a whole beef carcass to reduce the meat bill. Frequently, however, the consumer has little understanding of why two sides of the same hanging weight can yield considerably different amounts of cut and wrapped beef. Buying a side of beef can be a "money-saving" or "money-losing" proposition depending upon carcass or side retail yields and purchase cost.

It is important to recognize that yields should be computed on a percentage basis. Calculating percent retail yield is important since hanging weights of carcasses can vary from 400 to 800 pounds, depending upon the size of the animal from which the carcass was derived.

$$\text{Percent retail yield} = \frac{\text{weight of trimmed and packaged cuts}}{\text{weight of the hanging side or carcass}} \times 100$$

Why Yields Vary

Cutting and trimming procedures influence the percent retail yield. When fat and bone are removed from the carcass and its cuts, the percent retail yield decreases.

Deposits of fat in excess of 3/8 to 1/2 of an inch are normally trimmed off of retail cuts prior to wrapping. Thus if an animal had very little fat, little or no fat would have to be trimmed from the retail cuts of that carcass. However, some animals contain excessive amounts of external and body cavity fats. Animals vary in their fatness because of their genetic ability to fatten, consistent with how much feed they have been fed. Also, as the animal and its carcass become heavier, more fat is usually deposited externally and especially between the muscles (seam fat).

The percent bone in a carcass is relatively constant. Animals with dairy breeding will generally yield carcasses that contain one to two percentage units more bone than the conventional beef breeds.

Muscling is an important factor in determining the percent retail yield of a beef carcass. Genetic make-up is one reason why animals vary in their muscle:bone ratio. As the area of the rib eye increases, the percent retail yield also increases.

How Much Yields Vary

With the exception of variances in cutting and trimming procedures, percent retail yield can be closely estimated by determining the U.S.D.A. yield grade of a beef carcass. The yield grades take into account the fat thickness over the rib eye, the percent kidney, pelvic, and heart fat, the hot carcass weight, and the rib eye area. See figure 1 for illustrations of two different yield grades.

Yield grades are determined for carcasses by U.S.D.A. meat graders at federally inspected packing plants. However, the grading is voluntary so the locker plant from which you buy a side of beef may or may not choose to buy yield graded carcasses from the packer. If the side of beef you wish to buy is not yield graded, ask the locker operator to estimate the yield grade or help him estimate it. Yield grade is determined by the following formula: Yield grade = 2.5 + (2.50 x adjusted fat thickness, inches) + (0.20 x percent kidney, pelvic, and heart fat) + (0.0038 x hot carcass weight, pounds) - (0.32 x ribeye area, square inches). Adjusted fat thickness is measured over the

Buying a Side of Beef

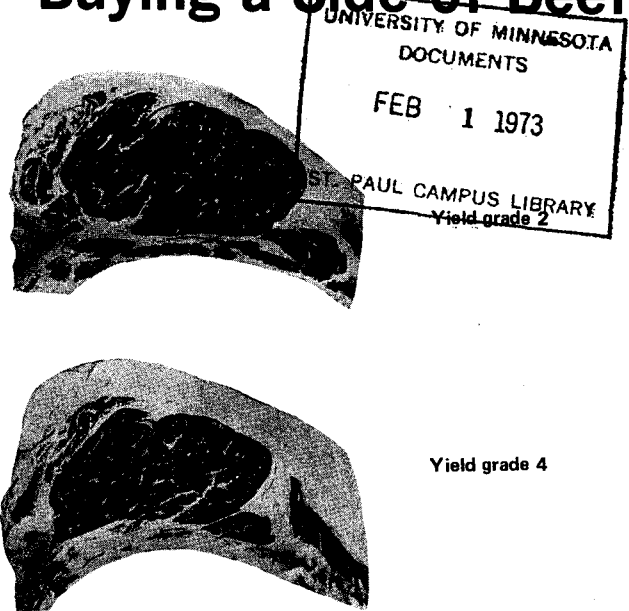


Figure 1. Rib from yield grade 2 and yield grade 4 carcasses. Note differences in fat thickness and ribeye area. Both are within Choice quality grade.

ribeye at a point 3/4 the distance of the ribeye from the chine bone end. Percent kidney, pelvic, and heart fat of the hot carcass weight is subjectively evaluated. Multiply cold carcass (hanging) weight by 1.02 to obtain an estimate of hot carcass weight. Ribeye area can be estimated by using a plastic grid or by actually tracing the area of the longissimus muscle (exposed at the 12-13 rib) on acetate paper and computing the square inches with the use of a polar planimeter.

The usefulness of yield grades is that they predict the percent retail yield of a carcass or side before that carcass or side is cut and wrapped. Table 1 reveals that carcasses of different yield grades have different percent retail yields as follows:

| Yield Grade | % Retail Yield |
|-------------|----------------|
| 1 | 82.0 |
| 2 | 77.4 |
| 3 | 72.8 |
| 4 | 68.2 |
| 5 | 63.6 |

How to Compare Costs

Cattle or beef carcasses of yield grade 1 or 2 will cost more per pound hanging weight than carcasses of yield grade 4 or 5. One can expect a higher percent retail yield from yield grade 1 or 2 but they do cost more than yield grade 4 or 5, so it is important to calculate how much more yield you get for the extra price you pay. Each total percent retail yield for each yield grade remains constant (except for variation in cutting and trimming procedures from plant to plant) but price per pound of hanging weight varies from day to day as the wholesale price of beef varies. Make the following calculation each time you are shopping for a side of beef.

To figure total retail value per 100 pounds of hanging weight, multiply the average retail price of the various cuts (including sale

priced items) times the percent each cut makes up of the hanging weight for a particular yield grade (see table 1) then add the

values. A comparison of the retail value calculations for a yield grade 2 carcass and a yield grade 4 carcass is as follows:

| Retail cut | Retail price per pound | Yield grade 2 | | | Yield grade 4 | | | | | |
|-----------------------------|------------------------|--------------------|--------------------|------------------------|--------------------------------|--------------------|---|---------------|---|--------------------------------|
| | | Percent of carcass | Value/cwt. carcass | Retail price per pound | Percent of carcass | Value/cwt. carcass | | | | |
| Rump, boneless | \$ 1.44 | X | 3.5% | = | \$ 5.04 | \$ 1.44 | X | 3.1% | = | \$ 4.45 |
| Inside round, boneless | 1.60 | X | 4.5% | = | 7.20 | 1.60 | X | 3.7% | = | 5.92 |
| Outside round, boneless | 1.50 | X | 4.6% | = | 6.90 | 1.50 | X | 4.2% | = | 6.30 |
| Round tip, boneless | 1.52 | X | 2.6% | = | 3.95 | 1.52 | X | 2.4% | = | 3.65 |
| Sirloin, bone-in | 1.54 | X | 8.7% | = | 13.40 | 1.54 | X | 7.9% | = | 12.16 |
| Short loin, bone-in | 1.81 | X | 5.2% | = | 9.41 | 1.81 | X | 5.0% | = | 9.05 |
| Blade chuck, bone-in | .75 | X | 9.4% | = | 7.05 | .75 | X | 8.4% | = | 6.30 |
| Rib, short cut (7") bone-in | 1.37 | X | 6.2% | = | 8.49 | 1.37 | X | 6.0% | = | 8.22 |
| Chuck, arm boneless | 1.05 | X | 6.1% | = | 6.41 | 1.05 | X | 5.5% | = | 5.78 |
| Brisket, boneless | 1.24 | X | 2.3% | = | 2.85 | 1.24 | X | 1.9% | = | 2.36 |
| Flank steak | 1.74 | X | .5% | = | .87 | 1.74 | X | .5% | = | .87 |
| Lean trim | .96 | X | 11.3% | = | 10.85 | .96 | X | 9.3% | = | 8.93 |
| Ground beef | .75 | X | 12.2% | = | 9.15 | .75 | X | 10.0% | = | 7.50 |
| Kidney | .45 | X | .3% | = | .14 | .45 | X | .3% | = | .14 |
| Fat | .02 | X | 12.7% | = | .25 | .02 | X | 22.9% | = | .46 |
| Bone | .01 | X | 9.9% | = | .10 | .01 | X | 8.9% | = | .09 |
| TOTAL | | | 100.0% | | \$92.06 (or \$0.92/lb.) | | | 100.0% | | \$82.18 (or \$0.82/lb.) |

If you could buy a side of beef for less than the calculated figure for its yield grade, you would be dollars ahead. If you don't get the kidney, fat, and bone, subtract that value from the total retail value. Also remember that it is possible for a carcass to be fatter than yield grade 5, although 5 is as high as the official grades go.

Cutting, wrapping, and freezing costs are usually included in the price per pound of hanging weight quoted to you. Check this detail out to make sure. Frozen locker storage cost is almost always extra.

Quality Considerations

Within each yield grade there can be variations in quality of the lean as designated by quality grades of Prime, Choice, Good, and Standard. Quality grade is also voluntary and is determined at the same time the yield grade is. Marbling or specs of fat within the lean is the primary determinate of the quality grade because marbling contributes to flavor and juiciness. Prime has more marbling than Choice and Choice has more than Good.

There are 15 combinations of yield and quality grades one can normally choose from:

| | | |
|--|---|---|
| Yield 1—Prime high yielding, usually excellent flavor | Yield 1—Choice | Yield 1—Good high yielding, usually lower flavor |
| Yield 2—Prime | Yield 2—Choice | Yield 2—Good |
| Yield 3—Prime | Yield 3—Choice average in yield and flavor | Yield 3—Good |
| Yield 4—Prime | Yield 4—Choice | Yield 4—Good |
| Yield 5—Prime low yielding, usually excellent flavor | Yield 5—Choice | Yield 5—Good low yielding, usually lower flavor |

Storage

Fresh beef should be stored in the freezer at 0° F. or lower for no longer than 9 months. Rancidity may develop if stored for longer lengths of time. Rewrap any packages that you notice are torn to prevent air from coming in contact with the beef.

Table 1. Yield of Retail Cuts as Percent of Carcass Weight for Choice Beef by Yield Grades*

| Retail cut** | Yield grade 1 | Yield grade 2 | Yield grade 3 | Yield grade 4 | Yield grade 5 |
|---|---------------|---------------|---------------|---------------|---------------|
| Rump, boneless | 3.7 | 3.5 | 3.3 | 3.1 | 2.9 |
| Inside round, boneless | 4.9 | 4.5 | 4.1 | 3.7 | 3.3 |
| Outside round, boneless | 4.8 | 4.6 | 4.4 | 4.2 | 4.0 |
| Round tip, boneless | 2.7 | 2.6 | 2.5 | 2.4 | 2.3 |
| Sirloin, bone-in | 9.1 | 8.7 | 8.3 | 7.9 | 7.5 |
| Short loin, bone-in | 5.3 | 5.2 | 5.1 | 5.0 | 4.9 |
| Blade chuck, bone-in | 9.9 | 9.4 | 8.9 | 8.4 | 7.9 |
| Rib, short cut (7"), bone-in | 6.3 | 6.2 | 6.1 | 6.0 | 5.9 |
| Chuck, arm boneless | 6.4 | 6.1 | 5.8 | 5.5 | 5.2 |
| Brisket, boneless | 2.5 | 2.3 | 2.1 | 1.9 | 1.7 |
| Flank steak | .5 | .5 | .5 | .5 | .5 |
| Lean trim | 12.3 | 11.3 | 10.3 | 9.3 | 8.3 |
| Ground beef | 13.3 | 12.2 | 11.1 | 10.0 | 8.9 |
| Kidney | .3 | .3 | .3 | .3 | .3 |
| TOTAL PERCENT SALEABLE RETAIL CUTS** | 82.0 | 77.4 | 72.8 | 68.2 | 63.6 |
| FAT | 7.6 | 12.7 | 17.8 | 22.9 | 28.0 |
| BONE | 10.4 | 9.9 | 9.4 | 8.9 | 8.4 |
| TOTAL | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

*Courtesy of Arthur W. Stevens, U.S.D.A., Agricultural Marketing Service, Livestock Division, Standardization Branch, Washington, D.C. 20250.

**Retail cuts are boneless except for the sirloin, short loin, blade chuck, and short cut rib. External fat in excess of 1/2 inch and seam fat in excess of 1/4 inch was removed.